

ANNUAL REVIEW

for the period
1 July 2018 to 30 June 2019

FINAL

September 2019





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for the period
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Prepared by
Umwelt (Australia) Pty Limited
on behalf of
Walker Quarries Pty Ltd

Project Director: Alex Irwin
Project Manager: Alex Irwin
Report No. 4433/R14
Date: September 2019



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Document Status

Rev No.	Reviewer		Approved for Issue	
	Name	Date	Name	Date
Final	Robyn Provost	30/09/2019	Alex Irwin	30/09/2019

TITLE BLOCK

Name of operation	Wallerawang Quarry
Name of operator	Walker Quarries Pty Ltd
Development consent/project approval #	DA 344-11-2001
Name of holder of development consent/project approval	Walker Quarries Pty Ltd
Mining Lease #	ML 1633
Name of holder of mining lease	Walker Quarries Pty Ltd
Water licence #	N/A
Name of holder of water licence	N/A
MOP/RMP start date	15 May 2018
MOP/RMP end date	15 December 2020
Annual Review start date	1 July 2018
Annual Review end date	30 June 2019
<p>I, Paul Hensley, certify that this audit report is a true and accurate record of the compliance status of the Wallerawang Quarry for the period 1 July 2018 to 30 June 2019 and that I am authorised to make this statement on behalf of Walker Quarries Pty Ltd.</p> <p><i>Note</i></p> <p>a) <i>The Annual Review is an 'environmental audit' for the purposes of section 122B(2) of the Environmental Planning and Assessment Act 1979. Section 122E provides that a person must not include false or misleading information (or provide information for inclusion in) an audit report produced to the Minister in connection with an environmental audit if the person knows that the information is false or misleading in a material respect. The maximum penalty is, in the case of a corporation, \$1 million and for an individual, \$250,000.</i></p> <p>b) <i>The Crimes Act 1900 contains other offences relating to false and misleading information: Section 192G (Intention to defraud by false or misleading statement – maximum penalty 5 years imprisonment); Section 307A, 307B and 307C (false or misleading application/information/documents – maximum penalty 2 years imprisonment or \$22,000, or both).</i></p>	
Name of authorised reporting officer	Paul Hensley
Title of authorised reporting officer	Director and Compliance Manager
Signature of authorised reporting officer	
Date	30 September 2019

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1.0 Statement of Compliance

The Statement of Compliance comprises **Table 1.1** and **Table 1.2** below and reflects the non-compliance that occurred as a result of activities during the reporting period.

Table 1.1 Statement of Compliance

Were all conditions of the relevant approval(s) complied with?	Yes/No
DA 344-11-2001	No
ML 1633	Yes
EPL 13172	Yes

Table 1.2 Non-compliances

Condition	Condition Description (summary)	Compliance Status	Comment	Section Where Addressed
DA 344-11-2001 Schedule 3 Condition 4	The Applicant must carry out noise monitoring (at least every 3 months or as otherwise agreed with the Secretary)	ANC	The Noise management Plan requires noise monitoring every six months. The period in between monitoring during the reporting period was 7 months and 5 days.	Section 6.3 Section 11.3
DA 344-11-2001 Schedule 5 Condition 8	The CCC must be operated in general accordance with the Department's CCC Guidelines.	ANC	Community Consultative Committee Meeting Minutes for June 2019 not provided on Walker Quarries website.	Section 9.1 Section 11.3

Table 1.3 Compliance Status Key

Risk Level	Colour Code	Description
High	Non-compliant	Non-compliance with potential for significant environmental consequences, regardless of the likelihood of occurrence.
Medium	Non-compliant	Non-compliance with: <ul style="list-style-type: none"> Potential for serious environmental consequences, but is unlikely to occur; or Potential for moderate environmental consequence but is likely to occur.
Low	Non-compliant	Non-compliance with: <ul style="list-style-type: none"> Potential for moderate environmental consequences, but is unlikely to occur; or Potential for low environmental consequences but is likely to occur.
Administrative non-compliance	Non-compliant	Only to be applied where the non-compliance does not result in any risk of environmental harm (e.g. submitting a report to government later than required under approval conditions).

2.0 Introduction

2.1 Scope and Format

This Annual Review has been prepared for the Wallerawang Quarry (the Quarry) in accordance with the requirements of Condition 5(12) of Development Consent DA 344-11-2001 (DA 344-11-2001). The Quarry is operated by Walker Quarries Pty Ltd (Walker Quarries), a wholly owned subsidiary company of Sitegoal Pty Ltd, and is located approximately 8 kilometres (km) north-west of Lithgow (**Figure 2.1**). This report documents the works undertaken and environmental performance from 1 July 2018 to 30 June 2019 (the reporting period).

DA 344-11-2001 was granted by the Minister for Infrastructure and Planning on 19 October 2004, and was modified (MOD 1) on 25 August 2017 to regularise several constructed components of the Quarry and formalise the approval of production of a more extensive range of quarry products. On 7 December 2018, DA 344-11-2001 was modified (MOD 2) to extend the operation of the Quarry to 15 July 2020.

A copy of Schedule 5 of DA 344-11-2001 is provided in **Appendix 1**. Condition 5(12) of Development Consent DA 344-11-2001 is reproduced below.

“By the end of September each year, or other timing as may be agreed by the Secretary, the Applicant must submit a review to the Department reviewing the environmental performance of the development to the satisfaction of the Secretary. This review must:

a) describe the development (including any progressive rehabilitation) that was carried out in the previous financial year, and the development that is proposed to be carried out over the current financial year;

b) include a comprehensive review of the monitoring results and complaints records of the development over the previous financial year, which includes a comparison of these results against the:

– relevant statutory requirements, limits or performance measures/criteria;

– requirements of any plan or program required under this consent;

– monitoring results of previous years; and

– relevant predictions in the documents listed in condition 2(a) of Schedule 2;

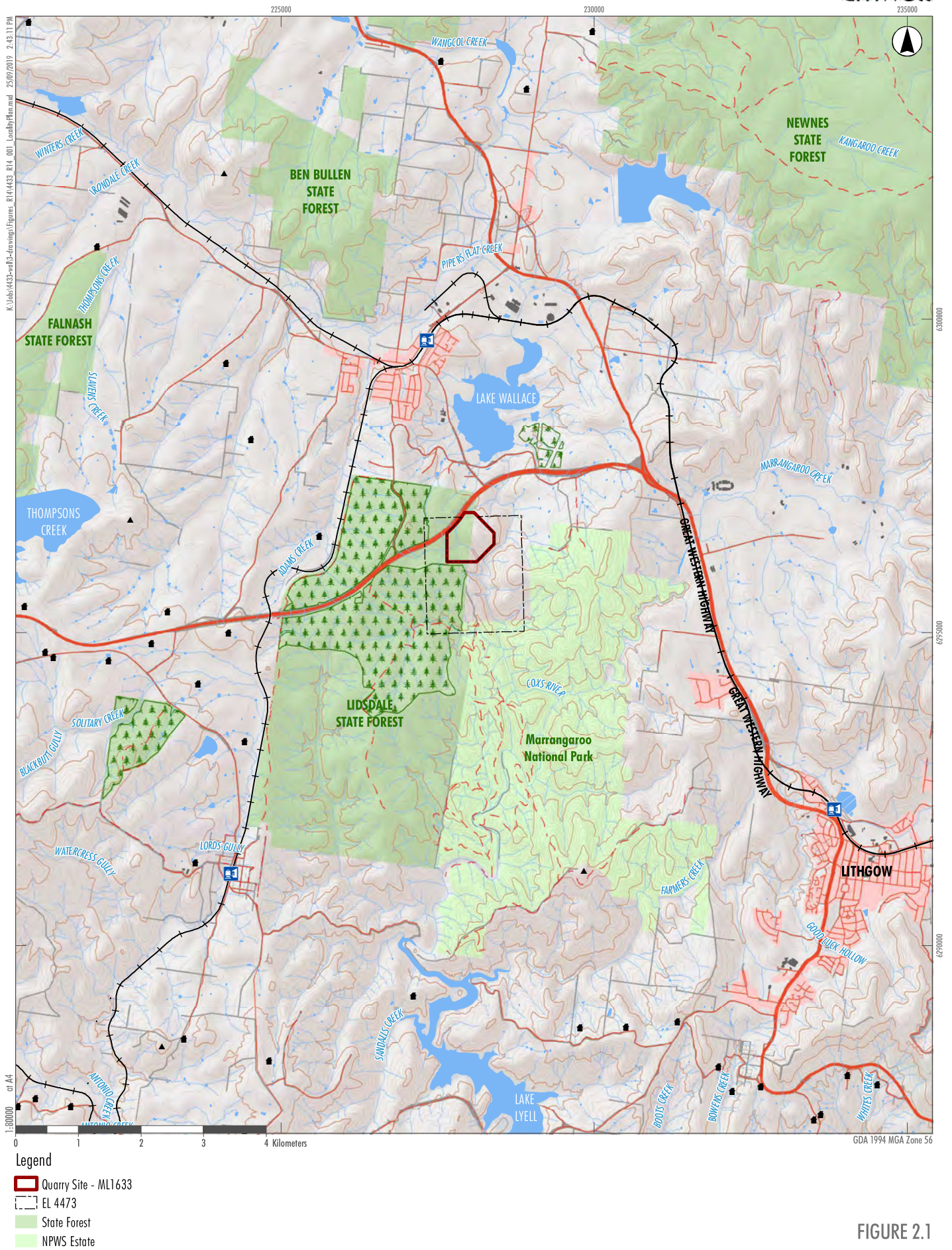
c) identify any non-compliance over the past financial year, and describe what actions were (or are being) taken to ensure compliance;

d) identify any trends in the monitoring data over the life of the development;

e) identify any discrepancies between the predicted and actual impacts of the development, and analyse the potential cause of any significant discrepancies; and

f) describe what measures will be implemented over the current [financial/calendar] year to improve the environmental performance of the development.”

The information presented within this Annual Review has been prepared based on information compiled by Umwelt (Australia) Pty Limited (Umwelt) and provided by Walker Quarries, as well as an inspection of the Quarry undertaken by Umwelt (Australia) Pty Limited (Umwelt) on 30 August 2018. This Annual Review adheres to the format and content requirements identified in the Annual Review Guideline of the Department of Planning, Infrastructure and Environment (DPIE) Post-approval requirements for State significant mining developments dated October 2015. It should also be noted that this Annual Review has been prepared based upon the approval and licencing requirements applicable following modification of DA 344-11-2001 on 7 December 2018.



2.2 Walker Quarries

Sitegoal Pty Ltd was formed in 1994 to identify and develop mineral resources in New South Wales. Walker Quarries Directors maintain a hands-on management style and are either Lithgow or Sydney based.

Walker Quarries Pty Ltd was created to carry out mining, processing, transport and other ancillary activities at the Wallerawang Quarry and remains a wholly owned subsidiary of Sitegoal Pty Ltd. Walker Quarries Pty Ltd is committed to operating the Quarry in a manner that complies with relevant environmental legislation and is environmentally responsible.

2.3 Overview of Operations

2.3.1 Approved Activities

The approved activities at the Quarry comprise the following (**Figure 2.2**).

- Development and use of an extraction area to extract quartzite using conventional drill and blast, load and haul methods.
- Construction and use of stockpile areas for storage of extracted and processed material.
- Use of mobile processing plant to process extracted material by crushing, screening and washing, to produce a range of aggregates, pebbles and sand. Crushing to produce coarse aggregates is currently undertaken within the void space created by the extraction area. Washing and screening to produce finer aggregates and sand is undertaken on Main Stockpile Area 1 to the immediate west of the Extraction Area.
- Construction and use of an access road and haul roads, and an intersection with the Great Western Highway.
- Transportation of up to 500 000 t per year of quarry products via the Great Western Highway using predominantly truck and dog and B-Double trucks.

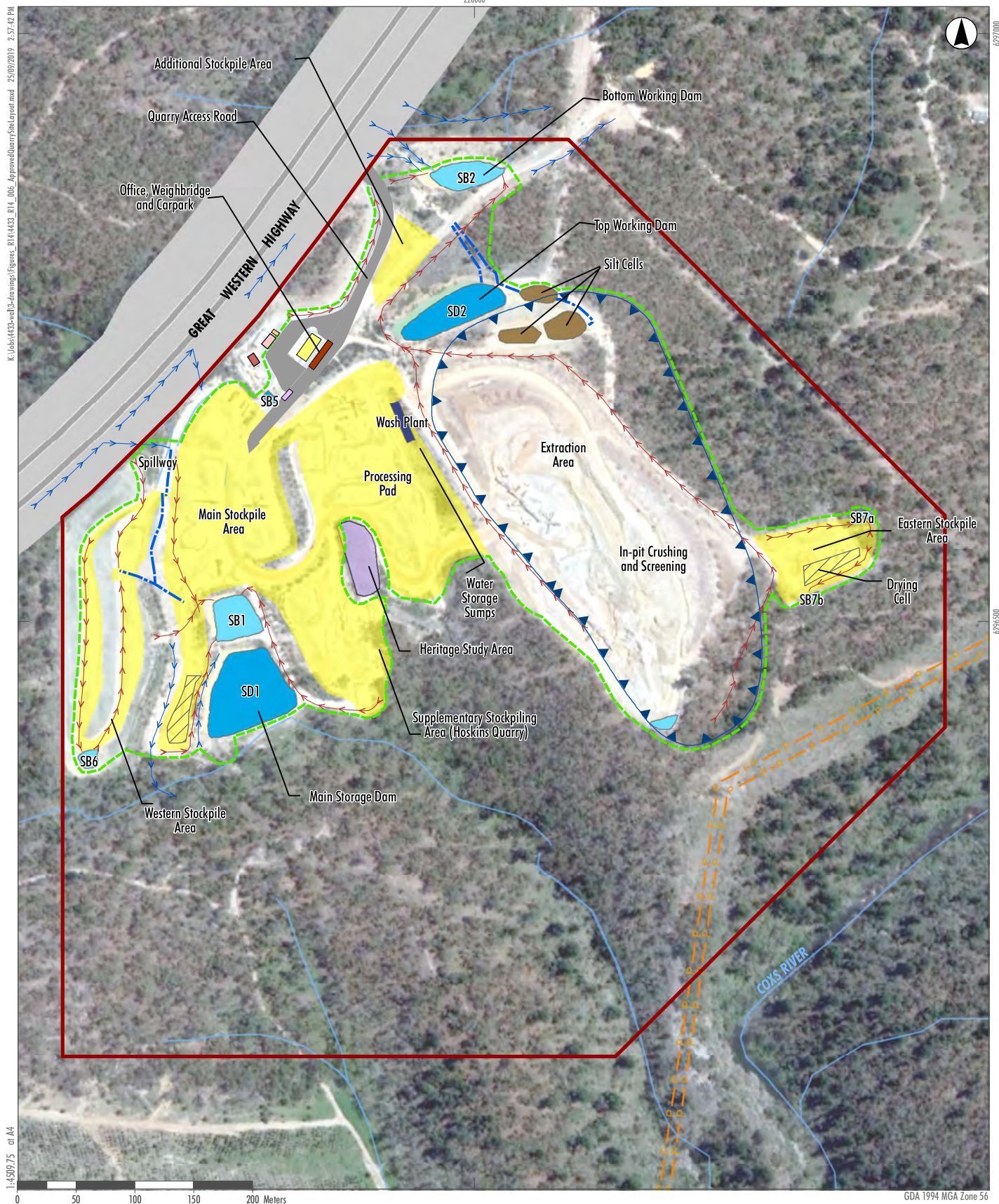
2.3.2 Hours of Operation

The approved hours of operation are outlined in **Table 2.1**.

Table 2.1 Hours of Operation

Activity	Hours
Quarrying operations	<ul style="list-style-type: none"> • 7.00 am to 6.00 pm Monday to Friday • 8.00 am to 1.00 pm Saturday
Loading and dispatch of trucks	Any time, provided activities comply with specified noise criteria
Blasting	<ul style="list-style-type: none"> • 9.00 am to 5.00 pm Monday to Friday • 9.00 am to 1.00 pm Saturday
Maintenance	Any time, provided activities are inaudible at privately-owned residences

All activities during the reporting Period were undertaken within the approved hours of operation.



Legend

- Quarry Site - ML1633
- ▶ Approved Extraction Area
- Approved Area of Disturbance
- Drying Cell
- Sealed Quarry Access Road and Carpark
- Stockpile Area
- Sediment Basin
- Silt Cell
- Storage Dam
- Water Storage Sumps
- Clean Water Drain
- Dirty water drain
- Water Pipeline
- Electricity Transmission Lines
- Heritage Study Area

FIGURE 2.2

Approved Quarry Site Layout

2.3.3 Employment

The Quarry currently employs five management staff and nine equipment operators. Employment is expected to remain the same during the next reporting period.

2.4 Key Personnel Contact Details

The key personnel contact names, position and phone numbers are listed in **Table 2.2**.

Table 2.2 Key Personnel Contact Details

Name	Position	24 Hour Contact
Paul Hensley	Managing Director/Compliance Manager	0418 680 022
Trevor Hoffman	Operations Manager	0417 663 222
Johann van der Merwe	Quarry Manager	0413 784 420

2.5 Management of Document Preparation

This document has been prepared by Ms Robyn Provost (B.Sc. (Hons)), Environmental Scientist. The document was reviewed by Mr Alex Irwin (B.Sc. (Hons)), Principal Environmental Consultant, both with Umwelt. Both Ms Provost and Mr Irwin completed the site inspection of 30 August 2019 noted in **Section 2.1**.

Mr Johann Van der Merwe, Quarry Manager and Mr Paul Hensley (M.E., B.E.) Director/Compliance Manager, Walker Quarries, provided technical input and information on Quarry operations and environmental performance during the reporting period. Mr van der Merwe was present during the site inspection and was assisted during the inspection by Mr Paul Quinn.

3.0 Approvals

Table 3.1 presents the approvals and licences held in relation to the Quarry.

Table 3.1 Wallerawang Quarry – Approvals, Leases and Licences

Consent/Lease/Licence	Issue Date	Expiry Date	Details/Comments
Development Approval DA 344-11-2001	19/10/2004 Modified 25/8/2017 (MOD 1) Modified 7/12/2018 (MOD 2)	15/7/2020	Issued by the Minister for Planning
Development Approval DA019/18	28/2/2018	28/2/2023	Issued by Lithgow City Council for demountable office buildings
Environment Protection Licence EPL 13172	21/10/2012 Last varied 23/1/2018	-	Issued by the Environment Protection Authority
Mining Lease 1633	15/7/2009	15/7/2040	Issued by the Minister for Mineral Resources

As identified in **Table 3.1** and noted in **Section 2.1**, MOD 2 (of DA 344-11-2001) was issued under delegation by the Minister for Planning on 7 December 2018 to extend the period of consent to July 2020.

Also during the reporting period, Walker Quarries lodged an application for a third modification (MOD 3) to extend the extraction area and increase the area available for stockpiling to the south-west and south of the Western Stockpile Area. The application was submitted on 28 June 2018.

In addition to the approvals and licences listed in **Table 3.1**, Walker Quarries retains a Compensation Agreement with Forestry Corporation of NSW (FC NSW) which allows Walker Quarries to operate within an area of Lidsdale State Forest on Lot 7322 DP1149335 and Lot 7071 DP1201227. In a submission to the proposed modification to DA 344-11-2001 (MOD 3), FC NSW have noted no objection to the proposed extension of operations within Lidsdale State Forest, subject to the continuation and enforcement of the existing Compensation Agreement and avoidance of their softwood plantation harvesting operations.

Table 3.2 presents the documentation used by Quarry management to guide day-to-day operations at the Quarry. All management plans are regularly reviewed in accordance with Condition 5(3), with the last review undertaken following the approval of MOD 2. An extension to the term of the Mining Operations Plan (MOP) was granted by the Department of Planning & Environment – Resources Regulator on 14 January 2019 to reflect the extended period of approved operations under DA 344-11-2001.

Table 3.2 Quarry Documentation

Document Title (date)	Date Approved
Supporting Documentation for DA 344-11-2001	
Environmental Impact Statement Proposed Wallerawang Quarry (13/11/2001)	19/10/2004
Supplementary Report to the Environmental Impact Statement Proposed Wallerawang Quarry (July 2002)	
Environmental Assessment for Modification to Operations at the Wallerawang Quarry (DA 344-11-2001) (MOD 1) (4/5/2017)	25/8/2017
Statement of Environmental Effects for Proposed Modification No 2 (MOD 2) to DA 344-11-2001 (Wallerawang Quarry) (October 2018)	7/12/2018
Wallerawang Quarry Modification 3 Statement of Environmental Effects (MOD 3) (28/6/2018)	Pending approval
Supporting Documentation for ML 1633	
Mining Operations Plan (incorporating a Rehabilitation Management Plan)	8/5/2018 (extension to term approved on 14 January 2019)
Environmental Management Plans (date)	
Environmental Management Strategy (April 2019)	3/4/2019
Rehabilitation Management Plan (March 2018) ¹	8/5/2018 (extension to term approved on 14 January 2019)
Noise Management Plan (April 2019)	3/4/2019
Blast Management and Explosives Control Plan (April 2019)	3/4/2019
Air Quality Management Plan (April 2019)	3/4/2019
Biodiversity Management Plan (April 2019)	8/4/2019
Soil and Water Management Plan (April 2019)	3/4/2019
Environmental Monitoring Program (April 2019)	N/A ²
Bushfire Management Plan (February 2019)	6/3/2019 ³
Pollution Incident Response Management Plan	15/8/2019
Biodiversity Offset Strategy	13/7/2018

Note 1: The Rehabilitation Plan has been incorporated into the Mining Operations Plan

Note 2: Approval for the Environmental Monitoring Program is not required.

Note 3: The Department of Planning & Environment confirmed on 6/3/2019 that endorsement of this document by the NSW Rural Fire Service was unable to be obtained and confirmed that compliance with the conditional requirement (Condition 3(40)) was satisfied.

4.0 Operations Summary

4.1 Introduction

Figure 4.1 presents an overview of the Quarry layout at the end of the current reporting period. The only changes to the layout expected during the next reporting period will be an increase in the disturbance footprint of the Extraction Area (in accordance with the mining and rehabilitation plans presented in the MOP (see **Figure 4.2**). In addition, Plates 1 to 12 present views of various components of the Quarry.

4.2 Mining Operations

Table 4.1 presents the material movements during the reporting period and the anticipated movements during the next reporting period.

Table 4.1 Production Summary – tonnes

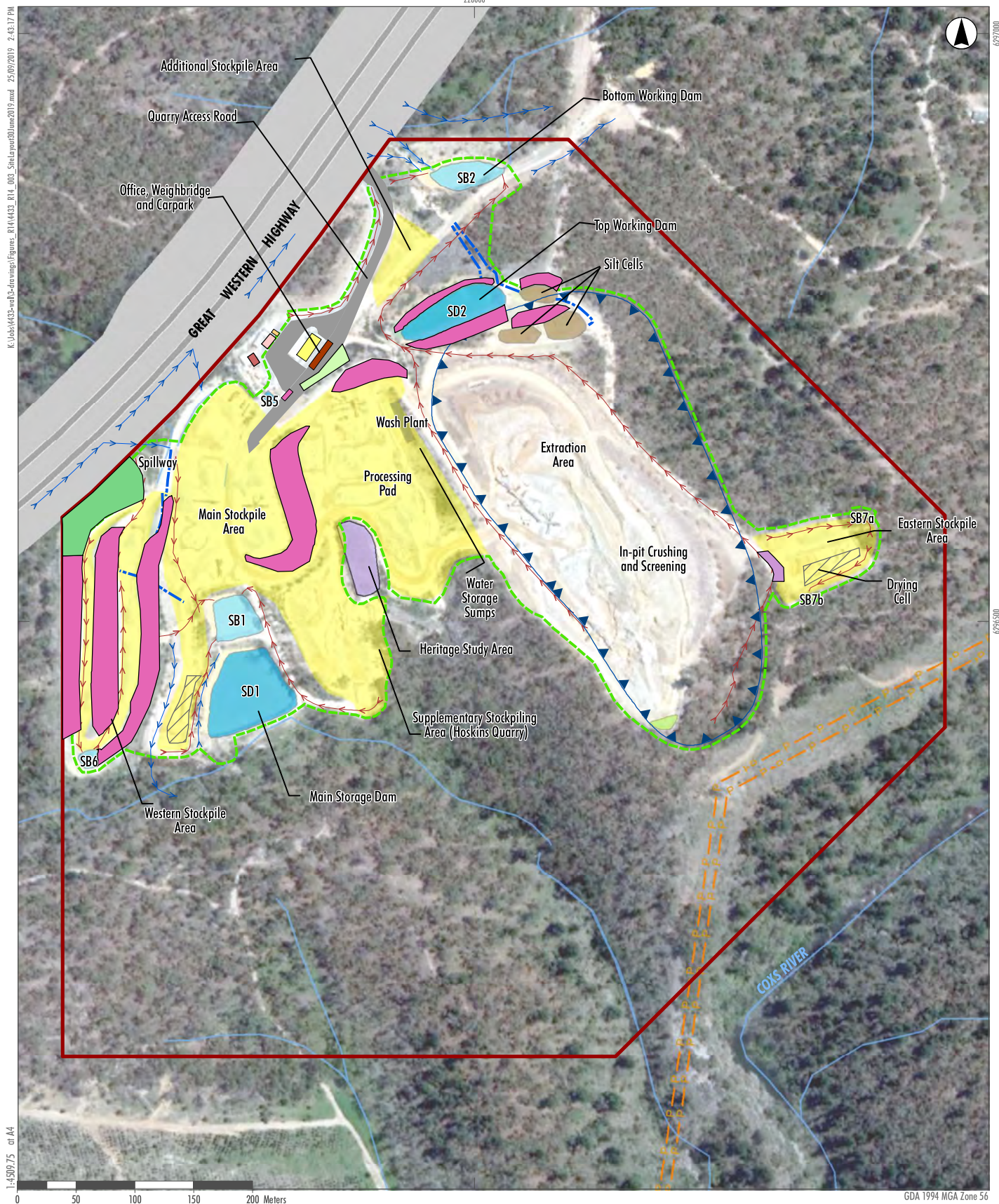
Material	Approved limit (specify source)	Previous reporting period (actual)	This reporting period (actual)	Next reporting period (forecast)
Soil	N/A	0	0	0
Overburden	N/A	202	0	0
Product (sold and transported off site)	500,000	73,326	152,654	276,464
Source: Walker Quarries Pty Ltd				

Non-quartzite material extracted during the reporting period was sold as select fill or retained in stockpiles at the northern perimeter of the extraction area. A copy of Form S1 submitted to the Division of Resources & Geoscience during the reporting period is included as **Appendix 2**.

A total of six blasts were initiated during the reporting period. **Table 4.2** presents the date and volume of each blast. All blasts were production blasts and occurred within the approved extraction area.

Table 4.2 Blasting Operations during the Reporting Period

Blast Date	Volume of Blast (tonnes)
20 November 2018	12,293
18 December 2018	48,980
19 February 2019	24,531
1 April 2019	55,009
11 June 2019	52,112
Source: Walker Quarries Pty Ltd	

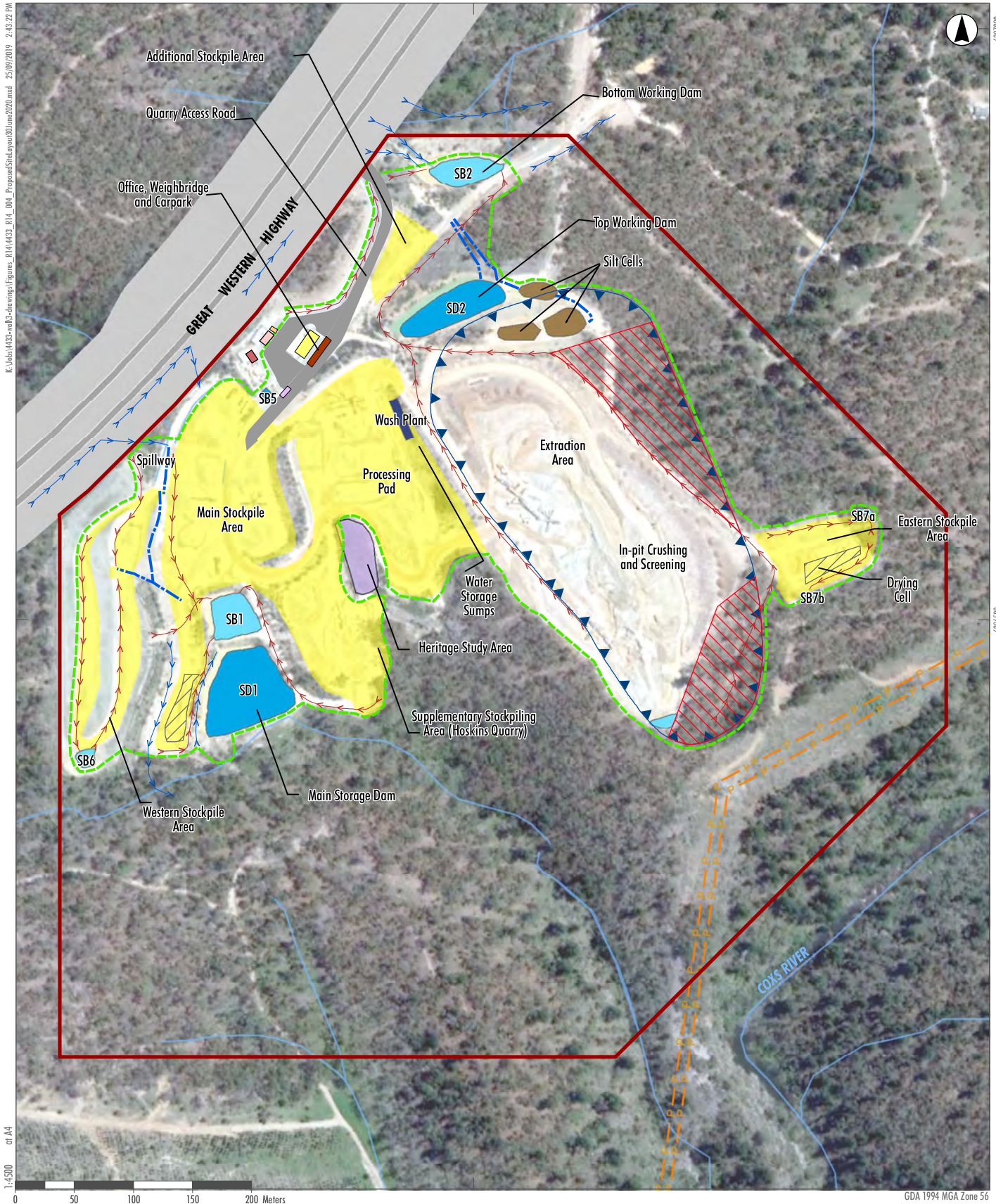


Legend

- | | | |
|---|--|---|
| Quarry Site - ML1633 | Silt Cell | Natural vegetation regrowth |
| ▶▶▶ Approved Extraction Area | Storage Dam | Rehabilitation under maintenance (hydroseeded with grasses and shrubs) |
| Approved Area of Disturbance | Water Storage Sumps | Topsoil application |
| Drying Cell | ▶▶▶ Clean Water Drain | Tubestock planting |
| Sealed Quarry Access Road and Carparks | ▶▶▶ Dirty water drain | Heritage Study Area |
| Stockpile Area | — Water Pipeline | |
| Sediment Basin | —P— Electricity Transmission Lines | |

FIGURE 4.1

Site Layout - 30 June 2019



Legend

- Quarry Site - ML1633
- ▶ Approved Extraction Area
- Approved Area of Disturbance
- Drying Cell
- Sealed Quarry Access Road and Carparks
- Stockpile Area
- Sediment Basin
- Silt Cell
- Storage Dam
- Water Storage Sumps
- Clean Water Drain
- Dirty water drain
- Water Pipeline
- P — Electricity Transmission Lines
- Extraction Area Extension
- Heritage Study Area

FIGURE 4.2

Proposed Site Layout - 30 June 2020



PLATE 1

View from Visual Amenity Bund Looking East Over Operations
(note vegetation growth and stockpiles)



PLATE 2

Quarry Operations Showing Mobile Crushing Equipment



PLATE 3

Sediment Basin 5 Requiring Dewatering, Desilting and
Enlargement



PLATE 4

Sediment Basin 7a Requiring Desilting and Enlargement



PLATE 5
Sediment Basin 7b Requiring Desilting and Enlargement



PLATE 6
Area East of Silt Cells Requiring Additional Erosion and Sediment Control



PLATE 7
Tubestock Planting and Regrowth on Visual Amenity Bund



PLATE 8
Tubestock Planting and Regrowth on Visual Amenity Bund



PLATE 9
Easterly View from Visual Amenity Bund
showing Tubestock Planting and Growth



PLATE 10
Rehabilitation Under Maintenance



PLATE 11
Application of Topsoil (batter south of weighbridge)



PLATE 12
Natural Regrowth on Dam Wall (SB1)

Walker Quarries and blast contractors implement a continuous improvement protocol for blasting through implementation of the following procedures (which are nominated in the Blast Management Plan).

- Blast energies are minimised as far as possible.
- Electronic detonators are not used at the Quarry at any time.
- Quality control practices are implemented on the ground to ensure blasts are kept within design tolerances.
- Adequate burden is maintained on all faces to prevent blowouts and blast anomalies.
- Blasts are designed to ensure fly-rock, dust and fumes, and the impact/damage to people, property, livestock and infrastructure, are limited as much as reasonably practicable.
- Each blast is monitored to confirm compliance with air blast overpressure and ground vibration criteria.
- Following each blast, the area surrounding the blast location is inspected and fly-rock distribution to the front, rear and both sides of the blast site observed.
- Blast contractors, in conjunction with the Quarry Manager, review blast monitoring records to enable continuous improvement and quality control, resulting in continual development of optimum blast parameters.

The results of blast monitoring are provided in **Section 6.4.2 (Table 6.6)**.

4.3 Other Operations

4.3.1 Construction Operations

No construction operations were undertaken during the reporting period.

The Construction and Occupation Certificates for the buildings constructed during the previous reporting period were not received during the reporting period. The buildings have remained unoccupied.

4.3.2 Processing Operations

The processing operations involve the use of a series of crushers and screens to crush, separate and wash the quartzite into various size aggregates and sands. The development consent does not impose restrictions on the processing equipment which may be used subject to compliance with noise and air emission criteria. Walker Quarries operates both crushing and screening circuits, as well as a washing circuit as follows.

Crushing and Screening Circuits

There are currently two crushing and screening circuits operating, one producing road base materials and the second aggregates of various sizes. The number of crushing trains and arrangement of the crushing and screening equipment may be modified in accordance with DA 344-11-2001 subject to meeting noise and air emission criteria.

Both crushing circuits were operated within the extraction area during the reporting period.

Washing Circuit

A sand washing plant was operated on the Main Stockpile Area with a series of silt settlement cells located adjacent to the washing plant and to the immediate north of the extraction area.

Water is added to the <7 millimetre (mm) material over a variable sized vibrating screen (mesh sizes of 7 mm or 5 mm). This initial mixing of water and rock, along with the vibrating nature of the screen, allows for the removal of fine clay and silt particles. Water sprays are also used to remove additional clays and silts with the heavier and washed aggregates moving to the bottom of the tanks and the silt containing water drawn off the top and pumped initially to a water storage sump to the immediate east of the processing plant for initial settlement. The <7 mm or <5 mm quartzite aggregate collected at the base of the tank is then dewatered with the aggregates stacked before being loaded to trucks and delivered to stockpile. The washing plant incorporates a Silt Arrestor to improve the recovery of water and produce a drier product.

While the washing plant may be used periodically to wash and grade any cobble conglomerate which is extracted and produces decorative pebble products for landscaping, this was not undertaken during the reporting period.

4.3.3 Stockpiling Operations

The Quarry features several hardstand stockpile areas identified on **Figure 2.2**, which were used as follows during the reporting period.

- The Main Stockpile was operated as the principal stockpile areas for quarry products.
- Supplementary Stockpile Area, which was used for the stockpiling of crushing and screening reject material prior to sale or use of this material in rehabilitation works.
- Western Stockpile Area, which was used for the stockpiling of smaller volume and specialty products.
- Eastern Stockpile Area, which was used for the drying of silts removed from the sand washing plant silt cells prior to use in rehabilitation.

4.3.4 Product Transportation

Product transported off site during the reporting period was approximately 173,910 tonnes of material, well below the approved annual transportation volume of 500,000 tonnes. There were a total of 6,802 truck movements during the reporting period.

4.4 Next Reporting Period

Walker Quarries anticipates that blasting will continue during the next reporting period, and estimates that subject to market demand, between five and 10 blasts will be undertaken. Walker Quarries anticipates that production will increase significantly in the next reporting period, to approximately 275,000t (see **Table 4.1**).

Processing activities using the mobile plant are proposed to continue during the next reporting period, with the amount of material to be processed dependant on the demand for the Quarry's products. It is expected that the aggregate crushing circuit, currently located in an elevated position on the northern perimeter of the extraction area will be relocated to the operating floor of the extraction area during the next reporting period.

Subject to the approval of MOD 3, a westerly extension of the extraction area may occur during the next reporting period. However, this extension would be subject to the review and update of the Quarries Environmental Management plans and Mining Operations Plan.

Product transported during the next reporting period will be consistent with production and is anticipated to rise to 275,000t. This remains well below the production limit of DA 344-11-2001.

5.0 Actions Required from Previous Annual Review

Correspondence from the Department of Planning and Environment regarding the *Annual Review 2019* was provided on 21 December 2017. The correspondence provided that ‘pursuant to Condition 3F (Annual Rehabilitation Report) of ML 1633, the abovementioned Annual Review is to the satisfaction of the Minister for Resources’.

Condition 3F of ML1633 states:

The lease holder must prepare a Rehabilitation Report to the satisfaction of the Minister. The report must:

- (i) provide a detailed review of the progress of rehabilitation against the performance measures and criteria established in the approved MOP;*
- (ii) be submitted annually on the grant anniversary date (or at such other times as agreed by the Minister); and*
- (iii) be prepared in accordance with any relevant annual reporting guidelines published on the Department’s website at www.resourcesandenergy.nsw.gov.au/miners-andexplorers/rules-and-forms/paf/environmental-guidelines*

Table 5.1 describes the feedback the Department provided and Walker Quarries’ response including actions outlined in Section 12.0 of the 2018 Annual Review.

Table 5.1 Actions from the Previous Annual Review

Action Required from Previous Annual Review	Requested By	Action Taken	Refer to
Annual Rehabilitation Report to be prepared and submitted.	Department of Planning and Environment (DPE)	Inclusion of Rehabilitation Report in current Annual Review.	Section 8.0
Revision of environmental management plans of the Quarry will be reviewed and (if required) revised to address the recommendations of an IEA and Walker Quarries’ objective to continually improve environmental performance.	Walker Quarries/ Operator	Environmental management plans of the Quarry were reviewed, revised (where required) and submitted for approval.	Section 2.5

Action Required from Previous Annual Review	Requested By	Action Taken	Refer to
<p>The environmental management and monitoring commitments of the Quarry's environmental management plans will be implemented and adhered to. Key changes to environmental monitoring and management to be implemented during the next reporting period are as follows.</p> <ul style="list-style-type: none"> • Annual surface water monitoring in the Coks River will be reinstated • Groundwater monitoring from three bores to be constructed on the Quarry Site will be commenced. 		<p>Environmental management plans implemented.</p> <p>Annual surface water monitoring undertaken at SD3 and SD4 on 28 June 2019.</p> <p>Groundwater monitoring at GW1, GW2 and GW3 undertaken April 2019</p>	<p>Section 7.2</p> <p>Section 7.3</p>
An application to modify DA 344-11-2001 under Section 4.155(1A) of the EP&A Act will be made to extend the limit on quarrying operations by 12 months (to 15 July 2020).	Walker Quarries/Operator	An application was submitted and approved on 7 December 2018 to extend the limit on quarrying operations to 15 July 2020.	Section 3.0
Consultation in accordance with a Community Engagement Strategy will be completed to assess any concerns the local community may have over extended Quarry operations.	Walker Quarries/Operator	<p>Following notification of the local community during the last reporting period, a register of interested parties was created and each was contacted to discuss key matters of concern. A meeting was held at 42 Rocky Waterhole Drive on Friday 7 December 2018.</p> <p>An updated overview of proposed operations was emailed to the registered community members.</p>	Section 9.1

6.0 Environmental Performance

6.1 Introduction

Environmental monitoring is undertaken to determine the degree of impact the Quarry is having on the environment. Assessment of these results can establish if environmental management systems are being successfully applied in the short term and if the management systems need to be amended.

Appropriate environmental monitoring, apart from satisfying necessary statutory requirements, demonstrates to the local community and relevant authorities Walker Quarries commitment to the protection of the environment.

The following sub-sections present the results of the various monitoring programs undertaken throughout the reporting period. Where appropriate, results of the previous years' monitoring are also presented for comparative purposes.

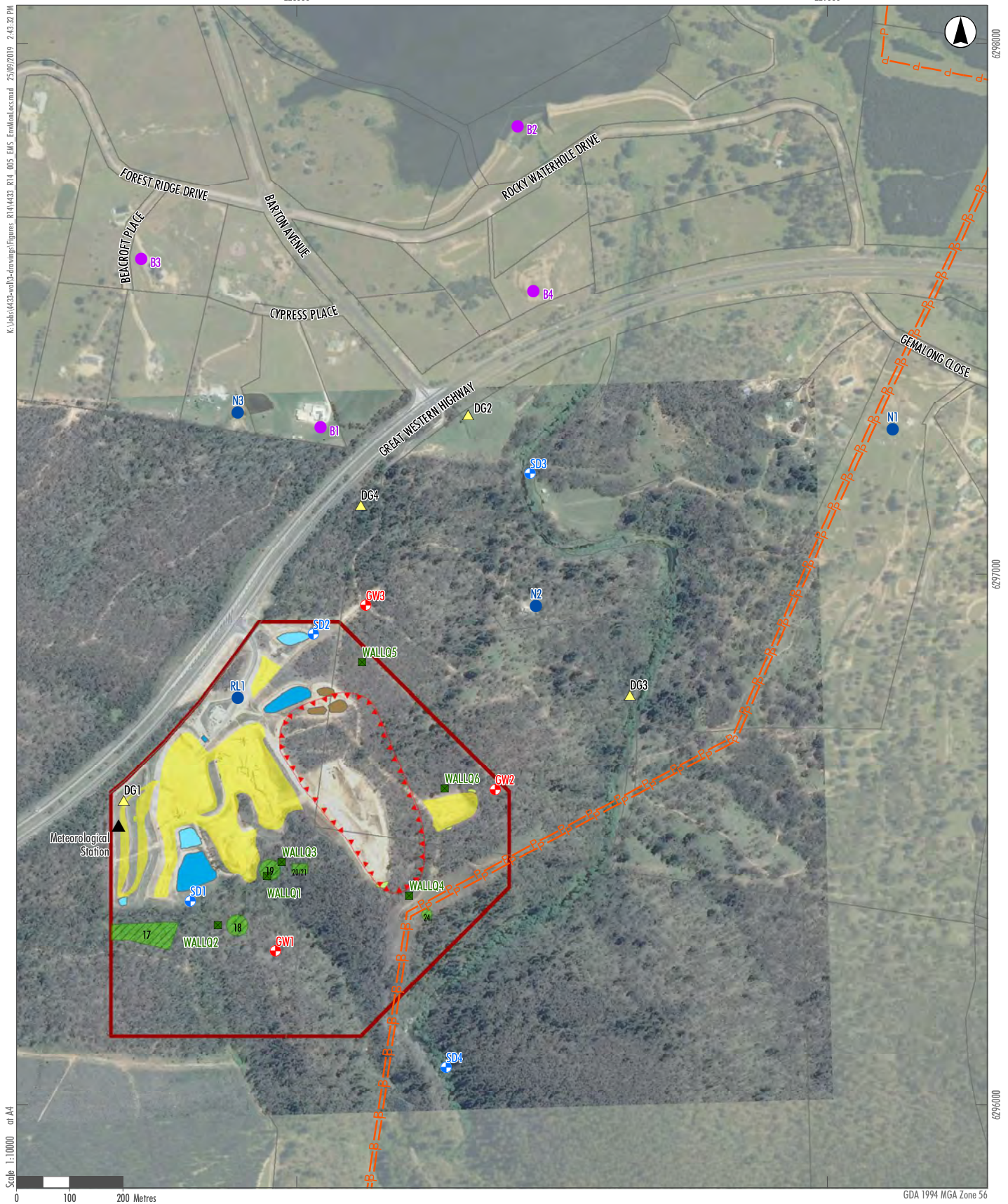
Figure 6.1 provides the monitoring locations referred to in this section.

6.2 Meteorological Monitoring

Table 6.1 Meteorological Monitoring Results

Year		Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Annual
Average Temperature (°C)														
2017/18	Max	11.7	12.4	19.8	20.8	20.2	26.4	28.0	26.0	23.8	21.8	15.4	10.5	19.7
	Min	-0.4	0.4	2.1	7.6	8.5	13.0	12.8	11.6	10.9	10.9	2.1	1.6	6.8
2018/19	Max	10.5	10.4	14.5	18.2	21.1	25.5	27.2	22.8	21.7	17.4	14.4	10.8	17.9
	Min	-0.1	2.4	4.8	6.3	8.2	13.2	15.5	13.8	7.3	8.7	1.8	0.8	6.9
Rainfall (mm)														
2017/18	Total	14.2	36	5.4	77.2	22	77.4	43	90.6	26.2	9.8	15.8	32.8	450.4
	No. of Rain Days	11	9	5	11	12	12	5	8	11	9	8	18	119.0
	Max. Daily Rainfall	6.8	12.4	2.6	49.4	8.6	28.8	37.2	55	13.8	2.8	10.2	14.4	55.0
2018/19	Total	7.4	52.2	53.8	83.6	141.8	82.8	115.2	16.4	91.0	15.6	47.0	28.4	735.2
	No. of Rain Days	10	13	11	15	14	11	14	8	13	6	16	14	145
	Max. Daily Rainfall	2.4	13.4	16.2	27.2	88.6	36.6	21.6	5.0	27.2	13.8	32.0	8.2	88.6
Source: Walkers Quarry Pty Ltd														

A meteorological monitoring station has been operating at the Quarry, in its current location, since July 2016. Previously a meteorological station was located to the east of the Quarry Site on the boundary of Lot 6 DP872230. This meteorological station was damaged beyond repair by a lightning strike in 2015. Meteorological monitoring was not undertaken during the 2015/16 reporting period as a result.



Legend

- | | |
|---|--|
| Quarry Site - ML1633 | ▲ Air Quality Monitoring Locations |
| Stockpile Area | ■ Biodiversity Monitoring Locations |
| Layer | ● Blast Monitor |
| Sediment Basin | ▲ Meteorological Station |
| Silt Cell | ● Noise Monitoring Locations |
| Storage Dam | ■ Surface Water Monitoring Location |
| Cadastral boundary | ● Groundwater Bore Location |
| Remnant Patches of <i>Bursaria spinosa</i> | —P— Power Line |

FIGURE 6.1

Environmental Monitoring Locations

6.3 Noise

6.3.1 Performance Criteria and Predicted Impacts

Table 6.2 identifies the relevant noise-related performance criteria for residences surrounding the Quarry Site identified by Condition 3(3) of DA 344-11-2001.

Table 6.2 Noise-related Performance Criteria

Receiver	Day dB(A) ¹	Evening dB(A) ¹	Night dB(A) ¹
Any residence on privately owned land	43	43	39
Note 1: Units = LAeq 15 minutes			

Modelling of predicted noise levels for potential receptors in the vicinity of the Quarry was undertaken for the original Environmental Impact Statement (EIS) (Pacrim, 2001). The results of the modelling reported by Pacrim (2001) indicated that all noise criteria would be complied with under calm conditions, however, exceedances could occur during adverse atmospheric conditions at some receptor locations.

6.3.2 Measured Performance

Section 6.3 of the *Noise Management Plan* (NMP) identifies that attended noise monitoring will be undertaken at least every six months at the following three off-site monitoring locations as shown on **Figure 6.1**, which represent the closest residential receivers to the Quarry.

- N1: “Gemalong” property residence.
- N2: “Cockatoo Pines” property boundary adjacent to residence.
- N3: Cypress Place, Wallerawang.

In addition, a fourth monitoring point, RL1, is located adjacent to the Quarry office.

Attended noise monitoring programs were undertaken on 28 and 29 August 2018, and 2 and 3 April 2019 by Muller Acoustic Consulting Pty Ltd (MAC). The resulting reports (MAC, 2018 and MAC, 2019) are presented as **Appendix 3**.

All noise monitoring was undertaken under the following operational conditions.

- Extraction of quartzite using standard drill, blast, load and haul techniques.
- Processing of extracted quartzite and stockpiling.
- Transportation of quarry products.

Noise monitoring was undertaken at monitoring locations N1, N2, N3 and RL1 (see **Figure 6.1**) during each monitoring campaign. The noise monitoring results are summarised in **Table 6.3** and **Table 6.4**.

6.3.3 Discussion and Analysis

Monitoring during the reporting period was undertaken on the Noise levels at locations N1, N2 and N3 complied with the assessment criteria in all instances during the reporting period. The attended monitoring program found that the Quarry was inaudible at these locations over background noise levels except for one instance at location N3 during the noise assessment on Tuesday 2 April 2019. In this instance, the quarry contribution was estimated to be less than 35 dB(A), well below the assessment criteria of 43 dB(A). As such, there are no identifiable trends in noise levels, except the continued compliance of the operation.

Monitoring during the reporting periods was undertaken on the 28 and 29 August 2018, and 2 and 3 April 2019. The period between monitoring periods exceeds 6 months (7 months and 5 days) and represents an administrative non-compliance with Condition 3(4) of DA 344-11-2001.

Table 6.3 Noise Monitoring Results – 28-29 August 2018

Location	Date and Time (hrs)	Attended Noise Monitoring Results (dB(A))				Criteria dB(A)	Met Conditions ¹		Comments
		Total Measured			Site Contribution L _{eq}		Wind Speed (m/s)	Wind Direction	
		L _{max}	L _{eq}	L ₉₀					
N1	28/8, 12.25	70	52	43	Quarry Inaudible	43	1.5	NW	Traffic 40-72; Livestock 55-58; Wind in Trees 30-41; Aircraft 45-51.
	29/8, 8.15	77	52	45	Quarry Inaudible	43	0.1	E	Traffic 50-64; Birds 50-77.
N2	28/8, 13.01	56	45	38	Quarry Inaudible	43	1.2	NW	Traffic 45-56; Birds 41-45; Wind in Trees 40-45.
	29/8, 8.45	57	41	36	Quarry Inaudible	43	0.6	E	Traffic 34-42; Birds 43-57; Aircraft 37-45.
N3	28/8, 15.22	66	50	41	Quarry Inaudible	43	0.2	NW	Traffic 40-66; Aircraft 59-64, Birds 50-60.
	29/8, 9.31	65	45	38	Quarry Inaudible	43	1.4	E	Traffic 40-54; Birds 35-65.
RL1	28/8, 13.22	84	66	64	66	N/A	0.8	NW	Onsite Truck 59-61; Sand Plant; 60-66; Staff Talking 60-84.
	29/8, 9.11	90	66	51	66	N/A	2.5	S	Export Trucks 50-90; Loader 50-58; Water Cart 61-72; Highway Trucks 50-60.
Note 1: Meteorological data was recorded with a hand-held anemometer.									
N/A: Not applicable.									
Source: Muller Acoustic Consulting (2018) – Tables 4-7.									

Table 6.4 Noise Monitoring Results – 2-3 April 2019

Location	Date and Time (hrs)	Attended Noise Monitoring Results (dB(A))					Criteria dB(A)	Met Conditions ¹		Comments
		Total Measured			Site Contribution L _{eq}	Wind Speed (m/s)		Wind Direction		
		L _{max}	L _{eq}	L ₉₀						
N1	2/4, 12.20	65	49	43	Quarry Inaudible	43	1.5	ENE	Traffic 48-52; Livestock 46-48; Birds 43-65; Wind in Trees 38-42.	
	3/4, 9.38	68	47	42	Quarry Inaudible	43	0.6	NW	Traffic 44-68; Birds 40-54; Music in House 35-39.	
N2	2/4, 13.27	59	41	38	Quarry Inaudible	43	1.4	NE	Traffic 40-42; Birds 35-59; Wind in Trees 30-40.	
	3/4, 10.03	73	49	42	Quarry Inaudible	43	0.7	NW	Traffic 41-73; Birds 45-48.	
N3	2/4, 13.55	82	60	44	35	43	0.5	NE	Traffic 40-53; Dogs 58-82; Truck 53; Quarry Operations 32-40.	
	3/4, 10.45	73	49	42	Quarry Inaudible	43	1.6	W	Traffic 48-54; Birds 42-73; Wind in Trees 40.	
RL1	2/4, 12.47	76	69	67	69	N/A	1.2	NE	Process Plant 65-69; Reverse Alarm 60-65; Sand Screens 70-76; Light Vehicle 68-76; Service Truck 60-61.	
	3/4, 10.24	80	66	64	65	N/A	0.7	NW	Loader Pass By 70-80; Plant 64-66; Reverse Alarm 43-45; Export Truck 70-72.	
Note 1: Meteorological data was recorded with a hand-held anemometer.										
N/A: Not applicable.										
Source: Muller Acoustic Consulting (2018) – Tables 3-6.										

6.4 Blasting

6.4.1 Public Notices, Performance Criteria and Predicted Performance

Condition 3(9) of DA 344-11-2001 requires Walker Quarries during blasting operations to:

- Implement best practice management to:
 - protect the safety of people and livestock
 - protect public or private infrastructure and property from damage
 - minimise the dust and fume emissions.
- Operate a suitable system to enable the local community to get up-to-date information on the proposed blasting schedule on site.
- Carry out regular monitoring to determine whether the development is complying with the relevant conditions of this consent.

A blast notification board, detailing the date and time of the next blast is maintained at the Quarry entrance on the Great Western Highway and updated at least 24 hours before each blast. In addition, Walker Quarries provides specific notification of individual blasts to any landowner, within 2 km of the Quarry who has registered an interest in being notified about the blasting schedule at the Quarry.

Table 6.5 presents the airblast overpressure and ground vibration performance criteria identified in Conditions 3(6) of DA 344-11-2001.

Table 6.5 Blasting-related Performance Criteria

Receiver	Airblast Overpressure (dB Linear Peak)	Ground Vibration (mm/s)	Allowable Exceedance
	120	10	%
Any residence on privately-owned land	115	5	5% of the total number of blasts over a period of 12 months
All public infrastructure	-	50	0%

The Blast Management Plan identifies that blast monitoring will be undertaken at three locations, B1, B2 and B3, for each blast event, as shown in **Figure 6.1**. During the reporting period, a new blast monitor (B4) was installed at a residence of 42 Rocky Waterhole Drive at the request of the resident. Monitoring at this location commenced during the 1 April 2019 monitoring event and results are included in **Table 6.6**.

In addition to the above criteria, Condition 3(1) of DA 344-11-2001 permits blasting between 9:00am and 5:00pm, Monday to Friday, and between 9:00am and 1:00pm on Saturdays. No blasting is permitted on Sundays or Public Holidays.

Modelling of predicted ground vibration and overpressure was undertaken for the original EIS (Pacrim, 2001), with results indicating that the criteria for ground vibration and airblast overpressure would not be exceeded at any time during Quarry operations at the nearest receivers.

6.4.2 Measured Performance

Table 6.6 presents the results of blast monitoring during the reporting period.

Table 6.6 Blast Monitoring Results

Date		B1 (Intersection)		B2 (Dam Wall)		B3 (Residence)		B4 (Residence)	
		Ground Vibration (mm/s)	Air Blast (dB)	Ground Vibration (mm/s)	Air Blast (dB)	Ground Vibration (mm/s)	Air Blast (dB)	Ground Vibration (mm/s)	Air Blast (dB)
Criterion	95%/yr	5	115	5	115	5	115	5	115
	100%	10	120	10	120	10	120	10	120
20/11/2018		N/T	N/T	N/T	N/T	N/T	N/T	-	-
18/12/2018		0.81	101.0	0.07	102.8	0.70	106.0	-	-
19/02/2019		0.57	101.1	0.35	101.0	N/T	N/T	-	-
1/04/2019		0.93	105.5	0.73	102.8	N/T	N/T	0.74	109.2
11/06/2019		N/T	N/T	0.79	105.5	N/T	N/T	0.61	106.0
N/T No Trigger. Blast was not sufficient to 'trigger' the monitors, which were set to trigger at 100dB (air blast) and 0.51mm/sec (ground vibration).									
Source: Walker Quarries Pty Ltd									

6.4.3 Discussion and Analysis

The criteria of 5 mm/s for ground vibration and 115 dB for air blast overpressure were not exceeded during the reporting period. Blasting results therefore satisfied the criteria presented in **Table 6.6**. During the five blast monitoring events, B1 was triggered on three occasions, B2 was triggered on four occasions and B3 was triggered on one occasion. The November blast did not trigger any of the monitors.

During the reporting period and over the course of the Quarry's operation, all blasts have remained below the performance criteria. In previous reporting periods (2014 to 2018), ground vibration levels recorded at B1 have ranged between 0.6 mm/s and 1.4 mm/s, while air blast overpressure levels have ranged between 97.5 dB and 110.6 dB. During the previous reporting period, B1 was triggered on only one occasion from four blasts.

Ground vibration levels at B2 have ranged between 0.5 mm/s and 1.3 mm/s in previous reporting periods, while recordings of air blast overpressure have ranged from 95.9 dB to 111.8 dB. During the previous reporting period, B2 was triggered on only one occasion from four blasts.

Historically, B3 has only triggered twice. Once in November 2014 when it registered ground vibration at 0.6 mm/s and air blast overpressure at 104.5 dB and once during the current reporting period (December 2018) when it registered ground vibration at 0.7 mm/s and air blast overpressure at 106 dB.

The newly installed blast monitor, B4, triggered on both occasions. Ground vibration recorded 0.74 mm/s and 0.61 mm/s and air blast overpressure recorded 109.2 dB and 106.0 dB.

During the reporting period, the number of blasts resulting in triggers has increased compared with the previous reporting period. Overall, there is no identifiable trend in monitored ground vibration and air blast overpressure levels since the commencement of blasting operations at the Quarry.

6.5 Air Quality

6.5.1 Performance Criteria and Predicted Impacts

Table 6.7 presents the air quality performance criteria presented in Condition 3(12) of DA 344-11-2001.

Table 6.7 Air Quality-related Performance Criteria

Pollutant	Averaging Period	Criterion
Particulate matter < 10 µm (PM ₁₀)	Annual	25 µg/m ³
Particulate matter < 10 µm (PM ₁₀)	24 hour	50 µg/m ³
Particulate matter < 2.5 µm (PM _{2.5})	Annual	8 µg/m ³
Total suspended particulates (TSP)	Annual	90 µg/m ³
Deposited dust	Annual Incremental Increase	2 g/m ² /month
Deposited dust	Annual Average Total Deposited Dust	4 g/m ² /month

Modelling of likely dust emissions resulting from the Quarry was undertaken for the original EIS (Pacrim Environmental, 2001), with results indicating that nuisance and health related dust impacts would be negligible at all production levels and under all wind conditions. The modelling predicted that increases in dust deposition rates for the surrounding area would not exceed 0.1 g/m²/month above existing dust levels under a production rate scenario of 125 000 tpa. The average deposited dust levels in 1999 were 0.9 g/m²/month at monitoring location DG1, 0.6 g/m²/month at DG2, 0.9 g/m²/month at DG3, and 1.0 g/m²/month at DG4.

6.5.2 Measured Performance

6.5.2.1 Particulate Matter

The third revision of the Air Quality Management Plan (AQMP) was approved by the Department of Planning and Environment on 3 April 2019. In accordance with the AQMP, monitoring of particulate matter will be implemented should the rolling average of monthly deposited dust monitoring results reach a trigger level of 4.0 g/m²/month (this was updated during the reporting period from 3.5 in the AQMP). During the reporting period, this trigger level was not reached (see **Section 6.5.2.2**).

6.5.2.2 Deposited Dust

Locations of the deposited dust monitoring locations are shown on **Figure 6.1**. **Table 6.8** presents the results of the deposited dust monitoring program for 2018/19 and the 2017/18 average for comparison, while **Figure 6.2** presents these results graphically.

Table 6.8 Deposited Dust Monitoring Results

Start Date	End Date	Monitoring Location				Criterion
		DG1	DG2	DG3	DG4	
2017/18 Annual Average		0.9	2.5	0.9	0.8	4.0
2/7/2018	1/8/2018	0.4	0.8	1.6	1.0	4.0
1/8/2018	3/9/2018	0.7	0.9	3.9	0.9	4.0

Start Date	End Date	Monitoring Location				Criterion
		DG1	DG2	DG3	DG4	
3/9/2018	3/10/2018	0.9	1.6	0.8	0.8	4.0
3/10/2018	1/11/2018	0.2	0.4	1.6	0.4	4.0
1/11/2018	3/12/2018	3.6	1.0	12.0	3.0	4.0
3/12/2018	2/1/2019	2.7	3.3	3.5	5.1	4.0
2/1/2019	4/2/2019	2.6	1.5	2.0	2.7	4.0
4/2/2019	4/3/2019	3.4	1.2	2.3	N/A	4.0
4/3/2019	3/4/2019	0.3	3.0	3.0	0.8	4.0
3/4/2019	6/5/2019	0.7	0.3	0.5	0.7	4.0
6/5/2019	3/6/2019	0.7	2.7	0.2	0.4	4.0
3/6/2019	1/7/2019	0.4	0.9	1.1	0.8	4.0
Annual Average		1.4	1.5	2.7	1.5	4.0
Note 1: Units – g/m ² /month						
N/A: Not available (damaged gauge)						
Source: Walker Quarries Pty Ltd						

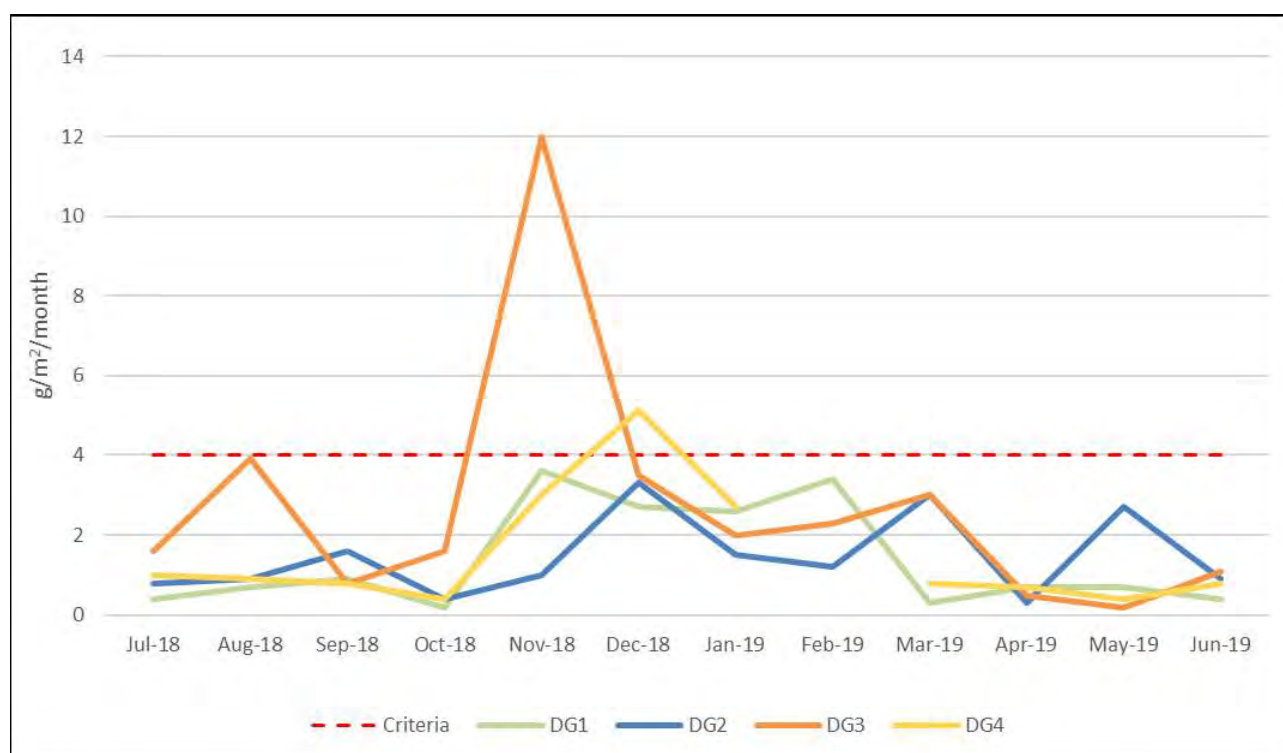


Figure 6.2 Deposited Dust 2018/19

6.5.3 Discussion and Analysis

Samples recorded in the reporting period varied between 0.2 g/m²/month and 12.0 g/m²/month. The deposited dust criterion was exceeded on one occasion at DG3 between 1/11/2018 and 3/12/2018 when 12.0 g/m²/month was recorded and on one occasion at DG4 between 3/12/2018 and 2/1/2019 when 5.1 g/m²/month was recorded. The recordings at DG1, DG2 and DG4 ranged between 1.0 g/m²/month and 3.6 g/m²/month during the period of the high reading at DG3. The recordings at DG1, DG2 and DG3 ranged between 2.7 g/m²/month and 3.5 g/m²/month during the period of the high reading at DG4. Results are unavailable for February 2019 for DG4 due to the gauge being identified as broken during an inspection in February. The dust gauge was replaced and remains operational.

The annual average deposited dust for DG3 was 2.7 g/m²/month and DG4 was 1.5 g/m²/month. During the remainder of the reporting period recordings for DG3 ranged from 0.3 g/m²/month to 3.9 g/m²/month and recordings for DG4 ranged from 0.4 g/m²/month to 3.0 g/m²/month. Considering the isolated nature of the results exceeding monthly dust deposition criteria, it appears likely that these are anomalous results and do not reflect dust emissions from the Quarry. Annual averages were between 1.4 g/m²/month and 2.7 g/m²/month at the four dust gauges, indicating that the deposited dust impacts as a result of the Quarry's operations are generally well below the assessment criterion.

6.6 Biodiversity

6.6.1 Consent Conditions

In accordance with Condition 2.38 of the original development consent, and the approved Flora and Fauna Management Plan, Walker Quarries has undertaken monitoring of flora and fauna on the Quarry Site. The Flora and Fauna Management Plan also states that these areas will be monitored annually for evidence of Purple Copper Butterfly and the health and distribution of Blackthorn. When DA 344-11-2001 was modified on 25 August 2017, Condition 2.38 was replaced by Condition 3(26), which requires monitoring of biodiversity to be undertaken in accordance with a Biodiversity Management Plan. This condition includes a requirement that the Biodiversity Management Plan describe the procedures to be implemented for ensuring minimal environmental consequences for threatened species, populations and habitats, including the Purple Copper Butterfly. The Biodiversity Management Plan was approved by the DPE on 8 April 2019.

6.6.2 Measured Performance

Vegetation / Flora

Biodiversity monitoring was undertaken by Ecoplaning Pty Ltd (Ecoplaning) on 1 November 2018 when the six 10 m x 10 m vegetation monitoring plots established in September 2016 were re-surveyed (see **Figure 6.1**). The resulting report (Ecoplaning, 2019) is presented as **Appendix 4**.

Ecoplaning (2019) confirmed an increase in native species richness at the monitoring locations compared to previous monitoring events. Ecoplaning (2019) suggested that this may be a result of natural fluctuations in species richness due to changes in climatic conditions and rainfall or the change in relation to personnel undertaking the surveys. No flora species listed in the NSW *Biodiversity Conservation Act 1995* (BC Act) or Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) were detected. Based on the results of vegetation plot monitoring, Ecoplaning (2019) report the quarry is not impacting on woodland within the monitoring sites and therefore native species richness is not being impacted.

Fauna

Fauna species observed or heard during the field survey included two native mammals, 18 birds, one reptile and one amphibian. No threatened fauna species listed under the BC Act were observed during the survey and Ecoplaning (2019)¹ confirmed that habitat for native fauna species continues to be available at the quarry.

Purple Copper Butterfly

An investigation to determine the presence of Purple Copper Butterfly was undertaken on 23 October 2018 at five Blackthorn (*Bursaria spinosa* subsp. *lasiophylla*) monitoring sites that were identified during an initial survey for the species undertaken in 2016 (**Figure 6.1**). In consultation with the Office of Environment and Heritage (OEH), a new control site (Cheetham Flats TSR, Hampton Road, Rydal) was identified as a location where the Purple Copper Butterfly has been previously detected. This control site was visited during the survey. The Coxs River, Wallerawang control site and the Eusdale Road, Yetholme control site were not surveyed.

A report of the investigation is included in the Biodiversity Monitoring Report (Ecoplaning, 2019) in **Appendix 4**, and the results are summarised as follows.

- Within ten minutes of observation, three Purple Copper Butterflies were observed in flight above and between patches of *Bursaria spinosa* subsp. *lasiophylla* at the Cheetham Flats TSR control site. To avoid disturbance, further monitoring at the control site ceased.
- No Purple Copper Butterflies or their larvae were observed within any of the monitoring sites.
- No *Anonychomyrma itinerans* ants were present within any of the monitoring sites.
- Species of butterfly, ants and other insects were present within the Quarry Site.
- All of the monitoring sites within the Quarry exhibited grazing of the Blackthorn leaves and new growth.

Weeds / Exotic Species

Ecoplaning (2019) found that exotic species richness has remained relatively stable between 2016 and 2018. Predominant weed and exotic species within the quarry were Blackberry (*Rubus ulmifolius*), St Johns Wort (*Hypericum perforatum*) and Radiata Pines (*Pinus radiata*). Ecoplaning (2019) recommends that these species be targeted as part of weed control works within the quarry.

Biodiversity Offset Strategy

During the reporting period, the Biodiversity Offset Strategy (Ecoplaning, 2018) was finalised (13 July 2018). The strategy was developed for the retirement of ecosystem and species credits in accordance with Condition 3(24) of the Notice of Modification for DA 344-11-2001 (MOD 1). The ecosystem credits included PCT 732 Broad-leaved Peppermint Ribbon Gum grassy open forest in the north-east of the South Eastern Highlands Bioregion and PCT 1093 Red Stringybark – Brittle Gum – Inland Scribbly Gum dry open forest of the tablelands, South Eastern Highlands Bioregion. Species credits included the Purple Copper Butterfly.

The Biodiversity credits were retired on 29 November 2018 with payment into the Biodiversity Conservation Fund.

¹ Varied Sittellas (*Daphoenositta chrysoptera*) and Scarlet Robins (*Petroica boodang*), both listed as Vulnerable under the BC Act, were detected during the 2016 survey, but were not observed or heard during the 2018 survey.

Rehabilitation

No significant rehabilitation had been undertaken at the Quarry Site at the time of the field survey to allow monitoring of rehabilitation to commence.

6.6.3 Discussion and Analysis

The flora and fauna monitoring undertaken in accordance with the Biodiversity Management Plan has identified no evidence that the Quarry is having any detrimental effect on the biodiversity of the Quarry Site and surrounds.

6.7 Heritage

6.7.1 Consent Conditions

An archaeological survey of the Quarry Site undertaken in 1999 identified a single Aboriginal site containing 22 artefacts (see **Figure 2.2**).

Condition 3(21) of DA 344-11-2001 requires that Walker Quarries:

- Not disturb the area marked “Aboriginal Heritage Site” on the Development Layout Plan; and
- Protect and conserve the area subject in consultation with the Bathurst Local Aboriginal Land Council, and to the satisfaction of the Secretary.

6.7.2 Aboriginal and Historic Cultural Heritage Assessment

An Aboriginal and Historic Cultural Heritage Assessment (AHCHAR) was undertaken by OzArk Environmental and Heritage Management Pty Ltd (OzArk) and the resulting report (OzArk, 2018) is presented as **Appendix 5**. A field survey undertaken on 29 August 2018 identified no new Aboriginal sites.

The assessment was undertaken to support the application to modify DA 344-11-2001 (MOD 3). OzArk (2018) made the following recommendations regarding Aboriginal and historic heritage components of the assessment.

Aboriginal heritage

- Should development consent for the project be granted, the Statement of Commitments set out in Section 6.3 of the assessment (provided in **Appendix 5** of this Annual Review) will be followed.
- All ground disturbance activities must be confined to within the assessed Heritage Study Area.
- Prior to disturbance beyond the Heritage Study Area, further field surveys should be completed prior to surface disturbance in these areas.
- Following SSD approval for the project, a Cultural Heritage Management Plan (CHMP) for the management and mitigation from impacts to Aboriginal heritage (including the implementation of an unanticipated finds protocol and heritage site induction for staff and contractors), would be development in agreement with the proponent, Registered Aboriginal Party representatives, OEH and DPE. The archaeological management recommendations in this report would normally be incorporated into the CHMP that is usually formulated following development approval.

Historic heritage

- The activities of the project can proceed without further historic heritage investigation provided that all ground disturbance activities are confined to within the Heritage Study Area. If the parameters of the proposed activity extend beyond the assessed area, then further archaeological assessment may be required.
- This assessment has concluded that there is a low likelihood that the proposed work would harm any historic items. The CHMP will include protocols for the management and mitigation to historic heritage from the impacts, should objects be encountered that are suspected to be historic heritage items.
- The CHMP shall include protocols for inductions for staff undertaking the proposed activity, and will include the legislative protection requirements for historic sites and items in NSW and the relevant fines for non-compliance.

6.8 Traffic and Transport

Transportation activities during the reporting period occurred during the approved hours of operation (Section 2.3.2).

6.9 Visual/Landscape Management

Operations with the potential to adversely impact visual amenity during the reporting period include the development of the Extraction Area and stockpiling of extracted material and products.

Walker Quarries maintained a visual amenity bund located to the north of the Western Stockpile Area during the reporting period to minimise visual amenity impacts associated with its operations, as shown in **Figure 4.1** and **Plate 7** to **Plate 9**.

As the Extraction Area is developed below the current floor level of 945 m AHD, the visibility of these activities will reduce as natural screens formed by the retained hill slope and vegetation take effect.

6.10 Waste Management

Waste generation during the reporting period was negligible, with general waste placed within skip bins that are serviced monthly by a licenced waste contractor. Liquid wastes, principally waste hydrocarbons generated during equipment servicing, are removed by a licenced oil waste contractor when their storage container reaches capacity. As a consequence of the limitations to on-site disposal, all wastewater generated via the effluent and ablutions system is collected and disposed of off-site by a licenced contractor.

6.11 Emergency and Hazards

Diesel delivered to the Quarry Site was delivered in bulk by a diesel supplier and stored in a self-bunded diesel tank. Refuelling of equipment was undertaken either within a secured, sealed and bunded area where any spillage or leakage can be contained, or by a mobile fuel truck away from natural or artificial drainage lines. The mobile fuel truck, as well as the plant or vehicle being refuelled, maintain hydrocarbon spill kits for use in the event of leakage or spillage. No significant hydrocarbon spills occurred during the reporting period. Oils and lubricants are stored under shelter on a catchment pallet where spillage or leakage can be contained.

Explosives used during the reporting period were transported to Site by the blasting contractor on the day of the blast.

No significant safety hazards occurred during the reporting period.

6.12 Bushfire

Management of bushfire hazards is provided through the Bushfire Management Plan (BMP). The plan outlines procedures to be implemented in the event of a bushfire within or surrounding the Site.

During the reporting period, Walker Quarries maintained fire extinguishers at the Fuel and Lube Bay, within the offices and workshops, and on all earthmoving machinery, mobile plant and light vehicles. In addition, Walker Quarries maintains a water truck with fire-fighting capability within the Quarry.

No fires occurred within the Site during the reporting period.

7.0 Water Management

7.1 Water Use

Walker Quarries estimates that approximately 1 ML of water is used during each day of operations for sand washing and dust suppression activities. Approximately 85% of that water is reused, while approximately 15% is lost in either product moisture or evaporation. Walker Quarries estimates that 90% of water used was sourced from the water storage dams at the Quarry during the warmer months, and 95% during the cooler months. No water was purchased during the reporting period.

7.2 Surface Water

7.2.1 Predicted Impacts and Performance Criteria

The Soil and Water Management Plan (SWMP) indicates that surface water monitoring will be undertaken monthly during discharge at two locations, SD1 and SD2 (see **Figure 6.1**). Section 10.7 of the SWMP identifies that, in the event that water is discharged from the licensed discharge points at the Quarry, the results of water quality monitoring will be included in this Annual Review.

EPL 13172 specifies the water quality criteria that apply to water discharged from the Quarry, which are presented in **Table 7.1**. The limits presented do not authorise the pollution of waters by any other pollutants and the Quarry must comply with Section 120 of the *Protection of the Environment Operations Act 1997* (POEO Act).

Table 7.1 Surface Water Monitoring Criteria

Pollutant	Unit of Measure	Criteria
TSS	mg/L	30
Sulphate	mg/L	250
Grease and Oil	mg/L	10
Electrical Conductivity	µS/cm	1,500
pH	pH	6.5-8.5

To meet the environmental management and monitoring commitments of the Quarry's environmental management plans, annual surface water monitoring at the Cocks River commenced during the reporting period. Monitoring took place at SD3 and SD4 (see **Figure 6.1**) on 28 June 2019.

7.2.2 Measured Performance

There were no water discharges during the reporting period and therefore no monitoring of water quality was undertaken and no exceedances of surface water criteria occurred.

7.2.3 Discussion and Analysis

The dams, sediment basins, catchment drains and other erosion and sediment control structures of the Quarry Site were observed to be generally well maintained and managed in accordance with the Quarry Soil and Water Management Plan (SWMP). The SWMP was reviewed, updated and submitted to the DPE to

better comply with Condition 3(18) of DA 344-11-2001. The revised SWMP addressed the following matters.

- Security of water supply.
- Reinstatement of a program for obtaining baseline data on surface water flows and quality in water bodies that could potentially be affected by the development.
- Monitoring and reporting on the effectiveness of the water management system.
- Monitoring and reporting on surface water quality in local watercourses.

The SWMP was approved by the DPE on 3 April 2019.

The generally good practice notwithstanding, the capacity of sediment basins 5, 7a and 7b appeared below that required to effectively store and settle runoff from the respective catchments (refer to **Plate 3**, **Plate 4** and **Plate 5**). It is recommended that the capacity requirements for these catchments is reviewed against the SWMP and these sediment basins desilted, enlarged and regularly inspected to ensure capacity requirement are maintained.

The generally excellent management of water containment and diversionary structures is reflected in the feedback received from the DPE following an inspection of 18 December 2018. In email correspondence provided to Walker Quarries on 21 December 2019, the DPE representative notes:

“Overall it would appear that the site was being managed well ... It was noted that some of the erosion and sediment controls on site had deteriorated and needed maintenance. The Department acknowledges that plans are in place for these to be changed out/repared over the Christmas period.”

The observations made during the inspection of 30 August indicate that an adequate inspection and maintenance regime for erosion and sediment control structures is being implemented.

It is noted that following an inspection by the DPE-Resources Regulator in March 2019, the following observations with respect to erosion and sediment control were noted.

Observation 1: Extensive additional vegetation clearing has been undertaken associated with expansion of the quarry area (see photo below). The potential for erosion has been increased and sediment and erosion control needs to be a particular focus at the site in the short term.



Observation 2: The western stockpile area has now been constructed. While generally stable, some minor rilling was noted on the embankments and the crown of one bank had some cracking (see photo below); these issues should be monitored and addressed where appropriate.



During the inspection of the Quarry Site, remedial actions and additional erosion and sediment controls were observed in the locations nominated by the Resource Regulators observations.

The actioning of these observations notwithstanding, other areas where evidence of erosion and sediment control were identified (refer to **Plate 6**) which require attention (refer to **Section 12.0**).

A Silt Arrestor continued to be utilised on the sand washing plant improving the recovery of water and producing a drier product. Walker Quarries estimates that the efficiency of water recycling is improved by 10% as a result of the Silt Arrestor.

7.3 Groundwater

7.3.1 Performance Criteria

There are no prescribed groundwater monitoring criteria in DA 344-11-2001 or EPL 13172. Rather, the elevation of the local water table is to be monitored to prevent unanticipated intersection by extraction operations at the Quarry, which is considered unlikely above an elevation of 930 m AHD. In the absence of prescribed criteria, a deviation of 2 m from the long-term median groundwater level is considered a trigger for further action. Notwithstanding this, the Quarry must comply with Section 120 of the POEO Act.

7.3.2 Measured Performance

No groundwater was encountered within the extraction and the elevation of the extraction area remained above 940 m AHD.

To meet the environmental management and monitoring commitments of the Quarry's environmental management plans, groundwater monitoring commenced at three bores during the reporting period (refer to **Figure 6.1**). Continuous monitoring of these bores is undertaken by down-hole data loggers which monitor groundwater levels at a 6-hourly frequency. Monitoring commenced on 22 June 2018 at GW1, 12 July 2018 at GW2, and 3 August 2018 at GW3. The data period covered by this report extends from the start of the logging period to 7 March 2019. The data loggers are owned by the Quarry and remain installed to collect ongoing baseline data for the Quarry. Groundwater levels are summarised in **Table 7.2**. The data period used to calculate the **Table 7.2** summary statistics was chosen to commence after the bore

groundwater levels had recovered following drilling in order that natural variability would be captured by the statistics.

Table 7.2 Summarised Quarry Groundwater Monitoring Bore Groundwater Level Data

Bore ID	Data logger minimum groundwater level (m AHD)	Data logger mean groundwater level (m AHD)	Data logger maximum groundwater level (m AHD)	Data logger period used to derive minimum, mean and maximum groundwater levels
GW1	873.69	874.48	874.63	10/08/18 to 07/03/19
GW2	899.60	899.73	899.92	26/07/18 to 07/03/19
GW3	893.78	894.48	895.12	07/08/18 to 07/03/19
Source: Jacobs (2019)				

7.3.3 Discussion and Analysis

As expected, groundwater was not encountered within the extraction area during the reporting period.

An analysis of the groundwater monitoring data collected indicates groundwater levels remained static over the nine month period of monitoring. No trend in groundwater level has been observed.

Walker Quarries has committed to downloading and reviewing the groundwater data at more regular intervals so as to establish trends in water level.

8.0 Rehabilitation

8.1 Rehabilitation Performance during the Reporting Period

Limited areas of the Quarry Site were available for rehabilitation during the reporting period. As a result, landscape management activities were limited to the following, as shown on **Figure 4.1**.

- Vegetation established on the Visual Amenity Bund, located to the north of the Western Stockpile Area was maintained (see **Plate 7** to **Plate 9**).
- Batters to the south of the weighbridge (along the haul road) were applied with topsoil (see **Plate 11**).
- Natural regeneration of the batter slopes on the walls of the three dams (see **Plate 12**) in the Quarry, on a batter to the west of the Eastern Stockpile Area and on a batter to the north of the Top Working Dam continues to increase in density.
- Rehabilitation areas along the Great Western Highway on either side of the Quarry entrance were maintained.

Table 8.1 provides a summary of the disturbance and rehabilitation areas.

Table 8.1 Rehabilitation Status

Mine Area Type	Previous Reporting Period (Actual) (ha)	This Reporting Period (Actual) (ha)	Next Reporting Period (Forecast) (ha)
A. Total mine footprint	18.6	18.6	18.6 ¹
B. Total active disturbance	16.0	16.0	18.6
C. Land being prepared for rehabilitation	0	0	0
D. Land under active rehabilitation	2.6	2.9	2.9
E. Completed rehabilitation	0	0	0

Note 1: An increase in mine footprint could occur subject to approval of MOD 3.

8.2 Actions for the Next Reporting Period

As all areas of disturbance will be required for Quarry operations, no rehabilitation activities are proposed for the next reporting period.

9.0 Community

9.1 Consultation and Community Engagement

9.1.1 Community Consultative Committee

Two meetings of the Wallerawang Quarry Community Consultative Committee (CCC) were held during the reporting period on the following dates.

- 8 November 2018.
- 5 June 2019.

Appendix 6 presents the minutes from each of the meetings. The Quarry staff present at the meetings provided information about Quarry operations, planning and compliance matters, and answered questions. The minutes from the meeting held on 5 June 2019 have not been provided on the website at the time of reporting. Walker Quarries have been advised to upload minutes to their website.

9.1.2 Other Consultation (MOD 3)

In June 2018, a letter informing residents of the intention of Walker Quarries to seek modification to DA 344-11-2001 and inviting them to register to be consulted was distributed to 48 recipients of the letter by post, hand delivery or email. Responses from six landowners were received and an interested parties register created.

Each landowner of the interested parties register was contacted in October and November 2018 to further discuss any issues or concerns over the proposed modification. A meeting was subsequently scheduled and held at the residence of 42 Rocky Waterhole Drive on Friday 7 December 2018. The objective of this meeting was to establish the social values of these stakeholders, discuss the potential impact of the Proposed Modification on these and consider mitigation or management measures as relevant. The meeting was attended by the five property owners on Rocky Waterhole Drive who were provided with a summary of the Proposed Modification and asked questions regarding the proposed operation and potential impacts. At the meeting with the local community (residents of Rocky Waterhole Drive) in December 2018, and in email and phone consultation following this, the primary issues of concern were identified as follows:

- Visual impact, being the potential for the Quarry operations to become more visible from private (existing or future residential) vantage points.
- Property damage and reduced amenity as a result of blasting.
- Poor driver behaviour (although it was noted that this applied to all truck drivers on the Great Western highway and not necessarily those servicing the Quarry).
- Potential pollution of the Cocks River.
- Reduced local (rural) amenity as a result of greater intrusion of the Quarry (views, noise, vibration).
- The potential for a reduction in property values.

Following the meeting, the Applicant agreed to undertake blast monitoring at 42 Rocky Waterhole Drive to provide additional information on vibration levels received.

Following this consultation where key issues of concern were identified, additional impact mitigation and management measures were identified before technical assessment of impacts on environmental parameters. On completion of these technical studies, the residents of Rocky Waterhole Drive were emailed an updated overview (with figures) of the Proposed Modification along with a summary of the key findings of visual, noise and blasting impact assessments on 7 May 2019. No further feedback was received.

Walker Quarries maintains an open door policy and has offered to provide local community members with 'tours' of the Quarry if requested. Both the Quarry Manager and Operations manager have indicated they are happy to field queries and respond to issue of concern.

9.2 Complaints

No complaints were received during the reporting period.

10.0 Independent Audit

10.1 Requirement

In accordance with the requirements of Condition 5(13) of DA 344-11-2001, an Independent Environmental Audit (IEA) of the Quarry is to be completed within a year of the date of consent, and every three years thereafter.

10.2 Independent Environment Audit

An IEA was completed and submitted in July 2018 and was discussed in the 2017/18 Annual Review.

10.2.1 Action Plan

The next IEA is due to be submitted by July 2021.

11.0 Incidents and Non-Compliances during the Reporting Period

11.1 Incidents

There were no Incidents recorded during the reporting period.

11.2 Warnings, Notices and Additional Regulatory Authority Advice

No warnings or notices were issued by the Department of Planning (DPE) during the reporting period.

The DPE and the Environment Protection Authority (EPA) inspected the site on Tuesday 18 December 2018. Email correspondence received on 21 December 2018 from Chris Schultz, Senior Compliance Officer, DPE advised the following:

As discussed, the EPA had raised the visual screen on the bund with the Department, primarily due to the clearing that had been undertaken around the quarry which is quite visual by highway users. It is acknowledged that the climatic conditions have not been favourable that has impacted on the growth of the trees in the screen, however some new growth was noted. The Department encourages you to implement any reasonable and feasible measures to promote growth.

It was noted that some of the erosion and sediment controls on site had deteriorated and needed maintenance. The Department acknowledges that plans are in place for these to be changed out/repaired over the Christmas period.

It was also noted that a drum of waste oil was being stored outside of a bund, and that actions were implemented at the time to rectify this issue.

The requested actions have been observed to have been completed.

In addition to the above, Walker Quarries notes that representatives of the Department of Planning & Environment – Resources Regulator completed an inspection of the Quarry Site on 12 March 2019. Several observations were made with a request to address matters raised with respect to weed management, ongoing sediment and erosion control and remediation of areas of erosion.

11.3 Non-Compliant Conditions

Please refer to **Table 1.2** in **Section 1.0**, which summarises the Quarry's non-compliances with conditions of DA 344-11-2001, ML 1633, and EPL 13172 during the reporting period.

During the reporting period, the following Administrative Non-Compliances occurred:

- Condition 3(4) of DA 344-11-2001: The condition requires quarterly monitoring of noise levels, unless otherwise approved by the Secretary of the Department of Planning & Environment. The Noise Management Plan provides for six monthly noise monitoring, however, the period between the two monitoring campaigns during the report period extended to 7 months and 5 days.

- Condition 5(8) of DA 344-11-2001: The condition requires Community Consultative Committee meeting minutes to be uploaded to Walker Quarries website. The minutes from the meeting held on 5 June 2019 have not been provided on the website at the time of reporting. Walker Quarries have been advised to upload minutes to their website.

11.4 General Compliance

During the reporting period, the only non-compliances have been administrative in nature.

It is considered that during the reporting period, the improvements to overall environmental performance and adherence to administrative environmental requirements observed during the last reporting period have been maintained. This is evidenced by the outcomes and feedback from the DPE, EPA and Resources Regulator following inspections during the reporting period.

During the reporting period, four dust monitoring events were performed outside the recommended 30 days ± 2 days (in accordance with AS/NZS 3580.10.1:2003 Methods for Sampling and Analysis of Ambient Air – Determination of Particulate Matter – Deposited Matter – Gravimetric Method).

During the reporting period (15 February 2019), Dust Gauge number 4 was discovered broken. As a result, dust results for Dust Gauge 4 were unavailable for the February monitoring period. An Incident Report was completed on 21 February 2019 and the dust gauge was replaced.

All environmental monitoring has been undertaken with results confirming compliance with relevant criteria and generally good environmental performance.

Continued excellent environmental performance is expected over the course of the next reporting period as operations progress to the MOD 3 extension.

12.0 Activities to be Completed in the Next Reporting Period

Key activities to be completed during the next reporting period are summarised as follows.

- Quarry operations will continue generally as completed during the reporting period and in accordance with the Quarry MOP. Should any deviations from this be required, these will only be undertaken subject to approval by the DPIE and (if required) approval of an updated MOP.
- Rehabilitation activities will be restricted to the maintenance of areas already rehabilitated and ad hoc stabilisation and revegetation works as required.
- Sediment basins (SB5, SB7a and SB7b) (refer to **Figure 4.1**) require desilting and enlarging to ensure design storage capacity.
- Additional erosion and sediment control works are to be installed along the perimeter of the road to the east of the silt cells where water is currently being diverted and discharging to the slope to the north (see **Plate 6**).
- The environmental management and monitoring commitments of the Quarry's environmental management plans will be implemented and adhered to. Key changes to environmental monitoring and management to be implemented during the next reporting period are as follows.
 - Groundwater levels monitoring data is to be downloaded at quarterly intervals to enable identification of any trends in water level.
 - Water monitoring within the Coxs River (background sites) will be increased to monthly to allow for the establishment of site specific water quality objectives.
- An updated Landscape Planting Plan will be prepared to enable the more visible areas of the Quarry Site to be better screened or obstructed from external vantage points (including the Great Western Highway).
- All environmental management plans will be reviewed and updated as required within three months of this Annual Review. It is noted that should MOD 3 be approved prior to 30 December 2019, or is expected shortly thereafter, any update to the management plans will likely be delayed to incorporate the change to Quarry operations associated with this modification.
- Inspection checklists, including Environmental Inspection Checklist, Haul Road Inspection Checklist and Wallerawang Site SHE Schedule will be updated.

13.0 References

Ecoplanning Pty Ltd (Ecoplanning) (2019). Biodiversity Monitoring 2018 Walker Quarry, Wallerawang, NSW. Prepared for: Walker Quarries Pty Limited, 05 February 2019 Version: Final.

Ecoplanning Pty Ltd (Ecoplanning) (2018). Biodiversity Offset Strategy Wallerawang Quarry. Prepared for: Walker Quarries, 13 July 2018 Version 1.1: Final.

Jacobs Australia Pty Limited (Jacobs) (2019). Wallerawang Quarry – Groundwater Impact Assessment. Wallerawang Quarry Extension. Prepared for Walker Quarries, 28 May 2019 Version 001: Final

Muller Acoustic Consulting Pty Ltd (MAC) (2018). Noise Monitoring Assessment Wallerawang Quarry, August 2018. Prepared for Walker Quarries, 11 September 2018 Version: Final.

Muller Acoustic Consulting Pty Ltd (MAC) (2019). Noise Monitoring Assessment Wallerawang Quarry, April 2019. Prepared for Walker Quarries, 2 May 2019 Version: Final

OzArk Environmental and Heritage Management Pty Ltd (OzArk) (2018). Aboriginal and Cultural Heritage Assessment Report. Prepared for Umwelt (Australia) Pty Limited on behalf of Walker Quarries Pty Limited, June 2019 Version: Final V3.

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



APPENDIX 1

Development Consent DA 344-11-2001

SCHEDULE 5
ENVIRONMENTAL MANAGEMENT, REPORTING AND AUDITING

ENVIRONMENTAL MANAGEMENT

Environmental Management Strategy

1. The Applicant must prepare an Environmental Management Strategy for the development to the satisfaction of the Secretary. This strategy must:
 - (a) be submitted to the Secretary for approval within 6 months of the Secretary requiring preparation of the strategy by notice to the Applicant;
 - (b) provide the strategic framework for environmental management of the development;
 - (c) identify the statutory approvals that apply to the development;
 - (d) describe the role, responsibility, authority and accountability of all key personnel involved in the environmental management of the development;
 - (e) describe the procedures to be implemented to:
 - keep the local community and relevant agencies informed about the operation and environmental performance of the development;
 - receive, record, handle and respond to complaints;
 - resolve any disputes that may arise during the course of the development;
 - respond to any non-compliance;
 - respond to emergencies; and
 - (f) include:
 - copies of any strategies, plans and programs approved under the conditions of this consent; and
 - a clear plan depicting all the monitoring to be carried out under the conditions of this consent.

The Applicant must implement any Environmental Management Strategy as approved from time to time by the Secretary.

Evidence of Consultation

2. Where consultation with any public authority is required by the conditions of this consent, the Applicant must:
 - (a) consult with the relevant public authority prior to submitting the required document ~~to the Secretary for approval;~~
 - (b) submit evidence of this consultation as part of the relevant document;
 - (c) describe how matters raised by the authority have been addressed and any matters not resolved; and
 - (d) include details of any outstanding issues raised by the authority and an explanation of disagreement between any public authority and the Applicant.

Management Plan Requirements

3. The Applicant must ensure that the management plans required under this consent are prepared in accordance with any relevant guidelines, and include:
 - (a) detailed baseline data;
 - (b) a description of:
 - the relevant statutory requirements (including any relevant approval, licence or lease conditions);
 - any relevant limits or performance measures/criteria; and
 - the specific performance indicators that are proposed to be used to judge the performance of, or guide the implementation of, the development or any management measures;
 - (c) a description of the measures that to be implemented to comply with the relevant statutory requirements, limits, or performance measures/criteria;
 - (d) a program to monitor and report on the:
 - impacts and environmental performance of the development; and
 - effectiveness of any management measures (see (c) above);
 - (e) a contingency plan to manage any unpredicted impacts and their consequences and to ensure that ongoing impacts reduce to levels below relevant impact assessment criteria as quickly as possible;
 - (f) a program to investigate and implement ways to improve the environmental performance of the development over time;
 - (g) a protocol for managing and reporting any:
 - incidents;
 - complaints;
 - non-compliances with statutory requirements; and
 - exceedances of the impact assessment criteria and/or performance criteria; and

- (h) a protocol for periodic review of the plan.

Note: The Secretary may waive some of these requirements if they are unnecessary or unwarranted for particular management plans.

Application of Existing Management Plans

4. The Applicant must continue to apply existing approved management plans, strategies or monitoring programs that have most recently been approved under this consent, until the approval of a similar plan, strategy or program under this consent.

Revision of Strategies, Plans & Programs

5. Within 3 months of the submission of an:
- (a) incident report under condition 9 below;
 - (b) Annual Review under condition 11 below;
 - (c) audit report under condition 12 below; and
 - (d) any modifications to this consent,
- the Applicant must review the strategies, plans and programs required under this consent, to the satisfaction of the Secretary. The applicant must notify the Department in writing of any such review being undertaken. Where this review leads to revisions in any such document, then within 6 weeks of the review the revised document must be submitted for the approval of the Secretary.

Note: The purpose of this condition is to ensure that strategies, plans and programs are regularly updated to incorporate any measures recommended to improve environmental performance of the development.

Updating and Staging of Strategies, Plans or Programs

6. To ensure that strategies, plans or programs required under this consent are updated on a regular basis, and that they incorporate any appropriate additional measures to improve the environmental performance of the development, the Applicant may at any time submit revised strategies, plans or programs for the approval of the Secretary. With the agreement of the Secretary, the Applicant may also submit any strategy, plan or program required by this consent on a staged basis.

The Secretary may approve a revised strategy, plan or program required under this consent, or the staged submission of any of these documents, at any time. With the agreement of the Secretary, the Applicant may prepare the revised or staged strategy, plan or program without undertaking consultation with all parties nominated under the applicable condition in this consent.

While any strategy, plan or program may be submitted on a staged basis, the applicant will need to ensure that the operations associated with the development are covered by suitable strategies, plans or programs at all times.

If the submission of any strategy, plan or program is to be staged; then the relevant strategy, plan or program must clearly describe the specific stage/s of the development to which the strategy, plan or program applies; the relationship of this stage/s to any future stages; and the trigger for updating the strategy, plan or program.

Adaptive Management

7. The Applicant must assess and manage development-related risks to ensure that there are no exceedances of the criteria and/or performance measures in Schedule 3. Any exceedance of these criteria and/or performance measures constitutes a breach of this consent and may be subject to penalty or offence provisions under the EP&A Act or EP&A Regulation.

Where any exceedance of these criteria and/or performance measures has occurred, the Applicant must as soon as becoming aware of any exceedance:

- (a) take all reasonable and feasible steps to ensure that the exceedance ceases and does not reoccur;
 - (b) consider all reasonable and feasible options for remediation (where relevant);
 - (c) within 14 days of the exceedance occurring, submit a report to the Secretary describing these remediation options and any preferred remediation measures or other course of action; and
 - (d) implement remediation measures as directed by the Secretary;
- to the satisfaction of the Secretary.

COMMUNITY CONSULTATIVE COMMITTEE

8. The Applicant must establish and operate a Community Consultative Committee (CCC) for the development to the satisfaction of the Secretary. The CCC must be operated in general accordance with the Department's *Community Consultative Committee Guidelines, November 2016* (or later version).

Notes:

- *The CCC is an advisory committee. The Department and other relevant agencies are responsible for ensuring that the Applicant complies with this consent.*
- *In accordance with the guidelines, the Committee should comprise an independent chair and appropriate representation from the Applicant, Council and the local community.*

REPORTING

Incident Reporting

9. The Applicant must immediately notify the Secretary (using the contact name, email address and phone number provided by the Department from time to time) and any other relevant agencies of any incident.
10. Within 7 days of the date of the incident, the Applicant must provide the Secretary and any relevant agencies with a detailed report on the incident, and such further reports as may be requested. This report must include the time and date of the incident, details of the incident, measures implemented to prevent re-occurrence and must identify and non-compliance with this consent.

Regular Reporting

11. The Applicant must provide regular reporting on the environmental performance of the development on its website, in accordance with the reporting arrangements in any plans or programs approved under the conditions of this consent.

Annual Review

12. By the end of September each year, or other timing as may be agreed by the Secretary, the Applicant must submit a review to the Department reviewing the environmental performance of the development to the satisfaction of the Secretary. This review must:
 - (a) describe the development (including any progressive rehabilitation) that was carried out in the previous financial year, and the development that is proposed to be carried out over the current financial year;
 - (b) include a comprehensive review of the monitoring results and complaints records of the development over the previous financial year, which includes a comparison of these results against the:
 - relevant statutory requirements, limits or performance measures/criteria;
 - requirements of any plan or program required under this consent;
 - monitoring results of previous years; and
 - relevant predictions in the documents listed in condition 2(a) of Schedule 2;
 - (c) identify any non-compliance over the past financial year, and describe what actions were (or are being) taken to ensure compliance;
 - (d) identify any trends in the monitoring data over the life of the development;
 - (e) identify any discrepancies between the predicted and actual impacts of the development, and analyse the potential cause of any significant discrepancies; and
 - (f) describe what measures will be implemented over the current [financial/calendar] year to improve the environmental performance of the development.

The Applicant must ensure that copies of the Annual Review are submitted to Council and are available to the Community Consultative Committee (see condition 7 of Schedule 5) and any interested person upon request.

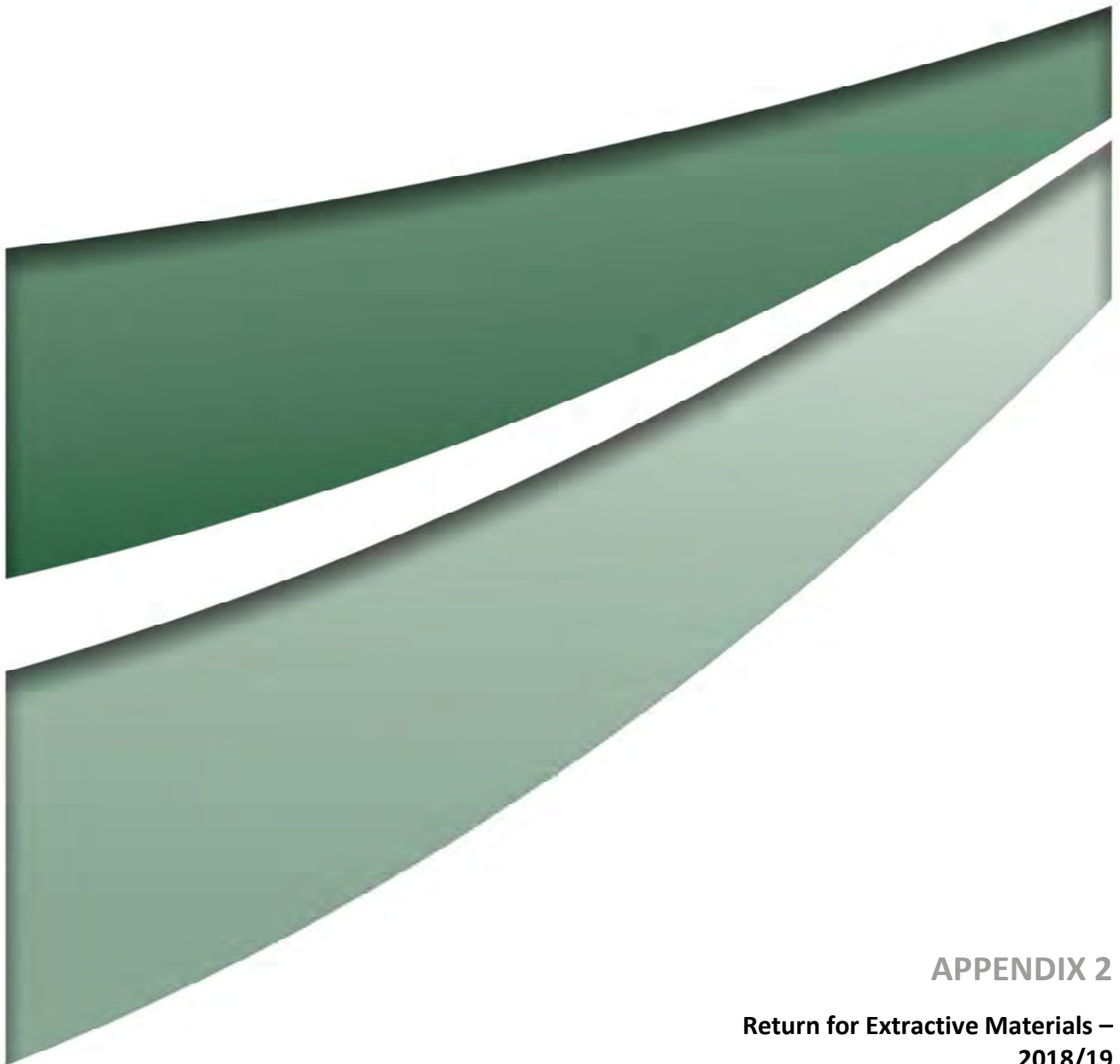
INDEPENDENT ENVIRONMENTAL AUDIT

13. Within a year of the date of this consent, and every 3 years thereafter, unless the Secretary directs otherwise, the Applicant must commission, commence and pay the full cost of an Independent Environmental Audit of the development. This audit must:
 - (a) be led and conducted by a suitably qualified, experienced and independent team of experts whose appointment has been endorsed by the Secretary;
 - (b) include consultation with the relevant agencies and the CCC;
 - (c) assess the environmental performance of the development and whether it is complying with the relevant requirements in this consent and any relevant EPL or necessary water licences for the development (including any assessment, strategy, plan or program required under these approvals);
 - (d) review the adequacy of strategies, plans or programs required under the abovementioned approvals;

- (e) recommend appropriate measures or actions to improve the environmental performance of the development, and/or any assessment, strategy, plan or program required under the abovementioned approvals; and
 - (f) be conducted and reported to the satisfaction of the Secretary.
14. Within 12 weeks of commencing this audit, or as otherwise agreed by the Secretary, the Applicant must submit a copy of the audit report to the Secretary and any other NSW agency that requests it, together with its response to any recommendations contained in the audit report, and a timetable for the implementation of these recommendations as required. The Applicant must implement these recommendations, to the satisfaction of the Secretary.

ACCESS TO INFORMATION

15. Within 6 months of the date of this consent, until the completion of all works, including rehabilitation and remediation the Applicant must:
- (a) make the following information publicly available on its website:¹
 - the documents listed in condition 2(a) of Schedule 2;
 - current statutory approvals for the development;
 - all approved strategies, plans and programs required under the conditions of this consent;
 - a comprehensive summary of the monitoring results of the development, reported in accordance with the specifications in any conditions of this consent, or any approved plans and programs;
 - a complaints register, updated monthly;
 - the annual reviews of the development;
 - any independent environmental audit as described in condition 12 above, and the Applicant's response to the recommendations in any audit; and
 - any other matter required by the Secretary; and
 - (b) keep this information up-to-date, to the satisfaction of the Secretary.



APPENDIX 2

**Return for Extractive Materials –
2018/19**

RETURN FOR EXTRACTIVE MATERIALS: YEAR ENDED 30 JUNE 2019

Quote RIMS ID in all correspondence

Quarry Id: 133991110	Rims ID: 401163	Inquiries please telephone: (02) 4063 6713 Completed or Nil Returns Email – mineral.royalty@planning.nsw.gov.au Postal Address (see below)
Operators Name: WALKER QUARRIES PTY LTD Address: PO BOX 115 WALLERAWANG NSW 2845 Email: accounts@walkerquarries.com.au	Quarry Name: WALLERAWANG QUARRY Quarry Address: LOT 6 GREAT WESTERN HIGHWAY	
		Please amend name, postal address and location of mine or quarry if incorrect or incomplete.

2018-2019

The return should be completed and forwarded to **Senior Advisory Officer, RESOURCE ECONOMICS, RESOURCE PLANNING & PROJECTS, NSW DEPARTMENT OF PLANNING, INDUSTRY & ENVIRONMENT, PO BOX 344 HUNTER REGION MAIL CENTRE NSW 2310 on or before 31 October 2019**. If completion of the return is unavoidably delayed, an application for extension of time should be requested **before** the due date. If no work was done during the year, a **NIL** return must be forwarded.

The return should relate to the **above quarrying establishment** and should cover the operations of quarrying and treatment (such as crushing, screening, washing etc.) carried out at or near the quarry. A return is required even if the operations are solely of a developmental nature and whether the area being worked is held under a mining title or otherwise.

Director, Resource Planning & Projects

Please complete all of the following information to assist in identifying the location of the Quarry

Typical Geology Quartzite (Mineral Group 2)

Nearest Town to Quarry Wallerawang

Local Council Name Lithgow City Council Crown Land (Lot 7322/DP1149335)

Deposited Plan and Lot Number/s of Quarry Sitegoal PL (Lot 7/DP872230), State Forest (Lot 7071/DP1201227)

Email Address of Operator accounts@walkerquarries.com.au

Name of Owner or Licensee Walker Quarries Pty Ltd

Postal Address of Licensee PO Box 115 Wallerawang NSW 2845

Licence/Lease Number/s (if any)
 From Mineral Resources NSW (Industry & Investment NSW) ML 1633
 From Department of Lands or other Department NA

If any output was obtained from land NOT held under licence from the above Departments, state the Name/s and Address/es of the Owners of the land Sitegoal Pty Ltd

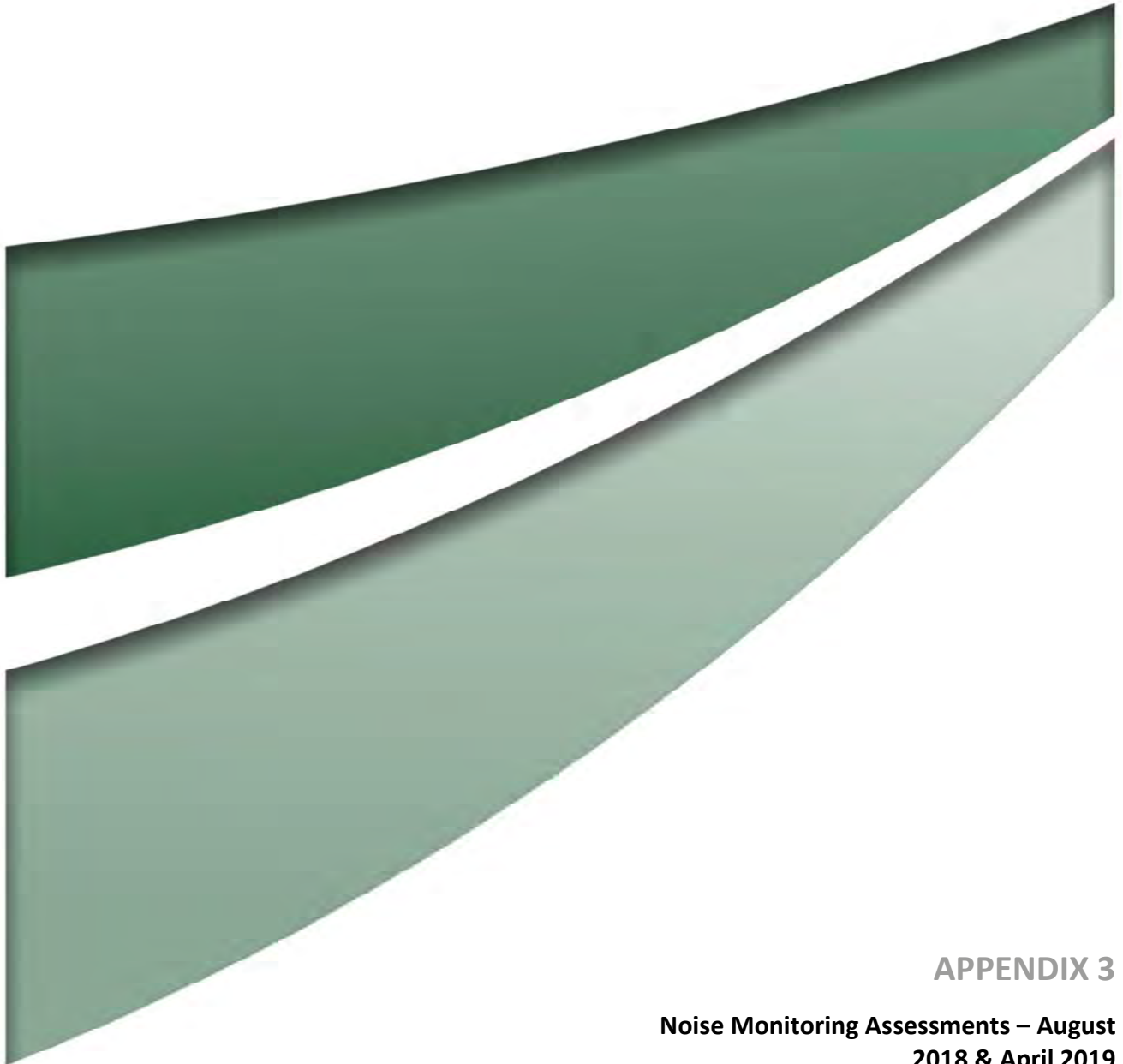
To the best of my knowledge, information entered in this return is correct and no blank spaces left where figures should have been inserted.

- SIGNATURE of PROPRIETOR or MANAGER [Signature] DATE 26/9/19
- CONTACT PERSON for this return Accounts
- NAME (Block letters) EMILY HONEYSETT Telephone 02 6324 4066

Production information may be published in aggregated form for statistical reporting. However, production data for individual operations is kept strictly confidential.

Product	Description	Quantity Tonnes
Virgin Materials		
• Crushed Coarse Aggregates		
Over 75mm	Armour Rock & Gabion	152.18
Over 30mm to 75mm	Ballast & 40/20mm Aggregates	2397.88
5mm to 30mm	20/14mm, 10/7mm & 7mm Agg	39796.95
Under 5mm		
Natural Sand		
Manufactured Sand	Coarse, Fine Washed & Fill Sands	35309.07
Prepared Road Base & Sub Base	DGB20, DGS40 & Roadbase	74911.26
Other Unprocessed Materials		
Recycled Materials		
• Crushed Coarse Aggregates		
Over 75mm		
Over 30mm to 75mm		
5mm to 30mm		
Under 5mm		
Natural Sand		
Manufactured Sand		
Prepared Road Base & Sub Base		
Other Unprocessed Materials		
• River Gravel		
Over 30mm	Pebbles	86.66
5mm to 30mm		
Under 5mm		
• Construction Sand	Excluding Industrial	
• Industrial Sand		
Foundry, Moulding		
Glass		
Other (Specify)		
• Dimension Stone	Building, Ornamental, Monumental	
Quarried in Blocks		
Quarried in Slabs		
• Decorative Aggregate	Including Terrazzo	
• Loam	Soil for Topdressing, Garden soil, Horticultural purposes)	
• TOTAL SITE PRODUCTION		152654
• Gross Value (\$) of all Sales	\$2 878 852.00	
• Type of Material	Virgin Material	
• Number of Full-Time Equivalent (FTE) Employees	Employees: 15	Contractors NA

Please Note: A return for clay based products can be obtained by contacting the inquiry number.



APPENDIX 3

Noise Monitoring Assessments – August
2018 & April 2019

Noise Monitoring Assessment

Wallerawang Quarry,
August 2018



Document Information

Noise Monitoring Assessment

Wallerawang Quarry, August 2018

Prepared for: Walker Quarries Pty Ltd

Prepared by: Muller Acoustic Consulting Pty Ltd

PO Box 262, Newcastle NSW 2300

ABN: 36 602 225 132

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www.mulleracoustic.com

Document ID	Status	Date	Prepared By	Signed	Reviewed By	Signed
MAC160392RP4	Final	11 September 2018	Robin Heaton	<i>Robin Heaton</i>	Oliver Muller	<i>OM</i>

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1 Introduction

Muller Acoustic Consulting Pty Ltd (MAC) has been commissioned by Walker Quarries Pty Ltd to complete a bi-annual Noise Monitoring Assessment (NMA) for Wallerawang Quarry ('the quarry').

The NMA involved quantifying the noise contribution of the quarry by direct attended measurements to compare quarry emissions against relevant criteria. Monitoring has been conducted at three representative receiver locations in accordance with the Walker Quarry Noise Management Plan (NMP) and the quarry's Environmental Protection License (ref: 13172). An additional measurement at a nearfield reference location was also conducted to verify the operation of quarry plant and to quantify the noise contribution from site.

The assessment has been conducted in accordance or with reference to the following documents:

- NSW Environment Protection Authority (EPA), Noise Policy for Industry (NPI), 2017;
- Environment Protection Licence EPL 13172 (EPL);
- Australian Standard AS 1055.1:1997 - Acoustics - Description and measurement of environmental noise - General Procedures;
- Atkins Acoustics and Associates Pty Ltd, Noise and Blast Impact Assessment, 2001; and
- R.W.Corkery & Co. Pty Limited, Wallerawang Quarry Noise Management Plan (NMP), 2016.

A glossary of terms, definitions and abbreviations used in this report is provided in **Appendix A**.

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2 Noise Criteria

2.1 Environmental Protection License Noise Limits

Table 1 reproduces the noise criteria for the quarry as per Condition L4.1 of EPL 13172.

Table 1 Noise Limits, dBA			
Location	Day	Evening	Night
	LAeq(15min)	LAeq(15min)	LAeq(15min)
All privately owned residences	43	43	39

Note: Day Period is 7am to 6pm, Evening Period is 6pm to 10pm, Night Period is 10pm to 7am.

It is noted that Condition L4.3 of EPL 13172 identifies conditions under which the noise criteria do not apply and include:

- a) Wind speeds greater than 3m/s at 10m above ground level;
- b) Temperature inversion conditions greater than 3 degrees Celsius / 100m; or
- c) Under “non-significant weather conditions”.

2.2 Quarry Plant Sound Power Noise Limits

Table 6 of the Noise and Blast Impact Assessment (Atkins Acoustics and Associates Pty Ltd, 2001) prepared for the Environmental Impact Statement (EIS) (R.W.Corkery & Co. Pty Limited, 2006) sets out the noise targets for mobile plant operating at the quarry. The noise criteria are reproduced in **Table 2**.

Table 2 Quarry Plant Sound Power Levels, dBA re10-12W	
Mobile Plant	Sound Power Level
Hydraulic Hammer Drill	116
Excavator	115
Rock Breaker	116
Mobile Crusher	115
Permanent Crusher	117
Front End Loader	115
Traxcavator	115
Truck	106

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3 Methodology

3.1 Locality

Wallerawang is located approximately 10km to the north west of Lithgow, NSW. Receivers in the locality surrounding the quarry are primarily rural/residential and for consistency the naming conventions for each receiver has been retained from the NMP. The monitoring locations with respect to the quarry are presented in **Table 3** and graphically in the locality plan shown in **Figure 1**.

Table 3 Receiver Locations

ID	Address	Distance to Quarry Boundary
RL1	Reference Location (adjacent to site office)	N/A
N1	139 Gemalong, Marrangaroo, NSW	1000m
N2	987 Great Western Highway, Marrangaroo, NSW	160m
N3	2 Cypress Close, Wallerawang, NSW	480m

3.2 Environmental Noise Assessment Methodology

The attended noise surveys were conducted in general accordance with the procedures described in Australian Standard AS 1055-1997, "Acoustics - Description and Measurement of Environmental Noise", the EPL and NMP. The measurements were carried out using a Svantek Type 1, 971 noise analyser on Tuesday 28 September 2018 and Wednesday 29 September 2018. The acoustic instrumentation used carries current NATA calibration and complies with AS IEC 61672.1-2004-Electroacoustics - Sound level meters - Specifications. Calibration of all instrumentation was checked prior to and following measurements. Drift in calibration did not exceed $\pm 0.5\text{dBA}$.

Two daytime measurements of 15 minutes in duration were completed at each monitoring location during standard onsite operations. Where possible, throughout each survey the operator quantified the contribution of each significant noise source. Extraneous noise sources were excluded from the analysis to calculate the $\text{LAeq}(15\text{min})$ quarry noise contribution for comparison against the relevant EPL limits. Localised meteorological conditions (ie windspeed and temperature) were recorded during each measurement utilising a Kestrel 5000 Pocket Weather Meter.

FIGURE 1

LOCALITY PLAN

REF: MAC160392



KEY



RECEIVER / MONITORING
LOCATION



REFERENCE LOCATION



PROJECT SITE



4 Results

The monitoring and assessment results are presented in individual tables for each assessment location.

4.1 Assessment Results – Reference Location (RL1)

Operational attended noise monitoring was completed at RL1 on Tuesday 28 August 2018 and Wednesday 29 August 2018. **Table 4** presents the monitored noise level contributions and observed meteorological conditions for each measurement.

Table 4 Operator-Attended Noise Survey Results – Reference Location 1 (RL1)

Date	Time (hrs)	Descriptor (dBA re 20 µPa)			EPL Limit ¹	Meteorology	Comments
		L _{Amax}	L _{Aeq}	L _{A90}			
28/08/2018	13:22	84	66	64	N/A	Wind Speed: 0.8m/s	Onsite Truck 59 – 61
						Wind Dir: NW	Sand Plant 60 – 66
						Rain: Nil	Staff Talking 60 – 84
						Quarry Site L _{Aeq} (15min) Contribution	
29/08/2018	09:11	90	66	51	N/A	Wind Speed:2.5 m/s	Export Trucks 50 – 90
						Wind Dir: S	Loader 50 – 58
						Rain: Nil	Water Cart 61 – 72
						Quarry Site L _{Aeq} (15min) Contribution	

Note 1: EPL not applicable for this onsite reference location.

4.2 Assessment Results - Location N1

Operational attended noise monitoring was completed at N1 on Tuesday 28 August 2018 and Wednesday 29 August 2018. **Table 5** presents the monitored noise level contributions and observed meteorological conditions for each measurement.

Table 5 Operator-Attended Noise Survey Results – Location N1							
Date	Time (hrs)	Descriptor (dBA re 20 µPa)			EPL	Meteorology	Comments
		L _{Amax}	L _{Aeq}	L _{A90}	Limit		
28/08/2018	12:25	70	52	43	43	Wind Speed: 1.5m/s	Traffic 40 – 72
						Wind Dir: NW	Livestock 55 – 58
						Rain: Nil	Wind in Trees 30 – 41
							Aircraft Noise 45 – 51
Quarry Site L _{Aeq} (15min) Contribution							Quarry Inaudible
29/08/2018	08:15	77	52	45	43	Wind Speed: 0.1m/s	Traffic 50 – 64
						Wind Dir: E	Birds 50 – 77
						Rain: Nil	
						Quarry Site L _{Aeq} (15min) Contribution	

4.3 Assessment Results - Location N2

Operational attended noise monitoring was completed at N2 on Tuesday 28 August 2018 and Wednesday 29 August 2018. **Table 6** presents the monitored noise level contributions and observed meteorological conditions for each measurement.

Table 6 Operator-Attended Noise Survey Results – Location N2							
Date	Time (hrs)	Descriptor (dBA re 20 µPa)			EPL	Meteorology	Comments
		L _{Amax}	L _{Aeq}	L _{A90}	Limit		
28/08/2018	13:01	56	45	38	43	Wind Speed: 1.2m/s	Traffic Noise 45 – 56
						Wind Dir: NW	Birds 41 – 45
						Rain: Nil	Wind in trees 40 – 45
						Quarry Site L _{Aeq} (15min) Contribution	
29/08/2018	08:45	57	41	36	43	Wind Speed: 0.6m/s	Traffic 34 – 42
						Wind Dir: E	Birds 43 – 57
						Rain: Nil	Aircraft 37 – 45
						Quarry Site L _{Aeq} (15min) Contribution	

4.4 Assessment Results - Location N3

Operational attended noise monitoring was completed at N3 on Tuesday 28 August 2018 and Wednesday 29 August 2018. **Table 7** presents the monitored noise level contributions and observed meteorological conditions for each measurement.

Table 7 Operator-Attended Noise Survey Results – Location N3							
Date	Time (hrs)	Descriptor (dBA re 20 µPa)			EPL Limit	Meteorology	Comments
		L _A max	L _A eq	L _A 90			
28/08/2018	15:22	66	50	41	43	Wind Speed: 0.2m/s	Traffic 40 – 66
						Wind Dir: NW	Aircraft 59 – 64
						Rain: Nil	Birds 50 – 60
Quarry Site L _A eq(15min) Contribution							Quarry Inaudible
29/08/2018	09:31	65	45	38	43	Wind Speed: 1.4m/s	Traffic 40 – 54
						Wind Dir: E	Birds 35 – 65
						Rain: Nil	
Quarry Site L _A eq(15min) Contribution							Quarry Inaudible

4.5 Sound Power Audit Results

Octave band centre frequency analysis of sound power data for measured on-site plant is presented in **Table 8**. Results of the analysis identify that the overall sound power of items of plant used at the project site are below target sound power levels outlined in the EIS and NMP.

Table 8 Sound Power Levels												
Plant	Octave Band Centre Frequency, Lw Spectrum									Sound	Criteria	
	32	63	125	250	500	1k	2k	4k	8k	Power dBA Lw		
Sandvik QA451	80	92	97	99	105	106	106	101	93	112	115	
Komatsu WA500	64	79	97	98	99	99	96	90	82	105	115	
Komatsu HM400	62	75	98	93	100	100	97	93	86	106	106	
Komatsu WA480	58	71	84	87	93	96	93	92	79	100	115	
Wirtgen Kleeman MR130Z	62	82	93	99	107	108	107	101	90	113	115	
Wirtgen Kleeman MS953	78	84	95	101	106	107	102	97	89	111	115	
Wirtgen Kleeman 21Z	68	82	105	102	105	109	105	100	90	113	115	
Wirtgen Kleeman MC095	66	92	92	96	101	104	106	104	97	110	115	

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5 Discussion

5.1 Discussion of Results – Reference Location (RL1)

Noise measurements on Tuesday 28 August 2018 and Wednesday 29 August 2018 were conducted when Wallerawang Quarry was operating at normal production levels, which included use of mobile crushers several mobile screens, excavator, road trucks, water cart, and mobile sand plant. The noise contribution from the quarry at the reference location was 66dBA LAeq(15min). Operations were typical of the works undertaken over the last six months at the quarry which is now fully operational. The noise environment at the reference location was primarily dominated by the sand plant and road trucks.

From the attended reference measurements, the sound power (Lw) for the three acoustically significant items of plant was calculated to be 108dBA LAeq(15min) for both measurements. It is noted that plant situated within the pit and were acoustically insignificant at this location.

To verify the received noise contribution from the quarry at each of the monitoring locations, calculations were undertaken to estimate the attenuation from the site to each monitoring location. The attenuation calculations incorporated loss due to distance, and conservative topography (ie barrier attenuation) and air absorption losses. The results of the attenuation calculations, identified received noise level and the results of the attended surveys are discussed for each monitoring location in **Section 5.2 to 5.4**.

5.2 Discussion of Results – Location N1

Measurements conducted on Tuesday 28 August 2018 and Wednesday 29 August 2018, identified that Wallerawang Quarry noise was inaudible for both attended measurements at this location. Therefore, the noise contribution from the quarry satisfied the relevant noise limits of 43dBA LAeq(15min). Extraneous non-quarry related sources included highway traffic, birds and wind that were significant contributors to the ambient noise environment.

The calculated attenuation between the quarry site and N1, taking into account distance loss, the surrounding topography and air absorption, was 82dB. Based on the site Lw established from the near field measurements, the resulting received quarry contribution at N1 is <26dBA. This level is significantly lower than the ambient dominant sources which would mask site noise and confirms the quarry was inaudible at this location for both measurements.

5.3 Discussion of Results – Location N2

Measurement results for N2 were dominated by highway traffic and bird noise that was constantly audible during all measurements on Tuesday 28 August 2018 and Wednesday 29 August 2018. Quarry emissions were inaudible during all measurements. Accordingly, quarry contributions remained below the relevant noise limit of 43dBA LAeq(15min).

The attenuation between the quarry site and N2 taking into account distance between the locations, the loss due to surrounding topography (ie ground attenuation) and air absorption is 72dB. Based on the current site Lw established from the near field measurements, the resulting received quarry contribution at N2 is <32dBA. Predicted quarry noise level at N2 verifies that quarry operations were inaudible for both attended measurements when compared to non-quarry sources.

5.4 Discussion of Results – Location N3

Measurements conducted on Tuesday 28 August 2018 and Wednesday 29 August 2018 for N3 were dominated by local and highway traffic. Quarry contributions remained below the relevant criteria of 43dBA LAeq(15min) for both measurements conducted at the location.

The total attenuation due to distance, air absorption and surrounding topography for N3 was estimated to be 76dB. This resulted in an estimated site noise contribution of <32dBA and due to the presence of dominant extraneous noise sources such as passing traffic, the noise from the site was masked and verifies that the site was inaudible throughout both of the survey periods.

5.5 Discussion of Results – Sound Power Audit

The results of the sound power audit demonstrate that current plant used onsite comply with the relevant mobile and static sound power criteria as outlined in the NMP.

6 Conclusion

Muller Acoustic Consulting Pty Ltd (MAC) has completed a Noise Monitoring Assessment on behalf of Walker Quarries Pty Ltd. The assessment was completed to assess Wallerawang Quarry noise emissions against relevant criteria presented in EPL 13172.

Attended measurements for Tuesday 28 August 2018 and Wednesday 29 August 2018 identified that noise emissions generated by Wallerawang Quarry satisfy relevant noise limits specified in the Noise Management Plan and Environmental Protection Licence at all assessed locations. In summary, quarry noise was inaudible during all offsite measurements with monitoring locations dominated by extraneous sources that mask quarry operations.

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Appendix A - Glossary of Terms

Several technical terms have been used in this report and are explained in **Table A1**.

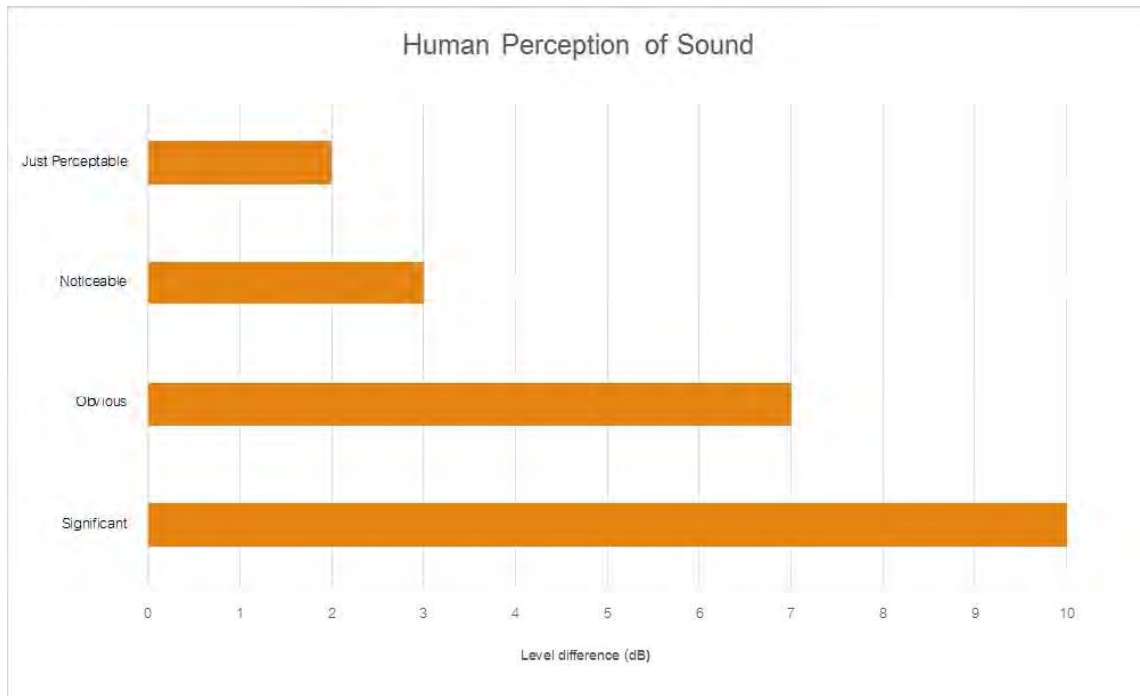
Table A1 Glossary of Terms	
Term	Description
1/3 Octave	Single octave bands divided into three parts
Octave	A division of the frequency range into bands, the upper frequency limit of each band being twice the lower frequency limit.
ABL	Assessment Background Level (ABL) is defined in the NPI as a single figure background level for each assessment period (day, evening and night). It is the tenth percentile of the measured L90 statistical noise levels.
Ambient Noise	The noise associated with a given environment. Typically a composite of sounds from many sources located both near and far where no particular sound is dominant.
A Weighting	A standard weighting of the audible frequencies designed to reflect the response of the human ear to noise.
dBA	Noise is measured in units called decibels (dB). There are several scales for describing noise, the most common being the 'A-weighted' scale. This attempts to closely approximate the frequency response of the human ear.
dB(Z)	Decibels Linear or decibels Z-weighted.
Hertz (Hz)	The measure of frequency of sound wave oscillations per second - 1 oscillation per second equals 1 hertz.
LA10	A noise level which is exceeded 10 % of the time. It is approximately equivalent to the average of maximum noise levels.
LA90	Commonly referred to as the background noise, this is the level exceeded 90 % of the time.
LAeq	The summation of noise over a selected period of time. It is the energy average noise from a source, and is the equivalent continuous sound pressure level over a given period.
LAm _{ax}	The maximum root mean squared (rms) sound pressure level received at the microphone during a measuring interval.
RBL	The Rating Background Level (RBL) is an overall single figure background level representing each assessment period over the whole monitoring period. The RBL is used to determine the intrusiveness criteria for noise assessment purposes and is the median of the ABL's.
Sound power level (SWL)	<p>This is a measure of the total power radiated by a source. The sound power of a source is a fundamental location of the source and is independent of the surrounding environment. Or a measure of the energy emitted from a source as sound and is given by :</p> $= 10 \cdot \log_{10} (W/W_0)$ <p>Where : W is the sound power in watts and W₀ is the sound reference power at 10-12 watts.</p>

Table A2 provides a list of common noise sources and their typical sound level.

Table A2 Common Noise Sources and Their Typical Sound Pressure Levels (SPL), dBA

Source	Typical Sound Level
Threshold of pain	140
Jet engine	130
Hydraulic hammer	120
Chainsaw	110
Industrial workshop	100
Lawn-mower (operator position)	90
Heavy traffic (footpath)	80
Elevated speech	70
Typical conversation	60
Ambient suburban environment	40
Ambient rural environment	30
Bedroom (night with windows closed)	20
Threshold of hearing	0

Figure A1 – Human Perception of Sound



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Noise Monitoring Assessment

Wallerawang Quarry
April 2019



Document Information

Noise Monitoring Assessment

Wallerawang Quarry, April 2019

Prepared for: Walker Quarries Pty Ltd

Prepared by: Muller Acoustic Consulting Pty Ltd

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Document ID	Status	Date	Prepared By	Signed	Reviewed By	Signed
MAC160392RP5V01	Final	2 May 2019	Robin Heaton	<i>Robin Heaton</i>	Oliver Muller	<i>Oliver Muller</i>

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1 Introduction

Muller Acoustic Consulting Pty Ltd (MAC) has been commissioned by Walker Quarries Pty Ltd to complete a bi-annual Noise Monitoring Assessment (NMA) for Wallerawang Quarry ('the quarry').

The NMA involved quantifying the noise contribution of the quarry by direct attended measurements to compare quarry emissions against relevant criteria. Monitoring has been conducted at three representative receiver locations in accordance with the Walker Quarry Noise Management Plan (NMP) and the quarry's Environmental Protection License (ref: 13172). An additional measurement at a nearfield reference location was also conducted to verify the operation of quarry plant and to quantify the noise contribution from site.

The assessment has been conducted in accordance or with reference to the following documents:

- NSW Environment Protection Authority (EPA), Noise Policy for Industry (NPI), 2017;
- Environment Protection Licence EPL 13172 (EPL);
- Australian Standard AS 1055:2018 - Acoustics - Description and measurement of environmental noise;
- Atkins Acoustics and Associates Pty Ltd, Noise and Blast Impact Assessment, 2001; and
- Umwelt (Australia) Pty Ltd, Wallerawang Quarry Noise Management Plan (NMP), 2019.

A glossary of terms, definitions and abbreviations used in this report is provided in **Appendix A**.

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2 Noise Criteria

2.1 Environmental Protection License Noise Limits

Table 1 reproduces the noise criteria for the quarry as per Condition L4.1 of EPL 13172.

Table 1 Noise Limits, dBA			
Location	Day	Evening	Night
	LAeq(15min)	LAeq(15min)	LAeq(15min)
All privately owned residences	43	43	39

Note: Day Period is 7am to 6pm, Evening Period is 6pm to 10pm, Night Period is 10pm to 7am.

It is noted that Condition L4.3 of EPL 13172 identifies conditions under which the noise criteria do not apply and include:

- a) Wind speeds greater than 3m/s at 10m above ground level;
- b) Temperature inversion conditions greater than 3 degrees Celsius / 100m; or
- c) Under “non-significant weather conditions”.

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3 Methodology

3.1 Locality

Wallerawang is located approximately 10km to the north west of Lithgow, NSW. Receivers in the locality surrounding the quarry are primarily rural/residential and for consistency the naming conventions for each receiver has been retained from the NMP. The monitoring locations with respect to the quarry are presented in **Table 2** and graphically in the locality plan shown in **Figure 1**.

Table 2 Receiver Locations

ID	Address	Distance to Quarry Boundary
RL1	Reference Location (adjacent to site office)	N/A
N1	139 Gemalong, Marrangaroo, NSW	1000m
N2	987 Great Western Highway, Marrangaroo, NSW	160m
N3	2 Cypress Close, Wallerawang, NSW	480m

3.2 Environmental Noise Assessment Methodology

The attended noise surveys were conducted in general accordance with the procedures described in Australian Standard AS 1055-2018, "Acoustics - Description and Measurement of Environmental Noise", the EPL and NMP. The measurements were carried out using a Svantek Type 1, 971 noise analyser on Tuesday 2 April 2019 and Wednesday 3 April 2019. The acoustic instrumentation used carries current NATA calibration and complies with AS IEC 61672.1-2019-Electroacoustics - Sound level meters - Specifications. Calibration of all instrumentation was checked prior to and following measurements. Drift in calibration did not exceed $\pm 0.5\text{dBA}$.

Two daytime measurements of 15 minutes in duration were completed at each monitoring location during standard onsite operations. Where possible, throughout each survey the operator quantified the contribution of each significant noise source. Extraneous noise sources were excluded from the analysis to calculate the $L_{Aeq}(15\text{min})$ quarry noise contribution for comparison against the relevant EPL limits. Localised meteorological conditions (ie windspeed and temperature) were recorded during each measurement utilising a handheld weather station.

FIGURE 1

LOCALITY PLAN

REF: MAC160392



KEY



RECEIVER / MONITORING
LOCATION



REFERENCE LOCATION



PROJECT SITE



4 Results

The monitoring and assessment results are presented in individual tables for each assessment location.

4.1 Assessment Results – Reference Location (RL1)

Operational attended noise monitoring was completed at RL1 on Tuesday 2 April 2019 and Wednesday 3 April 2019. **Table 3** presents the monitored noise level contributions and observed meteorological conditions for each measurement.

Table 3 Operator-Attended Noise Survey Results – Reference Location 1 (RL1)							
Date	Time (hrs)	Descriptor (dBA re 20 µPa)			EPL Limit ¹	Meteorology	Comments
		L _A max	L _A eq	L _A 90			
02/04/2019	12:47	76	69	67	N/A		Process Plant 65-69
						WS: 1.2m/s	Reverse Alarm 60-65
						WD: NE	Sand Screens 70-76
						Rain: Nil	Light Vehicle 68-76
							Service Truck 60-61
Quarry Site L _A eq(15min) Contribution							69
03/04/2019	10:24	80	66	64	N/A	WS: 0.7m/s	Loader Pass by 70-80
						WD: NW	Plant 64-66
						Rain: Nil	Reverse Alarm 43-45
							Export Truck 70-72
Quarry Site L _A eq(15min) Contribution							65

Note 1: EPL not applicable for this onsite reference location.

4.2 Assessment Results - Location N1

Operational attended noise monitoring was completed at N1 on Tuesday 2 April 2019 and Wednesday 3 April 2019. **Table 4** presents the monitored noise level contributions and observed meteorological conditions for each measurement.

Table 4 Operator-Attended Noise Survey Results – Location N1							
Date	Time (hrs)	Descriptor (dBA re 20 µPa)			EPL	Meteorology	Comments
		L _{Amax}	L _{Aeq}	L _{A90}	Limit		
02/04/2019	12:20	65	49	43	43	WS: 1.5m/s	Traffic 48-52
						WD: ENE	Livestock 46-48
						Rain: Nil	Birds 43-65
							Wind in Trees 38-42
Quarry Site L _{Aeq} (15min) Contribution							Quarry Inaudible
03/04/2019	09:38	68	47	42	43	WS: 0.6m/s	Traffic 44-68
						WD: NW	Birds 40-54
						Rain: Nil	Music in House 35-39
Quarry Site L _{Aeq} (15min) Contribution							Quarry Inaudible

4.3 Assessment Results - Location N2

Operational attended noise monitoring was completed at N2 on Tuesday 2 April 2019 and Wednesday 3 April 2019. **Table 5** presents the monitored noise level contributions and observed meteorological conditions for each measurement.

Table 5 Operator-Attended Noise Survey Results – Location N2							
Date	Time (hrs)	Descriptor (dBA re 20 µPa)			EPL	Meteorology	Comments
		L _{Amax}	L _{Aeq}	L _{A90}	Limit		
02/04/2019	13:27	59	41	38	43	WS: 1.4m/s	Traffic 40-42
						WD: NE	Birds 35-59
						Rain: Nil	Wind in trees 30-40
Quarry Site L _{Aeq} (15min) Contribution							Quarry Inaudible
03/04/2019	10:03	73	49	42	43	WS: 0.7m/s	Traffic 41-73
						WD: NW	Birds 45-48
						Rain: Nil	
Quarry Site L _{Aeq} (15min) Contribution							Quarry Inaudible

4.4 Assessment Results - Location N3

Operational attended noise monitoring was completed at N3 on Tuesday 2 April 2019 and Wednesday 3 April 2019. **Table 6** presents the monitored noise level contributions and observed meteorological conditions for each measurement.

Table 6 Operator-Attended Noise Survey Results – Location N3							
Date	Time (hrs)	Descriptor (dBA re 20 µPa)			EPL Limit	Meteorology	Comments
		L _A max	L _A eq	L _A 90			
02/04/2019	13:55	82	60	44	43	WS: 0.5m/s	Traffic 40-53
						WD: NE	Dogs 58-82
						Rain: Nil	Truck 53
							Quarry Operations 32-40
Quarry Site L _A eq(15min) Contribution							35dBA
03/04/2019	10:45	73	49	42	43	WS: 1.6m/s	Traffic 48-54
						WD: W	Birds 42-73
						Rain: Nil	Wind in Trees 40
Quarry Site L _A eq(15min) Contribution							Quarry Inaudible

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5 Discussion

5.1 Discussion of Results – Reference Location (RL1)

Noise measurements on Tuesday 2 April 2019 and Wednesday 3 April 2019 were conducted when Wallerawang Quarry was operating at normal production levels, which included use of mobile crushers several mobile screens, excavator, road trucks, water cart, and mobile sand plant. The noise contribution from the quarry at the reference location was 69dB LAeq(15min) and 65dB LAeq(15min). Operations were typical of the works undertaken over the last six months at the quarry which is now fully operational. The noise environment at the reference location was primarily dominated by the screens, sand plant and plant movements.

From the attended reference measurements, the sound power (Lw) for the acoustically significant items of plant was calculated to be 113dBA LAeq(15min) for reference measurement one and 109dBA LAeq(15min) for reference measurement two.

To verify the received noise contribution from the quarry at each of the monitoring locations, calculations were undertaken to estimate the attenuation from the site to each monitoring location. The attenuation calculations incorporated loss due to distance, and conservative topography (ie barrier attenuation) and air absorption losses. The results of the attenuation calculations identified received noise level and the results of the attended surveys are discussed for each monitoring location in **Section 5.2 to 5.4**.

5.2 Discussion of Results – Location N1

Measurements conducted on Tuesday 2 April 2019 and Wednesday 3 April 2019, identified that Wallerawang Quarry noise was inaudible for both attended measurements at this location. Therefore, the noise contribution from the quarry satisfied the relevant noise limits of 43dB LAeq(15min). Extraneous non-quarry related sources included highway traffic, birds and wind that were significant contributors to the ambient noise environment.

The calculated attenuation between the quarry site and N1, taking into account distance loss, the surrounding topography and air absorption was 82dBA. Based on the site Lw established from the near field measurements, the resulting received quarry contribution at N1 was <35dBA for each measurement. This level is lower than the ambient non quarry sources which mask site noise.

5.3 Discussion of Results – Location N2

Measurement results for N2 were dominated by highway traffic, wind in trees and bird noise that was constantly audible during all measurements on Tuesday 2 April 2019 and Wednesday 3 April 2019. Quarry emissions were inaudible during all measurements. Accordingly, quarry contributions remained below the relevant noise limit of 43dB LAeq(15min).

The attenuation between the quarry site and N2 taking into account distance between the locations, the loss due to surrounding topography (ie ground attenuation) and air absorption is 72dBA. Based on the current site Lw established from the near field measurements, the resulting received quarry contribution at N2 is <41dBA. Predicted quarry noise level at N2 verifies that quarry operations were inaudible for both attended measurements when compared to non-quarry sources.

5.4 Discussion of Results – Location N3

Measurements conducted on Tuesday 2 April 2019 and Wednesday 3 April 2019 for N3 were dominated by wind in trees, birds and traffic noise. Quarry contributions were audible on Tuesday 2 April 2019, however remained below the relevant criteria of 43dB LAeq(15min). The quarry was inaudible during the measurement on Wednesday 3 April 2019 thus satisfying the relevant noise limits of 43dB LAeq(15min) at the location.

The total attenuation due to distance, air absorption and surrounding topography for N3 was estimated to be 76dBA. This resulted in an estimated site noise contribution of <37dBA and therefore remained below relevant criteria.

6 Conclusion

Muller Acoustic Consulting Pty Ltd (MAC) has completed a Noise Monitoring Assessment on behalf of Walker Quarries Pty Ltd. The assessment was completed to assess Wallerawang Quarry noise emissions against relevant criteria presented in EPL 13172.

Attended measurements for Tuesday 2 April 2019 and Wednesday 3 April 2019 identified that noise emissions generated by Wallerawang Quarry satisfy relevant noise limits specified in the Noise Management Plan and Environmental Protection Licence at all assessed locations. In summary, quarry noise was inaudible during all offsite measurements, with the exception on round one survey period at N3, with monitoring locations dominated by extraneous sources that mask quarry operations.

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Appendix A - Glossary of Terms

Several technical terms have been used in this report and are explained in **Table A1**.

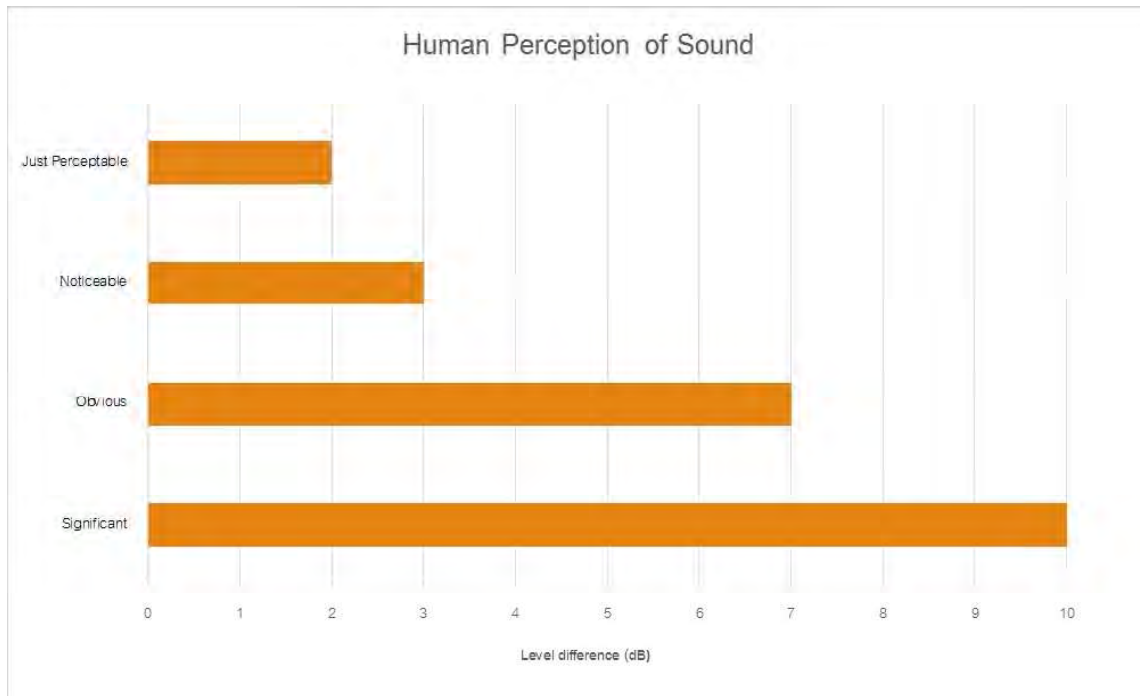
Table A1 Glossary of Terms	
Term	Description
1/3 Octave	Single octave bands divided into three parts
Octave	A division of the frequency range into bands, the upper frequency limit of each band being twice the lower frequency limit.
ABL	Assessment Background Level (ABL) is defined in the NPI as a single figure background level for each assessment period (day, evening and night). It is the tenth percentile of the measured L90 statistical noise levels.
Ambient Noise	The noise associated with a given environment. Typically a composite of sounds from many sources located both near and far where no particular sound is dominant.
A Weighting	A standard weighting of the audible frequencies designed to reflect the response of the human ear to noise.
dBA	Noise is measured in units called decibels (dB). There are several scales for describing noise, the most common being the 'A-weighted' scale. This attempts to closely approximate the frequency response of the human ear.
dB(Z)	Decibels Linear or decibels Z-weighted.
Hertz (Hz)	The measure of frequency of sound wave oscillations per second - 1 oscillation per second equals 1 hertz.
LA10	A noise level which is exceeded 10 % of the time. It is approximately equivalent to the average of maximum noise levels.
LA90	Commonly referred to as the background noise, this is the level exceeded 90 % of the time.
LAeq	The summation of noise over a selected period of time. It is the energy average noise from a source, and is the equivalent continuous sound pressure level over a given period.
LAmx	The maximum root mean squared (rms) sound pressure level received at the microphone during a measuring interval.
RBL	The Rating Background Level (RBL) is an overall single figure background level representing each assessment period over the whole monitoring period. The RBL is used to determine the intrusiveness criteria for noise assessment purposes and is the median of the ABL's.
Sound power level (SWL)	<p>This is a measure of the total power radiated by a source. The sound power of a source is a fundamental location of the source and is independent of the surrounding environment. Or a measure of the energy emitted from a source as sound and is given by :</p> $= 10 \cdot \log_{10} (W/W_0)$ <p>Where : W is the sound power in watts and W₀ is the sound reference power at 10-12 watts.</p>

Table A2 provides a list of common noise sources and their typical sound level.

Table A2 Common Noise Sources and Their Typical Sound Pressure Levels (SPL), dBA

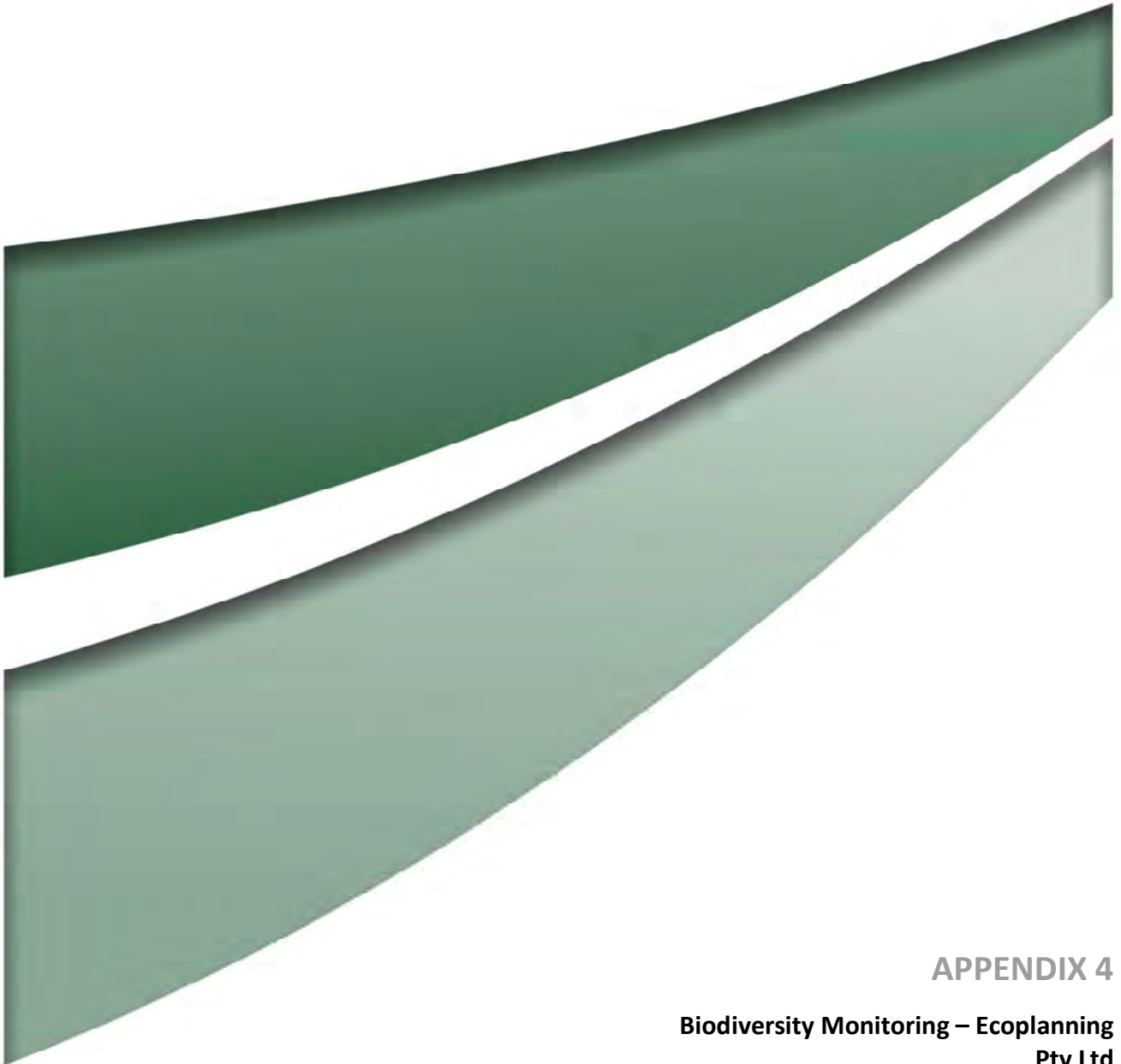
Source	Typical Sound Level
Threshold of pain	140
Jet engine	130
Hydraulic hammer	120
Chainsaw	110
Industrial workshop	100
Lawn-mower (operator position)	90
Heavy traffic (footpath)	80
Elevated speech	70
Typical conversation	60
Ambient suburban environment	40
Ambient rural environment	30
Bedroom (night with windows closed)	20
Threshold of hearing	0

Figure A1 – Human Perception of Sound



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APPENDIX 4

**Biodiversity Monitoring – Ecoplanning
Pty Ltd**



ecoplanning
ecology | planning | offsets

Biodiversity monitoring 2018



Walker Quarry, Wallerawang, NSW

Prepared for: Walker Quarries

05 February 2019 Version: Final

PROJECT NUMBER	2018-087		
PROJECT NAME	Biodiversity monitoring 2018		
PROJECT ADDRESS	Walker Quarry, Wallerawang, NSW		
PREPARED FOR	Walker Quarries		
AUTHOR/S	Brian Towle		
REVIEW	Technical	QA	Version
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VERSION	Version	Date to client	
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1 Introduction

Walker Quarries Pty Ltd (Walker Quarries) currently operates Wallerawang Quarry (the Quarry), located on land adjoining the Great Western Highway to the south of Wallerawang, approximately 8 km northwest of Lithgow (**Figure 1.1**). Original approval (DA 344-11-2001) was granted to Sitegoal Pty Ltd (parent company of Walker Quarries Pty Ltd) in 2004, however, activities were not commenced until late 2014. DA 344-11-2001 was modified on 25 August 2017 and required the preparation of a Biodiversity Management Plan (Condition 3(26)).

Section 5 of the Biodiversity Management Plan (BMP) for the Quarry outlines 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 BMP.

The specific 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, 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.

The BMP includes specific monitoring procedures in relation to the Purple Copper Butterfly (*Paralucia spinifera*; PCB) and local flora and fauna which represent a continuation of monitoring techniques undertaken at the Quarry in 2016 and 2017 (Lesryk Environmental 2016a; 2016b; 2017a; 2017b).

This report presents the method and results of monitoring for the PCB and local flora and fauna undertaken in spring 2018 and in accordance with the BMP. A brief comparison with the results of previous vegetation monitoring in 2016 and 2017 is included to assess changes in quality, integrity and habitat value of retained vegetation.

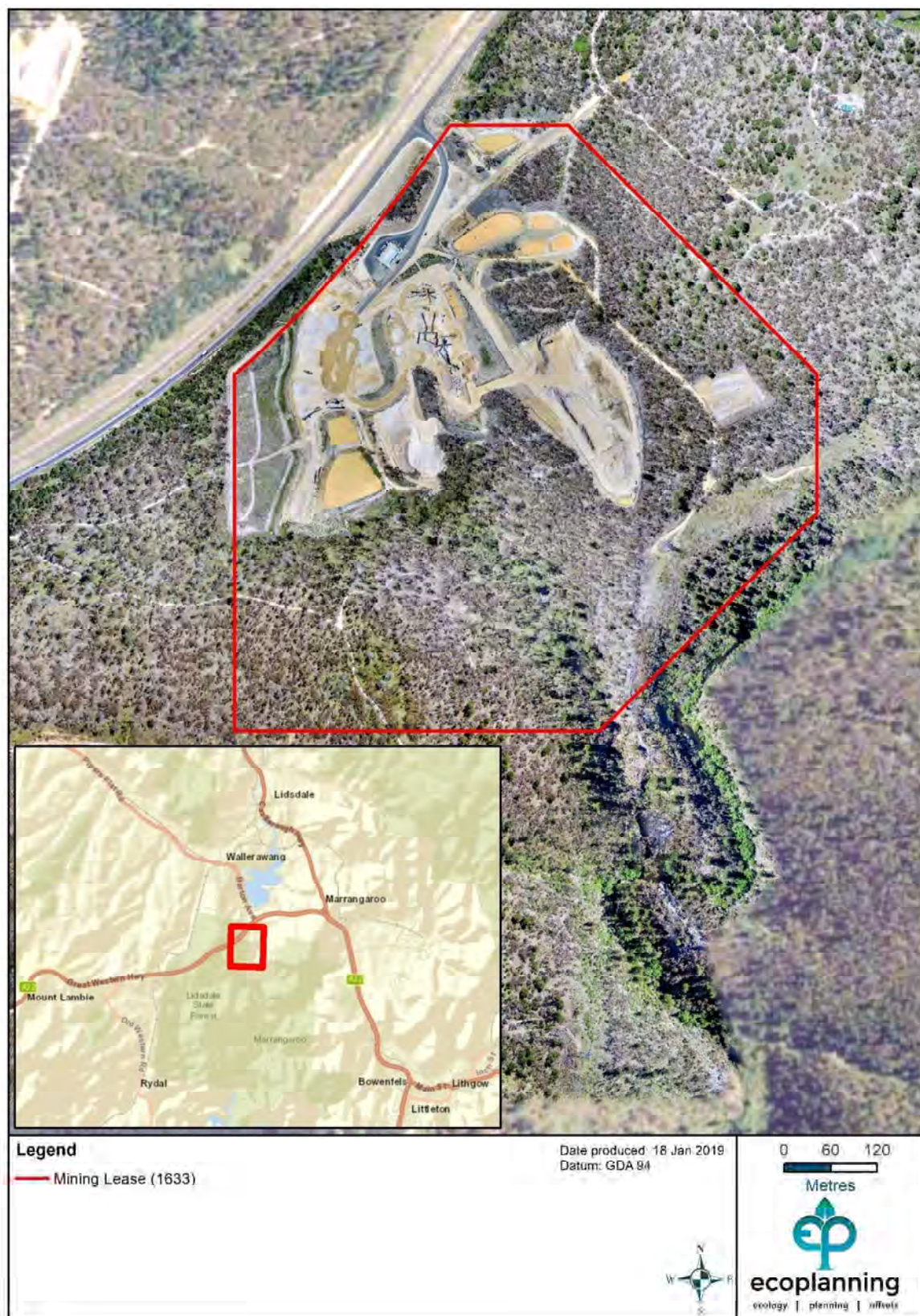


Figure 1.1: Site location

2 Methods

2.1 Local flora and fauna

Monitoring surveys for local flora and fauna were undertaken by Brian Towle (Senior Ecologist) and Thomas Hickman (Ecologist) on the 1 November 2018.

In accordance with the requirements of the BMP, monitoring of local flora involves annual monitoring of vegetation within six monitoring plots (10 m x 10 m). As rehabilitation of the Quarry is completed, additional quadrats will be established to allow for comparison of the vegetation of rehabilitated landform to the surrounding landforms.

The locations of the six monitoring plots are shown in **Figure 2.1** with site details summarised in **Table 2.1**. Each plot is marked with a star picket in its north-western corner (where GPS coordinates for the plot have been recorded) and a photo of each plot was taken from this location.

The monitoring within the six monitoring plots follows the methods of previous monitoring surveys (Lesryk Environmental 2016a; 2017a) and the methods outlined within the BMP. Within each plot the abundance of all vascular plants present was recorded using the following modified Braun-Blanquet scale:

1. <5% cover & 3 or less individuals
2. <5% cover & More than 3 individuals sparsely scattered
3. <5% cover common and consistent
- 4a. <5% cover & very abundant many individuals
- 4b. 5 – 25% cover
5. 25 – 50% cover
6. 50 – 75% cover
7. 75% - 100% cover

The dominant species and foliage cover for each stratum (e.g. canopy, shrub, groundcover) was also recorded for each monitoring plot.

Two Levy Pole transects were also conducted for each monitoring plot. Each Levy Pole transect involves a 5 m transect extending into the quadrat at 90 degrees to the quadrat perimeter tape. The starting points for each transect were determined by a random number generator excluding the sides of the quadrat (0, 10, 20, 30 and 40 metres). This meant that numbers from the following number sets were selected (1-9, 11-19, 21-29, 31-39). If the two transect locations determined by the random number generator intersected each other, the second transect was moved based upon another randomly generated number (provided the second number was 1 m or more apart from the first transect).

At 0.5 m increments along the Levy Pole transect (starting at 0.5 m and finishing at 5.0 m) all vegetation that made contact with a pole (approximately 18 mm diameter) held vertically was recorded. Vegetation which made contact with the pole was identified to species level and the height of the vegetation was assigned to one of the following height categories:

- 0 - 0.1 m

- >0.1 - 0.5 m
- >0.5 - 1 m
- >1.0 – 2.0 m
- >2.0 – 4.0 m.

Observations of local fauna, including species identified from call recognition, indirect observations (including scats, tracks, chewed cones etc.) or observed visually were recorded concurrently with surveys for the PCB and the vegetation monitoring plots. These fauna observations were not confined to any specific plot and included areas of retained bushland within the Quarry which were traversed to access monitoring plots.

Table 2.1: Floristic monitoring plot details

Monitoring plot	GPS co-ords (GDA94)		Aspect (°)	Slope (°)	Location
	Easting	Northing			
WALLQ1	227942	6296438	140	20	East of the supplementary stockpile area
WALLQ2	227859	6296349	310	5	South of creek below main storage dam
WALLQ3	227992	6296455	225	30	South of extraction area
WALLQ4	228201	6296456	80	10	East of extraction area
WALLQ5	228117	6296843	10	8	North-east of the top working dam
WALLQ6	228269	6296610	320	15	NE of the extraction area



Figure 2.1: Vegetation monitoring locations

2.2 Purple Copper Butterfly

Monitoring surveys for the PCB at the Quarry and control site were undertaken on the 23 October 2018 by Brian Towle. In accordance with the BMP, five patches of *Bursaria spinosa* subsp. *lasiophylla* (Blackthorn) within the Quarry were monitored. The locations of the five monitoring sites are shown in **Figure 2.2** with site details summarised in **Table 2.2**. At each of the monitoring sites the following methods were employed:

- Surveyors positioned themselves to survey the site and conduct visual inspections to observe any butterfly activity for at least 10 minutes per site.
- Random plants were searched for PCB caterpillars.
- Random plants were selected and searched for the ant species *Anonychomyrma itinerans*, as this ant has a mutualistic relationship with PCB.
- Selected *Bursaria spinosa* subsp. *lasiophylla* plants were gently shaken to trigger a flight response from any butterflies present.
- Any butterflies observed were captured using a butterfly net and identified using Braby (2016). All animals captured were released at their point of capture.
- The age of plants (large plants and seedlings present), health (any new shoots present) and evidence of grazing (chewed leaves) were recorded.

The BMP identifies that this survey methodology is also to be undertaken at two control sites, with control sites located at Cox's Creek Wallerawang and Eusdale Road Yetholme surveyed in previous seasons. In consultation with OEH, an alternative control site was identified at the Cheetham Flats TSR (Hampton Road, Rydal) located approximately 13 km south-west of the Quarry. In 2018 surveys for PCB at control sites were limited to the single site at Cheetham Flat TSR. Where PCB were observed flying at the control site no further searches for caterpillars or ants were undertaken.

Weather conditions during the survey period (23 October 2018), as recorded onsite, were warm with temperatures between 28-30°C, cloud cover of between 5-10% and with moderate humidity recorded (30 – 50 %). Winds were generally light although increased in the late afternoon (after surveys were completed). Weather conditions as recorded at the nearest meteorological station at Marrangaroo (station 063308), located approximately 5 km east of the Quarry, are presented in **Table 2.3**.

Table 2.2: PCB monitoring site details

Monitoring plot	GPS co-ords (GDA94)		Elevation (masl), aspect & slope (°)	Approx. stand size
	Easting	Northing		
17	227716	6295941	~922 m ASL. North facing slope, ~10°	100 x 30 m
18	227887	6295945	~917 m ASL. North facing slope, ~5°	20 x 20 m
19	227948	6296046	~915 m ASL. East facing slope, ~30°	20 x 20 m
20/21	228005	6296045	~910 m ASL. South facing slope, ~30°	30 x 20 m
24	228244	6295945	~955 m ASL. North-east facing slope, ~20°	20 x 20 m

ASL – Above Sea Level

Table 2.3: Weather conditions during Purple Copper Butterfly surveys, as recorded at Marrangaroo meteorological station

Date	Temperature (°C)		Rainfall (mm)	Wind - 9am		Wind – 3 pm	
	Min	Max		Direction	speed	Direction	speed
23/10/2018	6.7	25.4	0	WNW	4	WNW	13



Figure 2.2: Purple Copper Butterfly monitoring locations

3 Results and Discussion

3.1 Local flora and fauna

The photos and floristic data recorded within each monitoring plot and the Levy Pole transect results are presented within **Appendix A**.

3.1.1 Photo-point monitoring

Photos taken from the north-west corner of each vegetation monitoring plot are included within **Appendix A** of this report. No disturbance to vegetation or soils including vegetation clearing, widespread dieback, erosion or excavations associated with the Quarry operations were recorded within monitoring plots as shown in site photographs. Additionally, no detectable change in vegetation integrity or condition can be observed from comparison of photographs from monitoring plots across seasons.

3.1.2 Floristic monitoring

A summary of native and exotic species richness within each monitoring site is presented in **Table 3.1**. Across all monitoring locations, native species richness has increased in 2018 compared to previous monitoring seasons (**Figure 3.1**). It is unknown whether the observed increase represents natural fluctuations in species richness in response to climatic conditions including rainfall or if the observed increase is related to the change in observers or survey effort. Nonetheless, the recorded increase in native species richness in 2018 suggests that the retained woodland within monitoring sites is not being impacted by the Quarry operations in a manner which is impacting native species richness.

Exotic species richness has remained relatively stable at individual monitoring plots across seasons (**Table 3.1**). One monitoring plot (WALLQ1) recorded an increase in exotic species richness in 2018 with seven exotic species recorded at this site in 2018 compared with five and two species within 2016 and 2017, respectively. The increase in exotic species richness at WALLQ1 occurred in conjunction with an increase in native species richness and may be related to natural fluctuations in species richness or the change in observers in 2018. The additional weed species observed at WALLQ1 in 2018 were all present at low densities and are species which have been observed within the Quarry in previous years. One of the additional weed species recorded at WALLQ1, *Hypericum perforatum* (St Johns Wort), is a high threat exotic weed, as defined under the Biodiversity Assessment Method.

The percent cover of individual species and structural layers within monitoring plots was generally similar across seasons. Increases and decreases in cover of individual species at individual sites were observed, although no overall trends suggesting increases or decreases in individual species, or groups of species, were observed.

Table 3.1: Species richness within monitoring plots

Factor	WALLQ1			WALLQ2			WALLQ3			WALLQ4			WALLQ5			WALLQ6		
	2016	2017	2018	2016	2017	2018	2016	2017	2018	2016	2017	2018	2016	2017	2018	2016	2017	2018
No. native species	28	30	35	17	21	27	29	27	42	19	19	24	16	17	23	16	16	21
No. exotic species	5	2	7	2	2	2	2	2	2	1	2	1	1	1	1	0	0	0
Total Species richness	33	32	42	19	23	29	31	29	44	20	21	25	17	18	24	16	16	21

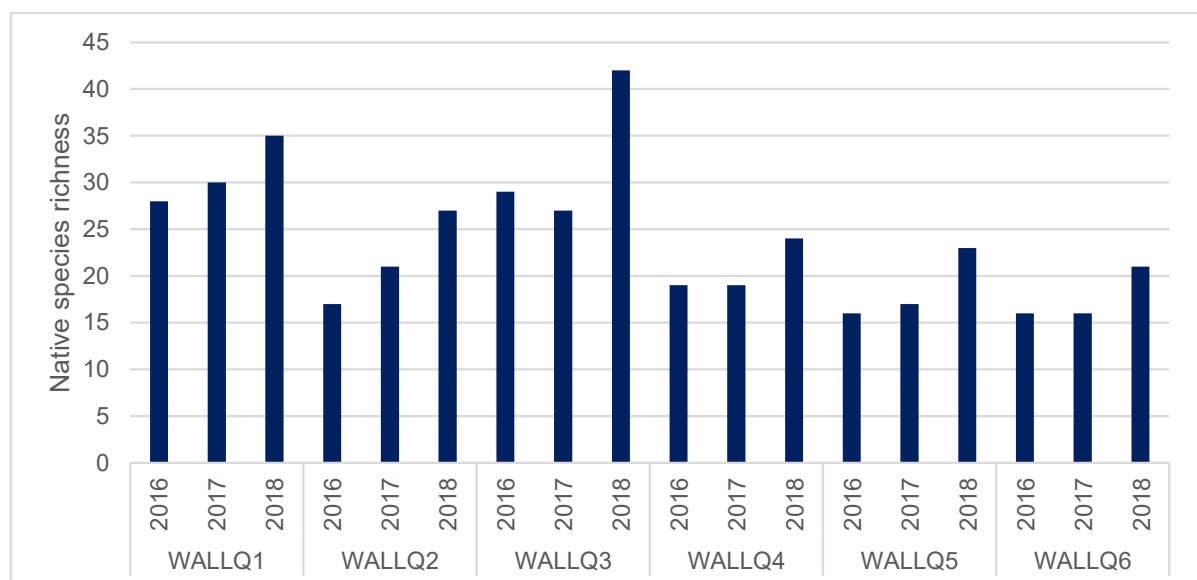


Figure 3.1: Native species richness within monitoring plots

3.1.3 Vegetation structure

The height, cover and dominant species within each structural layer at each monitoring location is presented in **Table 3.2**. Data from Levv Pole transects is presented in **Appendix A**. Across all monitoring plots, native dominated woodland and forest remain present including structural layers which are typical of the woodland and forest types present within the Quarry. The cover and composition of structural layers in 2018 was generally similar to the results from previous monitoring seasons (Lesryk Environmental 2017a). The generally small fluctuations observed in cover of individual structural layers are thought to be related to the subjective nature of this data, rather than indicating changes in overall cover of vegetation structural layers.

Only one monitoring location (WALLQ1) included exotic species as one of the dominant species, although this result is consistent with previous monitoring results (Lesryk Environmental 2017a).

Table 3.2 Vegetation structural data

Monitoring plot	Stratum	Height (m)	Cover (%)	Dominant species
WALL-Q1	Tree	17	20	<i>Eucalyptus viminalis</i> , <i>Eucalyptus bridgesiana</i> , <i>Eucalyptus mannifera</i>
	Shrub	2	10	<i>Bursaria spinosa</i> subsp. <i>lasiophylla</i>
	Ground	0.5	70	<i>Lomandra filiformis</i> , <i>Anthoxanthum odoratum</i> *, <i>Hypochaeris radicata</i> *
WALL-Q2	Tree	18	20	<i>Eucalyptus mannifera</i> , <i>Eucalyptus melliodora</i>
	Shrub	6	5	<i>Acacia dealbata</i>
	Ground	0.5	60	<i>Lomandra filiformis</i> , <i>Poa sieberiana</i> , <i>Gonocarpus tetragynus</i> , <i>Viola betonicifolia</i>
WALL-Q3	Tree	18	30	<i>Eucalyptus dives</i> , <i>Eucalyptus viminalis</i> , <i>Eucalyptus bridgesiana</i>
	Shrub	2	5	<i>Bursaria spinosa</i> subsp. <i>lasiophylla</i>
	Ground	1	60	<i>Rytidosperma pallida</i> , <i>Poa sieberiana</i> , <i>Dianella revoluta</i> , <i>Lomandra filiformis</i>
WALL-Q4	Tree	12	10	<i>Eucalyptus dives</i> , <i>Eucalyptus mannifera</i>
	Ground	0.8	30	<i>Rytidosperma pallida</i> , <i>Goodenia bellidifolia</i> , <i>Dillwynia phyllicoides</i>
WALL-Q5	Tree	12	15	<i>Eucalyptus mannifera</i> , <i>Eucalyptus rossii</i>
	Ground	0.75	20	<i>Lomandra longifolia</i> , <i>Poa sieberiana</i> , <i>Rytidosperma pallida</i>
WALL-Q6	Tree	16	25	<i>Eucalyptus mannifera</i> , <i>Eucalyptus rossii</i>
	Shrub	1.5	1	<i>Hakea laevipes</i>
	Ground	0.5	15	<i>Rytidosperma pallida</i> , <i>Lomandra longifolia</i> , <i>Lomandra gunnii</i>

* denotes an exotic species.

3.1.4 Local fauna

Two native mammals, 18 birds, one amphibian and one reptile species were opportunistically observed during the monitoring surveys (**Appendix B**). No threatened species listed under the NSW *Biodiversity Conservation Act 2016* (BC Act) were observed.

Observations of local fauna made during the monitoring indicate that the vegetated areas of the Quarry continue to provide habitat for an array of native fauna species.

3.2 Purple Copper Butterfly

At least three PCB were observed flying above and between patches of *Bursaria spinosa* subsp. *lasiophylla* at the control site at Cheetham Flat TSR within the first 10 minutes of observation (**Plate 3.1**). These observations confirmed that the timing and weather conditions were appropriate for PCB surveys. As the control site represents a known site for the species and which is subject to ongoing monitoring by OEH, no further assessment of *Bursaria spinosa* subsp. *lasiophylla*, ant species was undertaken to avoid any further disturbance to PCB individuals.

No PCBs were observed within any of the monitoring sites at the Quarry. One butterfly species, Australian Painted Lady (*Vanessa kershawi*), was recorded in addition to a number of moths, beetles, bees and dragonflies. Data recorded from each monitoring site is included in **Appendix C**.

Ant species were observed at all monitoring sites, with the exception of site 24, although the ant species present was identified as a *Crematogaster* sp. and not the species *Anonychomyrma itinerans* with which PCB has mutualistic relationship.

Bursaria spinosa subsp. *lasiophylla* within each of the monitoring sites was observed to be in a healthy condition with mature fruiting individuals and seedlings present. All sites included *Bursaria spinosa* subsp. *lasiophylla* with new growth (**Plate 3.1**) and some evidence of grazing, although it was not possible to determine whether the grazing was recent.

These monitoring results are largely consistent with monitoring results from 2017, where no PCB or *Anonychomyrma itinerans* were recorded within the Quarry, although *Bursaria spinosa* subsp. *lasiophylla* remained in good health with new growth evident.

As the PCB has an annual life-cycle with one generation completed annually, and the species has not been detected within the Quarry during the last three years of monitoring, it is likely that the population(s) which once occurred within the Quarry has become locally extinct. The landscapes surrounding the Quarry, including forestry plantations, cleared agricultural lands and steeply sloping land adjacent to the Cox's River do not represent habitat for the PCB and reduce the chances of habitat on site being recolonised by the species. Another factor reducing the likelihood that habitat at the Quarry may be recolonised by PCB is the weak erratic flight of this species and its extremely low dispersal capability (NPWS 2001).



Plate 3.1: Purple Copper Butterfly observed at the reference site (left) and *Bursaria spinosa* subsp. *lasiophylla* with new growth

4 Conclusions and recommendations

No large-scale disturbance to vegetation or soils which were attributable to the quarry operations were detected within the areas surrounding the Quarry operations. Observations of local fauna made during the monitoring indicate that the vegetated areas of the Quarry continue to provide habitat for an array of native fauna species.

Based upon results from the 2018 monitoring period, no observable or significant trends in the occurrence of specific threatened species or quality / quantity of available habitat has been identified.

Several exotic flora species which have potential to invade native vegetation and outcompete native species were recorded within the Quarry including *Hypericum perforatum** (St Johns Wort), *Pinus radiata** (Radiata Pine) and *Rubus ulmifolius** (Blackberry). These species should be targeted as part of weed control works within the Quarry.

As no PCB or attendant ants (*Anonychomyrma itinerans*) have been recorded within the Quarry during the last three monitoring surveys (Lesryk 2016b; 2017b), with PCB last detected in the Quarry in September 2002, it is likely that the population of PCB which once occurred within the Quarry is now locally extinct. As such, continued monitoring of this species within the Quarry is no longer warranted.

5 References

Braby, M., 2016. *The complete field guide to butterflies of Australia*. 2nd ed. Victoria: CSIRO Publishing.

Lesryk Environmental (2016a) Vegetation monitoring: Walker Quarry, Wallerawang, NSW. Unpublished report prepared for Walker Quarries Pty Ltd.

Lesryk Environmental (2016b). Purple Copper Butterfly Targeted investigation, Walker Quarry, Wallerawang, NSW. Unpublished report prepared for Walker Quarries Pty Ltd.

Lesryk Environmental (2017a). *Vegetation Monitoring Walker Quarry, Wallerawang, NSW*. Unpublished report prepared for Walker Quarries Pty Ltd.

Lesryk Environmental (2017b). Purple Copper Butterfly Monitoring report #2, Walker Quarry, Wallerawang, NSW. Unpublished report prepared for Walker Quarries Pty Ltd.

NSW National Parks and Wildlife Services (NPWS) (2001). Bathurst Copper Butterfly (*Paralucia spinifera*) Recovery Plan. Threatened Species Unit, NPWS.

Wildthing (1999) Statement of effect on threatened flora and fauna over land proposed for a hard rock quarry within EL4473 near Wallerawang, NSW. Unpublished report prepared for Pacrim Environmental Pty Ltd.

Appendix A Floristic Monitoring data

Site Photos



WALLQ1 – 1 Nov 2018



WALLQ2 – 1 Nov 2018



WALLQ3 – 1 Nov 2018



WALLQ1 – 1 Nov 2018



WALLQ5 – 1 Nov 2018



WALLQ6 – 1 Nov 2018

Vegetation monitoring plot data

Family	Species	Cover abundance											
		Q1-2016	Q1-2017	Q1-2018	Q2-2016	Q2-2017	Q2-2018	Q3-2016	Q3-2017	Q3-2018	Q4-2016	Q4-2017	Q4-2018
Anthericaceae	<i>Laxmannia gracilis</i>										1	2	2
Apiaceae	<i>Platysace lanceolata</i>												
Araliaceae	<i>Hydrocotyle laxiflora</i>	3	2	2	3	3	3	3	3	2	2	3	3
Aspleniaceae	<i>Asplenium flabellifolium</i>		3	2									
Asteraceae	<i>Arrhenechthites mixtus</i>	3	3					3	3				
	<i>Brachyscome spathulata</i>									3			
	<i>Cassinia aculeata</i>	1	1										
	<i>Cassinia laevis</i>			1			1						
	<i>Chrysocephalum apiculatum</i>												2
	<i>Cirsium vulgare</i> *	1		1									
	<i>Coryza</i> sp.			2									
	<i>Coronidium scorpioides</i>	2	1		2	2			1	2			
	<i>Cymbonotus lawsonianus</i>	2		3			2	3	2	2			
	<i>Euchiton</i> sp.						1						
	<i>Gamochaeta</i> sp.*	1											
	<i>Hypochoeris radicata</i> *	3		3	1	1	2	1	1	2	1	1	
	<i>Ozothamnus diosmifolius</i>		1								2	2	
	<i>Senecio hispidulus</i>			1									
	<i>Senecio quadridentatus</i>			1									
Campanulaceae	<i>Xerochrysium viscosum</i>	3			3		1	2					
	<i>Wahlenbergia</i> sp.			2			2			2			1
	<i>Stellaria pungens</i>	4A	4A	3									
Convolvulaceae	<i>Dichondra repens</i>		3	2	2	2	2						

Family	Species	Cover abundance																		
		Q1-2016	Q1-2017	Q1-2018	Q2-2016	Q2-2017	Q2-2018	Q3-2016	Q3-2017	Q3-2018	Q4-2016	Q4-2017	Q4-2018	Q5-2016	Q5-2017	Q5-2018	Q6-2016	Q6-2017	Q6-2018	
Cyperaceae	<i>Lepidosperma gunnii</i>									1	1	1				1			3	
	<i>Lepidosperma urophorum</i>																4A	4A		
Dilleniaceae	<i>Hibbertia ?riparia</i>														2	1				
	<i>Hibbertia obtusifolia</i>										4A	4A	2							
Droseraceae	<i>Drosera hookeri</i>										4A		2	3						
Ericaceae	<i>Astroloma humifusum</i>		1					1	2				1							
	<i>Brachyloma daphnoides</i>							1	1	2			2						1	
	<i>Leucopogon ericoides</i>		1					1	1		3	3								
	<i>Leucopogon virgatus</i>									2			2							
	<i>Lissanthe strigosa</i>			1	3	3	2	3	3	2	1	2								
	<i>Monotoca scoparia</i>	1	1																	
	<i>Aotus ericoides</i>							2	2											
	<i>Bossiaea buxifolia</i>									2										
	<i>Bossiaea prostrata</i>					1														
	<i>Desmodium</i> sp.						1													
Fabaceae - Faboideae	<i>Dillwynia phyllioides</i>					1	1	3	3	1			3	3	3	2	1		1	
	<i>Glycine clandestina</i>	1	1	2			2			1										
	<i>Gompholobium uncinatum</i>									2										
	<i>Hardenbergia violacea</i>															1			2	
	<i>Hovea heterophylla</i>						1			2		2							2	
	<i>Hovea linearis</i>										1	1								
	<i>Mirbelia platylobioides</i>													2	2	2	3	3	2	
	<i>Pultenaea subspicata</i>														1	1				
	<i>Pultenaea tuberculata</i>															1				
	<i>Vicia</i> sp. *			2																

Family	Species	Cover abundance																	
		Q1-2016	Q1-2017	Q1-2018	Q2-2016	Q2-2017	Q2-2018	Q3-2016	Q3-2017	Q3-2018	Q4-2016	Q4-2017	Q4-2018	Q5-2016	Q5-2017	Q5-2018	Q6-2016	Q6-2017	Q6-2018
Fabaceae - Mimosoideae	<i>Acacia dealbata</i>	1	2	2	2	4B	2												
	<i>Acacia gunnii</i>										1	2	2						
Geraniaceae	<i>Geranium homeanum</i>	4A	2	2	3	1	2												
Goodeniaceae	<i>Goodenia bellidifolia</i>										2	2	4a	3	3	3	2	2	
	<i>Goodenia hederacea</i>																		2
Haloragaceae	<i>Gonocarpus micranthus</i>		1		3	3		3	3		3	3							
	<i>Gonocarpus tetragynus</i>			2			3			3		3				3			
Hypericaceae	<i>Hypericum gramineum</i>				2	2		2	2	1	2	1	2	3	3	2	1	1	
	<i>Hypericum perforatum*</i>			1			1												
Iridaceae	<i>Patersonia sericea</i>										4A	4A	3	3	3	3	3	2	2
Juncaceae	<i>Juncus</i> sp.					1	1												
Lamiaceae	<i>Ajuga australis</i>			2			3			2									
Lauraceae	<i>Cassytha glabella</i>									2			1						
	<i>Cassytha melantha</i>							2	2										
Liliaceae	<i>Liliaceae</i> sp.																		1
Lomandraceae	<i>Lomandra filiformis</i>	3	3	4b	4B	4B	4b	4B	4B	4a		1	1	3	3	3	3	3	3
	<i>Lomandra longifolia</i>												1	4B	4B	4b	4B	4B	3
	<i>Lomandra multiflora</i>	3	3	3						1									
Myrtaceae	<i>Eucalyptus bridgesiana</i>	4B	4B	1	4B	4B		4B	4B	1									
	<i>Eucalyptus dives</i>									4b	4B	4B	2				1	1	
	<i>Eucalyptus mannifera</i>	4B	4B	1	4B	4B	4b				4B	4B	2	4B	4B	4b	4B	4B	4b
	<i>Eucalyptus melliodora</i>						1												
	<i>Eucalyptus pauciflora</i>			1				1	1	1									
	<i>Eucalyptus rossii</i>													4B	4B	4b	4B	4B	4b
	<i>Eucalyptus viminalis</i>	4B	4B	4B				4B	4B	4b									

Family	Species	Cover abundance											
		Q1-2016	Q1-2017	Q1-2018	Q2-2016	Q2-2017	Q2-2018	Q3-2016	Q3-2017	Q3-2018	Q4-2016	Q4-2017	Q4-2018
Orchidaceae	<i>Caladenia fuscata</i>									1			
	<i>Caladenia moschata</i>									1			
	<i>Caleana</i> sp.										2		
	<i>Oxalis perennans</i>									1			
Phormiaceae	<i>Dianella revoluta</i>	3	3	2		2	2	3	3	3			
Phyllanthaceae	<i>Phyllanthus hirtellus</i>								1				
	<i>Poranthera ericifolia</i>							1	1				
	<i>Poranthera microphylla</i>									1	1		1
Pinaceae	<i>Pinus radiata</i> *											1	1
Pittosporaceae	<i>Billardiera scandens</i>			1									
	<i>Bursaria spinosa</i>	4B	4B	4B				4B	4B	2			
Plantaginaceae	<i>Plantago debilis</i>	3	3			1		4A	4A				
	<i>Plantago gaudichaudii</i>			3			2			3			
	<i>Plantago lanceolata</i> *			1									
	<i>Veronica calycina</i>	3		2			2	2		2			
Poaceae	<i>Anthoxanthum odoratum</i> *	5	5	4b	3	3		4B	4B	3			
	<i>Aristida vagans</i>									1		1	1
	<i>Dichelachne micrantha</i>											1	
	<i>Echinopogon caespitosus</i>	3	3		3	3			1	1	2	1	3
	<i>Echinopogon ovatus</i>											1	
	<i>Elymus scaber</i>	1	1							1			
	<i>Entolasia marginata</i>						1						
	<i>Microlaena stipoides</i>			3			2			2			
	<i>Poa sieberiana</i>	4B	4B	2	5	5	4a	5	5	4b	4B	4B	4B
	<i>Poaceae</i> sp.											1	
													2

Family	Species	Cover abundance											
		Q1-2016	Q1-2017	Q1-2018	Q2-2016	Q2-2017	Q2-2018	Q3-2016	Q3-2017	Q3-2018	Q4-2016	Q4-2017	Q4-2018
Polygonaceae	<i>Rytidosperma</i> sp.												2
	<i>Rytidosperma ?monticola</i>					1							
	<i>Rytidosperma pallida</i>	3	3		4A	4B		4B	4B	4b	3	3	4b
	<i>Rumex brownii</i>			1									
Proteaceae	<i>Hakea dactyloides</i>												
	<i>Hakea laevipes</i>												3
	<i>Persoonia linearis</i>							1	1	1			1
	<i>Cheilanthes sieberi</i>										1	1	
Ranunculaceae	<i>Clematis glycinoides</i>	3	3	2									
Restionaceae	<i>Lepyrodia scariosa</i>							1					
Rosaceae	<i>Acaena ovina</i>	3	3	2	2	2	1	1	1				
Rubiaceae	<i>Rubus parviflorus</i>			1									
	<i>Rubus ulmifolius*</i>	1	1	1									
	<i>Asperula conferta</i>			1									
	<i>Galium</i> sp.	1						2		2			
Stackhousiaceae	<i>Opercularia diphylla</i>												1
	<i>Pomax umbellata</i>											2	
Violaceae	<i>Stackhousia monogyna</i>									2			
	<i>Melicytus dentatus</i>	1	1										
	<i>Viola betonicifolia</i>			2	4A		3			2			

* indicates an introduced species

Cover abundance:

1. <5% cover & 3 or less individuals
2. <5% cover & More than 3 individuals sparsely scattered
3. <5% cover common and consistent
- 4a. <5% cover & very abundant many individuals
- 4b. 5 – 25% cover
5. 25 – 50% cover
6. 50 – 75% cover
7. 75% - 100% cover

Levy Pole transect data

Levy Pole Transect data – Q1a

Height interval recorded	Distance along transect									
	0.5 m	1.0 m	1.5 m	2.0 m	2.5 m	3.0 m	3.5 m	4.0 m	4.5 m	5.0 m
0-0.1 m	Oxalis perennans	Hypochoeris radicata*	Hypochoeris radicata*; Anthoxanthum odoratum*; Microlaena stipoides	-	Stellaria pungens	Hypochoeris radicata*; Lomandra filiformis; Anthoxanthum odoratum*	-	Rytidosperma pallida	-	Microlaena stipoides
0.1-0.5 m	-	-	-	-	-	-	-	-	-	-
0.5-1.0 m	-	-	-	-	-	-	-	-	-	-
1.0-2.0 m	-	-	-	-	-	-	-	-	-	-
2.0 - 4.0 m	-	-	-	-	-	-	-	-	-	-

Levy Pole Transect data – Q1b

Height interval recorded	Distance along transect									
	0.5 m	1.0 m	1.5 m	2.0 m	2.5 m	3.0 m	3.5 m	4.0 m	4.5 m	5.0 m
0-0.1 m	-	-	Geranium homeanum	Microlaena stipoides	-	Lomandra filiformis	Ajuga australis	-	Lomandra filiformis	-
0.1-0.5 m	Anthoxanthum odoratum*	-	Rytidosperma pallida	Lomandra filiformis	-	-	-	Lomandra filiformis	-	Anthoxanthum odoratum*
0.5-1.0 m	-	-	-	-	-	-	-	-	-	-
1.0-2.0 m	-	-	-	-	-	-	-	-	-	-
2.0 - 4.0 m	-	-	-	-	-	-	-	-	-	-

Levy Pole Transect data – Q2a

Height interval recorded	Distance along transect									
	0.5 m	1.0 m	1.5 m	2.0 m	2.5 m	3.0 m	3.5 m	4.0 m	4.5 m	5.0 m
0-0.1 m	<i>Lomandra filiformis</i>	<i>Viola betonicifolia</i> ; <i>Lomandra filiformis</i>	<i>Viola betonicifolia</i>	<i>Poa sieberiana</i>	<i>Viola betonicifolia</i> ; <i>Lomandra filiformis</i>	<i>Microlaena stipoides</i>		<i>Anthoxanthum odoratum</i> *	<i>Viola betonicifolia</i> ; <i>Poa sieberiana</i>	<i>Lomandra filiformis</i> ; <i>Hydrocotyle laxiflora</i>
0.1-0.5 m	<i>Dillwynia phyllicoides</i>						<i>Lomandra filiformis</i>			
0.5-1.0 m										
1.0-2.0 m										
2.0 - 4.0 m										

Levy Pole Transect data – Q2b

Height interval recorded	Distance along transect									
	0.5 m	1.0 m	1.5 m	2.0 m	2.5 m	3.0 m	3.5 m	4.0 m	4.5 m	5.0 m
0-0.1 m		<i>Hypericum gramineum</i>	<i>Lomandra filiformis</i>	<i>Lomandra filiformis</i>		<i>Lomandra filiformis</i> ; <i>Lissanthe strigosa</i>	<i>Lomandra filiformis</i>			
0.1-0.5 m	<i>Lomandra filiformis</i>				<i>Dianella revoluta</i>			<i>Lomandra filiformis</i>		
0.5-1.0 m										
1.0-2.0 m										
2.0 - 4.0 m										

Levy Pole Transect data – Q3a

Height interval recorded	Distance along transect									
	0.5 m	1.0 m	1.5 m	2.0 m	2.5 m	3.0 m	3.5 m	4.0 m	4.5 m	5.0 m
0-0.1 m	<i>Anthoxanthum odoratum*</i>		<i>Cassutha glabella</i>	<i>Rytidosperma pallida</i>	<i>Rytidosperma pallida</i>				<i>Galium sp.</i>	<i>Poa sieberiana</i>
0.1-0.5 m	<i>Bursaria spinosa</i>		<i>Rytidosperma pallida</i>	<i>Brachyloma daphnoides</i>						
0.5-1.0 m										
1.0-2.0 m										
2.0 - 4.0 m										

Levy Pole Transect data – Q3b

Height interval recorded	Distance along transect									
	0.5 m	1.0 m	1.5 m	2.0 m	2.5 m	3.0 m	3.5 m	4.0 m	4.5 m	5.0 m
0-0.1 m										
0.1-0.5 m	<i>Rytidosperma pallida</i>	<i>Rytidosperma pallida</i>	<i>Rytidosperma pallida</i>		<i>Rytidosperma pallida</i>	<i>Rytidosperma pallida</i>	<i>Rytidosperma pallida</i>	<i>Rytidosperma pallida</i>		<i>Lomandra filiformis</i>
0.5-1.0 m										<i>Brachyloma daphnoides</i>
1.0-2.0 m										
2.0 - 4.0 m										

Levy Pole Transect data – Q4a

Height interval recorded	Distance along transect									
	0.5 m	1.0 m	1.5 m	2.0 m	2.5 m	3.0 m	3.5 m	4.0 m	4.5 m	5.0 m
0-0.1 m										
0.1-0.5 m		<i>Rytidosperma pallida</i>	<i>Rytidosperma pallida</i>	<i>Rytidosperma pallida</i>			<i>Rytidosperma pallida</i>		<i>Rytidosperma pallida</i>	
0.5-1.0 m										
1.0-2.0 m										
2.0 - 4.0 m										

Levy Pole Transect data – Q4b

Height interval recorded	Distance along transect									
	0.5 m	1.0 m	1.5 m	2.0 m	2.5 m	3.0 m	3.5 m	4.0 m	4.5 m	5.0 m
0-0.1 m								<i>Lomandra filiformis</i>		
0.1-0.5 m		<i>Acacia gunnii</i>	<i>Rytidosperma pallida</i>		<i>Rytidosperma pallida</i>		<i>Rytidosperma pallida</i>		<i>Rytidosperma pallida</i>	
0.5-1.0 m										
1.0-2.0 m										
2.0 - 4.0 m										

Levy Pole Transect data – Q5a

Height interval recorded	Distance along transect									
	0.5 m	1.0 m	1.5 m	2.0 m	2.5 m	3.0 m	3.5 m	4.0 m	4.5 m	5.0 m
0-0.1 m									<i>Poa sieberiana</i>	
0.1-0.5 m	<i>Lomandra longifolia</i>			<i>Lomandra longifolia</i>			<i>Poa sieberiana</i>	<i>Poa sieberiana</i>		
0.5-1.0 m		<i>Lomandra longifolia</i>	<i>Lomandra longifolia</i>							<i>Lomandra longifolia</i>
1.0-2.0 m										
2.0 - 4.0 m										

Levy Pole Transect data – Q5b

Height interval recorded	Distance along transect									
	0.5 m	1.0 m	1.5 m	2.0 m	2.5 m	3.0 m	3.5 m	4.0 m	4.5 m	5.0 m
0-0.1 m										
0.1-0.5 m								<i>Poa sieberiana</i>		
0.5-1.0 m					<i>Lomandra longifolia</i>	<i>Lomandra longifolia</i>	<i>Lomandra longifolia</i>			
1.0-2.0 m										
2.0 - 4.0 m										

Levy Pole Transect data – Q6a

Height interval recorded	Distance along transect									
	0.5 m	1.0 m	1.5 m	2.0 m	2.5 m	3.0 m	3.5 m	4.0 m	4.5 m	5.0 m
0-0.1 m										
0.1-0.5 m		Rytidosperma pallida		Rytidosperma pallida	Rytidosperma pallida					
0.5-1.0 m									Lomandra longifolia	
1.0-2.0 m										
2.0 - 4.0 m										

Levy Pole Transect data – Q6b

Height interval recorded	Distance along transect									
	0.5 m	1.0 m	1.5 m	2.0 m	2.5 m	3.0 m	3.5 m	4.0 m	4.5 m	5.0 m
0-0.1 m										Lomandra filiformis
0.1-0.5 m					Rytidosperma pallida					
0.5-1.0 m										
1.0-2.0 m										
2.0 - 4.0 m										

Appendix B Fauna species list

Common name	Scientific name	Status (BC Act)	2018 monitoring	Previously recorded#
MAMMALS				
Common Wombat	<i>Vombatus ursinus</i>			X
Common Ringtail Possum	<i>Pseudocheirus peregrinus</i>			X
Eastern Grey Kangaroo	<i>Macropus giganteus</i>		X	X
Common Wallaroo	<i>Macropus robustus</i>		X	X
Swamp Wallaby	<i>Wallabia bicolor</i>			X
Yellow-bellied Sheathtail-bat	<i>Saccolaimus flaviventris</i>	V		X
Large Forest Bat	<i>Vespadelus darlingtoni</i>			X
* Fox	<i>Vulpes vulpes</i>			X
* Feral Cat	<i>Felis catus</i>			X
* Rabbit	<i>Oryctolagus cuniculus</i>			X
AVES (BIRDS)				
Yellow-rumped Thornbill	<i>Acanthiza chrysorrhoa</i>			X
Striated Thornbill	<i>Acanthiza lineata</i>		X	X
Brown Thornbill	<i>Acanthiza pusilla</i>			X
Buff-rumped Thornbill	<i>Acanthiza reguloides</i>		X	X
Eastern Spinebill	<i>Acanthorhynchus tenuirostris</i>			X
Grey Goshawk	<i>Accipiter novaehollandiae</i>			X
Australian King Parrot	<i>Alisterus scapularis</i>			X
Pacific Black Duck	<i>Anas superciliosa</i>			X
Red Wattlebird	<i>Anthochaera carunculata</i>			X
Brush Wattlebird	<i>Anthochaera chrysoptera</i>			X
Wedge-tailed Eagle	<i>Aquila audax</i>			X
Fan-tailed Cuckoo	<i>Cacomantis flabelliformis</i>			X
Pallid Cuckoo	<i>Cacomantis pallidus</i>			X
Gang-gang Cockatoo	<i>Callocephalon fimbriatum</i>	V		X
Yellow-tailed Black Cockatoo	<i>Calyptorhynchus funereus</i>			X
Australian Wood Duck	<i>Chenonetta jubata</i>			X
Spotted Quail-thrush	<i>Cinclosoma punctatum</i>			X
Red-browed Treecreeper	<i>Climacteris erythrops</i>			X
Grey Shrike-thrush	<i>Colluricincla harmonica</i>			X
Black-faced Cuckoo-shrike	<i>Coracina novaehollandiae</i>		X	X
White-winged Chough	<i>Corcorax melanorhamphos</i>			X
White-throated Treecreeper	<i>Cormobates leucophaea</i>			X
Australian Raven	<i>Corvus coronoides</i>		X	X
Australian Magpie	<i>Cracticus tibicen</i>			X
Grey Butcherbird	<i>Cracticus torquatus</i>			X
Laughing Kookaburra	<i>Dacelo novaeguineae</i>			X
Varied Sittella	<i>Daphoenositta chrysoptera</i>	V		X

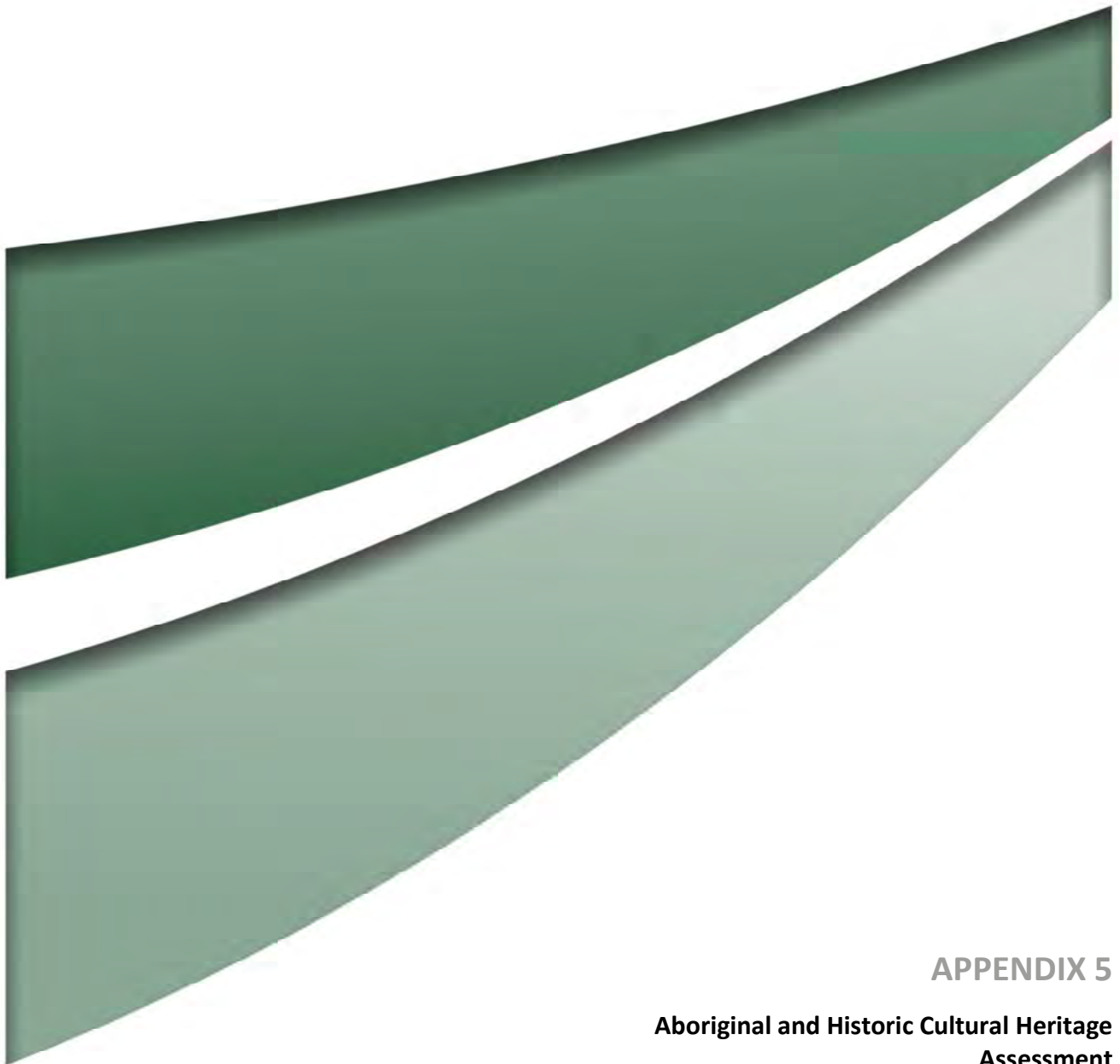


Common name	Scientific name	Status (BC Act)	2018 monitoring	Previously recorded [#]
Eastern Yellow Robin	<i>Eopsaltria australis</i>			X
Dollarbird	<i>Eurystomus orientalis</i>		X	
White-throated Gerygone	<i>Gerygone albogularis</i>		X	X
Welcome Swallow	<i>Hirundo neoxena</i>			X
Yellow-faced Honeyeater	<i>Lichenostomus chrysops</i>		X	X
White-eared Honeyeater	<i>Lichenostomus leucotis</i>			X
Superb Fairy-wren	<i>Malurus cyaneus</i>			X
Brown-headed Honeyeater	<i>Melithreptus brevirostris</i>			X
White-naped Honeyeater	<i>Melithreptus lunatus</i>			X
Restless Flycatcher	<i>Myiagra inquieta</i>		X	X
Leaden Flycatcher	<i>Myiagra rubecula</i>		X	X
Red-browed Finch	<i>Neochmia temporalis</i>			X
Rufous Whistler	<i>Pachycephala rufiventris</i>		X	X
Spotted Pardalote	<i>Pardalotus punctatus</i>		X	X
Striated Pardalote	<i>Pardalotus striatus</i>		X	X
Scarlet Robin	<i>Petroica boodang</i>	V		X
Red-capped Robin	<i>Petroica goodenovii</i>			X
Rose Robin	<i>Petroica rosea</i>			X
Noisy Friarbird	<i>Philemon corniculatus</i>		X	X
New Holland Honeyeater	<i>Phylidonyris novaehollandiae</i>			X
Crimson Rosella	<i>Platycercus elegans</i>		X	X
Eastern Rosella	<i>Platycercus eximius</i>		X	X
Tawny Frogmouth	<i>Podargus strigoides</i>			X
Grey Fantail	<i>Rhipidura albiscapa</i>		X	X
Willie Wagtail	<i>Rhipidura leucophrys</i>			X
White-browed Scrubwren	<i>Sericornis frontalis</i>			X
Pied Currawong	<i>Strepera graculina</i>		X	X
Grey Currawong	<i>Strepera versicolor</i>			X
Sacred Kingfisher	<i>Todiramphus sanctus</i>		X	X
Silvereye	<i>Zosterops lateralis</i>			X
AMPHIBIANS				
Common Eastern Froglet	<i>Crinia signifera</i>			X
Bleating Tree Frog	<i>Litoria dentata</i>		X	
REPTILES				
Copper-tailed Skink	<i>Ctenotus taeniolatus</i>		X	X
Pale-flecked Garden Sun-skink	<i>Lampropholis guichenoti</i>			X
Jacky Lizard	<i>Amphibolurus muricatus</i>			X

* denotes an introduced species; V – listed as 'Vulnerable' under the NSW *Biodiversity Conservation Act 2016* (BC Act); # Wildthing Consultants (1999) and Lesryk Environmental (2016; 2017).

Appendix C Purple Copper Butterfly monitoring data

Site	PCB observed	<i>Anonychomyrma itinerans</i> (Ants)	<i>Bursaria spinosa</i> subsp. <i>lasiophylla</i> (Blackthorn)						Other observations
			Number individuals	Height range (m)	Mature individuals	Seedlings	New growth	Grazing	
17	No	No	>200	0-2	Y	Y	Y	Y	Ant species (<i>Crematogaster</i> sp.) European Honey Bees (<i>Apis mellifera</i>) Moth (species unknown)
18	No	No	~30	0.2-1.4	Y	Y	Y	Y	Ant species (<i>Crematogaster</i> sp.) European Honey Bees (<i>Apis mellifera</i>) Moths & Grasshoppers (Species unknown)
19	No	No	~60	0.2-1	Y	Y	Y	Y	Ant species (<i>Crematogaster</i> sp.) Butterfly (Australian Painted Lady, <i>Vanessa kershawi</i>) Jewel Beetle (unknown species)
20/21	No	No	~30	0.2-2	Y	Y	Y	Y	Ant species (<i>Crematogaster</i> sp.) Moth and Dragonfly (species unknown)
24	No	No	~30	0.5-2.5	Y	Y	Y	Y	Ant species (<i>Crematogaster</i> sp.) present Butterfly (Australian Painted Lady, <i>Vanessa kershawi</i>)



APPENDIX 5

Aboriginal and Historic Cultural Heritage Assessment



View north to the current south-western boundary of the existing quarry.

ABORIGINAL AND HISTORIC CULTURAL HERITAGE ASSESSMENT REPORT

WALLERAWANG QUARRY EXTENSION PROJECT

LOT 6, GREAT WESTERN HIGHWAY, WALLERAWANG

LITHGOW CITY COUNCIL LGA

JUNE 2019

Report Prepared by
OzArk Environmental & Heritage Management Pty Ltd
for Umwelt (Australia) Pty Ltd
on behalf of
Walker Quarries Pty Ltd

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Acknowledgement

OzArk acknowledge Traditional Owners of the area on which this assessment took place and pay respect to their beliefs, cultural heritage and continuing connection with the land. We also acknowledge and pay respect to the post-contact experiences of Aboriginal people with attachment to the area and to the elders, past and present, as the next generation of role models and vessels for memories, traditions, culture and hopes of local Aboriginal people.

EXECUTIVE SUMMARY

OzArk Environmental & Heritage Management (OzArk) has been engaged by Walker Quarries Pty Ltd (the proponent) to complete an Aboriginal and Historic Cultural Heritage Assessment Report (AHCHAR) for a proposed extension of the Wallerawang Quarry (the Quarry) (the project). Contained within Mining Lease (ML) 1633, the Quarry Site is located within the Lithgow City Local Government Area. An extension to the Quarry Site is proposed to allow for the proposed extension to Quarry operations and is the subject of an application to extend ML 1633. The combined Quarry Site and proposed ML 1633 extension is referred to as the project Site. The area of the Project Site relating to the proposed Quarry extension and which is applicable to this AHCHAR is herein referred to as the 'Heritage Study Area' and encompasses approximately 17.77 hectares (ha) of land.

The purpose of the assessment is to inform and support a Statement of Environmental Effects (SEE) being prepared by Umwelt (Australia) Pty Limited to accompany an application to modify the State Significant Development (SSD) approval (DA 344-11-2001) under Section 4.55(2) of Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act). The key components of the proposed modification being to:

- extend the period of mining beyond July 2020;
- extend the extraction area of the Quarry;
- increase the area currently available for stockpiling;
- modify water management and storage infrastructure of the Quarry Site; and
- support the continued production of a more extensive range of quartzite products principally for use in the Wallerawang, Lithgow, Blue Mountains and Sydney regions.

The fieldwork component of this assessment was undertaken by OzArk on 29 August 2018. Registered Aboriginal Party (RAP) representatives from the Bathurst Local Aboriginal Land Council and Gundungurra Tribal Council Aboriginal Corporation participated in the field survey of the Heritage Study Area. The field survey identified no new Aboriginal sites. However, one previously recorded Aboriginal site, AHIMS #45-1-2802 (WQ1), exists within the Quarry Site boundary and will require management and mitigation prior to the proposed work of the project commencing.

The historic heritage field survey component of the assessment was undertaken concurrently with the Aboriginal heritage field survey. No items of historic heritage significance were identified and it was assessed that the Project Site and Heritage Study Area has no potential for historic archaeological deposits.

The following archaeological recommendations are made in regards to the Aboriginal and historic heritage components of the assessment.

Aboriginal heritage

1. Should development consent for the project be granted, the SoC set out in **Section 6.3** will be followed.
2. All ground disturbance activities must be confined to within the assessed Heritage Study Area.
3. Prior to disturbance beyond the Heritage Study Area, further field survey should be completed prior to surface disturbance in these areas.
4. Following SSD approval for the project, a CHMP for the management and mitigation from impacts to Aboriginal heritage (including the implementation of an unanticipated finds protocol and heritage site induction for staff and contractors), would be development in agreement with the proponent, RAPs, OEH and DP&E. The archaeological management recommendations in this report would normally be incorporated into the CHMP that is usually formulated following development approval.

Historic heritage

5. The activities of the project can proceed without further historic heritage investigation provided that all ground disturbance activities are confined to within the Heritage Study Area. If the parameters of the proposed activity extend beyond the assessed area, then further archaeological assessment may be required.
6. This assessment has concluded that there is a low likelihood that the proposed work would harm any historic items. The CHMP will include protocols for the management and mitigation to historic heritage from the impacts, should objects be encountered that are suspected to be historic heritage items.
7. The CHMP shall include protocols for inductions for staff undertaking the proposed activity, and will include the legislative protection requirements for historic sites and items in NSW and the relevant fines for non-compliance.

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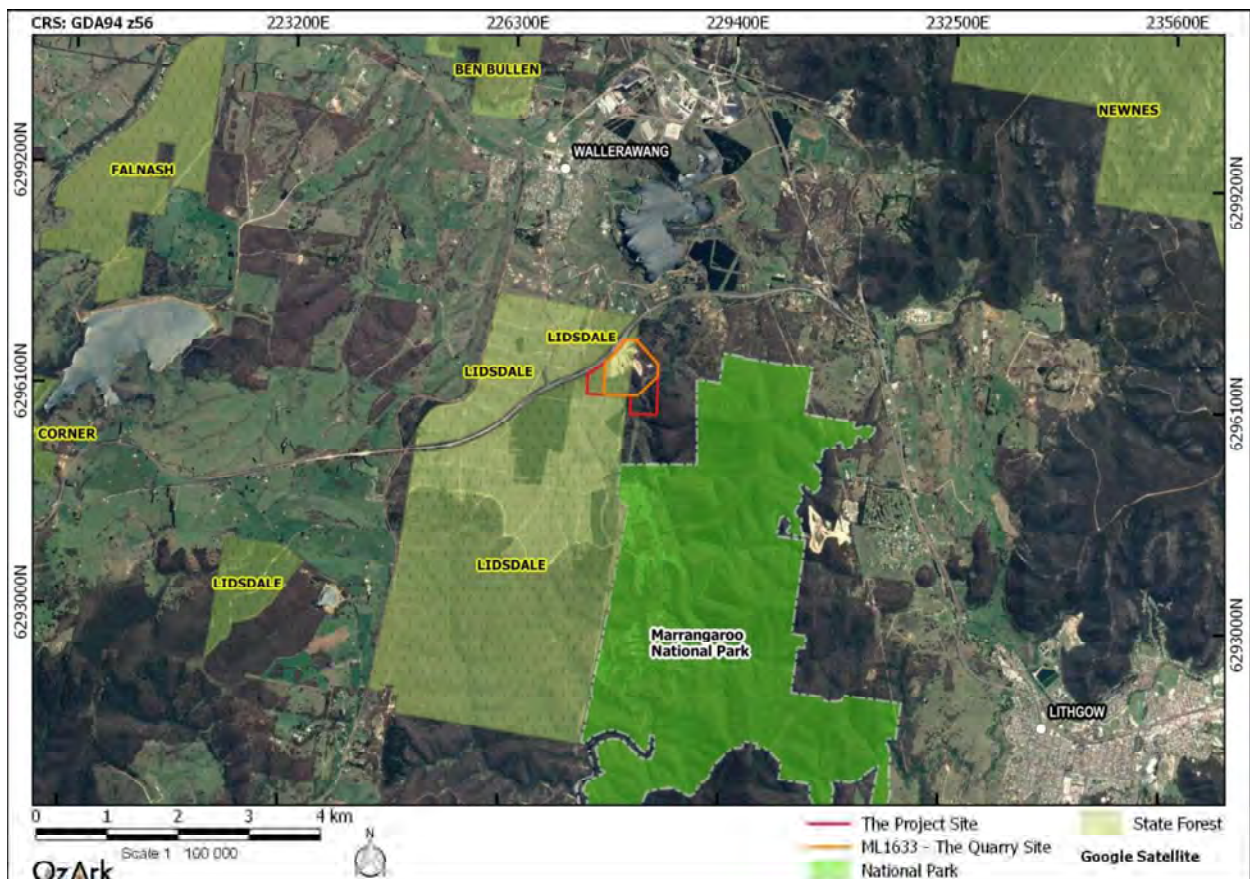
1 INTRODUCTION

1.1 BRIEF DESCRIPTION OF THE PROJECT

OzArk Environmental & Heritage Management (OzArk) has been engaged by Walker Quarries Pty Ltd (the proponent) to complete an Aboriginal and historic cultural heritage assessment report (AHCHAR) for a proposed extension of the Wallerawang Quarry (the Quarry) (the project). Contained within Mining Lease (ML) 1633, the Quarry Site is located within the Lithgow City Local Government Area (LGA) (**Figure 1-1**). An application to extend ML 1633 has been lodged separately by the proponent with the Department of Industry – Division of Resources & Geoscience (DRG). The combined Quarry Site and proposed ML 1633 extension is referred to as the Project Site.

The purpose of the assessment is to inform and support a Statement of Environmental Effects (SEE) being prepared by Umwelt (Australia) Pty Limited to accompany an application to modify the State Significant Development (SSD) approval (DA 344-11-2001).

Figure 1-1: Location of the Project Site in a regional context.



1.2 BACKGROUND

Silcox (2000) was engaged to undertake the Aboriginal archaeological values and assessment over an area of approximately 10 hectares as part of the assessment of the original Quarry proposal. The assessment identified one Aboriginal site; WQ1, situated within a spur landform to

the north of Hoskins Quarry. A total of 22 artefacts were identified at the site, scattered on the surface of an eroded, unsurfaced vehicle track. A number of artefacts were also noted to be partly buried sediment, although it was unclear whether they were eroding out of *in situ* deposit or out of redeposited sediment. Walker Quarries placed (and has maintained) a permanent fence around the WQ1 site boundary for its protection from quarry operations. Site WQ1 is registered on the Aboriginal Heritage Information Management System (AHIMS) as Site #45-1-2802.

In 2018, OzArk undertook an assessment of Site WQ1, for the purpose of locating the site and confirming its status and previously recorded features. It was noted that since Silcox's recording in 2000 that natural erosion related impacts, including surface sediment wash, have since occurred at the site. The ground-truthing of the site identified up to 16 artefacts, the majority within a gently sloping landform with moderately extensive exposures in the southern portion of the site adjacent to the fence line. Artefacts were also recorded along a disused track in the western portion of the site (**Figure 1-2**). OzArk considered that the archaeological potential of WQ1 could be determined without the need for test excavation as sufficient exposures to understand the nature of the site were present.

Figure 1-2: The ground-truthed location of AHIMS #45-1-2802.



Avoidance of the site has been confirmed by the Proponent as not feasible as developing the Quarry to the proposed target depth requires a westerly extension of the extraction area on to the land which currently occupies the site. As such, approval to disturb Site WQ1 will be required as

part of the proposed modification to DA 344-11-2001 (note, Section 4.41(1)(d) identifies that an Aboriginal Heritage Impact Permit (AHIP) is not required for a State Significant Development that is authorised by a development consent). Approval of the proposed modification and authorisation of the disturbance to Site WQ1 will be informed by the results of this AHCHAR. Project understanding & proposed work

1.2.1 Project Site

The Project Site is approximately eight kilometres northwest of Lithgow, NSW, and is bounded to the northwest by the Great Western Highway, to the east and southeast by existing vegetated land and the Coss River. The Project Site adjoins the Lidsdale State Forest in the west and southwest, with the western half of the ML boundary being situated within the boundary of the Lidsdale State Forest.

The proponent currently operates the Quarry on ML 1633, located at 963 Great Western Highway and traversing three lots (Lot 6 DP872230 - being freehold title owned by the proponent, Lot 7071 DP1201227 – being crown land contained within Lidsdale State Forest and managed by Forestry Corporation of NSW, and Lot 7322 DP1149335 – being crown land managed by the Department of Industry – Lands & Water). An extension of the ML 1633 to the west (onto Lot 7071 DP1201227 of Lidsdale State Forest) and to the south (onto Lot 7322 DP1149335 which is managed as crown land) is required and the Project Site incorporates these extensions.

1.2.2 Approved and Current Quarry Operations

The original Quarry approval (DA 344-11-2001) was granted to Sitegoal Pty Ltd (parent company of Walker Quarries Pty Ltd) in 2004. ML 1633 was obtained in July 2009 with activities commencing in 2014.

The proponent is approved to extract and transport up to 500,000 tonnes per year from an extraction area with a maximum depth of 930m AHD and surface area of approximately 4ha. DA 344-11-2001 was modified in August 2017 to regularize several constructed components of the Quarry and formalise the approval of production of a more extensive range of quartzite products. DA 344-11-2001 was modified again on 7 December 2018 to provide for a short-term extension to the limits on quarry operations (from July 2019 to July 2020).

1.2.3 The Proposed Modification

Following the completion of an exploration drilling program and resource assessment (RME, 2018), the Applicant confirmed the extension (laterally and vertically) of the quartzite resource beyond the approved extents of the extraction area. Following this confirmation, and on review of other operational constraints of DA 344-11-2001 and approved, the proponent proposes the following modifications to Quarry operations.

- An extension of the extraction area to increase the total resource approved for extraction by an additional 12 to 15 million tonnes. The extended area would allow for the extraction of the high silica, high purity metamorphosed (indurated) quartzose sandstone (quartzite) which is currently exposed and extracted from the open cut, as well as other resources such as hornfels, sandstone and cobble conglomerate.

The proposed extraction area would be developed to a maximum depth of 860m AHD (70m below the current approved limit and between 40m and 100m below the surrounding landform once the extraction area is developed to its full surface area) and extend the surface disturbance footprint by approximately 5ha.

The extraction area would remain a minimum of approximately 50m from the Coxs River and 10m above the river bank.

- An extension to product stockpiling areas of approximately 5.3ha to the southwest and south of the approved stockpile areas.
- Some water diversions to accommodate the stockpile area extensions and construction of an additional dam to improve water security for the Quarry.
- An extension to the life of the Quarry of 30 years.

The project requires an extension to ML 1633 (and the Quarry Site) to the west on to Lot 7071 DP1201227 (Lidsdale State Forest). The key features and concept design plan that comprise the Quarry extension are illustrated on **Figure 1-3**.

The proposed extensions to the extraction area and stockpile areas, and associated water management infrastructure modifications would be undertaken over the extended life of the Quarry. The disturbance associated with these modifications would only be undertaken as required, and the Applicant has developed a staged disturbance sequence to assist in quarry planning and management of environmental impacts over the life of the Quarry (see **Figure 1-4**).

1.2.4 Heritage Study Area

Field survey was completed over approximately 17.77 hectares of the Project Site and includes the majority of the proposed disturbance footprint of the proposed Quarry extension. The landscape context and details of the field survey area discussed in **Sections 3** and **5.1**.

Figure 1-3: Proposed Quarry Site layout.

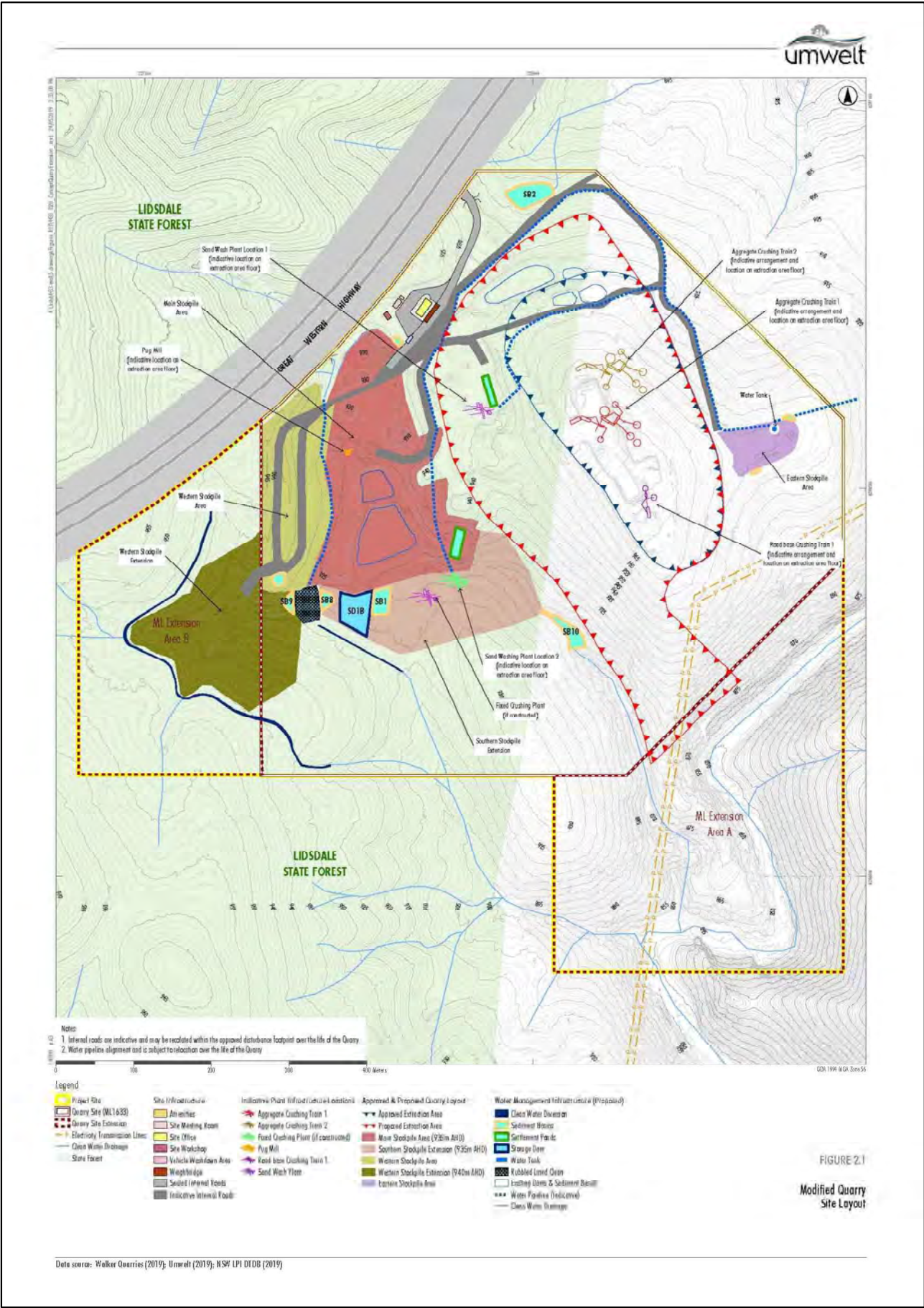


Figure 1-4: The Quarry Site plan showing the staged extensions.

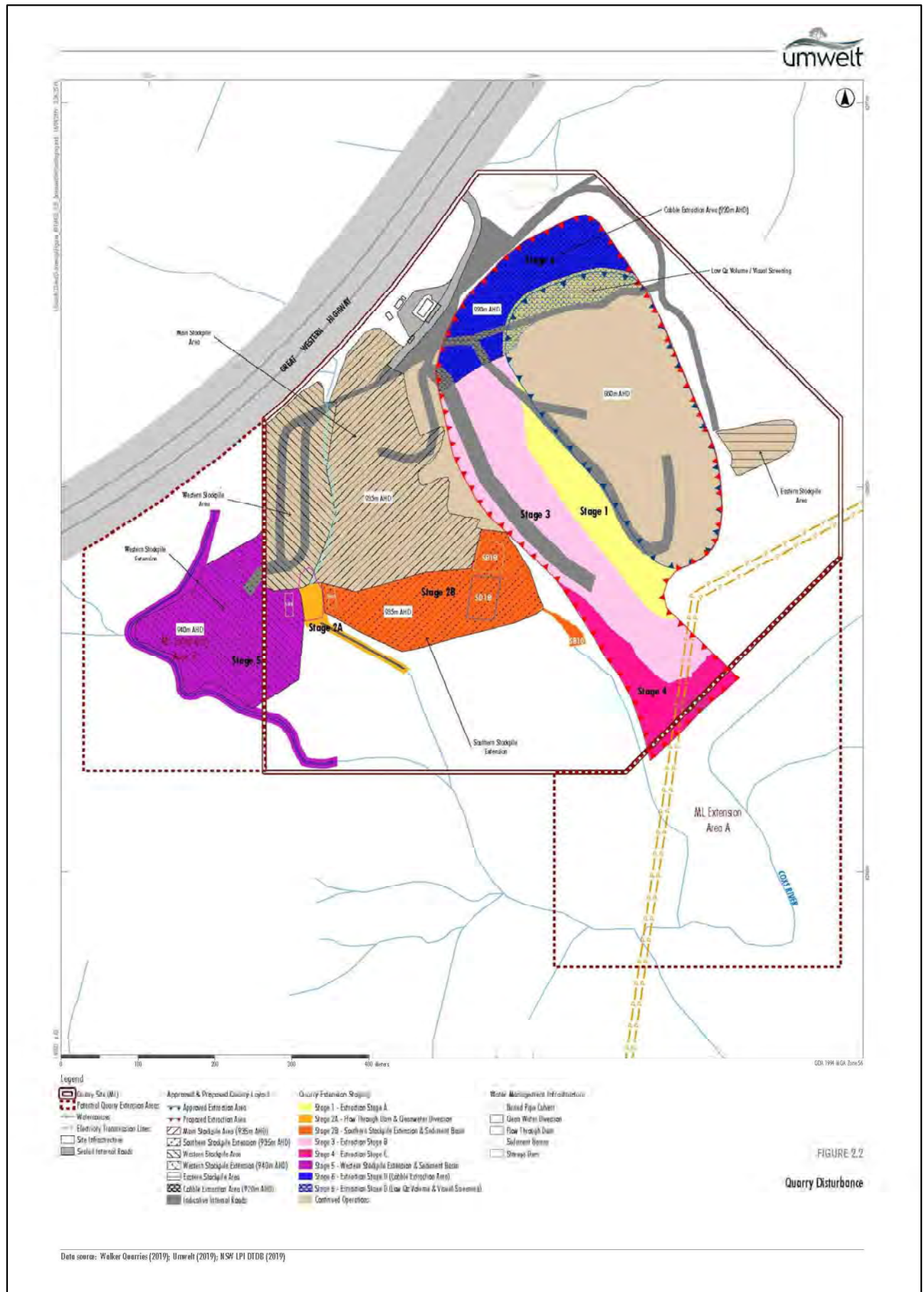
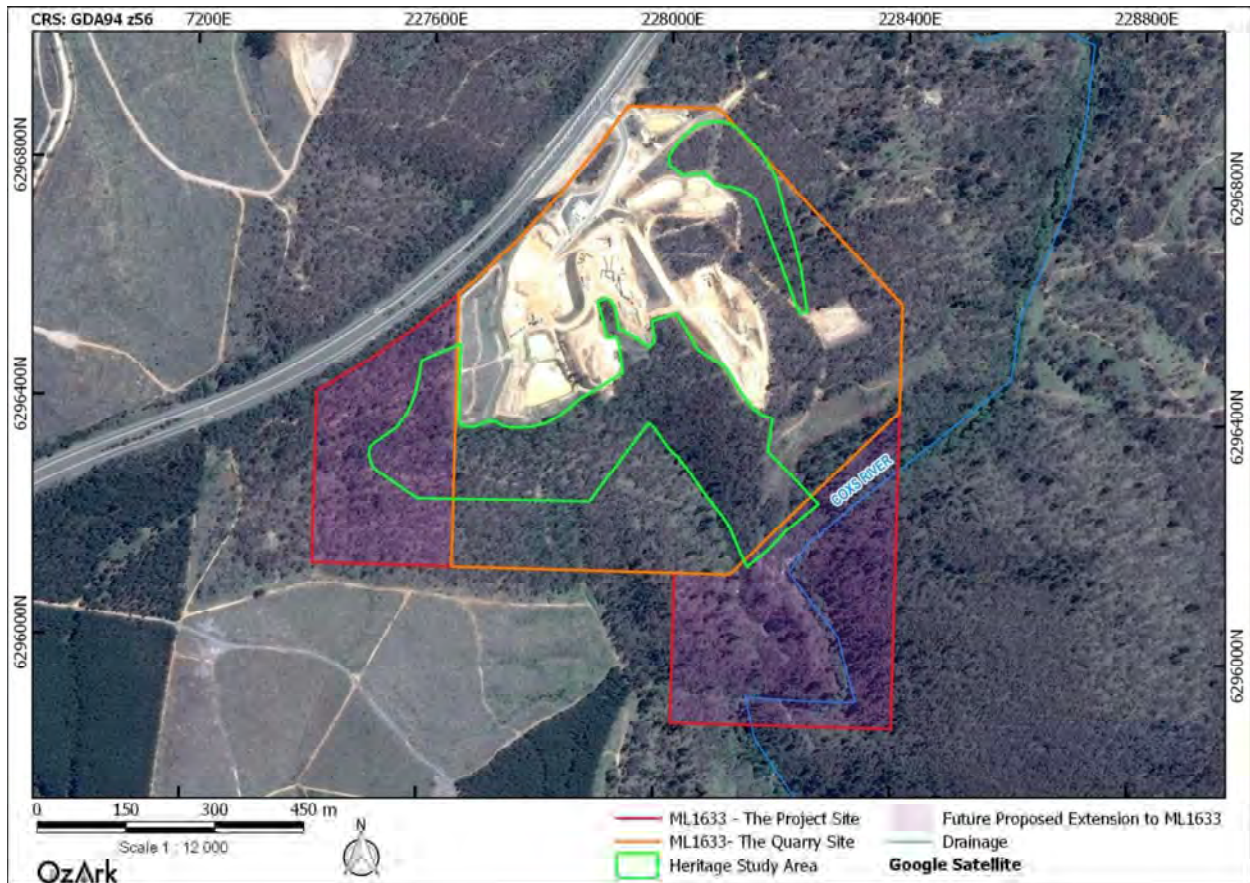


Figure 1-5: Location of the Heritage Study Area in relation to the Quarry Site.

This report covers the desktop review and assessment, and field survey assessment applicable to the Heritage Study Area.

1.3 RELEVANT LEGISLATION

Cultural heritage is managed by a number of state and national Acts. Baseline principles for the conservation of heritage places and relics can be found in the *Burra Charter* (Australia ICOMOS 2013). The *Burra Charter* has become the standard of best practice in the conservation of heritage places in Australia, and heritage organisations and local government authorities have incorporated the inherent principles and logic into guidelines and other conservation planning documents. The *Burra Charter* generally advocates a cautious approach to changing places of heritage significance. This conservative notion embodies the basic premise behind legislation designed to protect our heritage, which operates primarily at a state level.

A number of Acts of parliament provide for the protection of heritage at various levels of government.

1.3.1 State legislation

Environmental Planning and Assessment Act 1979 (EP&A Act)

This Act, amended by the *Environmental Planning and Assessment Amendment Act 2017*, establishes requirements relating to land use and planning. The framework governing environmental and heritage assessment in NSW is contained within the following parts of the EP&A Act:

- **Part 4:** Local government development assessments, including heritage. May include schedules of heritage items;
 - **Division 4.7:** Approvals process for state significant development;
 - **Section 4.41:** Authorisations that are not required for state significant development:
 - Part 4, or excavation permit under section 139 of the *Heritage Act 1977*.
 - Aboriginal Heritage Impact Permit (AHIP) under section 90 of the *National Parks and Wildlife Act 1974*.
- **Part 5:** Environmental impact assessment on any heritage items which may be impacted by activities undertaken by a state government authority or a local government acting as a self-determining authority; and
 - **Division 5.2:** Approvals process for state significant infrastructure.

National Parks and Wildlife Act 1974 (NPW Act)

Amended during 2010, the NPW Act provides for the protection of Aboriginal objects (sites, objects and cultural material) and Aboriginal places. Under the Act (Part 6), an Aboriginal object is defined as: any deposit, object or material evidence (not being a handicraft for sale) relating to indigenous and non-European habitation of the area that comprises NSW, being habitation both prior to and concurrent with the occupation of that area by persons of European extraction, and includes Aboriginal remains.

An Aboriginal place is defined under the NPW Act as an area which has been declared by the Minister administering the Act as a place of special significance for Aboriginal culture. It may or may not contain physical Aboriginal objects.

As of 1 October 2010, it is an offence under Section 86 of the NPW Act to 'harm or desecrate an object the person knows is an Aboriginal object'. It is also a strict liability offence to 'harm an Aboriginal object' or to 'harm or desecrate an Aboriginal place', whether knowingly or unknowingly. Section 87 of the Act provides a series of defences against the offences listed in Section 86, such as:

- The defendant exercised 'due diligence' to determine whether the action would harm an Aboriginal object; or
- The harm to the Aboriginal object occurred during the undertaking of a 'low impact activity' (as defined in the regulations).

Under Section 89A of the Act, it is a requirement to notify the Office of Environment and Heritage (OEH) Director-General of the location of an Aboriginal object. Identified Aboriginal items and sites are registered on Aboriginal Heritage Information Management System (AHIMS).

1.3.2 Commonwealth legislation

Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)

Matters of National Environmental Significance listed under the EPBC Act include the National Heritage List and the Commonwealth Heritage List, both administered by the Commonwealth Department of the Environment and Energy. Ministerial approval is required under the EPBC Act for proposals involving significant impacts to National/Commonwealth heritage places.

1.3.3 Applicability to the project

The current project will be assessed under Part 4 of the EP&A Act.

Any Aboriginal sites within the Study Area are afforded legislative protection under the NPW Act.

It is noted there are no Commonwealth or National heritage listed places within the Study Area, and as such, the heritage provisions of the EPBC Act do not apply.

1.4 ASSESSMENT APPROACH

The current assessment follows the *Code of Practice for the Investigation of Aboriginal Objects in New South Wales* (Code of Practice; DECCW 2010). Field assessment and reporting followed the Guide to investigating, assessing and reporting on Aboriginal cultural heritage in NSW (OEH 2011).

The historic heritage assessment component follows the Heritage Council's *Historical Archaeology Code of Practice* (Historical Code of Practice; Heritage Council 2006).

The Aboriginal Cultural Heritage Assessment Report (ACHAR) is presented in **Sections 2 to 6** of this report and the Historic Heritage Assessment Report (HHAR) is presented in **Sections 7 to 10** of this report.

Recommendations regarding Aboriginal cultural heritage and historic heritage are provided in **Section 11**.

ABORIGINAL CULTURAL HERITAGE ASSESSMENT REPORT

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2 THE ARCHAEOLOGICAL ASSESSMENT

2.1 PURPOSE AND OBJECTIVES

The purpose of the current study is to identify and assess heritage constraints relevant to the proposed works.

2.1.1 Aboriginal archaeological assessment objectives

The current assessment will apply the Code of Practice, in the completion of an Aboriginal archaeological assessment, in order to meet the following objectives.

Objective One: To undertake an Aboriginal archaeological survey of the Heritage Study Area as per the Code of Practice.

Objective Two: To assess the significance of any recorded Aboriginal sites, objects or places likely to be impacted by the project, in consultation with the RAPs, consistent with the Code of Practice and *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010* (ACHCRs; DECCW 2010b).

Objective Three: To assess the likely impacts of the project to any recorded Aboriginal sites, objects, places or cultural values, and to develop management recommendations, in consultation with RAPs, consistent with the Code of Practice and the ACHCRs.

2.2 DATE OF ARCHAEOLOGICAL ASSESSMENT

The fieldwork component of this assessment was undertaken by OzArk on Wednesday 29 August 2018.

2.3 ABORIGINAL COMMUNITY INVOLVEMENT

The assessment had followed the ACHCRs. Information regarding the ACHCRs, detailing the main stages, are as follows.

2.3.1 Stage 1: Notification of the development and registration of interest

- Advertisement placed in the Lithgow Mercury by R.W. Corkery & Co. Pty Limited on 15 May 2018 (**Appendix 1**).
- Letter seeking information from government agencies sent on 15 May 2018 (**Appendix 1¹**). Letters were sent to NTSCORP, Local Land Services, Native Title Tribunal, OEH, Bathurst Local Aboriginal Land Council (LALC) and Lithgow Shire Council.

¹ Please note that **Appendix 1** contains only a sample of each stage letter sent. Should OEH require every letter sent to all agencies and RAPs, OzArk can provide these.

- By the closing date registration of interest concerning this project, 10 groups registered to be consulted as a RAP for the project.
 - Yurrandaali Cultural Services
 - Barraby Cultural Services
 - Murra Bidgee Mullangari Aboriginal Corporation Cultural Heritage
 - Mingaan Wiradjuri Aboriginal Corporation
 - Merrigarn
 - Muragadi Heritage Indigenous Corporation
 - Yulay Cultural Service
 - Warrabinga Native Title Aboriginal Corporation
 - Gundungurra Tribal Council Aboriginal Corporation
 - Bathurst LALC

2.3.2 Stage 2/3: Presentation of information about the proposed development and gathering information about cultural significance

On 3 July 2018 RAPs were sent the following documents (**Appendix 1**).

- Cover letter and project overview.
- Background research, predictive modelling and survey methodology.

The following responses to the Stage 2/3 information package were received by OzArk.

- Barraby Cultural Services
 - Written feedback was received stating that Barraby Cultural Services support the methodology for this project.
- Yurrandaali Cultural Services
 - Written feedback was received stating that Yurrandaali supports the methodology for this project.
- Murra Bidgee Mullangari Aboriginal Corporation Cultural Heritage
 - Endorsement was received from the methodology recommendations made by OzArk. Murra Bidgee Mullangari also stated that 'the Lithgow area holds a lot of history for our family, my grandfather and cousins lived and hunted on the land with our great great uncle Neville who was a Wiradjuri'
- Muragadi Heritage Indigenous Corporation
 - Written response stating that the project information and methodology was read and that Muragadi endorse the recommendations made by OzArk.

2.3.2.1 Field survey participation

The following RAPs participated in the fieldwork.

- Colleen Fisk – Bathurst LALC.
- Vaimoana Kengike – Gundungurra Tribal Council Aboriginal Corporation.

2.3.3 Stage 4: Review of draft AHCHAR

A draft copy of the AHCHAR was sent to the RAPs for review and comment on 30 April 2019. Comments were received by one group within the review time period. A second email was sent to the RAPs, who had not responded to the first email, providing another opportunity for comments and feedback on the AHCHAR on 5 June 2019; one additional comment was received. The RAP comments are provided below:

- Muragadi Heritage Indigenous Corporation
 - Written feedback from Anthony, stating: "I have read the project information and draft report for the above project, I agree with the recommendations made by OzArk."
- Murra Bidgee Mullangari Aboriginal Corporation Cultural Heritage
 - Written feedback from Darleen Johnson, stating: "I have read the project information and ACHAR for the above project, I endorse the recommendations made. We would also like to be involved in all aspects of the project i.e. surveying and fieldwork."

Copies of the correspondence sent and received for Stage 4 are included in **Appendix 1**.

2.4 OZARK INVOLVEMENT

2.4.1 Field assessment

The fieldwork component of the assessment was undertaken by:

- Archaeologist: Philippa Sokol (OzArk Project Archaeologist, BA and DipScience, University of New England).

2.4.2 Reporting

The reporting component of the assessment was undertaken by:

- Report Author: Philippa Sokol; and
- Reviewer: Ben Churcher (OzArk Principal Archaeologist; BA[Hons], Dip Ed).

3 LANDSCAPE CONTEXT

An understanding of the environmental contexts of a specific study area is requisite in any Aboriginal archaeological investigation (DECCW 2010). It is a particularly important consideration in the development and implementation of survey strategies for the detection of archaeological sites. In addition, natural geomorphic processes of erosion and/or deposition, as well as humanly activated landscape processes, influence the degree to which these material cultural remains are retained in the landscape as archaeological sites; and the degree to which they are preserved, revealed and/or conserved in present environmental settings.

The Heritage Study Area is located within the Hill End subregion (east of the area) and Capertee Uplands subregion (west of the area), within the South Eastern Highlands Bioregion (NPWS 2016). The bioregion represents the plateau and dissected ranges of the Great Dividing Range bounded by the slopes of the inland drainage basins to the west, the Great Escarpment to the east, and the Australian Alps to the south. This region incorporates portions of the Macquarie, Lachlan, Murrumbidgee, and Murray River catchments (NPWS 2016).

3.1 TOPOGRAPHY

Topography of the Bathurst subregion is primarily comprised of a granite basin of rounded hills surrounded by steep slopes (NPWS 2016). As such the topographical features within the Heritage Study Area that would have encouraged past Aboriginal land use and occupation, include:

- the gently sloped and spurred and crest landforms in the northeast and southwest of the Study Area have the potential to contain stone artefact sites and/or the potential as being identified as a landform of cultural significance;
- the landforms nearest the Coxs River have the capability of providing elevated landforms adjacent to water: landforms recognised in the region as having archaeological sensitivity; and
- the potential for outcropping may exist on the Study Area's spurs and crests, which may be a source of raw material procurement for artefact manufacture.

Explanations of the terms used on **Figure 3-2** are in **Table 3-1**. **Table 3-2** quantifies the extent of these landforms specific to the Heritage Study Area and representative photos of the sloping and flatter landforms of the Heritage Study Area are shown on **Figure 3-3**.

Figure 3-1: Map showing the topographical and hydrological features of the Project Site and Heritage Study Area's surrounding landforms.

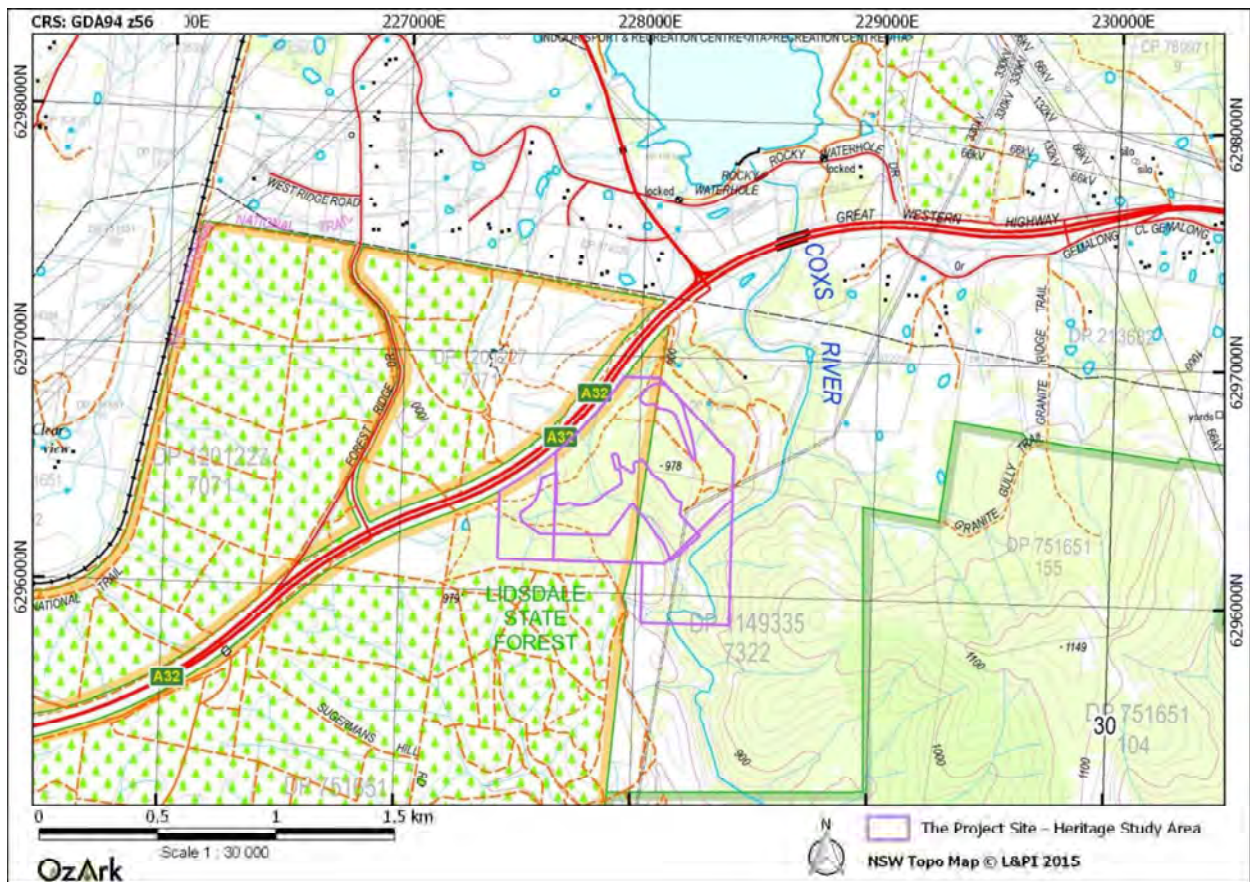


Figure 3-2: Landforms units within the Heritage Study Area.

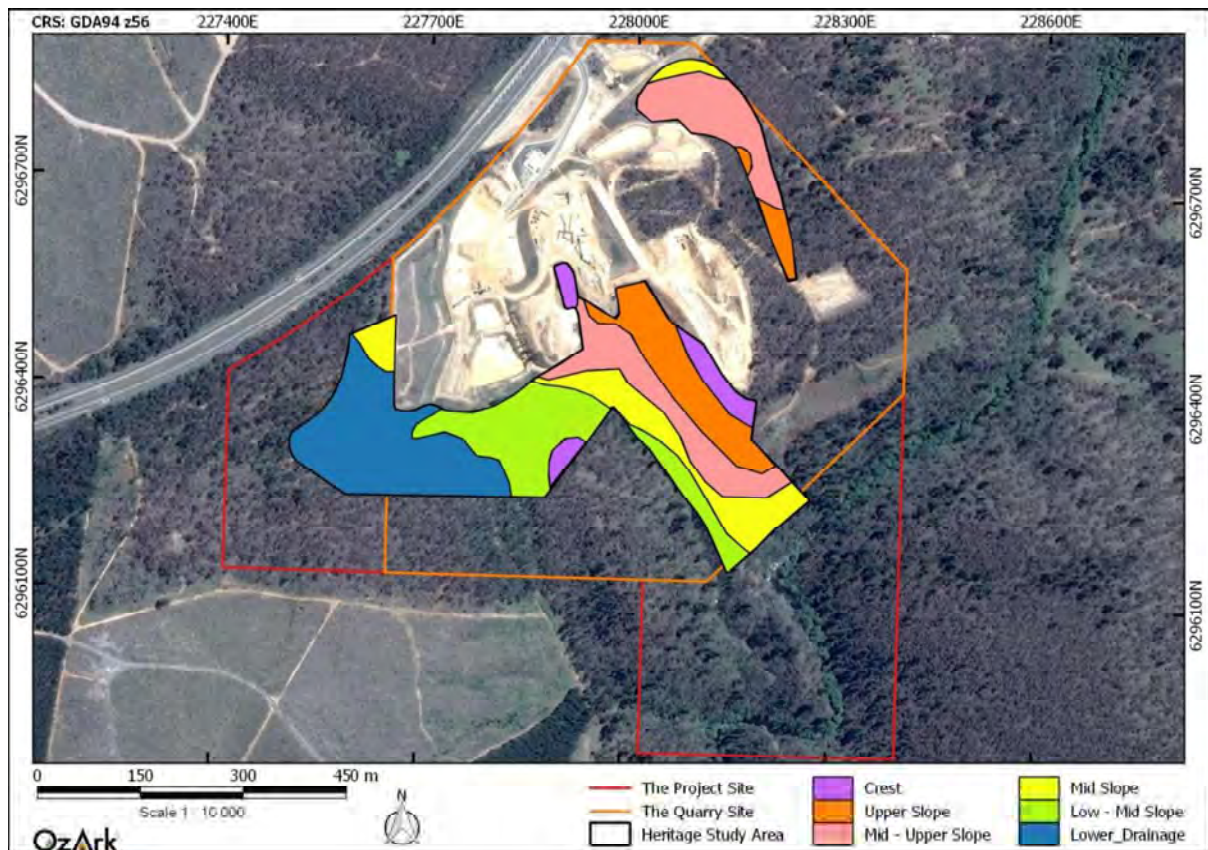


Table 3-1. Landform descriptions of the Heritage Study Area.

Landform	Description
Crest	Raised area with a confined summit.
Upper slope	Sloping land adjoining hill tops or ridges. In the Heritage Study Area upper slopes are very steep between 20° and 25° slope.
Mid – Upper slope	Sloping land between the mid and upper slope landforms. In the Heritage Study Area mid – upper slopes are steep between 15° to 20°.
Mid slope	Sloping land often between mid - upper and lower slopes. In the Heritage Study Area mid slopes form a steady sloping topography, containing moderate undulations, with average slopes around 10°.
Low – Mid slope	Sloping land often between low slopes and mid-slopes. In the Heritage Study Area these slopes are gentle to moderate and range from 5° to 10°.
Low - Drainage	For the Heritage Study Area, low – drainage landforms include the low and gently slopes adjacent to a drainage line and range from 0° to 5°.

Table 3-2. Summary of key terrain features within the Heritage Study Area.

Total Survey Area	Crest	Upper slope	Mid-upper slope	Mid slope	Low-mid slope	Low-drainage
17.77ha	0.92ha 5.17%	2.57ha 14.46%	4.03ha 22.68%	2.55ha 14.35%	3.38ha 19.02%	4.32ha 24.31%

Figure 3-3: Topography of the Heritage Study Area.

3.2 GEOLOGY AND SOILS

Understanding land formation processes is an important part of assessing the availability of exploitable resources in the landscape and predicting the ability of that landscape to preserve archaeological material (DECCW 2010).

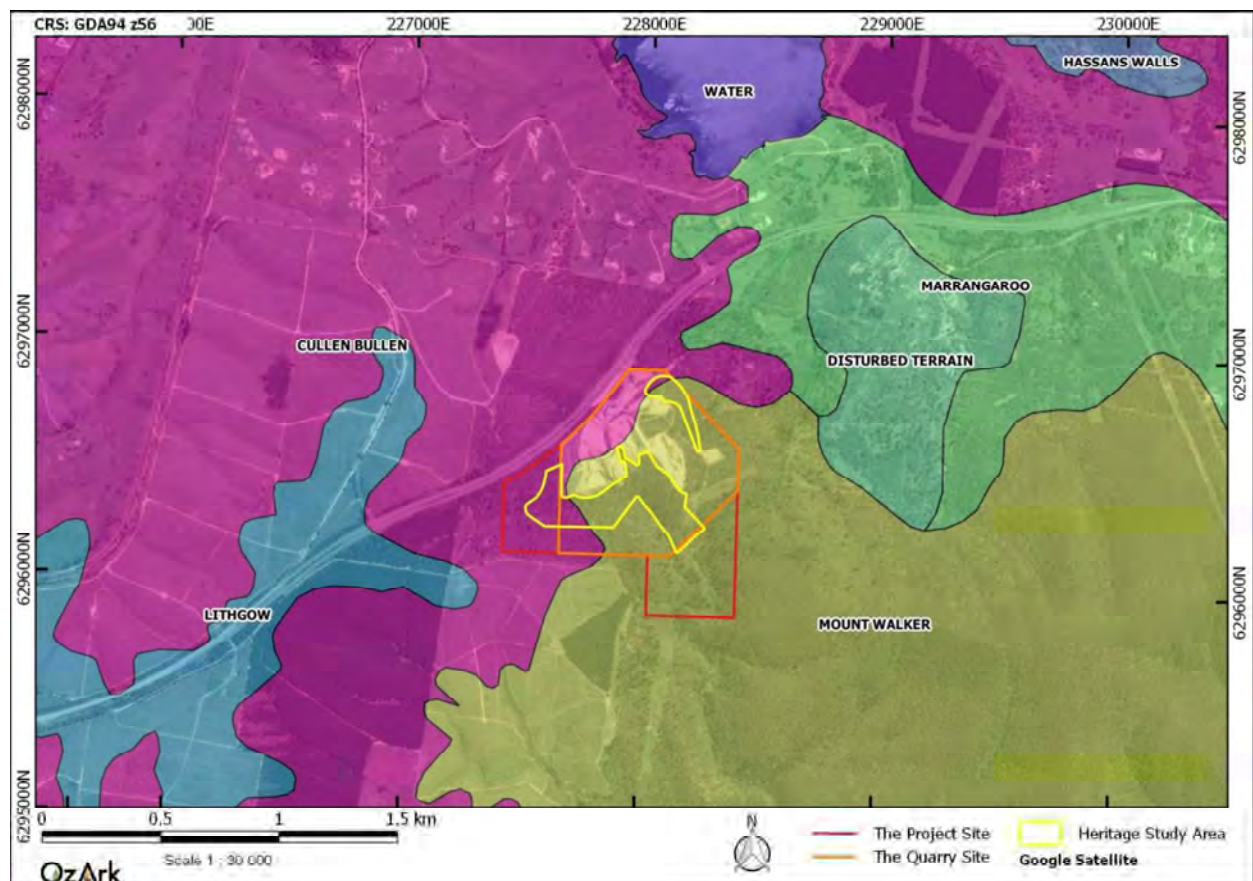
Geology of the Hill End subregion is typically characterised by Silurian and Devonian slates, sandstone and volcanics with numerous quartz veins and Tertiary basalt caps. The Capertee Uplands is primarily characterised by Permian Shoalhaven Group conglomerates, sandstones, and shales with coal at the base of the Sydney Basin. The Heritage Study Area is covered by two

soil landscapes: Mount Walker which occupies the majority in the east and Cullen Bullen which occupies the west of the area (**Figure 3-4**).

Mount Walker soil landscape is characterised by steep to very steep hills with narrow rounded crests, with a local relief of 40–200 metres and elevation of 780–1190 metres. Soils of this landscape are shallow and stony on crests with moderately deep to deep red earths, yellow earths and leached loams on steep side slopes, and yellow podzolic soils on lower slopes near drainage lines. The parent rock primarily represents metasediments of the Upper Devonian Lambie Group comprising massive white quartzites, shales, siltstones, sandstone, impure limestones, claystones and conglomerates (King 1993: 66).

Cullen Bullen soil landscape is characterised by rolling low hills and rises on Illawarra Coal Measures and Berry Formation, with a local relief of <50 metres and elevation of 550–1050 metres. Soils of this landscape are shallow to moderately deep yellow earths on crests, moderately deep yellow leached earths on upper and mid slopes, and moderately deep yellow solodic and yellow podzolic soils on lower slopes near and along narrow drainage lines. The parent rock primarily represents shale, sandstone, conglomerate, limestone, dolomite, claystone, mudstone, coal and torbanite within the Illawarra Coal Measures, and grey siltstone with thin beds of limestone and sandstone within the Berry Formation (King 1993: 79).

Figure 3-4: Map showing the Project Site and Heritage Study Area in relation to soil landscape units (King 1993).



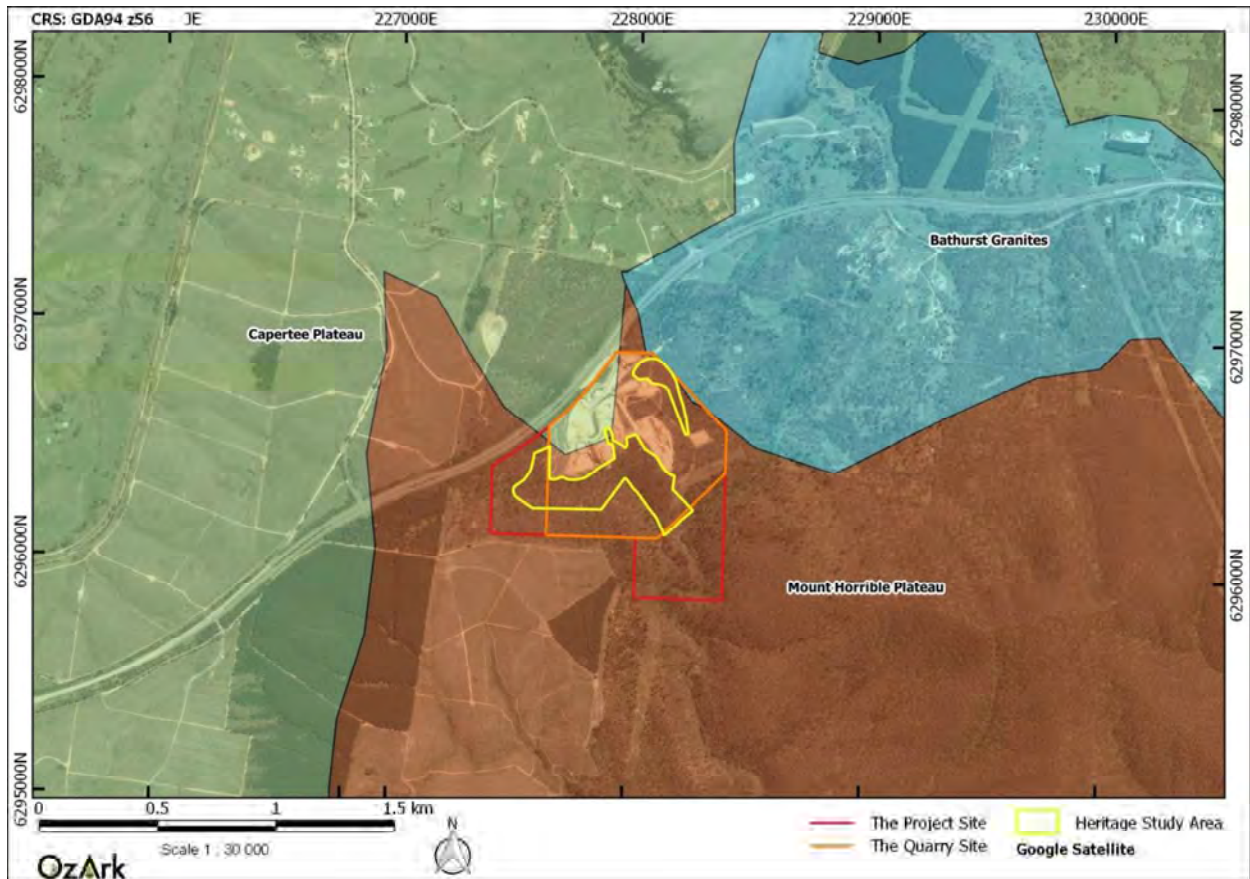
3.3 HYDROLOGY

The South Eastern Highlands Bioregion incorporates portions of the Macquarie, Lachlan, Murrumbidgee, and Murray River catchments (NPWS 2016). The primary water source of the landscape immediately surrounding the Project Site is the Cocks River, meandering past the south-eastern boundary of the Project Site at a distance of between 80 and 200 metres. Hydrological resources directly within the Heritage Study Area are limited to first and second order tributaries, and ephemeral drainage lines of the Cocks River (see **Figure 3-1**).

3.4 VEGETATION

Recorded vegetation within the Hill End and Capertee Uplands subregion, of the South Eastern Highlands Bioregion, is largely comprised of Yellow box, Red box and Blakely's red gum with Broadleaved peppermint and White gum on hills and Scribbly gum, Red stringybark, Red box and Broad-leaved ironbark on talus slopes. Shrubby understorey and wallaby grass in common (NPWS 2016). Much of this characterisation is likely to be representative of the landscape pre-1788. According to Mitchell landscape data, the Project Site is situated across three vegetation landscapes: Mount Horrible Plateau; Capertee Plateau; and a small portion of Bathurst Granites in the northeast (**Figure 3-5**). However, the Heritage Study Area is entirely situated within the Mount Horrible Plateau landscape unit, which prior to historical clearing would have supported snow gum on crests above 1000 metres. Red stringybark, Broad-leaved peppermint, Candlebark, Brittle gum and Scattered cypress pine on ridges; Apple and White box with Mountain gum and Stringybark on slopes; and Yellow box, Blakely's red gum, Manna gum and scattered Brown barrel along streams (Mitchell 2002: 134–135). Recent vegetation mapping of the Quarry Site undertaken by Ecoplanning (2019), identified the remnant vegetation as dominated by three Plant Community Types (PCTs):

- PCT 732: Broad-leaved peppermint ribbon gum and grassy open forest.
- PCT 1100: Ribbon gum – snow gum grassy forest on damp flats.
- PCT 1093: Red stringybark, brittle gum, inland scribbly gum dry open forest.

Figure 3-5: Project Site and Heritage Study Area in relation to environmental landscape units.

3.5 CLIMATE

The Bureau of Meteorology (BOM) weather station nearest to the Project Site is located at Mount Boyce in the Blue Mountains, approximately 27 kilometres to the southeast. Climate statistics from Mount Boyce (BOM 2018) indicate that the region experiences a mostly temperate to cool climate with temperatures just above zero during the cooler months. The climate statistics show that the highest mean maximum temperatures are in January (24.1°) and the lowest mean minimum temperatures are in July (2.5°). Rainfall is greatest in February (mean rainfall: 123.7mm) and the lowest in July (mean rainfall: 41.1mm). The average annual rainfall is 972.9mm. As such, the climate of the region would have been suitable for past Aboriginal occupation.

3.6 LAND-USE HISTORY AND EXISTING LEVELS OF DISTURBANCE

Crucial for the preservation of archaeological deposits is the history of past land use in a particular area, particularly the European settlement and associated agricultural practices of a given area. Satellite imagery of the Project Site shows that, while not as extensive as surrounding areas, the immediate landscape has been subject to historical clearing and much of the vegetation represents regrowth. Mature trees are, however, likely to be present. In addition, the previously cleared portions of the Study Area is likely to not have completely removed archaeological

material from the area, though it will have disturbed the upper layers of any archaeological deposits.

3.7 CONCLUSION

An examination of the landforms within the Heritage Study Area indicate that the landforms have undergone a moderate level of clearing and past disturbances associated with the clearing and formation of access roads, fencing and easement corridors. Natural disturbances caused from water wash and erosion would be evident within the steep landforms, particularly the moderately to very steep landform units, where the soils may have been moved from the slopes towards the creek systems. This would have the effect of displacing or impacting on archaeological deposits had they existed in the Heritage Study Area. The lower drainage landforms in the west would additionally be subject to increased water wash and erosion during heavy rain periods leading to increased aggrading and displacement of any archaeological material.

Reference to the landform map (**Figure 3-2**) indicates that the impact to Potential Archaeological Deposits (PADs) will vary depending on the landform in which they may exist. With respect to the landforms within the Heritage Study Area, the following observations can be made.

- Crest landforms have the potential to preserve archaeological deposits, however, the presence of this landform unit within the Heritage Study Area is rather limited. A portion of the crest area lies in the east and south, although situated within approximately 200 metres of the Coxs River. The Coxs River would likely have been the main source of water in the area and is considered substantial enough to sustain occupation over a long period of time. Additionally, this landform represents a degrading environment with soil loss stemming from some vegetation clearing, soil movement and the erosional characteristics of the landscape; that if such sites existed in the past they would have been removed or dissipated.
- Mid – upper slopes are generally moderately to steeply sloped and commonly have very thin soils due to soil loss following clearing and water wash. Intact Aboriginal sites are highly unlikely to be located on the flank of slopes and any objects identified in this environment would be in a secondary context.
- Low – mid slopes are low to moderately sloping and are generally placed at the foot of the steep sloped landforms. In the Heritage Study Area they are commonly associated with the sloped landforms and bank adjacent to drainage lines. As this landform is sloped it is considered to be in a potentially degrading and redeposited environment, as such soil loss would have had an impact on sites had they existed within the landform, and would have caused them to become displaced. Creek systems in this landform type are moderate to low lying and may be unsuitable for long-term occupation should high periods of rain occur.

- Lower slopes and drainage are most commonly associated with low lying areas and drainage lines. Should these landforms have adequate elevation above water sources, they would be suitable for camping and the retention of artefacts. These landforms have the potential to retain A-Horizon soils and may contain intact sites, depending on previous levels of disturbance. However, evidence of this occupation may have become obscured or dissipated due to the impact of inundation events and sheet wash in this landform type. The tributaries in the Heritage Study Area are considered to be semi-permanent, and as such, likely only supported short-term occupation resulting in sites with a low artefact density and a low level of site complexity.

According to Tindale (1974), the current Project Site falls within the eastern limits of the lands occupied by the Wiradjuri tribe. However, due to the location of this area at the western base of the mountains it has often been referred to as zone of interaction between the Wiradjuri, the Dharug to the east and the Gundungurra to the south (Bowdler 1983).

Although separate nations, all three language groups were neighbours and shared certain similarities with other Aboriginal groups in south-eastern Australia. Plants were used for food, as well as in the manufacture of practical items, decorative items and medicines, with some species providing more than one resource. Grass stalks could be used for weaving or producing baskets. Large trees were useful in providing bark and fibres used for the manufacture of tools, containers

and possibly the construction of watercraft. The resin obtained from Grass Trees, for example, were an adhesive that could be used in hafting processes. Bark fibres were twisted into twine which could then be woven into traps, containers or baskets and a variety of wooden tools. Stone was also used for tools (RPS 2014).

The Blue Mountains offered a variety of resources to Aboriginal people, including flora, fauna and stone material. Gunyahs or bark huts were usually made from the broad leafed paperbark, box or stringybark trees and were constructed mostly by women. They were generally located close to a reliable water source or opportunistically situated on trade routes. Rock shelters are common in the Blue Mountains region, and would likely have been occupied periodically as shelter or in association with camp sites. Camp sites were places commonly used for sleeping, eating, tool making, social activity and as a base for hunting and gathering (RPS 2014).

4.2 REGIONAL ARCHAEOLOGICAL CONTEXT

The National Parks and Wildlife Service commissioned Gollan (1987) to undertake a regional study of the Newnes Plateau in order to provide a comprehensive assessment of the archaeological resources of the area and their corresponding regional and local significance. Through this research, a number of regional archaeological patterns based on the relationship between site types and land use were identified. Gollan concluded that the overall plateau area provided suitable resources for Aboriginal occupation. Gollan proposed that artefact scatters (and isolated finds) are likely to be found on fringes of swamps, as lithic material and food resources were available in these areas. There was also evidence of the grinding of stone artefacts with several grinding groove sites and ground edge artefacts recorded. Shelters with art were also present in areas of the plateau where suitable rock types such as pagodas and interbedded sandstone and claystone rock outcrops were found. Gollan considered the plateau to be a landform of high scientific and social significance based on the diversity of Aboriginal cultural heritage sites, including the forested upland areas with having the potential to have provided substantial archaeological resources for an upland hunter gatherer economy (Gollan 1987).

Oral histories of recorded of Aboriginal people in the area were noted to have been recorded by a resident of nearby Lidsdale, Fay Hasler (reproduced in part in Kelton 2002: 12–13), which are held by the Lithgow and District Family Historical Society. The salient points derived from these notes are as follows.

- A large Aboriginal settlement is described as being located at Pipers Flat, with the burial ground being located at Lidsdale.
- The Pipers Flat Aboriginal group would regularly travel to Richmond to fight the local Aboriginal communities and bring back women to combat in-breeding.
- The communities occupying the valleys in the area were wiped out by disease including measles and small pox.

Interviews with Fay Hasler during March and May 1999 (Gay 1999) indicate that the burial ground at Lidsdale was located on the river flats either side of Cocks River. It is noted that the colliery railway line was constructed through this area in the 1920s, and further disturbance would have affected this area during the Cocks River realignment in the 1950s (Gay 1999: 15).

Gay (1999: 16) also notes an historical reference to the burial of an Aboriginal Elder in the Wallerawang area. King Myall (Mylles) had worked for James Walker who had been granted land in the Wallerawang and Lidsdale districts during the 1820s. The burial site of King Myall was drawn and published in the Sydney Illustrated News in October 1880, showing a burial mound and carved trees. This may be part of the burial ground referred to by Fay Hasler (Gay 1999: 16).

4.3 LOCAL ARCHAEOLOGICAL CONTEXT

4.3.1 Previous archaeological surveys

There have been a small number of archaeological investigations in the local and regional area; of note, is the archaeological study undertaken by Silcox (2000) over the land currently operating as the Quarry. The results of the investigations summarised below provide the basis for an archaeological context for the current assessment and were used in the preparation of a predictive model for Aboriginal site location (**Section 4.4**). This section refers to the archaeological assessments and investigations that were undertaken in the region of the Heritage Study Area.

4.3.1.1 Archaeological survey: Proposed Springvale Colliery and Conveyor, Wallerawang (Rich and Gorman 1992).

In 1992, a survey by Rich and Gorman (1992) recorded 35 sites, including two open sites, Sites 2 and 9, situated in the Cox's River Valley. Site 2, located on the southern bank of Pipers Flat Creek, consisted of over 100 artefacts within a 200 x 40 metre (m) area. Two quartz knapping floors with artefact densities of over 25/m² were identified at Site 2 as were a smaller number of indurated mudstone artefacts. Site 9, located c. 700 m west of Duncan street, on elevated terrain above and on the west side of the Cox's River, was comprised of 26 artefacts, primarily quartz, with a maximum artefact density of 6/m². As a result of this study, Rich argues that the larger sites within her study area lie closest to the Cox's River and Pipers Flat Creek.

4.3.1.2 Archaeological survey, salvage and test excavation: Augmentation works at Lyell Dam (Barton and McDonald 1995; Gay 1999).

Lyell Dam, situated in the Cocks River catchment, was formed by damming the Cocks River. Three open sites located on the slopes of spurs overlooking the Cocks River floodplain were investigated here in 1994, prior to raising the water level in the lake. All three sites were situated c. 400 m from the river margin (Gay 1999: 14).

At open site Lyell Dam 3 (LD3) a quartz block fractured knapping floor was found. Although the assemblage was dominated by quartz, other raw materials such as indurated mudstone and stone of volcanic origin was also present. In terms of surface manifestations of this site, the highest artefact density recorded was 3/m², with most sample areas showing lower densities (Barton & McDonald 1995: 25). The excavated assemblage, however, was far larger, with estimated thousands of artefacts present at this location. Barton & McDonald (1995: 35) interpreted this site as being repeatedly occupied by people carrying out the same range of tasks.

Conclusions of the Lyell Dam site investigation project can be summarised as follows (from Barton & McDonald 1995: 67 as summarised in Gay 1999: 15):

- Cobbles of igneous, metamorphic and sedimentary rocks were procured locally, primarily from the bed of the Coxs River;
- Quartz was locally available and the ease with which it was procured eliminated the need to flake using the bipolar technique;
- Quartz was used to create medium sized flakes and some smaller retouched tools;
- Volcanic stone was used to create large or heavy tools; and
- All three sites were interpreted as representing repeated short-term occupation areas that focussed on acquiring resources such as specific plants or animals endemic to the swampy margins of the Coxs River.

4.3.1.3 Archaeological test excavation: Springvale coal project (McIntyre 1993).

In 1993, McIntyre carried out test excavation to investigate the possibility of an Aboriginal burial area being located close to the Springvale coal project (McIntyre 1993). Oral history from a local informant provided primary data for the location of the burial ground. During this work two areas were tested, one on the west side of the railway line and the second along the area proposed as a flood mitigation embankment. This second area, thought to be on the east side of the current river alignment, was tested using auger holes only. No skeletal remains were uncovered during these excavations, although a minor open site was identified on the west side of the railway line (#45-1-0237), where stone tools were said to have been manufactured or repaired. This site was assessed as having low scientific significance. McIntyre concluded that the reported burial ground may have been destroyed during the Cox's River deviation works in the 1950s, although there is still the possibility that skeletal material may occur east of the railway and river. She further notes that the presence of artefacts within the level ground adjacent to the river indicates the potential this landscape unit has for the occurrence of Aboriginal sites (McIntyre as reported in Gay 1999: 16–17).

4.3.1.4 Archaeological survey: Wallerawang and Marrangaroo (Kelton 1999, 2000).

In 1999 and 2000, Kelton undertook surveys in the Wallerawang and Marrangaroo areas respectively. Of the seventeen sites recorded at Marrangaroo, the majority were rock shelter sites, as most of the study area was within the sandstone escarpment. Kelton notes that the location and nature of sites recorded conforms to the generally accepted site prediction principles for the region, primarily the presence of precipitous sandstone geology and the proximity of permanent water sources (Kelton 2000: 101).

4.3.1.5 Archaeological assessment: Proposed hard rock quarry, Wallerawang (Silcox 2000).

Silcox (2000) was engaged to undertake the Aboriginal archaeological values and assessment over an area of approximately 10 hectares as part of the assessment of the original Quarry proposal, immediately north and south of the current Heritage Study Area (**Figure 1-2**). In addition to the assessment for the Quarry, the assessment also included a proposal for associated facilities such as: an amenities block; carpark and service area; a feed stockpile; a crushing and screening area; and a product stockpile.

During the field assessment one Aboriginal archaeological site, WQ1, was identified (see **Figure 4-2**). The site was observed as an eroding open artefact scatter to the north of the existing Hoskins Quarry and on the mid sloped, spurred landform of an ephemeral tributary of the Coxs River which is located approximately 500 metres to the southeast. Although Silcox identified the site to be highly eroded, he also assessed the site to have potential heritage significance and the possibility of subsurface archaeological deposits. A total of 22 artefacts were identified at the site on an eroded exposure and an unsurfaced vehicle track. Silcox (2000) noted that several artefacts were identified as partially buried in the surface sediment; however, it was unclear whether they were eroding out of *in situ* deposit or out of redeposited sediment. Silcox considered that the site was more extensive than what was apparent at the time.

4.3.1.6 Lidsdale, Site #45-1-2574

Test excavation of two PADs was undertaken by OzArk (OzArk 2003) in February 2003 in the face of potential impacts from the realignment of the Castlereagh Highway at Lidsdale, NSW.

These PADs, located on terraces above the Coxs River, had been identified by Gay (1999) and were recorded as PAD1 (#45-1-2573) and PAD2 (#45-1-2574). The results of the test excavation indicated the presence of an extensive open site with low to moderate artefact densities. The test excavation revealed that a variety of activities appear to have been carried out on the site, evidenced by the presence of hammers/anvils for on-site stone tool production or food preparation. The systematic flaking of stone was carried out at several locations across the site, with one discrete knapping event, associated with a stone feature, showing the manufacture of

backed artefacts (specifically bondi points). Pits showing deeper soil profiles, mainly located in the area of PAD2, also revealed preliminary evidence for possible stratification, and higher artefact densities in this part of the site may indicate repeated occupation. Quartz was the predominant raw material, although silicified tuff apparently increases in incidence in the upper portion of the profile. The excavated test pits revealed soil profiles indicative of an intact site with good structural integrity.

On the basis of the test excavation results, PAD2 was assessed as being of high Aboriginal significance and moderate to high archaeological significance. It was considered to have the potential to provide data on a range of archaeological questions, including:

- Whether the site showed evidence of use as a transient camping location for a specific activity or, was repeatedly occupied through time;
- Possible changes through time in the use of various raw materials and stone tool production, and the technological strategies that underpin these factors; and,
- Whether the site exhibited spatially discrete activity areas.

Consequently, it was recommended that #45-1-2574 was worthy of salvage excavation prior to any further impacts.

Salvage excavations were completed on the 18th July 2003 under Consent to Destroy Permit #1666.

The salvage excavation (OzArk 2004) showed that Lidsdale PAD2 (# 45-1-2574) is a large and complex site. The site showed internal spatial variation in lithic assemblages. The deeper soil in Area I was found to have retained some cultural stratigraphy: the lithic assemblages from spits 1, 2 and 3+4 differing and showing change over time. Areas II and III were excavated in locations with more shallow soils, but the lower spits also retain slight variations in the frequencies of different raw material types, suggesting that early occupation of the site may have been widespread, not just confined to the area of deeper soils.

Excavation of this site has been quite extensive with a total of 132m² excavated as part of the salvage work, and an additional 22m² excavated during the test excavation phase: a total of 154m² of excavation. Almost 6,100 artefacts were recovered. Additional monitoring of the site during construction works provided an additional 441 artefacts.

The key features of the Lidsdale assemblages were:

- Raw materials varied across the site. In Area I quartz was strongly predominant (76%), less predominant in Area II (52%) and a minor material in Area III (17%). Silicified tuff was not uncommon in Area I (20%), much more frequent in Area II (43%) and relatively rare in Area III (9%). Silcrete, and a material which appears to vary between quartzite and silcrete, occurred very rarely in Area I (just 1 artefact comprising <0.1%), a little more frequent in Area II (2.6%) and it dominated the assemblage from Area III (68%).

- Quartz occurs as large pebbles & cobbles, one artefact weighed 373g and three others between 150g and 166g. The large size of quartz artefacts contrasts regionally with smaller quartz pebbles found in the sandstones and conglomerates of the Narrabeen formation which forms the surrounding sandstone country.
- Non-local materials, particularly silicified tuff and silcrete, and probably also other fine-grained siliceous (FGS) materials, were also taken to the Lidsdale site. Together, these materials made up 40% of the artefacts recovered, indicating the importance of non-local stone.
- The imported silcrete, and much of the imported silicified tuff was used for systematic flaking and backed artefact production (knapping floors). These materials may have augmented local quartz, which was also sometimes used for these kinds of lithic activities. The FGS materials were used for limited flaking events.
- Backed artefacts were not uncommon on the site, making up 2.4% of the assemblage overall, and c. 2% of the assemblages from spits 1 and 2 in Area I. The backed artefacts varied in shape and size. One from Area II (and another from the monitoring) appears to have been used as a steep-edged tool (“scraper”) at one end.
- An array of retouched and/or used flake tools were recovered, one of quartz with a rare dentate worked edge.
- An igneous broken flake had a bifacially ground edge. This is not an overly large artefact (just 3–3.5cm in size and 9.0g in weight), and while bifacial grinding occurs more often on cobbles as edge-ground hatchets (or on a ground-edge adze that was found at Lyell Dam site LD3 [Barton & McDonald 1995: 27]), edge-grinding on a flake of this size was noted as rare.
- Several hammers and anvils were also recovered.
- Change over time was evident within Area I. The assemblage from the lower spits 3 and 4 appeared to be of Pre-Bondaian age. It lacked backed artefacts and lacked evidence of asymmetric alternating flaking: no cores showing this flaking pattern and no faceted platforms were recovered from these spits. This Pre-Bondaian assemblage is dominated by quartz, and has higher frequencies of quartzite and igneous artefacts than more recent assemblages. The assemblage also includes two hammers and no bipolar artefacts.
- The assemblage from spits 1 and 2 both included backed artefacts, cores showing asymmetric alternating platforms and debitage with faceted platforms. Both assemblages are dominated by quartz, but silicified tuff is more frequent in spit 1 than in spit 2. A few bipolar artefacts occurred in spit 2. A piece of utilised pigment was also found in spit 2.
- Deeper sediments from the site (Area I square 35E 118N) have been dated using Optically-Stimulated Luminescence dating. The sample 30cm depth was 7,400+700 years before 2000 AD and sample 45cm depth was 13,500+1,000 years before 2000 AD. While these age determinations do not directly date the lithic assemblages they suggest a time frame consistent with other early dates from sites in the region (from c. 6,000–14,000 years before present) such as Kariwara sites 22 and 35, Capertee 3 and Noola, Bobadeen 1, Horseshoe Falls and Lyre Bird Dell.

As a result, no other site in the Lidsdale–Wallerawang area has been investigated in a manner comparable to site #45-1-2574.

4.3.2 Desktop database searches conducted

A desktop search was conducted on the following databases to identify any potential previously-recorded heritage within the Project Site and the Heritage Study Area. The results of this search are summarised in **Table 4-1** and presented in detail in **Appendix 2**.

Table 4-1: Aboriginal heritage: desktop-database search results.

Name of Database Searched	Date of Search	Type of Search	Comment
Commonwealth and National Heritage Listings	8/10/2018	NSW and Lithgow City Council LGA	No places listed on either the National or Commonwealth heritage lists are located within the Project Site or Heritage Study Area.
National Native Title Claims Search	8/10/2018	NSW	One Native Title Claim has been identified over the area of the Project Site. One Deed of Agreement identified over the Project Site.
OEH AHIMS	27/6/2018	10 x 10 km centres on the Project Site	48 sites within the search area. No sites in the Heritage Study Area. One site – WQ1 AHIMS #45-1-2802 within the Project Site.
Local Environment Plan (LEP)	8/10/2018	Schedule 5 and maps of Lithgow LEP of 2014	No places listed on either the National or Commonwealth heritage lists are located within the Project Site or Heritage Study Area.

4.3.2.1 Native Title Claim

As per **Table 4-1**, it is noted that the Project Site is situated on land that falls under a Native Title Claim (*NC2017/001, NSD857/2017, Warrabinga-Wiradjuri #7*). The proponent has sought title advice from Hetherington Exploration & Mining Title Services and legal opinion from Hickson's Lawyers who advise that as the Project Site and Heritage Study Area fall within ML 1633 and Exploration Lease (EL) 4473, both of which are situated within Travelling Stock Reserve (TSR) 70. As such, the investigations by Hetherington (2018), supported by Hicksons Lawyers, determined that the Native Title Rights over the ground subject to TSR 70 were fully extinguished upon notification of the reservation of portion No. 70 in the Cook County Parish of Lidsdale on 23 September 1879.

4.3.2.2 Walker Quarries – Deed of Agreement

A Deed of Agreement was established between Walker Quarries Pty Limited and Gundungurra Tribal Council Aboriginal Corporation (who previously held a Native Title Claim over the Project Site). The Deed was formed in October 2007. The term of the Deed states that it expires upon completion of the mining project.

4.3.2.3 AHIMS search results

A search of the AHIMS database was undertaken for a 10 x 10 kilometre area centred on the Project Site. A total of 47 previously recorded Aboriginal sites were returned in the search, with no previously recorded sites identified in the Project Site or the Study Area (**Figures 4-2 and 4-3; and Table 4-2**).

OzArk (2018) undertook a ground-truth assessment of an Aboriginal artefact scatter site (WQ1) identified and recorded by Silcox (2000). By undertaking the AHIMS search, it was identified that WQ1 had not previously been entered on the AHIMS database (as Site #45-1-2802). It is since being updated on the AHIMS database and has been included in **Table 4-2**, changing the total count of registered Aboriginal sites in the search area to 48.

Table 4-2: AHIMS search results and frequency.

Site type	Frequency
Artefact/s (unspecified number)	6
Artefact-PAD	1
Axe Grinding Groove	2
Axe Grinding Groove-Rock Engraving	1
Axe Grinding Groove-Shelter with Art-Shelter with Deposit	2
Axe Grinding Groove-Shelter with Deposit	2
Burial/s	1
Burial/s-Carved Tree	1
Isolated Find	4
Open Camp Site	23
PAD	2
Scarred Tree	1
Shelter with Art-Shelter with Deposit	1
Shelter with Deposit	1
Total	48

Of the 48 sites identified, the majority occur within 200 metres of a watercourse. These sites are typically artefact scatters and isolated finds identified on eroding creek banks, spurs and elevated flat areas overlooking watercourses. Rock shelters and grinding grooves have a moderate occurrence in the search area, primarily within landforms containing escarpments and outcropping rock. Additionally, PADs are more likely to be identified within such elevated landforms.

Two AHIMS sites #45-1-2573 and #45-1-2574 have previously been issued with determined permits and were subject to test excavation. As a result, the status of these sites has been updated: AHIMS #45-1-2573 (destroyed) and #45-1-2574 (partially destroyed). Additionally, the status of AHIMS #41-1-0238 has been updated to 'deleted' and is likely a duplicate of valid AHIMS site #45-1-2583 (**Appendix 2**).

The results of previous investigations summarised in **Section 4.3.1**, and the summary of previously recorded sites in **Table 4-2**, would suggest that:

- the most common site type will be stone artefact sites; either low density artefact scatters or isolated finds;
- culturally modified trees are rare due to the level of historical clearing yet they may be present;
- PADs may be recorded where there are undisturbed deposits on elevated landforms above permanent water sources;
- site types such as rock shelters with art and deposit, and grinding grooves are identified in the search area and are generally associated with landscape features such as suitable outcropping rock and overhangs, and rock platforms containing good quality sandstone suitable for sharpening stone tools; and
- burials are uncommon and have been previously recorded in areas with less ground disturbance and with more suitable landscape features than those of the Heritage Study Area.

Figures 4-2 and 4-3 illustrates the spatial patterning of AHIMS recorded sites.

Figure 4-2: AHIMS #45-1-2802 (WQ1) in relation to the Project Site and Heritage Study Area.

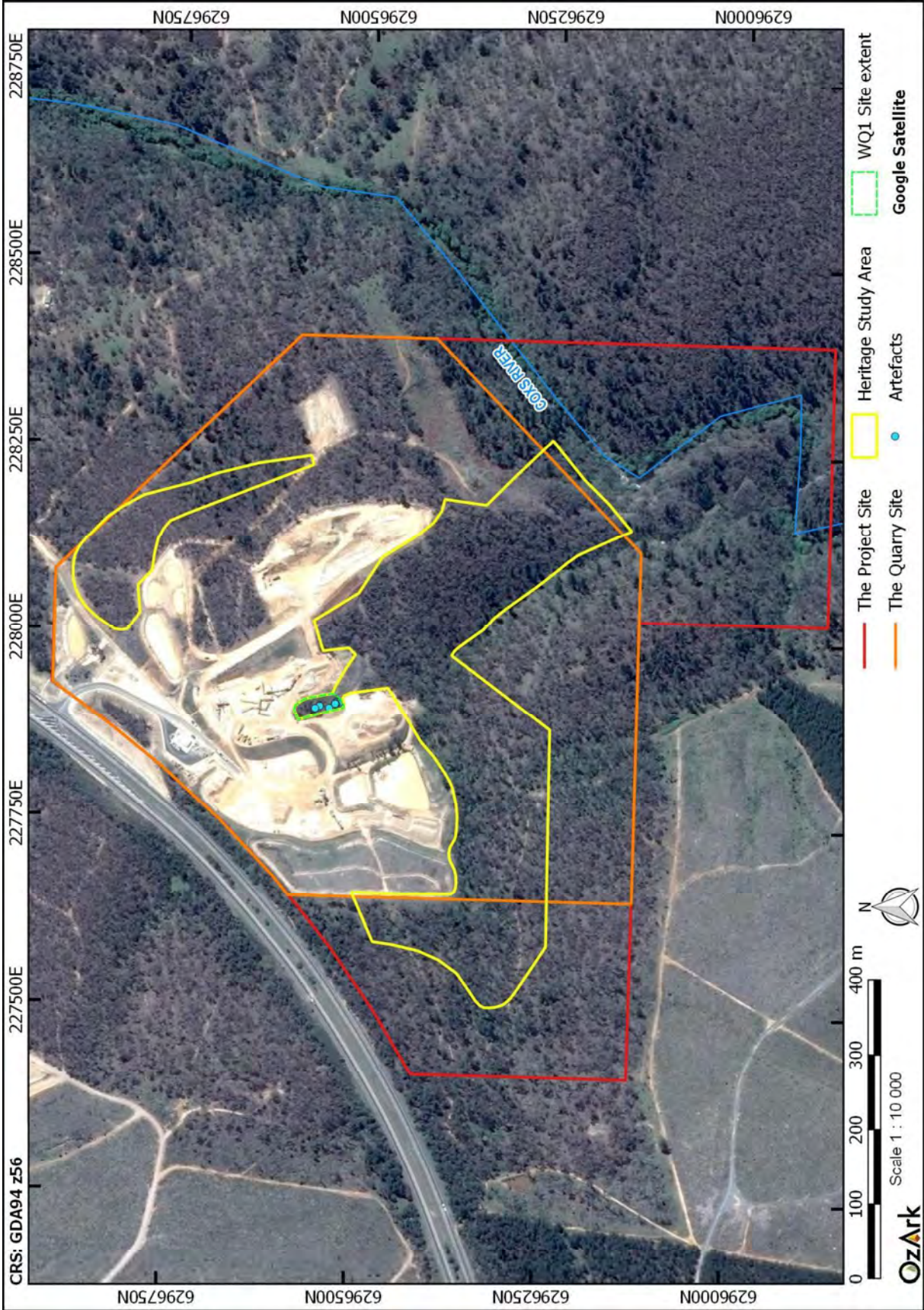
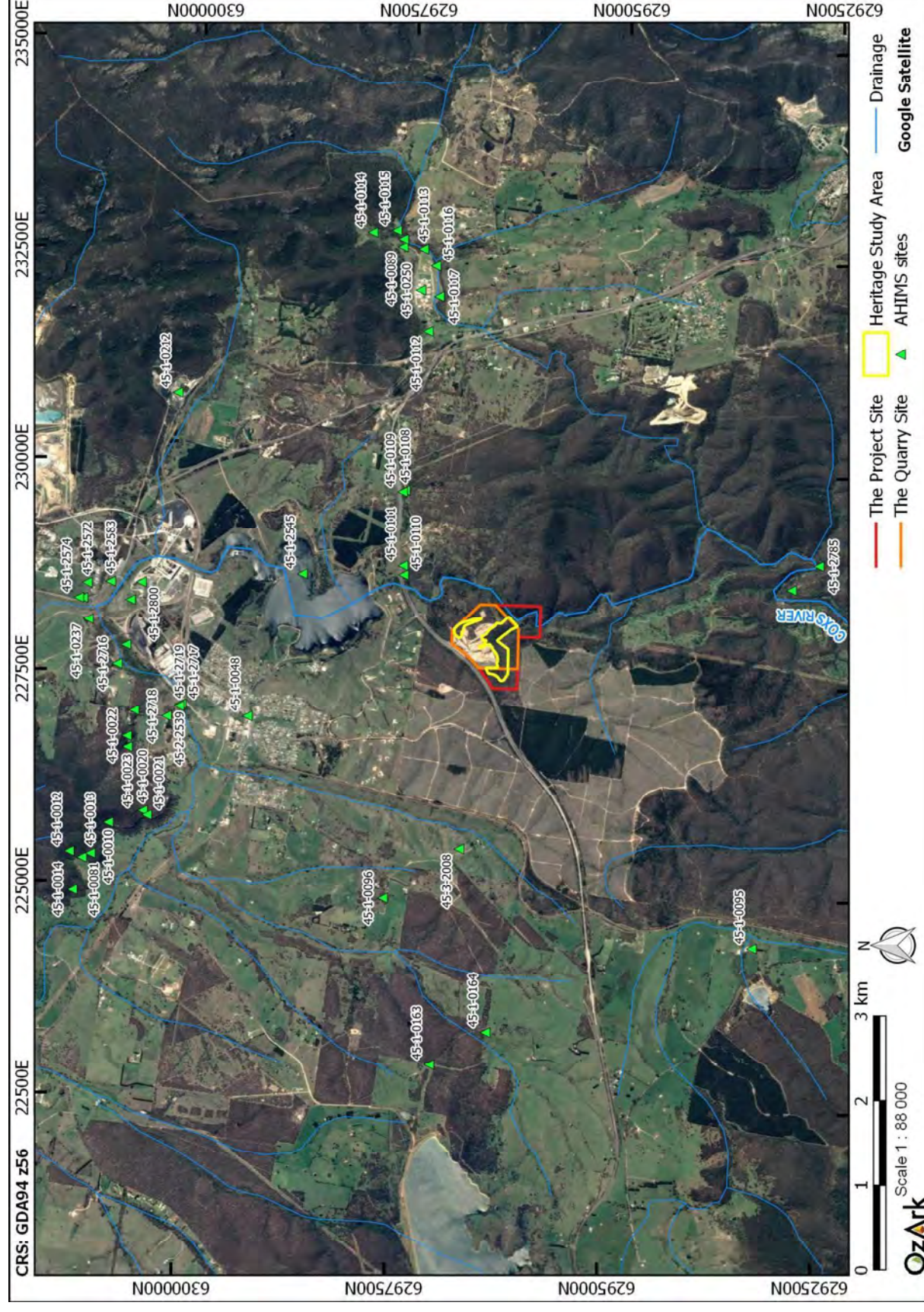


Figure 4-3: Project Site and Heritage Study Area in relation to the recorded AHIMS sites.



4.4 PREDICTIVE MODEL FOR SITE LOCATION

Across Australia, numerous archaeological studies in widely varying environmental zones and contexts have demonstrated a high correlation between the permanence of a water source and the permanence and/or complexity of Aboriginal occupation. Site location is also affected by the availability of and/or accessibility to a range of other natural resources including: plant and animal foods; stone and ochre resources and rock shelters; as well as by their general proximity to other sites/places of cultural/mythological significance. Consequently sites tend to be found along permanent and ephemeral water sources, along access or trade routes or in areas that have good flora/fauna resources and appropriate shelter.

In formulating a predictive model for Aboriginal archaeological site location within any landscape it is also necessary to consider post-depositional influences on Aboriginal material culture. In all but the best preservation conditions very little of the organic material culture remains of ancestral Aboriginal communities survives to the present. Generally it is the more durable materials such as stone artefacts, stone hearths, shell, and some bones that remain preserved in the current landscape. Even these however may not be found in their original depositional context since these may be subject to either (a) the effects of wind and water erosion/transport—both over short and long time scales—or (b) the historical impacts associated with the introduction of European farming practices. Scarred trees, by their nature, may survive for up to several hundred years but rarely beyond.

Knowledge of the environmental contexts of the Heritage Study Area and a desktop review of the known local and regional archaeological record, the following predictions are made concerning the probability of those site types being recorded:

- Isolated finds may be indicative of: random loss or deliberate discard of a single artefact, the remnant of a now dispersed and disturbed artefact scatter, or an otherwise obscured or sub-surface artefact scatter. They may occur anywhere within the landscape but are more likely to occur in topographies where open artefact scatters typically occur.
 - As isolated finds can occur anywhere, particularly within disturbed contexts and landforms that have been subject to extensive land use, it is predicted that this site type could be recorded within the Heritage Study Area.
- Open artefact scatters are here defined as two or more artefacts, not located within a rock shelter, and located no more than 50 metres away from any other constituent artefact. This site type may occur almost anywhere that Aboriginal people have travelled and may be associated with hunting and gathering activities, short or long term camps, and the manufacture and maintenance of stone tools. Artefact scatters typically consist of surface scatters or sub-surface distributions of flaked stone discarded during the manufacture of tools, but may also include other artefactual rock types such as hearth and anvil stones. Less commonly, artefact scatters may include archaeological stratigraphic features such as hearths and artefact concentrations which relate to activity areas. Artefact density can vary considerably between and across individual sites. Small ground exposures revealing

low density scatters may be indicative of background scatter rather than a spatially or temporally distinct artefact assemblage. These sites are classed as 'open', that is, occurring on the land surface unprotected by rock overhangs, and are sometimes referred to as 'open camp sites'.

Artefact scatters are most likely to occur on level or low gradient contexts, along the crests of ridgelines and spurs, and elevated areas fringing watercourses or wetlands. Larger sites may be expected in association with permanent water sources.

Topographies which afford effective through-access across, and relative to, the surrounding landscape, such as the open basal valley slopes and the valleys of creeks, will tend to contain more and larger sites, with camp sites mostly evidenced by open artefact scatters.

- The Heritage Study Area encompasses a number of spur/crest features and moderate to steep slopes within proximity to the Coxs River. One previously recorded Aboriginal site, WQ1, exists within the Project Site, and given the presence of a named water source within the vicinity (**Figure 3-1**), further manifestations of this site type are considered possible. Consideration will need to be made in regards to the past agricultural and recent industrial practices in the area and if this would indicate the potential for artefact scatters to have become displaced. Given past land use such as historical vegetation clearing and associated agricultural practices, should artefact scatters exist, they most likely have a low artefact density and a low complexity of tool types.
- Aboriginal scarred trees contain evidence of the removal of bark (and sometimes wood) in the past by Aboriginal people, in the form of a scar. Bark was removed from trees for a wide range of reasons. It was a raw material used in the manufacture of various tools, vessels and commodities such as string, water containers, roofing for shelters, shields and canoes. Bark was also removed as a consequence of gathering food, such as collecting wood boring grubs or creating footholds to climb a tree for possum hunting or bark removal. Due to the multiplicity of uses and the continuous process of occlusion (or healing) following removal, it is difficult to accurately determine the intended purpose for any particular example of bark removal. Scarred trees may occur anywhere old growth trees survive. The identification of scars as Aboriginal cultural heritage items can be problematical because some forms of natural trauma and European bark extraction create similar scars. Many remaining scarred trees probably date to the historic period when bark was removed by Aboriginal people for both their own purposes and for roofing on early European houses. Consequently the distinction between European and Aboriginal scarred trees may not be clear.
 - Due to the historical clearance of trees from within the Project Site, and partially within the Heritage Study Area, and the rarity of this site type at a regional level, the likelihood of recording culturally modified trees is considered moderate to low. A field survey is necessary, however, to determine the extent to which local vegetation represents old growth trees or regrowth.
- Quarry sites and stone procurement sites typically consist of exposures of stone material where evidence for human collection, extraction and/or preliminary processing has survived. Typically these involve the extraction of siliceous or fine grained igneous

and meta-sedimentary rock types for the manufacture of artefacts. The presence of quarry/extraction sites is dependent on the availability of suitable rock formations.

- This site type could be recorded within the Project Site should ground visibility exposing suitable rock outcrops, such as granite, hornfels, sandstone and quartzite, be available.
- Grinding grooves are typically present within landforms associated with reliable water and suitable outcropping sandstone along creek lines and may be found near to rock shelters. The presence of fine-grained uniform sandstone is the preferable material type for these sites to occur.
 - This site type could be recorded in the Heritage Study Area should the creek lines present contain suitable sandstone rock platforms.
- Rock shelters are generally identified in landforms that contain cliff faces, pagodas and exposed sandstone outcrops or large boulders. Commonly rock shelters are discovered as a result of outcropping sandstone along creek lines, in gorges, escarpments and slopes.
 - The site type has the potential to be recorded in the Heritage Study Area should suitably sized rock outcrops and overhangs be available.
- Burials are generally found in soft sediments such as aeolian sand, alluvial silts and rock shelter deposits. In valley floor and plains contexts, burials may occur in locally elevated topographies rather than poorly drained sedimentary contexts. Burials are also known to have occurred on rocky hilltops in some limited areas. Burials are generally only visible where there has been some disturbance of sub-surface sediments or where some erosional process has exposed them.
 - Although it is possible that this site type could be found within the Heritage Study Area, it is considered a rare site type especially given the disturbance that has occurred across the landforms and the types of landforms present which are generally associated with thin A-Horizon soils.

5 RESULTS OF ABORIGINAL ARCHAEOLOGICAL ASSESSMENT

5.1 SAMPLING STRATEGY AND FIELD METHODS

Standard archaeological field survey and recording methods were employed in this study (Burke & Smith 2004). The archaeological methods used in the Aboriginal archaeological assessment followed the Code of Practice and the proposed survey methodology which was sent to RAPs for review and comment. The Heritage Study Area was assessed using pedestrian transects, traversing all characterising landform types. The surveyors were spaced apart at a distance variable with the landform types, degree of slope, inaccessibility (steeply incised drainage lines and unstable ground), and past disturbances. Although all landform types were inspected in order to characterise the landforms within the Heritage Study Area, the average transect width ranged from approximately 10 metres to 30 metres.

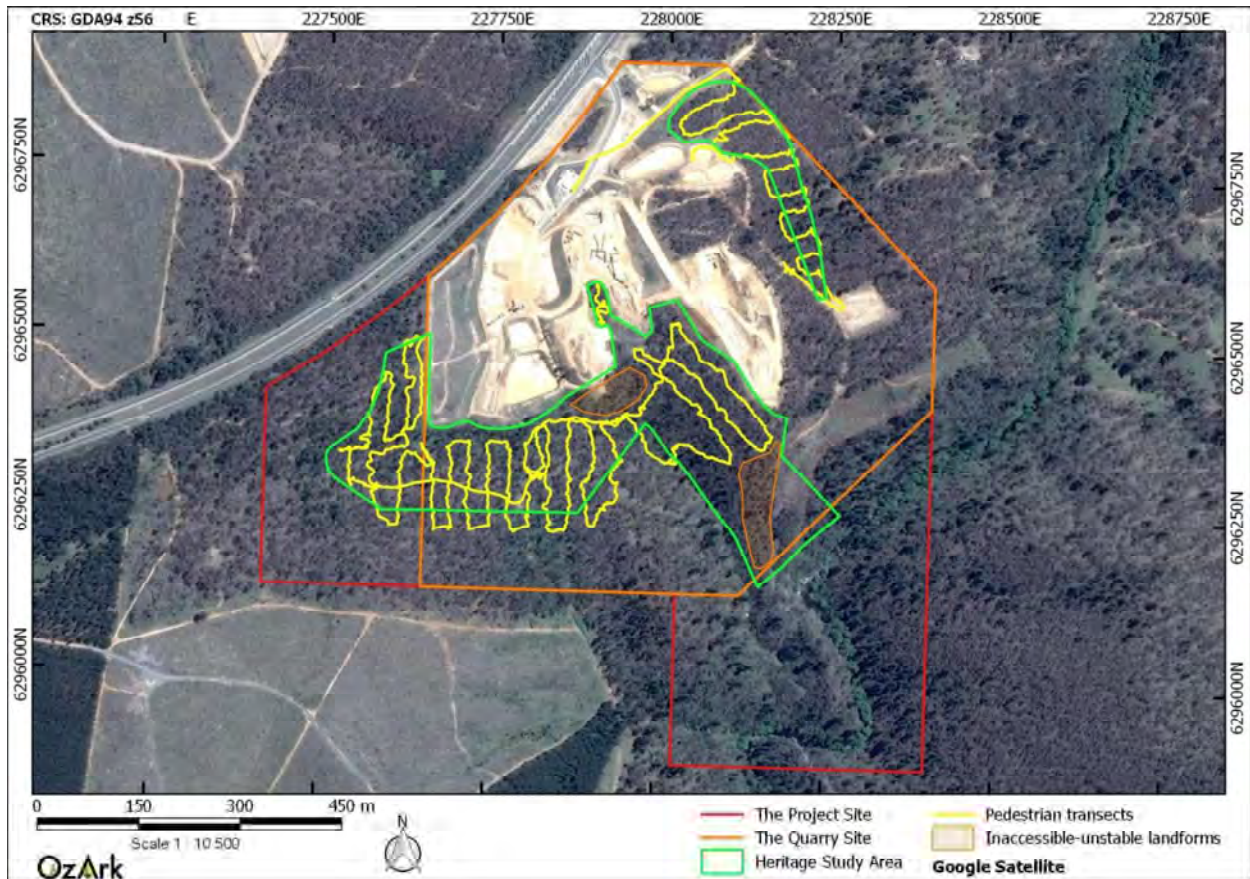
The field survey included:

- pedestrian survey of the Heritage Study Area. A vehicle was used to access the area and not as a means of inspecting the area;
- targeted and more focused inspections of areas of good ground surface visibility (GSV) and areas where the ground surface had been previously disturbed were identified, as these were areas of heightened exposure with an increased potential of revealing surface artefacts;
- ground exposures that presented a surface scatter of stone material, especially likely raw materials, were targeted for more focused inspection;
- landforms and banks associated with the tributaries of the Cocks River were more closely inspected as these are classified as landform features of increased archaeological potential; and
- all mature, native trees existing within the Heritage Study Area, with the potential to contain Aboriginal cultural scarring were inspected.

The RAPs assisted the archaeologist by alerting them to areas and features of interest. A located feature was then more closely examined and required details were recorded. Features were recorded using digital photography and by GPS (global positioning system) units with Mobile Mapper software and were described on field recording sheets. General notes pertaining to the survey and ground covered by the archaeologist were kept as well.

Figure 5-1 illustrates the pedestrian coverage of the Heritage Study Area. It should be noted that the below figure only displays the recorded transects of one surveyor although the Heritage Study Area was assessed by three surveyors in pedestrian transect format. Additionally, some of the landforms were inaccessible due to a high level of disturbance, unstable ground and degree slope not considered safe to traverse. These areas are indicated on **Figure 5-1**.

Figure 5-1: The Heritage Study Area showing pedestrian survey transects.



5.2 PROJECT CONSTRAINTS

The majority of the Heritage Study Area presented no significant constraints in completing the archaeological assessment. The levels of available ground surface exposure (GSE) across the area presented a level of constraint during the field survey (**Section 5.3**). Although the greatest constraints identified were those areas that presented very steep and unstable ground and those areas where works associated with the existing quarry operations had occurred.

5.3 EFFECTIVE SURVEY COVERAGE

Two of the key factors influencing the effectiveness of archaeological survey are ground surface visibility (GSV) and ground surface exposure (GSE). These factors are quantified in order to ensure that the survey data provides adequate evidence for the evaluation of the archaeological materials across the landscape. For the purposes of the current assessment, these terms are used in accordance with the definitions provided in the *Code of Practice* (DECCW 2010).

GSV is defined as:

... the amount of bare ground (or visibility) on the exposures which might reveal artefacts or other archaeological materials. It is important to note that visibility, on its own, is not a reliable indicator of the detectability of buried archaeological material. Things like

vegetation, plant or leaf litter, loose sand, stone ground or introduced materials will affect the visibility. Put another way, visibility refers to 'what conceals' (DECCW 2010b: 39).

GSE is defined as:

... different to visibility because it estimates the area with a likelihood of revealing buried artefacts or deposits rather than just being an observation of the amount of bare ground. It is the percentage of land for which erosion and exposure was sufficient to reveal archaeological evidence on the surface of the ground. Put another way, exposure refers to 'what reveals' (DECCW 2010: 37).

These factors are quantified in order to ensure that the survey data provides adequate evidence for the evaluation of the archaeological potential and objects across the Heritage Study Area. For the purposes of the current assessment, these terms are used in accordance with the definitions provided in the Code of Practice (DECCW 2010).

Tables 5-1 and 5-2 and **Figure 5-2** present the effective survey coverage within the Heritage Study Area in more detail.

The effective survey coverage across the Heritage Study Area was variable; either due to the availability of good GSE, ground disturbance areas offering good GSV, or the degree of slope which was generally reflected through higher erosion patterns. **Tables 5-1 and 5-2** indicate that the most effective surveyed landform was the crest landform (32%), followed closely by the mid – upper (26.25%) and low – mid sloped (26%) landforms. The crest landform is the higher point within the Heritage Study Area and the general landscape, with a gentler slope compared to the upper and mid slopes landforms, thus increasing its archaeological potential. Survey efficacy was higher in this landform mostly due to previous vegetation clearing and the presence of wildlife tracks which had subsequently widened through the added effects of erosion. However, no sites were recorded within this landform (**Table 5-2**).

The landform with the lowest survey efficacy was the lower slope – drainage line landform (15%). This landform, while having a moderately gentle gradient contained a higher ground vegetation cover, encouraged by the increased water holding abilities of this landform, therefore limiting the amount of available exposed ground surface for inspection.

GSV was higher immediately above the drainage and lower landforms and mid – upper slopes. The increase in slope gradient from the lower – drainage landform to the mid landforms was rather considerable with increased exposure due in most part from water wash and erosion. Exposures in these landforms were afforded by wildlife tracks, dispersed vegetation clearing, minor occurrence of vehicle tracks, and erosion. In these landforms the GSV ranged from 60-75%. While the GSV across the entire Heritage Study Area did not allow for a full investigation of the ground surface of all landforms, there remained sufficient exposures and coverage of all

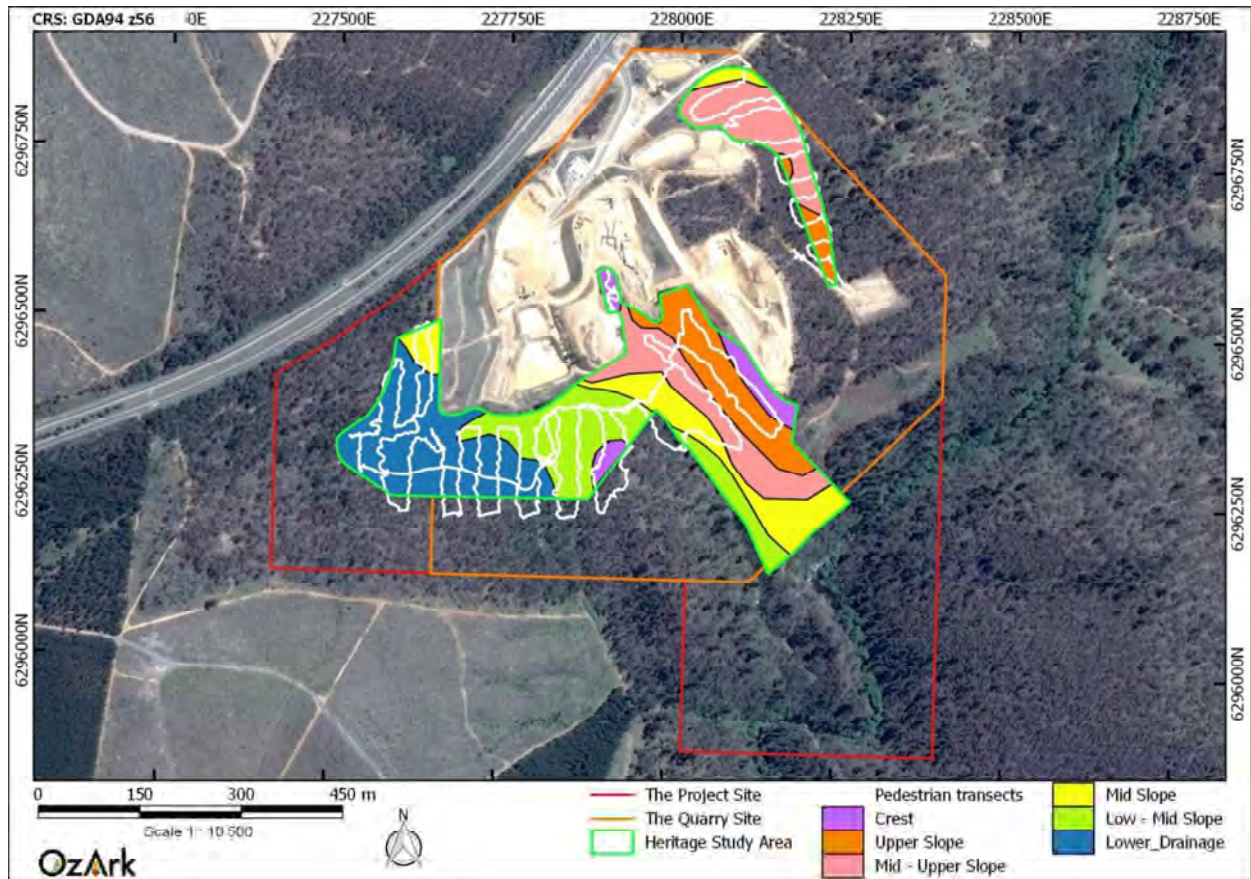
landform types to adequately characterise and assess the area's archaeological potential. Sample photographs of the Heritage Study Area are presented in **Plates 1 to 12**.

Table 5-1: Survey coverage data.

Survey Unit	Landform	Survey Unit Area (sq m)	Visibility %	Exposure %	Effective Coverage Area (sq m) (= Survey Unit Area x Visibility % x Exposure %)	Effective Coverage % (= Effective Coverage Area / Survey Unit Area x 100)
1	Crest	9,200	80	40	2,944	32%
2	Upper slope	25,700	70	30	5,397	21%
3	Mid – upper slope	40,300	75	35	10,578.75	26.25%
4	Mid slope	25,500	60	30	4,590	18%
5	Low – Mid slope	33,800	65	40	8,788	26%
6	Lower - Drainage	43,200	50	30	6,480	15%

Table 5-2: Landform summary—sampled areas.

Landform	Landform area (sq m)	Area Effectively Surveyed (sq m) (= Effective Coverage Area)	% of Landform Effectively Surveyed (= Area Effectively Surveyed / Landform x 100)	Number of Sites/features
Crest	9,200	2,944	32%	1 (AHIMS #45-1-2802)
Upper slope	25,700	5,397	21%	0
Mid – upper slope	40,300	10,579	26.25%	0
Mid slope	25,500	4,590	18%	0
Low – Mid slope	33,800	8,788	26%	0
Lower - Drainage	43,200	6,480	15%	0

Figure 5-2: The Heritage Study Area showing pedestrian transects and landforms.

5.4 ABORIGINAL SITES RECORDED

No newly identified Aboriginal sites were recorded as a result of the field survey.

5.5 PREVIOUSLY RECORDED ABORIGINAL SITES IN THE PROJECT SITE

One previously recorded Aboriginal site: AHIMS #45-1-2802 (WQ1), is located within the Project Site boundary though outside of the Heritage Study Area.

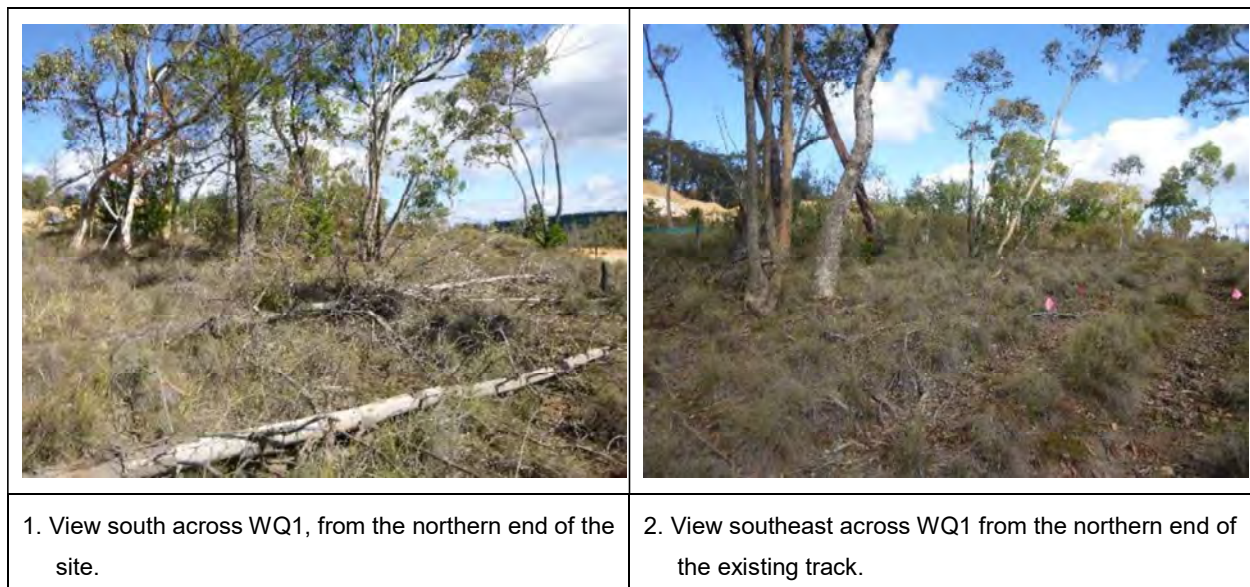
A ground-truth assessment and confirmation of site status was undertaken for #45-1-2802 by OzArk (March 2018). The site comprised an area of approximately 65m x 27m which is permanently fenced off, and is situated on a gentle to moderate slope, within a mid-slope landform. The closest permanent watercourse to the site is the Coxs River approximately 500 metres to the southeast. The ground-truth assessment identified up to 16 artefacts predominantly within extensive exposures in the southern portion of the site with further artefacts recorded along a disused vehicle track in the western portion of the site. Quarry related ground disturbance impacts have not occurred within the site area since it was initially recorded by Silcox (2000) as a result of the permanent fencing. However, ongoing erosion related impacts have occurred, including general erosion and surface sediment wash. Overall, the majority of the original site features recorded by Silcox (2000) were considered to have remained present in the site area.

(Section 1.2 and Section 4.3.1). A sample of artefacts recorded are detailed in **Table 5-3** with a sample of site photographs presented in **Figure 5-3**.

Table 5-3: Artefacts recorded at AHIMS #45-1-2802.

Artefact type	Material	Integrity	Reduction	Size	Notes
Flake	Quartz	Complete	Tertiary	1 (1-2cm)	
Flake	Quartz	Complete	Tertiary	2 (2-4cm)	
Flake	Mudstone	Distal flake	Tertiary	2 (2-4cm)	Right lateral usewear
Blade flake	Quartz	Complete	Tertiary	2 (2-4cm)	
Flake	Quartz	Complete	Tertiary	3 (4-6cm)	
Flake	Mudstone	Medial flake	Tertiary	2 (2-4cm)	
Flake	Quartzite	Proximal flake	Tertiary	2 (2-4cm)	Longitudinal break noted
Flake	Quartz	Complete	Tertiary	3 (4-6cm)	
Flake	Volcanic	Proximal flake	Tertiary	3 (4-6cm)	
Flake	Quartz	Medial flake	Tertiary	2 (2-4cm)	

Figure 5-3: AHIMS #45-1-2802 (WQ1): Site location and a selection of recorded artefacts.





3. View north at WQ1 showing identified artefacts on the track.



4. View east to the southern end of WQ1 showing artefacts identified on exposed ground.



5. View towards the south of WQ1 showing Hoskins Quarry in the background and further south of the site.



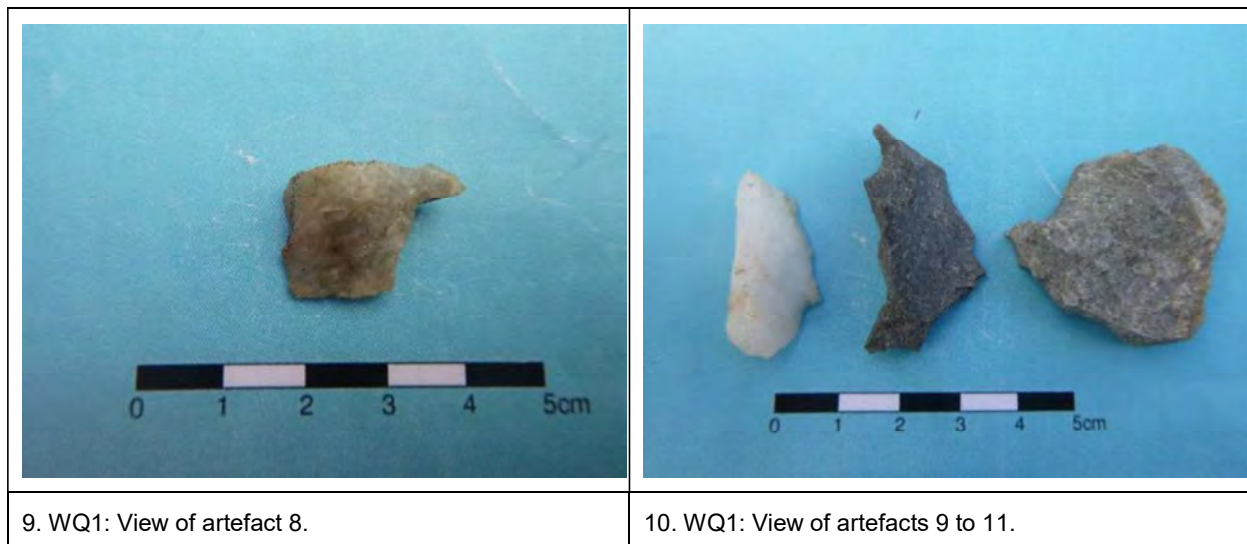
6. WQ1: View of artefacts 1 to 5.



7. WQ1: View of artefact 6.



8. WQ1: View of artefact 7.



The proponent is proposing to extend quarrying operations into the Heritage Study Area and into the area where AHIMS #45-1-2802 exists (**Figure 4-2**). As such, management and mitigation of the site's Aboriginal heritage is required prior to the commencement of the project (**Section 6.3**).

5.6 ABORIGINAL COMMUNITY INPUT

Nominated site officers from the Bathurst LALC and Gundungurra Tribal Council Aboriginal Corporation were present during the field survey (**Section 2.3.2**). There were no objections to the manner in which the survey was implemented and completed. Each stage and landform change during the field survey was discussed and the manner in which the survey was proposed was discussed and agreed upon prior to its enactment.

5.7 DISCUSSION

The field survey of the Heritage Study Area identified no additional Aboriginal sites/objects or features. One previously recorded Aboriginal site (AHIMS #45-1-2802) is situated to the north of the Heritage Study Area and within the overall Project Site for the Quarry. Further mitigation for the management of this site in relation to the proposed Quarry extension impacts is outlined in **Section 6**.

In review of the predictive model (**Section 4.4**), predictions for the occurrence of certain site types were made based on the previously recorded sites identified through the AHIMS search. The predictive model postulated that the presence of a nearby permanent water source, the Coxs River, would influence the potential for site to be present. The presence of a second order tributary of the Coxs River may also be a contributing factor for the increase in identified sites. Stone artefact sites were considered the most likely to occur, as these sites are generally present in a variety of landforms, and vary in size and complexity based on previous disturbances and impacts. The predictive model considered that the presence of scarred trees would have a moderate likelihood of occurrence, should native vegetation exist amongst regrowth vegetation.

The field survey confirmed there were a number of large mature trees though none that contained evidence of cultural scarring. Grinding groove and rock shelters had a moderate occurrence in the AHIMS search and had the potential to occur in the Heritage Study Area should the landscape features required to support these site types be present (i.e. sandstone overhangs, outcrops, pagodas, and fine-grained sandstone benching associated with creek lines). These landscape features were not present, generally sandstone cobbles and rock were high but nothing in the form of a boulder or pagoda to support habitation or sandstone benches within drainage lines that would be suitable for sharpening stone tools. The other likely site type for the Project Site as per the predictive model, were stone quarry sites. These were considered a possibility given that the area has been targeted for quarrying activities in the past and for the current proposal. However, no evidence of raw material procurement for stone tool manufacture was observed.

The field survey (pedestrian) was conducted across all landform types within the Project Site, with closer attention being paid in the vicinity of resources (tributaries of the Coxs River, gentle elevated slopes and crests) and areas of ground exposure. However, no Aboriginal sites or objects were identified. The landforms that were considered to have increased potential for the surface manifestation of Aboriginal heritage, such as the crest, gentle elevated slopes and landforms adjacent to the drainage lines, did not reveal any surface evidence. This is considered to be a result of soil removal caused by minor vegetation clearing, increased sheet wash and erosion on moderate to steep slopes and areas of extensive gully erosion within drainage areas, burrowing animals within lower sloped drainage areas, and other activities such as fencing and minor clearing and grading for tracks.

5.8 ASSESSMENT OF SIGNIFICANCE

5.8.1 Introduction

The appropriate management of cultural heritage items is usually determined on the basis of their assessed significance, as well as the likely impacts of any proposed developments. Scientific, cultural and public significance are identified as baseline elements of significance assessment, and it is through the combination of these elements that the overall cultural heritage values of a site, place or area are resolved.

Social or Cultural Value

This area of assessment concerns the importance of a site or features to the relevant cultural group: in this case the Aboriginal community. Aspects of social value include assessment of sites, items, and landscapes that are traditionally significant or that have contemporary importance to the Aboriginal community. This importance involves both traditional links with specific areas, as well as an overall concern by Aboriginal people for their sites generally and the continued

protection of these. This type of value may not be in accord with interpretations made by the archaeologist: a site may have low archaeological value but high social value, or vice versa.

Archaeological/Scientific Value

Assessing a site in this context involves placing it into a broader regional framework, as well as assessing the site's individual merits in view of current archaeological discourse. This type of value relates to the ability of a site to answer current research questions and is also based on a site's condition (integrity), content (rarity) and representativeness.

The overriding aim of cultural heritage management is to preserve a representative sample of the archaeological resource. This will ensure that future research within the discipline can be based on a valid sample of the past. Establishing whether or not a site can contribute to current research also involves defining 'research potential' and 'representativeness'. Questions regularly asked when determining significance are: can this site contribute information that no other site can? Is this site representative of other sites in the region?

Aesthetic Value

This refers to the sensory, scenic, architectural and creative aspects of the place. It is often closely linked with the social values. It may consider form, scale, colour, texture and material of the fabric or landscape, and the smell and sounds associated with the place and its use (Australia ICOMOS 2013).

Historic Value

Historic value refers to the associations of a place with a historically important person, event, phase or activity in an Aboriginal community. Historic places do not always have physical evidence of their historical importance (such as structures, planted vegetation or landscape modifications). They may have 'shared' historic values with other (non-Aboriginal) communities.

Places of post-contact Aboriginal history have generally been poorly recognised in investigations of Aboriginal heritage. Consequently the Aboriginal involvement and contribution to important regional historical themes is often missing from accepted historical narratives. This means it is often necessary to collect oral histories along with archival or documentary research to gain a sufficient understanding of historic values.

5.8.2 Assessed significance of recorded sites

As discussed in **Section 5.4**, no other Aboriginal sites were recorded during the most recent field survey. The previously recorded Aboriginal site: AHIMS #45-1-2802 (WQ1), identified within the Project Site has been assessed for significance based on the criteria outlined in **Section 5.9.1** and the results are discussed below.

Social or Cultural Value

The social value of Aboriginal sites is determined by the Aboriginal community. Aboriginal sites have a high significance to the local Aboriginal community, as they demonstrate the occupation and use of the land by their ancestors. AHIMS #45-1-2802 would be considered to hold a strong social value to the Aboriginal community. As such, it has been assessed as having **high social/cultural values**.

Archaeological/Scientific Value

Silcox (2002) considered the likelihood for site WQ1 to contain more artefacts than were immediately apparent on the ground surface. Silcox noted that several artefacts were identified as being partially buried in the surface sediment; however, it was unclear whether they were eroding out of *in situ* deposit or out of redeposited sediment. Silcox considered that the site was more extensive than what was apparent at the time. The OzArk (2018) ground-truth assessment identified sufficient exposures to allow the archaeological nature of the landform to be understood and recommended that limited salvage excavation be conducted to confirm that there is little potential for intact archaeological deposits at the site. As such, it is considered that this site is limited in what additional information it can add to the archaeological context of the region; therefore, it has been assessed as having **low-moderate archaeological/scientific values**.

Aesthetic Value

AHIMS Site #45-1-2802 is situated in a moderately disturbed context, largely from natural weathering and erosional processes. The site comprises a gentle elevated landform and an old formed track. The majority of the artefacts were identified within an exposure in the south of the site and along the vehicle track. As the site was fenced after it was originally identified, no activities associated with the Quarry operations have impacted on the site. As such, this site has been assessed as having a **moderate aesthetic value**.

Historic Value

AHIMS Site #45-1-2802 has been provisionally assessed as having **low historic values**, as information directly relating to a period in history significant to the recorded site is presently unknown. Further research is needed to gain a better understanding of the period of use of this site in order to provide a more accurate and contextualised history.

A summary of the assessed significance of WQ1 is provided in **Table 5-4**.

Table 5-4: Significance assessment.

Site Name	Social or Cultural Value	Archaeological / Scientific Value	Aesthetic Value	Historic Value
WQ1	High	Low-moderate	Moderate	Low

5.8.3 Representativeness, rarity and integrity

All values of the *Burra Charter* are considered when evaluating the significance of the Aboriginal site. The significance of open sites is extremely variable and dependent upon several factors relating to:

- Preservation: Whether the site has the potential for the presence of intact, subsurface deposit, or whether disturbance (human: land surface impacts, or environmental: erosion, deflation) has reduced its integrity and thus its potential.
- Representativeness: If this is the type of site one may expect in this landscape. (Relates back to the predictive model), i.e. do many such sites occur nearby?
- Artefacts: If the artefacts present (material, types or combinations thereof) are rare in the area or unusual for that type of site.
- Potential Archaeological Deposits: It is impossible to determine the scientific significance of PADs that do not have visible surface artefacts, as there is no site material or soil data to assess. Consequently, test excavation is required for such areas to investigate the presence, extent, nature and integrity of any possible site material such that their significance can be assessed.

The features of representativeness, rarity and integrity of the archaeological site within the Heritage Study Area (AHIMS #45-1-2802 (WQ1) Artefact Scatter) were assessed and are discussed below:

Representativeness

WQ1 is an artefact scatter identified within the proposed quarry extension area and is representative of sites in the region that are located on similar landforms. In terms of the site's size, artefact density, raw materials and artefact types, the presence of the Aboriginal site is consistent with the archaeological context highlighted in **Section 4.2** and **Section 4.4**.

Rarity

In the past, sites such as isolated finds and artefact scatters would not have been rare and on a state-wide scale, low density artefact scatters and isolated finds would remain the most common site type recorded. Although the open site within the Heritage Study Area is of low to moderate density with a reduced archaeological significance, its presence alone, in albeit a landscape that has been affected by water wash and erosion, remains a memory of the past in a landscape that is fast changing.

Integrity

The results of the field survey conclude that the general site integrity is low to moderate and it has been disturbed by surface water wash and erosion.

The Quarry Site is predominantly represented by existing landform modifications associated with the mining activities, however the site is permanently fence off and has been protected since it was initially recorded by Silcox (2000) (**Section 4.3.1** and **Section 5.5**) by the surrounding quarry activities.

5.9 LIKELY IMPACTS TO ABORIGINAL HERITAGE FROM THE PROJECT

The Aboriginal site, AHIMS #45-1-2802 (WQ1), would be disturbed by the proposed Quarry extension. **Table 5-4** summarises the assessment of the impact to AHIMS #45-1-2802.

Table 5-5: Impact assessment.

Site Name	Type of Harm (Direct/Indirect/None)	Degree of Harm (Total/Partial/None)	Consequence of Harm (Total/Partial/No Loss of Value)	Potential impact
#45-1-2802 (WQ1)	Direct	Total	Total loss of value	The Quarry operations are proposed to extend over the entire area comprising the site. As such all artefacts and site features will be subject to direct impact from the proposed work.

5.10 OVERALL VALUE OF POTENTIAL IMPACT ON HERITAGE ITEMS

A series of guidelines have been developed by the Department of Planning and Environment to quantify and standardise impact assessments (DP&E 2016). The rubric outlined in DPE (2016) leads to all impacts being graded within the matrix shown in **Figure 5-4**. **Table 5-5** assesses the heritage item to arrive at a standardised 'value of impact'. In **Table 5-5**, the highest variable (2) has been given to cultural heritage and a medium variable (1) has been given to aesthetic values. Both scientific and historical values were ranked as low (0).

Figure 5-4: Potential impact to heritage items reference matrix.

Degree of potential impact on heritage item	Significance of heritage object or place				
		Very high	High	Medium	Low
	Total impact	Very high value	High value	Medium value	Low value
	High partial impact	High value	High value	Medium value	Low value
	Medium partial impact	Medium value	Medium value	Low value	Minimal value
	Minimal partial impact	Low value	Low value	Minimal value	Minimal value

Table 5-6: Overall value of potential impact on heritage item.

	Heritage item 1
Name or location of the heritage object or place	WQ1
Social or cultural value	2
Historical	0
Scientific	0
Aesthetic	1
Significance of heritage item	Medium importance
Degree of impact (partial or full)	Full impact
Overall value of potential impact on heritage item	Medium value
Reasoning behind scores	General natural disturbance at site and no impacts from Quarry operations; moderate artefact density.

As can be seen in **Table 5–5**, the proposed impact to the recorded site (WQ1) has been evaluated as having a medium value. This can be interpreted as meaning that should this site be destroyed, it would result in a medium loss of heritage value from the regional context. As such, the management measures set out in **Section 6** will be required to mitigate the loss of this heritage value.

5.11 ECOLOGICALLY SUSTAINABLE DEVELOPMENT AND CUMULATIVE IMPACT FOR THE PROJECT

Australia's *National Strategy for Ecologically Sustainable Development* (Ecologically Sustainable Development Steering Committee 1992) defines ecologically sustainable development (ESD) as:

...using, conserving and enhancing the community's resources so that ecological processes, on which life depends, are maintained, and the total quality of life, now and in the future, can be increased.

The management and mitigation of Aboriginal sites involves consideration of ESD principles including cumulative impacts, the precautionary principle and the principle of intergenerational equity (OEH 2011: 12-13).

With regards to cultural heritage, the most important aspect of ESD is inter-generational equity whereby the present generation should ensure that the health, diversity and productivity of the environment are maintained or enhanced for the benefit of future generations. Similarly inter-generational equity maintains that places and items of cultural heritage value should be preserved for the education, enjoyment and use of future generations.

The project adds to the cumulative impact on the region's Aboriginal cultural heritage as one site will be harmed. While the heritage impact value of this loss to the site has a medium value, the site is a very common site type for the region (refer **Section 4.3.2.2**), and the proposed salvage and excavation of the site will increase the scientific knowledge of occupation in the region. Therefore, the loss of the site is considered to have a negligible cumulative impact on the region's Aboriginal cultural heritage resource.

6 MANAGEMENT AND MITIGATION: ABORIGINAL HERITAGE

6.1 INTRODUCTION

Appropriate management of cultural heritage items is primarily determined on the basis of their assessed significance as well as the likely impacts of the proposed development. No new Aboriginal sites were identified within the Heritage Study Area during the field survey; however, one previously recorded site (AHIMS #45-1-2802, WQ1) is located within the Project Site and will be subject to impact as a consequence of the project.

While impact avoidance through modification to project design is the preferred approach to management, this is not feasible in this case as the westerly extension of the extraction area is required in order to develop the Quarry to the nominated depth and maximise the recovery of quartzite.

As impact avoidance is not feasible, management measures to minimise or mitigate the impacts are proposed (see **Section 6.3**) along with a Statement of Commitments (SoC) in terms of heritage management.

An AHIP which is normally required for impacts to Aboriginal sites under the NPW Act is not necessary (under Section 4.41[1d] of the EP&A Act) as the project is being assessed under Part 4 Division 4.7 of the EP&A Act (SSD) and impacts to Aboriginal heritage would normally be managed under a Cultural Heritage Management Plan (CHMP). Notwithstanding this, the spirit of site protection and management in the face of impacts remains the same. In place of an AHIP under the NPW Act, a Statement of Commitments (SoC) in terms of heritage management is prepared (**Section 6.3**). This SoC forms the basis for the Minister's approval which would usually contain one or more conditions, including a requirement for the preparation of a CHMP, with which the proponent would be required to operate in accordance with.

6.2 MANAGEMENT AND MITIGATION OF THE RECORDED ABORIGINAL SITE

Impact avoidance to WQ1 (artefacts and site features) at AHIMS #45-1-2802 is not considered feasible as described previously. **Table 5-4** describes the proposed disturbance to WQ1.

Sections 6.2.1 and **6.2.2** provide for the proposed management of the objects and features of Site WQ1.

6.2.1 Archaeological salvage: surface artefact collection

Objects from AHIMS #45-1-2802 will be recorded and collected from the whole of the site area by a qualified archaeologist together with RAPs. The site boundary is currently demarcated by a permanent fence. This shall stay in place to ensure the surface collection of artefacts takes place within the site boundary, as well as to prevent any damage or inadvertent entry into the site by quarry operations until the recovery process is complete.

The following methodology will be followed for the surface collection of Aboriginal artefacts at the site:

- All visible artefacts at the site will be flagged.
- The artefacts will be photographed after flagging and before recording.
- The following information will be collected for each artefact:
 - GPS location;
 - type;
 - size;
 - reduction level;
 - raw material; and
 - any relevant notes.
- Once all recording is complete, the artefacts will be collected and placed in appropriately labelled bags.
- The recording and analysis of the artefacts recovered will be largely completed in the field and this data will be interpreted and documented in a salvage report to OEH and the RAPs.
- The supervising archaeologist would be responsible for submitting an *Aboriginal Site Impact Recording Form* to the AHIMS to update the register with the results of the salvage works at the site.
- The salvaged artefacts should be reburied at an agreed location. This will take place in accordance with Requirement 26 “Stone artefact deposition and storage” in the Code of Practice. The location chosen for reburial will be an area where future developments will not occur and as close as possible to their original location. A site card will be submitted to AHIMS to record the relocation area.

6.2.2 Salvage excavation

A limited salvage excavation will take place at AHIMS #45-1-2802 in order to:

- confirm that the highly eroded surface disturbance recorded at the site is apparent at the subsurface level; and
- to confirm that there is no subsurface archaeological deposits of conservation value are present.

No more than six 50cm x 50cm squares should be excavated. The excavation squares will be positioned so a valid sample of the site area is obtained so that the archaeological values of the site can be characterised. Up to three additional excavation squares can be added to extend the existing squares, should intact archaeological deposits or archaeological features be encountered near the perimeter of the squares. Additional squares may also be triggered if rare or unusual artefacts are identified (such as manufactured from a rare stone type or less-common

tool forms such as ground edge axes, hammerstones, etc), or other signs of human occupation (i.e. ground ovens/hearths or charcoal concentrations) are found. The excavation director will determine if an expansion is required to gain the appropriate scientific information.

All artefacts recovered from the salvage excavation should be recorded and photographed. The following attributes will be recorded:

- Artefact type;
- Material;
- Integrity;
- Reduction;
- Size;
- Rotation;
- Platform type;
- Platform size; and
- Termination type.

The excavated material from all pits will be sieved on site using dry sieving through nested sieves of 6-8 millimetres (mm) and 2.5-3.5mm mesh (which is considered to satisfy the 5mm aperture wire-mesh sieve requirement). Deposits will be sieved on to tarpaulins and the spoil used to the backfill the excavation square.

Storage of artefacts recovered during the salvage excavations will follow the procedure for the surface collected artefacts, as outlined in **Section 6.1.1**.

6.2.2.1 Excavation square recording

If appropriate (i.e. if intact archaeological stratigraphy is recorded) section drawings will be completed for the appropriate excavation square(s). If no archaeological stratigraphy is recorded then digital photographs shall be taken of a representative section of each excavation square and a suitable representative drawing made of the excavation square section to show the profile.

6.3 STATEMENT OF COMMITMENTS

An AHIP, which is normally required under the NPW Act for impacts to Aboriginal sites, is not necessary under Section 4.41[1d] of the EP&A Act, as the project is being assessed under Part 4 Division 4.7 of the EP&A Act (SSD). In place of an AHIP under the NPW Act, a Statement of Commitments (SoC) in terms of heritage management has been prepared. This SoC forms the basis for the Minister's approval which would usually contain one or more conditions, including a requirement for the preparation of a Cultural Heritage Management Plan (CHMP).

The proponent shall undertake the following SoCs:

- 1) Should the project be approved, the proponent will develop the CHMP in consultation with the RAPs, OEH and DPE. The CHMP will include the recommendations contained in this report (**Section 11**) and this SoC.
- 2) The impacted Aboriginal site, AHIMS #45-1-2802 that has been recorded in the Quarry Site will be salvaged under the methodology set out in **Section 6.1.1** and **Section 6.1.2**, and relocated to a safe location away from impacts arising from the project.
- 3) The recovered artefacts should be reburied at a location agreed to by the RAPs and where no future developments are planned or likely. The agreed and finalised location and the manner of reburial of the Aboriginal objects will be detailed in the CHMP following RAPs consultation. As one option, Requirement 26 “Stone artefact deposition and storage” in the Code of Practice will be considered. A site card will be submitted to AHIMS to register the location of any reburied artefacts. Alternatively the Aboriginal community may prefer that Aboriginal objects be held by an Aboriginal community or other party, which will need to be stipulated in the CHMP.
- 4) An Aboriginal Site Impact Recording Form will be completed by the archaeologist and submitted to AHIMS recording the salvage results of the site, within four months of the salvage being completed.

HISTORIC HERITAGE ASSESSMENT REPORT

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7 HISTORIC HERITAGE ASSESSMENT: INTRODUCTION

7.1 BRIEF DESCRIPTION OF THE PROJECT

Please refer to **Sections 1.1 to 1.4** for a description of the project, the Quarry Site and the Heritage Study Area.

7.2 RELEVANT LEGISLATION

7.2.1 State legislation

Environmental Planning and Assessment Act 1979 (EP&A Act)

See **Section 1.4.1** for a brief description of the EP&A Act.

Heritage Act 1977 (Heritage Act)

The *Heritage Act 1977* (Heritage Act) is applicable to the current assessment. This Act established the Heritage Council of NSW. The Heritage Council's role is to advise the government on the protection of heritage assets, make listing recommendations to the Minister in relation to the State Heritage Register, and assess/approve/decline proposals involving modification to heritage items or places listed on the Register. Most proposals involving modification are assessed under Section 60 of the Heritage Act.

Automatic protection is afforded to 'relics', defined as 'any deposit or material evidence relating to the settlement of the area that comprised New South Wales, not being Aboriginal settlement, and which holds state or local significance' (note: formerly the Act protected any 'relic' that was more than 50 years old. Now the age determination has been dropped from the Act and relics are protected according to their heritage significance assessment rather than purely on their age). Excavation of land on which it is known or where there is reasonable cause to suspect that 'relics' will be exposed, moved, destroyed, discovered or damaged is prohibited unless ordered under an excavation permit.

7.2.2 Commonwealth legislation

Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)

See **Section 1.5.2** for a brief description of the EPBC Act.

7.2.3 Applicability to the project

The current project will be assessed under Part 4, Division 4.7, Section 4.41(2) of the EP&A Act.

Any items of local or state historical heritage significance within the Project Site are afforded legislative protection under the Heritage Act.

It is noted there are no Commonwealth or National heritage listed places within the Project Site, and as such, the heritage provisions of the EPBC Act do not apply.

7.3 HISTORIC HERITAGE ASSESSMENT OBJECTIVES

The current assessment applies the Heritage Council *Historical Archaeology Code of Practice* (Heritage Council 2006) in the completion of the historical heritage assessment, including field investigations, in order to meet the following objectives.

- Objective One:** Conduct database searches to identify whether or not historical heritage items or areas are, or are likely to be, present within the Heritage Study Area.
- Objective Two:** Assess the significance of any recorded historical heritage items or areas.
- Objective Three:** Determine whether the activities of the proponent are likely to cause harm to recorded historical heritage items or areas.
- Objective Four:** Provide management recommendations and options for mitigating impacts to heritage items through the activities of the project.

7.4 DATE OF HISTORIC HERITAGE ASSESSMENT

The fieldwork component of this assessment was undertaken simultaneously with the Aboriginal heritage assessment on Wednesday 29 August 2018. Please refer to **Section 5** for details on the assessment.

7.5 LANDSCAPE CONTEXT

Please refer to **Sections 3.1 to 3.7** for a description of the landscape context of the Heritage Study Area.

8 HISTORIC HERITAGE ASSESSMENT: BACKGROUND

8.1 BRIEF HISTORY OF THE LITHGOW VALLEY

Lithgow Valley's first European settlers arrived in 1824 and the town was named in 1827 by the explorer Hamilton Hume, in honour of William Lithgow, Governor Brisbane's private secretary (RPS 2014). Settlement in the area was slow; by 1860 only four properties were settled in the valley. In 1838, one of the owners of those properties, Andrew Brown of "Cooerwull", wrote in his diary "getting coal", which was the first written record of coal noted in the Lithgow Valley.

In 1868, the construction of the railway line through the Valley spread workmen who built their campsites close to the cuttings, embankments and viaducts throughout the length of the valley. To support the needs for cooking fires and heating during winter, Mr. Poole in 1868 opened the Hermitage Colliery as the first commercial mine to engage in mining and selling coal. By 1874, there were four mine producing – Eskbank Colliery (at the eastern end of Main Street near the present Hoskins Church), the Lithgow Valley Colliery, Vale of Clywdd Colliery and the Hermitage Colliery. The owners of the Lithgow Valley Colliery secured contracts to supply coal to the Railways to run their locomotives. The exportation of coal also became commercially viable with the construction of the railway line.

The nature of coal as a low value, high volume resource necessitated its need to be made available to be delivered in bulk or to be located near to established transport infrastructure. The failure of several coal mines in the Cullen Bullen region prior to the development of the Wallerawang-Mudgee railway line is testament to the importance of developing bulk haulage networks for coal (Christison 2003).

In 1870, the railway reached Wallerawang. The Cobb and Co. Coach Service provided transport between the station at Wallerawang, Bathurst and Mudgee, utilising the route approximating the current Castlereagh Highway. The exploitation of coal reserved began in Wallerawang around 1873 with a number of mines being opened on the Lithgow seam at Mount Piper, mid-way between Wallerawang and Lidsdale. Completion of the Wallerawang-Mudgee railway branch line in 1880s coincided with the rapid growth of the coal mining industry in the Western Coalfields. The mines in the Wallerawang district generally followed the railway line and included Irondale Colliery (1883), Ivanhoe Colliery (1893) and the Commonwealth Colliery (1895), which became the first open cut mine in NSW during World War (1940) (Carne 1908).

By 1900, Lithgow boasted nine hotels, three banks, a municipal water supply and gaslights in the main street. The population increased from 5,628 in 1901 to 8,196 in 1911, increasing the pressure on housing. In 1908, the sale of a portion of Cooerwull, one of the earliest settled properties in the area, provided an increase in the amount of available land; however, it was only marginally successful in easing the demand (Cremin 1989).

8.2 LOCAL CONTEXT

8.2.1 Desktop database searches conducted

A desktop search was conducted on the following databases to identify any potential previously-recorded heritage within the Study Area. The results of this search are summarised in **Table 8-1**.

Table 8-1: Historic heritage: desktop-database search results.

Name of Database Searched	Date of Search	Extent of Search	Comment
National and Commonwealth Heritage Listings	10/10/2018	NSW	No places listed on either the National or Commonwealth heritage lists are located within the Quarry Site or Heritage Study Area.
NSW State Heritage Register (NSW)	10/10/2018	Lithgow City LGA	No places of state historic heritage significance are listed within the Quarry Site or Heritage Study Area.
Australian Heritage Database	10/10/2018	Lithgow City LGA	No places of state historic heritage significance are listed within the Quarry Site or Heritage Study Area.
LEP	10/10/2018	Lithgow City LGA	No places of state historic heritage significance are listed within the Quarry Site or Heritage Study Area.

A search of the Heritage Council of NSW administered heritage databases and the Lithgow City Council LEP returned no records for historical heritage sites within the designated search areas.

8.3 SURVEY METHODOLOGY

The fieldwork component of this assessment was undertaken simultaneously with the Aboriginal heritage assessment. Please refer to **Section 5** for details on the assessment methodology and coverage.

9 RESULTS OF HISTORIC HERITAGE ASSESSMENT

The historic heritage assessment of the Heritage Study Area was undertaken concurrently with the Aboriginal cultural heritage assessment (**Section 5**). No historic heritage items or sites were recorded during the field survey.

As such, there are no likely impacts to historic heritage from the activities of the project.

10 MANAGEMENT AND MITIGATION: HISTORIC HERITAGE

10.1 GENERAL PRINCIPLES FOR THE MANAGEMENT OF HISTORIC SITES

Appropriate management of heritage items is primarily determined on the basis of their assessed significance as well as the likely impacts of the proposed development.

In terms of best practice and desired outcomes, avoiding impact to any historical item is a preferred outcome, however, where a historical site has been assessed as having no heritage value, impacts to these items does not require any legislated mitigation.

10.2 MANAGEMENT AND MITIGATION OF RECORDED HISTORIC SITES

No items or sites of historic heritage significance were identified in the Heritage Study Area. Should any items of historic heritage significance be uncovered then the mitigation of impacts to these items will need to be managed under conditions of the CHMP. The CHMP will stipulate the protocols to follow should likely historic objects become uncovered through the activities of the project.

11 RECOMMENDATIONS

11.1 ABORIGINAL HERITAGE

Under Section 89A of the NPW Act, it is mandatory that all newly-recorded Aboriginal sites be registered with OEH AHIMS. As a professional in the field of cultural heritage management it is the responsibility of OzArk to ensure this process is undertaken.

To this end it is noted that **one Aboriginal site** (WQ1) exists within the Quarry Site.

No other Aboriginal sites were recorded within the Heritage Study Area during the field survey.

The following recommendations are made on the basis of the proposed impacts to WQ1 and with regard to:

- legal requirements under the terms of the NPW Act whereby it is illegal to damage, deface or destroy an Aboriginal place or object without the prior written consent of OEH;
- the findings of the current investigations undertaken within the Heritage Study Area; and
- the interests of the Aboriginal community.

Recommendations concerning the proposed activities within the Quarry Site, and to ensure any necessary protection to the area's Aboriginal cultural heritage values, are as follows:

1. Should development consent for the project be granted, the SoC set out in **Section 6.3** will be followed.
2. All ground disturbance activities must be confined to within the assessed Heritage Study Area.
3. Prior to disturbance beyond the Heritage Study Area, further field survey should be completed prior to surface disturbance in these areas.
4. Following SSD approval for the project, a CHMP for the management and mitigation from impacts to Aboriginal heritage (including the implementation of an unanticipated finds protocol and heritage site induction for staff and contractors), would be development in agreement with the proponent, RAPs, OEH and DP&E. The archaeological management recommendations in this report would normally be incorporated into the CHMP that is usually formulated following development approval.

11.2 HISTORIC HERITAGE

The historic heritage assessment concluded that no heritage items of intact archaeological deposits are likely to be harmed by the project. The following recommendations are made on the basis of these impacts and with regard to:

- legal requirements under the terms of the Heritage Act;

- guidelines presented in the *Burra Charter* (Australia ICOMOS 2013);
- the findings of the current assessment; and
- the interests of the local community.

To ensure that historic heritage values are protected, the following recommendations are made:

5. The activities of the project can proceed without further historic heritage investigation provided that all ground disturbance activities are confined to within the Heritage Study Area. If the parameters of the proposed activity extend beyond the assessed area, then further archaeological assessment may be required.
6. This assessment has concluded that there is a low likelihood that the proposed work would harm any historic items. The CHMP will include protocols for the management and mitigation to historic heritage from the impacts, should objects be encountered that are suspected to be historic heritage items.
7. The CHMP shall include protocols for inductions for staff undertaking the proposed activity, and will include the legislative protection requirements for historic sites and items in NSW and the relevant fines for non-compliance.

REFERENCES

-
- | | |
|--------------------------|---|
| Australia ICOMOS 2013 | International Council on Monuments and Sites 2013. <i>The Burra Charter: The Australia ICOMOS Charter for Places of Cultural Significance</i> , 2013. |
| Barton and McDonald 1995 | Barton, H. and McDonald, J. <i>Archaeological investigation of sites affected by augmentation works at Lyell Dam, near Lithgow, NSW. Salvage and test excavation report</i> . Report prepared for Pacific Power. |
| BOM 2018 | Bureau of Meteorology 2018, Climate statistics for Australian Locations, Blayney Post Office, website viewed 9 October 2018, < http://www.bom.gov.au/climate/averages/tables/cw_063010.shtml >. |
| Bowdler 1983 | Bowdler, S. 1983 <i>Aboriginal sites on the Crown timber lands of NSW</i> . Report to the Forestry Commission of NSW. |
| Burke & Smith 2004 | Burke, H. and Smith, C. 2004. <i>The Archaeologist's Field Handbook</i> , Blackwell, Oxford. |
| Carne 1908 | Carne, J.E. 1908. <i>Geology and mineral resources of the Western Coal Field</i> . Government Printer, Sydney. |
| Christison 2003 | Christison, R. 2003. <i>The cultural inheritance of coal mining communities</i> . University of New England. |
| Cremin 1987 | Cremin, A, Jack, R.I. 1987. <i>Survey of historical sites in Lithgow Area</i> . Report on a survey prepared for the Heritage Council of NSW by the University of Sydney. |
| DECCW 2010 | Department of Environment, Climate Change and Water, Sydney (now OEH). <i>Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales</i> . |
| DECCW 2010b | Department of Environment, Climate Change and Water, Sydney (now OEH). <i>Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010</i> . |
| DP&E 2016 | Department of Planning and Environment. Guidelines for the Economic Assessment of Mining and Coal Seam Gas Proposals. |
| Gay 1999 | Gay, L. <i>Proposed Realignment of the Castlereagh Highway, Lidsdale, NSW: Indigenous Heritage Assessment</i> . Report to the RTA. |
| Gollan 1987 | Gollan, K. 1987. <i>Archaeological investigations on Newness Plateau</i> . Report for National Parks and Wildlife Service NSW. |

Heritage Council 2006	Heritage Council of NSW. 2006. <i>Historical Archaeology Code of Practice</i> . In <i>NSW Office of Environment & Heritage</i> [website]. Available from: http://www.environment.nsw.gov.au/resources/heritagebranch/heritage/HistArchCodeofPractice.pdf [accessed January 2018].
Hetherington 2018	Hetherington Exploration & Mining Title Services. 2018. <i>Native Title Clearance Report</i> . Prepared for Walker Quarries Pty Ltd.
Kelton 1999	Kelton, J. <i>An Archaeological survey of the proposed silicon plant at Wallerawang, near Lithgow, Central tablelands of NSW</i> . Report to R.W. Corkery, Orange.
Kelton 2000	Kelton, J. <i>An Aboriginal Archaeological study of the Marrangaroo Department of Defence site, Lithgow, NSW</i> . Report to Dames and Moore Pty Ltd, North Sydney.
Kelton 2002	Kelton, J. <i>An Aboriginal Archaeological Study & Non-Indigenous Heritage Overview of the Proposed Boulder Road Coal Mine, Near Cullen Bullen</i> . A report to International Environmental Consultants P/L.
King 1993	King, D.P. 1993. <i>Soil Landscapes of the Wallerawang 1:100,000 Sheet map and report</i> . NSW Department of Land and Water Conservation, Sydney.
McIntyre 1993	McIntyre, S. <i>Springvale coal project – Aboriginal burial site</i> . Report prepared for Clutha Limited and Samsung (Australia) Pty Ltd).
Mitchell 2002	Mitchell, P. 2002. <i>Description for NSW (Mitchell) Landscapes Version 2</i> . Department of Environment and Climate Change NSW.
NPWS 2016	New South Wales National Parks and Wildlife Services. 2016. <i>South Eastern Highlands</i> . Accessed 9/10/18.
OEH 2011	Office of Environment and Heritage 2011. <i>Guide to investigating, assessing and reporting on Aboriginal cultural heritage in NSW</i> .
OzArk 2003	<i>Archaeological Test Excavation of PADs 1 and 2 (site L2: NPWS #45-1-2573 & 45-1-2574): Proposed corridor of the new Castlereagh highway 86, Lidsdale, NSW</i> . Report to the RTA.
OzArk 2004	<i>Salvage Excavation of Site L2 (DEC AHIMS #45-1-2573 & 2574). Proposed Corridor of the new Castlereagh Highway 86, Lidsdale, NSW</i> . Report to the RTA.
OzArk 2018	OzArk. 2018. <i>Assessment and heritage advice for site WQ1</i> . Report to Walker Quarries Pty Ltd.

Rich and Gorman 1992	Rich, E. and Gorman, A. <i>Proposed Springvale Colliery and Conveyor, Wallerawang: Archaeological Survey for Aboriginal Sites</i> . Report prepared for Clutha Limited and Samsung (Aust) Pty Ltd.
RPS 2014	RPS. 2014. <i>Cultural Heritage Impact Assessment: Angus Place Extension Project, Lithgow Local Government Area</i> . Report to Centennial Coal Pty Ltd.
Silcox 2000	Silcox, R. <i>Archaeological Assessment for a Proposed Hardrock Quarry, Wallerawang</i> . Report to Pacrim Environmental Pty Ltd.
Tindale 1974	Tindale, A. 1974. <i>Aboriginal Tribes of Australia</i> . University of California Press.

PLATES



Plate 1: View southeast along an existing formed track and into the northeast portion of the Heritage Study Area.



Plate 2: View of typical vegetation and low ground surface exposure in the northeast portion of the Heritage Study Area.



Plate 3: Overall good visibility and partially cleared ground surface within the mid – upper slope landform.



Plate 4: View of previous clearing and ground disturbance identified along the boundary of the Heritage Study Area.



Plate 5: Typical soils and gravel fragments identified on the ground surface.



Plate 6: View north in the west of the Heritage Study Area showing a previously formed track and a drainage line in the background.



Plate 7: View of the steeply incised drainage line in the Heritage Study Area.



Plate 8: View east across the gentle and lower elevated crest landform in the south of the Heritage Study Area.



Plate 9: Good ground surface exposure identified on one of the previously formed tracks.



Plate 10: View northwest showing the steep upper slope landform in the Heritage Study Area.



Plate 11: View from the drainage line looking southeast from the mid slope to the upper slope and crest landform.



Plate 12: View of previous landform disturbance identified in the southern portion of the Heritage Study Area.

APPENDIX 1: ACHCR DOCUMENTATION

Log of Aboriginal community consultation

Aboriginal Consultation Log - Wallerawang			
Date	Organisation	Comment	Method/comments
15.5.18	Lithgow Mercury	R.W. Corkery and Co. placed an advertisement seeking EOI	
15.5.18	Bathurst LALC	Stage 1 agency letter requesting potential stakeholders sent by R.W. Corkery and Co.	
15.5.18	OEH	Stage 1 agency letter requesting potential stakeholders sent by R.W. Corkery and Co.	
15.5.18	Office of The Registrar, ALRA	Stage 1 agency letter requesting potential stakeholders sent by R.W. Corkery and Co.	
15.5.18	NTSCORP	Stage 1 agency letter requesting potential stakeholders sent by R.W. Corkery and Co.	
15.5.18	National Native Title Tribunal	Stage 1 agency letter requesting potential stakeholders sent by R.W. Corkery and Co.	
15.5.18	Lithgow Shire Council	Stage 1 agency letter requesting potential stakeholders sent by R.W. Corkery and Co.	
15.5.18	National Native Title Tribunal	R.W. Corkery and Co. <i>Records held by the National Native Title Tribunal as at 15th May 2018 indicate that there are two Native Title Determination Applications (Wendy Lewis, Mavis Agnew and Martin de Launey on behalf of Warrabinga-Wiradjuri #2, Warrabinga-Wiradjuri #7) Zero Determinations of Native Title and one Indigenous Land Use Agreements (Gundungurra Area Agreement) over the identified area of Lithgow LGA.</i>	
17.5.18	NTSCORP	R.W. Corkery and Co. Received response advising their privacy guidelines prevent them from providing any contact details of traditional owners and that they will forward our correspondence to and individual or group they are aware of with relevant knowledge and interest in the area and request they contact us by the 28th May 2018	
28.5.18	OEH	Responded and suggested R.W. Corkery and Co contact Dhuuluu-Yala Aboriginal Corporation, Gundungurra Aboriginal Heritage Association Inc, Gundungurra Tribal Council Aboriginal Corporation, Hawkesbury-Nepean Catchment Management Authority, Lyn Syme, Mingaan Aboriginal Corporation, Mooka, Murra Bidgee Aboriginal Corporation, North-Eastern Wiradjuri, Trevor Robinson, Warrabinga Native Title Claimants Aboriginal Corporation, Wiradjuri Council of Elders, Wiradjuri Interim Working Party	
6.6.18	Office of The Registrar, ALRA	Responded and suggested R.W. Corkery and Co contact Bathurst Local Aboriginal Land Council	
29.5.18	Mr Bill Allen	Stage 1 Community letters expression of interest sent	
29.5.18	Chairperson, Dhuuluu-Yala Aboriginal Corporation*	Stage 1 Community letters expression of interest sent	Letter returned to sender
29.5.18	Chairperson, Gundungurra Aboriginal Heritage Association	Stage 1 Community letters expression of interest sent	
29.5.18	Chairperson, Gundungurra Tribal Council Aboriginal Corporation	Stage 1 Community letters expression of interest sent	
29.5.18	Aboriginal Reference Group, Hawkesbury-Nepean Catchment Management Authority*	Stage 1 Community letters expression of interest sent	Letter returned to sender
29.5.18	Mingaan Aboriginal Corporation	Stage 1 Community letters expression of interest sent	
29.5.18	Mr Neville Williams, Mooka	Stage 1 Community letters expression of interest sent	

Aboriginal Consultation Log - Wallerawang			
29.5.18	Murra Bidgee Aboriginal Corporation	Stage 1 Community letters expression of interest sent	
29.5.18	North – Eastern Wiradjuri	Stage 1 Community letters expression of interest sent	
29.5.18	Mr Trevor Robinson*	Stage 1 Community letters expression of interest sent	Letter returned to sender
29.5.18	Ms Lyn Syme	Stage 1 Community letters expression of interest sent	
29.5.18	Mr Lance Syme, Director, Warrabinga Native Title Claimants Aboriginal Corporation*	Stage 1 Community letters expression of interest sent	Letter returned to sender
29.5.18	Mr Robert Clegg, Wiradjuri Council of Elders	Stage 1 Community letters expression of interest sent	
29.5.18	Wiradjuri Interim Working Party	Stage 1 Community letters expression of interest sent	Letter returned to sender
29.5.18	Murra Bidgee Mullangari Aboriginal Corporation Cultural Heritage	Ryan responded and indicated he would like to be a RAP for the project	email
30.5.18	Gundungurra Tribal Council Aboriginal Corporation	Responded, would like to be a RAP for this project	email
30.5.18	Muragadi Heritage Indigenous Corporation	Jesse Carroll – Johnson responded would like to be a RAP for this project	email
4.6.18	Mingaan Aboriginal Corporation	Responded, would like to be a RAP for this project	email
25.6.18	Central Tablelands Local Land Services	Stage 1 Community letters expression of interest sent, closes 9th July 2018	email
21.6.18	Yulay Cultural Services@gmail.com	AI from RWC received a confirmation of RAP from Yulay Cultural Services@gmail.com	email
3.7.18	Yurrandaali Cultural Services	SB sent stage 2 package. Requested confirmation would like to be a RAP as did not receive response initially. Feedback closes 1st August 2018	email
3.7.18	Barraby Cultural Services	SB sent stage 2 package. Requested confirmation would like to be a RAP as did not receive response initially. Feedback closes 1st August 2018	email
3.7.18	Murra Bidgee Mullangari Aboriginal Corporation Cultural Heritage	SB sent stage 2 package. Requested confirmation would like to be a RAP as did not receive response initially. Feedback closes 1st August 2018	email
3.7.18	Mingaan Wiradjuri Aboriginal Corporation	SB sent stage 2 package. Requested confirmation would like to be a RAP as did not receive response initially. Feedback closes 1st August 2018	email
3.6.18	Gundungurra Tribal Council Aboriginal Corporation	SB sent stage 2 package. Requested confirmation would like to be a RAP as did not receive response initially. Feedback closes 1st August 2018	email
3.7.18	Muragadi Heritage Indigenous Corporation	SB sent stage 2 package. Requested confirmation would like to be a RAP as did not receive response initially. Feedback closes 1st August 2018	email
3.7.18	Yulay Cultural Service	SB sent stage 2 package. Requested confirmation would like to be a RAP as did not receive response initially. Feedback closes 1st August 2018	email
3.7.18	Bathurst LALC	SB sent stage 2 package. Requested confirmation would like to be a RAP as did not receive response initially. Feedback closes 1st August 2018	email
3.7.18	Warrabinga Native Title Claimants Aboriginal Corporation*	SB sent stage 2 package. Requested confirmation would like to be a RAP as did not receive response initially. Feedback closes 1st August 2018	email
4.7.18	Gundungurra Tribal Council Aboriginal Corporation	SB sent amended letter with correct contact details	email
4.7.18	Merrigarn	SB sent amended letter with correct contact details	email
6.7.18	Barraby Cultural Services	SB received response supporting methodology	email

Aboriginal Consultation Log - Wallerawang			
6.7.18	Yurrandaali Cultural Services	SB received response supporting methodology	email
9.7.18	OEH	RH sent letter advising of RAPs	email
9.7.18	Bathurst LALC	RH sent letter advising of RAPs	email
10.7.18	Murra Bidgee Mullangari Aboriginal Corporation Cultural Heritage	SB received response supporting methodology	email
31.7.18	Muragadi Heritage Indigenous Corporation	SB received response supporting methodology	email
17.8.18	Bathurst LALC	RH sent invitation to survey. Fieldwork on 29th August. Requested confirmation to participate by 22.8.18	email
17.8.18	Gundungurra Tribal Council Aboriginal Corporation	RH sent invitation to survey. Fieldwork on 29th August. Requested confirmation to participate by 22.8.18	email
20.8.18	Bathurst LALC	RH received response that Colleen Fisk will be attending as the site officer	email
22.8.18	Gundungurra Tribal Council Aboriginal Corporation	RH phoned to check if attending fieldwork as RSVP ends at 3pm today, went straight to voice mail.	phone
22.8.18	Gundungurra Tribal Council Aboriginal Corporation	RH received email with insurances to confirm will be attending as a site officer	email
22.8.18	Gundungurra Tribal Council Aboriginal Corporation	RH responded to email to clarify who the site officer will be	email
27.8.18	Gundungurra Tribal Council Aboriginal Corporation	RH received response that the site officer will be Vaimoana Kengike and asked how many days field work is.	email
29.8.18		Field survey undertaken with OzArk, Gundungurra Tribal Council and Bathurst Land Council.	in person
29.8.18	Gundungurra Tribal Council Aboriginal Corporation	RH responded advising field work is just the one day, 29th August	email
30.4.19	Bathurst LALC	Philippa Sokol (PS) sent a copy of the draft heritage report to RAPs for review and comment - report comments close COB Wednesday 29.5.19.	email
30.4.19	Mingaan Wiradjuri Aboriginal Corporation	Philippa Sokol (PS) sent a copy of the draft heritage report to RAPs for review and comment - report comments close COB Wednesday 29.5.19.	email
30.4.19	Yurrandaali Cultural Services	Philippa Sokol (PS) sent a copy of the draft heritage report to RAPs for review and comment - report comments close COB Wednesday 29.5.19.	email
30.4.19	Murra Bidgee Mullangari Aboriginal Corporation Cultural Heritage	Philippa Sokol (PS) sent a copy of the draft heritage report to RAPs for review and comment - report comments close COB Wednesday 29.5.19.	email
30.4.19	Barraby Cultural Services	Philippa Sokol (PS) sent a copy of the draft heritage report to RAPs for review and comment - report comments close COB Wednesday 29.5.19.	email
30.4.19	Muragadi Heritage Indigenous Corporation	Philippa Sokol (PS) sent a copy of the draft heritage report to RAPs for review and comment - report comments close COB Wednesday 29.5.19.	email
30.4.19	Yulay Cultural Service	Philippa Sokol (PS) sent a copy of the draft heritage report to RAPs for review and comment - report comments close COB Wednesday 29.5.19.	email
30.4.19	Gundungurra Tribal Council Aboriginal Corporation	Philippa Sokol (PS) sent a copy of the draft heritage report to RAPs for review and comment - report comments close COB Wednesday 29.5.19.	email
30.4.19	Warrabinga Native Title Claimants Aboriginal Corporation*	Philippa Sokol (PS) sent a copy of the draft heritage report to RAPs for review and comment - report comments close COB Wednesday 29.5.19. Sent to Lance Syme as info 2warrabinga address not receiving emails	email
30.4.19	Merrigarn	Philippa Sokol (PS) sent a copy of the draft heritage report to RAPs for review and comment - report comments close COB Wednesday 29.5.19.	email

Aboriginal Consultation Log - Wallerawang			
		The email kept bouncing back. PS called Shaun to confirm the email address to forward on the report - the mobile number is no longer connected. Unable to get in contact with Merrigarn	
1.5.19	Muragadi Heritage Indigenous Corporation	Anthony of Muragadi sent email response to heritage report: <i>"I have read the project information and draft report for the above project, I agree with the recommendations made by OzArk."</i> PS thanked Anthony for taking the time to read the report and his speedy response.	email
5.6.19	Project RAPs	PS sent reminder email for return of comments/feedback to report - except Muragadi which have already responded. Merrigarn could not be sent(see entry 30.4.19), phone and email no longer connected	email
8.6.19	Murra Bidgee Mullangari Aboriginal Corporation Cultural Heritage	PS received a response to the heritage report from Darleen Johnson: <i>"I have read the project information and CHAR for the above project, I endorse the recommendations made. We would also like to be involved in all aspects of the project i.e. surveying and fieldwork."</i> PS (11.6.19) thanked Darleen for sending through her response and her interest in participating in future project work.	email

Stage 1 advertisement placed in the *Lithgow Mercury* newspaper, Tuesday 15 May 2018**Expression of Interest****Cultural Heritage Management**

OzArk Environmental & Heritage Management P/L has been engaged by RW Corkery Pty Ltd on behalf of the proponent Walker Quarries Pty Ltd and is seeking registrations of interest from Aboriginal groups or individuals of the Lithgow area, who wish to be consulted over the proposed Wallerawang Quarry Extension Project. The Wallerawang Quarry is located south of Wallerawang, approximately 8km northwest of Lithgow, NSW.

The purpose of this consultation is to identify stakeholders to assist in the Aboriginal cultural heritage assessment of the proposed development site. If you hold cultural knowledge relevant to determining the impacts to the cultural significance of the above mentioned area, please register your interest by post: OzArk EHM, PO Box 2069, Dubbo NSW 2830; email: sheridan@ozarkehm.com.au, or by phoning OzArk between 9.00am and 5.00pm weekdays on 02 6882 0118.

All submissions should be received no later than **9am Friday 29th June, 2018.**

Stage 1 letter to agencies and Aboriginal community organisations

R.W. CORKERY & CO.
PTY. LIMITED ABN 91 386 055 772
 GEOLOGICAL & ENVIRONMENTAL CONSULTANTS



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14 May 2018

Ms Tonilee Scott,
 Bathurst Local Aboriginal Land Council Pty Ltd
 149 Russell St,
 BATHURST NSW 2795.

Originally sent by email to:
 bathlalc2@bigpond.com

Dear Ms Scott,

**Re: Aboriginal Cultural Heritage Impact Assessment and Community Consultation:
 Wallerawang Quarry, Wallerawang, NSW**

Walker Quarries Pty Ltd (WQ) has requested RW Corkery & Co. Pty Limited (RWC) to commence Aboriginal community consultation, in accordance with the OEH *Aboriginal cultural heritage consultation requirements for proponents 2010*, for the Wallerawang Quarry (the Quarry). This consultation is to assist with establishing Registered Aboriginal Parties for future consultation, field survey and the potential assessment of impact on sites of Aboriginal Heritage significance.

WQ currently operates the Quarry, located on land adjoining the Great Western Highway to the south of Wallerawang, approximately 8km northwest of Lithgow. Project approval (DA 344-11-2001) was granted to Sitegoal Pty Ltd (parent company of Walker Quarries Pty Ltd) in 2004 by the then Minister for Planning as a 'State Significant Development'. An open camp site was identified on the Quarry Site by R. Silcox in 2000 (as Site WQ1) with a condition of DA 344-11-2001 requiring this Aboriginal site to remain undisturbed. WQ has fenced the location of Site WQ1 which remains undisturbed by Quarry operations. WQ recently commissioned OzArk Environmental and Heritage Management Pty Ltd to assess the nature and extent of the site in March 2018. OzArk confirmed WQ1 as intact and protected (see **Figure 2**) although noted it is not currently recorded in the Aboriginal Heritage Information Management System (AHIMS) database.

WQ proposes to apply for a Modification to DA 344-11-2001 to:

- extend the period of consent beyond July 2019;
- extend the extraction area (both laterally and vertically); and
- increase the area available for stockpiling (to the west of the Western Stockpile Area).

The proposed extensions to the extraction area and stockpiling area are shown in **Figure 1** and would require disturbance to Site WQ1.

Brooklyn Office:
 First Floor, 12 Dangar Road, PO Box 235, BROOKLYN NSW 2063
 Telephone: (02) 6985 8511 Email: brooklyn@rwcorkery.com

Orange Office:
 62 Hill Street, ORANGE NSW 2800
 Telephone: (02) 6962 5411 Email: orange@rwcorkery.com

Brisbane Office:
 Suite 5, Building 3, Pine Rivers Office Park, 205 Leitchs Road, BRENDALE QLD 4500
 Telephone: (07) 3205 5400 Email: brisbane@rwcorkery.com

14 May 2018

- 2 -

We are seeking Expressions of Interest from relevant Aboriginal groups and individuals in the Wallerawang and Lithgow areas to form a consultation group. This consultation is to assist RWC, WQ and archaeological consultants (to be confirmed) in the design and completion of a field survey over the areas of extension identified in **Figure 1** (which may be refined following further definition of the proposed site layout), consideration of the management of Site WQ1, and to assist in assessment and determination of the proposed modification to DA 344-11-2001.

I would be grateful if your organisation can recommend and provide contact details for any known Aboriginal groups who may have an interest for the Quarry area and hold knowledge relevant to determining the cultural significance of Aboriginal objects and/or places such that we can then include them in the consultation process with regards to the proposed heritage management.

We would appreciate it if you could provide any feedback regarding these Aboriginal stakeholder groups by COB Monday 28 May 2018 or sooner if possible.

Yours sincerely

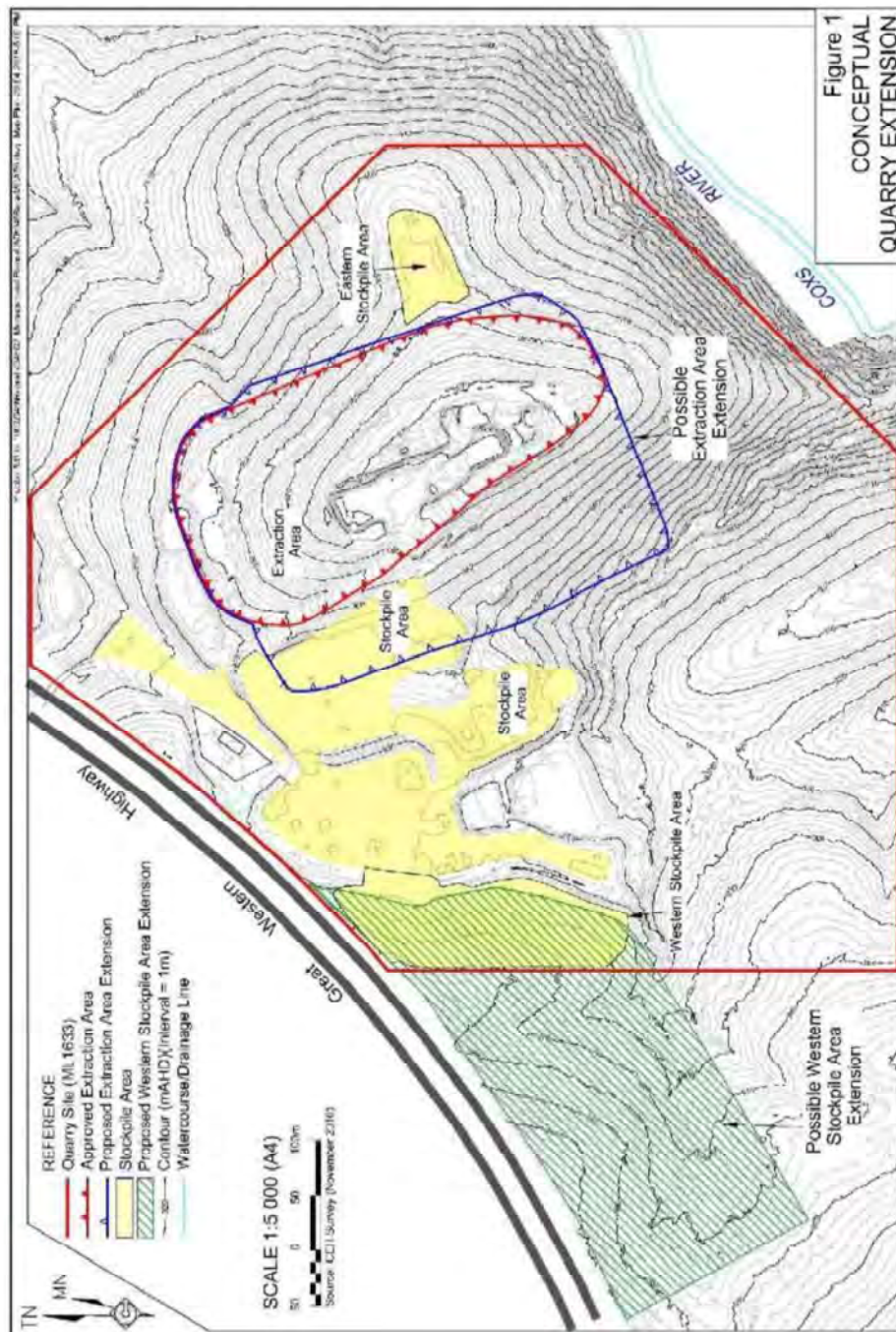
Alex Irwin
Senior Environmental Consultant

Copy: Walker Quarries Pty Ltd

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14 May 2018

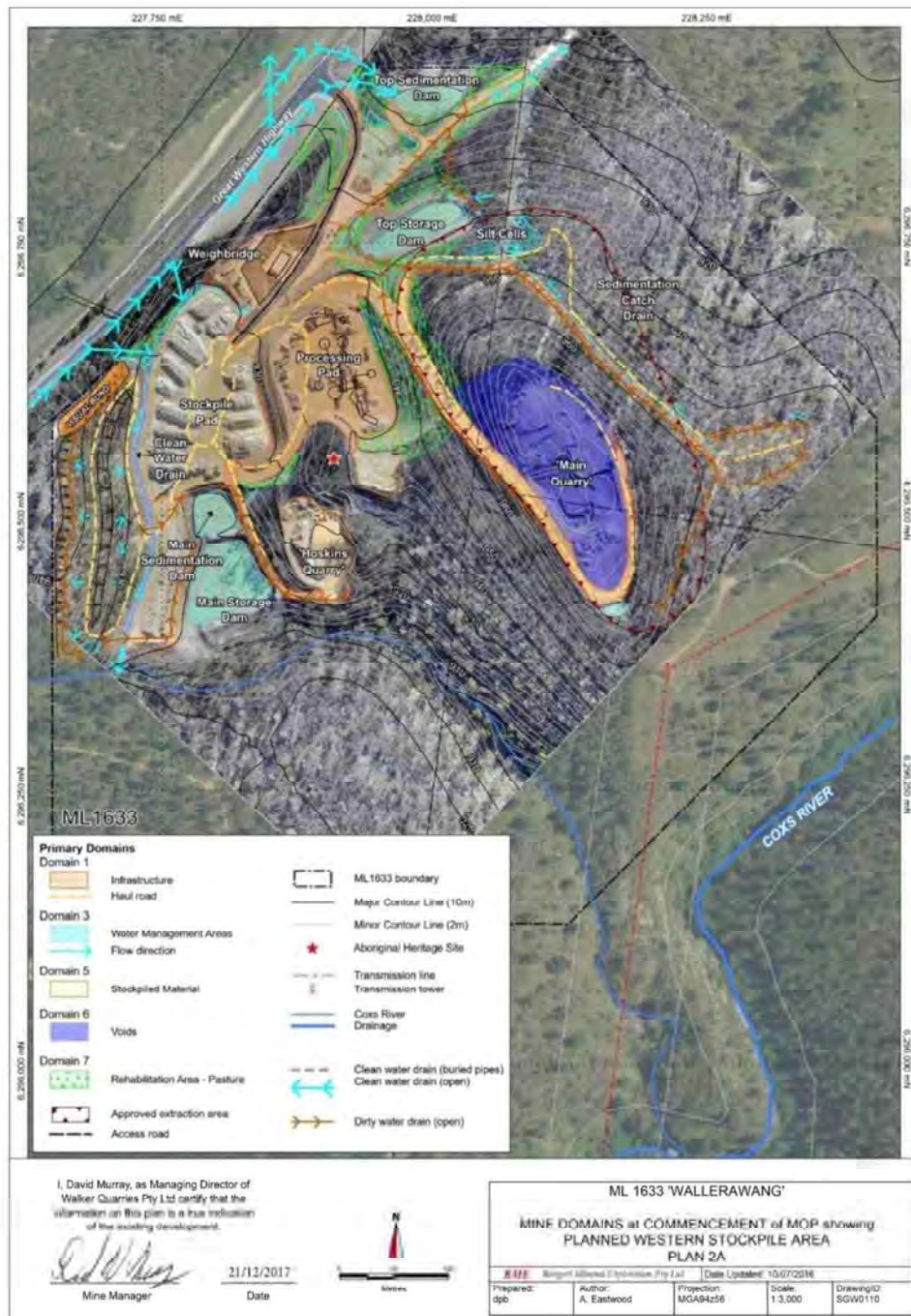
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14 May 2018

- 4 -



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Initial Stage 2/3 consultation letter (sent to all RAPs) accompanied the desktop assessment & survey methodology document.

The survey methodology document is a moderately sized document so at this stage has not been inserted here, however, a copy of this document may be requested and can be supplied.



Stage 4 consultation letter (sent to all RAPs) accompanied the draft ACHAR for RAP review and feedback.



OzArk Environment & Heritage		ABN 59 104 582 354
Dubbo	T: 02 6882 0118	145 Wingewarra St
Queanbeyan	enquiry@ozarkehm.com.au	PO Box 2069
Newcastle	www.ozarkehm.com.au	DUBBO NSW 2830

30th April 2019

Members
 Bathurst Local Aboriginal Land Council
 C/- Tonilee Scott
 149 Russell Street
 Bathurst NSW 2795
bathlalc2@bogpond.com

ABORIGINAL AND HISTORIC HERITAGE ASSESSMENT FOR THE PROPOSED WALLERAWANG QUARRY EXTENSION PROJECT.

Dear Members,

Thank-you for your continued participation as a Registered Aboriginal Party (RAP) and involvement in the above-mentioned project.

Walker Quarries Pty Ltd (the Proponent) would like to offer you the opportunity to provide feedback on the draft report that has been undertaken in accordance with stage four (4) of the *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010* (ACHCR).

As per the ACHCRs we are required to give you twenty-eight (28) days to supply feedback on the attached documents. This period closes on the **Wednesday 29th May 2019**.

Should our office not be contacted within this time frame, we will presume that you are satisfied with the contents of the report as it stands.


Should you need any help supplying feedback or have any queries, please do not hesitate to contact our office.

Kind regards,



Rebecca Hardman
 Community Liaison & Administration

Stage 4 – RAP response and feedback.




Wed 1/05/2019 11:48 AM

Muragadi <muragadi@yahoo.com.au>

RE: Wallerawang Walkers Quarry – Heritage report review and feedback

To philippa

 You replied to this message on 1/05/2019 11:50 AM.

Hi Philippa,
 I have read the project information and draft report for the above project, I agree with the recommendations made by Ozark.
 Kind regards
 Anthony
 0418970389

From: philippa [<mailto:Philippa@ozarkehm.com.au>]
Sent: Tuesday, 30 April 2019 1:02 PM
To: muragadi@yahoo.com.au
Cc: Rebecca Hardman <rebecca@ozarkehm.com.au>
Subject: Wallerawang Walkers Quarry - Heritage report review and feedback

Dear Members,

Thank you for your registration of interest in the above project and for your involvement in the project to date.


It has taken a little time to complete a draft report for this project, however, it is now done and ready for review.

As per Stage 4 of the consultation guidelines, please find attached the Stage 4 letter and the draft report for your review and feedback. Can you please send any feedback you may have through by **COB Wednesday 29th May 2019.**



Thank you.

Kind regards,
 Philippa

Philippa Sokol
 Project Archaeologist



OzArk Environment & Heritage
 PO Box 2069 DUBBO 2830
 02 6882 0118
philippa@ozarkehm.com.au; www.ozarkehm.com.au

OzArk and staff respectfully acknowledge the Traditional Owners and Custodians of the Country on which we work.



Sat 8/06/2019 6:38 AM

Ryan Johnson <murrabidgeemullangari@yahoo.com.au>

Re: Wallerawang Walkers Quarry - Heritage report review and feedback

To philippa

You replied to this message on 11/06/2019 9:10 AM.

Hi Philippa

I have read the project information and ACHAR for the above project, I endorse the recommendations made. We would also like to be involved in all aspects of the project i.e surveying and fieldwork.

Kind regards

Darleen

Sent from my iPhone

On 5 Jun 2019, at 5:50 pm, philippa <Philippa@ozarkehm.com.au> wrote:

Dear Members,

On the 30 April 2019, we sent you a copy of the Wallerawang Walkers Quarry draft heritage report for your review and comment (see below email). The review and comment stage did close last week, however, we would like to extend this offer to you in case you have anything you would like to add.

If you could send through any feedback you may have by COB Friday 7 June 2019, that would be great.


Thank you.

Kind regards,
Philippa


.....
Philippa Sokol

OzArk Environment & Heritage
Project Archaeologist
02 6882 0118

APPENDIX 2: AHIMS EXTENSIVE SEARCH RESULT

<div>  <div> AHIMS Web Services (AWS) Extensive search - Site list report </div> <div> View Data Download Worksheets Client Service ID: 333557 </div> </div>										
SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	Site Features	Site Types	Reports
45-1-2572	Site 1, Cuddebergh Highway Realignment, Lidsdale	AGD	56	229430	6301023	Open site	Valid	Artefact :-		4549
45-1-2573	Contact	Recorders	Ms Louise Gay							
	PAD 1, Cuddebergh Highway Realignment, Lidsdale	AGD	56	228250	6301070	Open site	Destroyed	Potential Archaeological Deposit (PAD) :-	1436,1666	96700,102443
45-1-2574	Contact	Recorders	Ms Louise Gay							
	PAD 2, Cuddebergh Highway Realignment, Lidsdale	AGD	56	228250	6301120	Open site	Partially Destroyed	Artefact :-, Potential Archaeological Deposit (PAD) :-	1436,1707	96700,102443
45-1-2593	Contact	Recorders	Ms Louise Gay							
	Doucaas/Mala Street PAD	AGD	56	229450	6300750	Open site	Valid	Artefact :-	1793	
47-1-0338	Contact	Recorders	Doctor Jodie Benton							
	Doucaas Street PAD (refer to site 45-1-2581)	AGD	56	228450	6300750	Open site	Deleted	Potential Archaeological Deposit (PAD) :-		
45-1-0250	Contact	Recorders	Doctor Jodie Benton							
	MCT (172) Marrangaroo Creek (172)	AGD	56	231900	6297200	Open site	Valid	Artefact :-	Isolated Find	
45-1-0163	Contact	Recorders	Elizabeth Rich							
	Site 6:	AGD	56	222850	6296850	Open site	Valid	Artefact :-	Open Camp Site	1706
45-1-2785	Contact	Recorders	Doctor Susan McIntyre-Tamwoy							
	Marrangaroo NP Cox's River	GDA	56	229900	6292622	Open site	Valid	Artefact :-		
45-1-2786	Contact	Recorders	Miss Sharon Riley							
	Marrangaroo NP Camp Ground	GDA	56	228663	6292938	Open site	Valid	Artefact :-		
45-1-0095	Contact	Recorders	Miss Sharon Riley							
	Rydal Mount 1 Rydal	AGD	56	224320	6293100	Open site	Valid	Artefact :-	Open Camp Site	950
45-1-2716	Contact	Recorders	Elizabeth Rich, Shelly Green, Doctor Susan McIntyre-Tamwoy							
	Site 1 - A5	GDA	56	227585	6300837	Open site	Valid	Artefact :-		
45-2-2539	Contact	Recorders	Ms Cheng-Yen Loo RFS East Australia Pty Ltd - Robeca Victoria							
	Site 1 - A7	GDA	56	227122	6300093	Open site	Valid	Artefact :-		
45-1-2717	Contact	Recorders	Ms Cheng-Yen Loo RFS East Australia Pty Ltd - Robeca Victoria							
	Site 1 - A8	GDA	56	227130	6300072	Open site	Valid	Artefact :-		
45-1-2718	Contact	Recorders	Ms Cheng-Yen Loo RFS East Australia Pty Ltd - Robeca Victoria							
	Site 1 - A9	GDA	56	226981	6300239	Open site	Valid	Artefact :-		
45-1-2719	Contact	Recorders	Ms Cheng-Yen Loo RFS East Australia Pty Ltd - Robeca Victoria							
	Site 1 - A6	GDA	56	227105	6300095	Open site	Valid	Artefact :-		
Report generated by AHIMS Web Service on 27/06/2018 for Thomas Dooley for the following area at Datum :GDA, Zone : 56, Eastings: 222873 - 232873, Northings: 6291463 - 6301463 with a Buffer of 0 meters. Additional Info : Background info. Number of Aboriginal sites and Aboriginal objects found is 47 This information is not guaranteed to be free from error or omission. Office of Environment and Heritage (NSW) and its employees disclaim liability for any actions or omissions made on the information and consequences of such acts or omissions.										

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<div>  <div> AHIMS Web Services (AWS) Extensive search - Site list report </div> <div> View Data Download Worksheets Client Service ID: 333557 </div> </div>										
SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	Site Features	Site Types	Reports
45-1-2799	Brays Lane ASI	GDA	56	227039	6300622	Open site	Valid	Artefact :-		
45-1-2860	Contact	Recorders	Bosnia Pty Ltd - Wallagong/Mrs Samantha Keats							
	WFS-IP1	GDA	56	228556	6300579	Open site	Valid	Artefact :-		
45-3-2008	Contact	Recorders	Bosnia Pty Ltd - Wallagong/Mrs Samantha Keats							
	Obang N.P.	AGD	56	225400	6296570	Open site	Valid	Art (Pigment or Engraved) :-, Grinding Groove :-	Axe Grinding Groove, Rock Hauling	1333
45-1-0164	Contact	Recorders	Warren Skiff							
	Site 7:	AGD	56	223250	6296200	Open site	Valid	Artefact :-	Open Camp Site	1706
45-1-0211	Contact	Recorders	Doctor Susan McIntyre-Tamwoy							
	S2, Wallerawang	GDA	56	227811	6300741	Open site	Valid	Artefact :-	Open Camp Site	2300
45-1-0212	Contact	Recorders	Mr Neville Baker, Elizabeth Rich, Bosnia Pty Ltd - Wallagong/Mrs Samantha Keats							
	GSI, Springvale Colliery	AGD	56	230700	6300020	Open site	Valid	Artefact :-	Open Camp Site	2300,2608
45-1-0117	Contact	Recorders	Elizabeth Rich, Alice Gorman							
	MCG:	AGD	56	231910	6296990	Open site	Valid	Artefact :-	Open Camp Site	
45-1-0337	Contact	Recorders	Helen Brayshaw, Elizabeth Rich							
	Springvale Colliery	AGD	56	228000	6301000	Open site	Valid	Artefact :-	Open Camp Site	
45-1-0247	Contact	Recorders	Doctor Susan McIntyre-Tamwoy							
	Wallerawang Schoolhouse	AGD	56	228240	6300510	Open site	Valid	Artefact :-	Open Camp Site	3819
45-1-0085	Contact	Recorders	Ms Elizabeth White							
	Rydal, 2 open Flat Ranges	AGD	56	225180	6301000	Closed site	Valid	Artefact :-, Art (Pigment or Engraved) :-, Grinding Groove :-	Axe Grinding Groove, Shelter with Art, Shelter with Deposit	
45-1-0089	Contact	Recorders	Alec Jellicoe							
	Marrangaroo Ridge 4:	AGD	56	223490	6297420	Open site	Valid	Artefact :-	Open Camp Site	1414
45-1-0090	Contact	Recorders	Helen Brayshaw							
	Marrangaroo Ridge 5:	AGD	56	223580	6297420	Open site	Valid	Artefact :-	Open Camp Site	1414
45-1-0096	Contact	Recorders	ASRSYS							
	Elizabeth Vale 1, Wallerawang	AGD	56	224800	6297450	Open site	Valid	Modified Tree (Carved or Scarred) :-	Scarred Tree	950
45-1-0100	Contact	Recorders	Elizabeth Rich, Shelly Green, Doctor Susan McIntyre-Tamwoy							
	W1:	AGD	56	229620	6297320	Open site	Valid	Artefact :-	Open Camp Site	1515
45-1-0109	Contact	Recorders	Rex Silcox							
	W2:	AGD	56	229600	6297350	Open site	Valid	Artefact :-	Open Camp Site	1515
Report generated by AHIMS Web Service on 27/06/2018 for Thomas Dooley for the following area at Datum :GDA, Zone : 56, Eastings: 222873 - 232873, Northings: 6291463 - 6301463 with a Buffer of 0 meters. Additional Info : Background info. Number of Aboriginal sites and Aboriginal objects found is 47 This information is not guaranteed to be free from error or omission. Office of Environment and Heritage (NSW) and its employees disclaim liability for any actions or omissions made on the information and consequences of such acts or omissions.										

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AHIMS Web Services (AWS)

Extensive search - Site list report

Account Number : 353557

Client Service ID : 353557

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
45-1-0110	Contact	Recorders	Rex Silcox					Permits		
	W4;	AGO	56	228620	6297310	Open site	Valid	Artifact :-	Open Camp Site	1515
45-1-0111	Contact	Recorders	Rex Silcox					Permits		
	W5;	AGO	56	228730	6297320	Open site	Valid	Artifact :-	Open Camp Site	1515
45-1-0112	Contact	Recorders	Rex Silcox					Permits		
	MC1;	AGO	56	231500	6297100	Open site	Valid	Artifact :-	Open Camp Site	1414
45-1-0113	Contact	Recorders	Helen Brayshaw,Elizabeth Rich					Permits		
	MC2;	AGO	56	232470	6297190	Open site	Valid	Artifact :-	Open Camp Site	1414
45-1-0114	Contact	Recorders	Helen Brayshaw,Elizabeth Rich					Permits		
	MC3;	AGO	56	232650	6297790	Open site	Valid	Artifact :-	Open Camp Site	1414
45-1-0115	Contact	Recorders	Elizabeth Rich					Permits		
	MC4;	AGO	56	232680	6297500	Open site	Valid	Artifact :-	Open Camp Site	1414
45-1-0116	Contact	Recorders	Helen Brayshaw,Elizabeth Rich					Permits		
	MC5;	AGO	56	232720	6297010	Open site	Valid	Artifact :-	Open Camp Site	1414
45-1-0010	Contact	Recorders	Helen Brayshaw,Elizabeth Rich					Permits		
	Pipers Flat Creek;	AGO	56	225600	6300700	Closed site	Valid	Artifact :- Grinding Groove :-	Axe Grinding Groove,Shelter with Deposit	1515
45-1-0012	Contact	Recorders	D Miller					Permits		
	Pipers Flat Creek;	AGO	56	225250	6301150	Closed site	Valid	Artifact :- Art (Pigment or Engraved) :-	Shelter with Art,Shelter with Deposit	
45-1-0013	Contact	Recorders	D Miller					Permits		
	Pipers Flat Creek;	AGO	56	225230	6300900	Closed site	Valid	Artifact :- Grinding Groove :-	Axe Grinding Groove,Shelter with Deposit	
45-1-0014	Contact	Recorders	ASRSYS					Permits		
	Pipers Flat Creek;	AGO	56	224800	6301100	Open site	Valid	Artifact :-	Open Camp Site	
45-1-0020	Contact	Recorders	R Miller					Permits		
	Pipers Flat Creek;	AGO	56	225750	6300300	Closed site	Valid	Artifact :- Art (Pigment or Engraved) :- Grinding Groove :-	Axe Grinding Groove,Shelter with Art,Shelter with Deposit	
45-1-0021	Contact	Recorders	R Miller					Permits		
	Pipers Flat Creek;	AGO	56	225700	6300250	Open site	Valid	Grinding Groove :-	Axe Grinding Groove	
	Contact	Recorders	R Miller					Permits		

Report generated by AHIMS Web Service on 27/06/2018 for Thomas Dnoley for the following area at Datum :GDA, Zone : 56, Eastings : 222873 - 232873, Northings : 6291463 - 6301463 with a Buffer of 0 meters. Additional Info : Background Info. Number of Aboriginal sites and Aboriginal objects found is 47

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AHIMS Web Services (AWS)

Extensive search - Site list report

Account Number : 353557

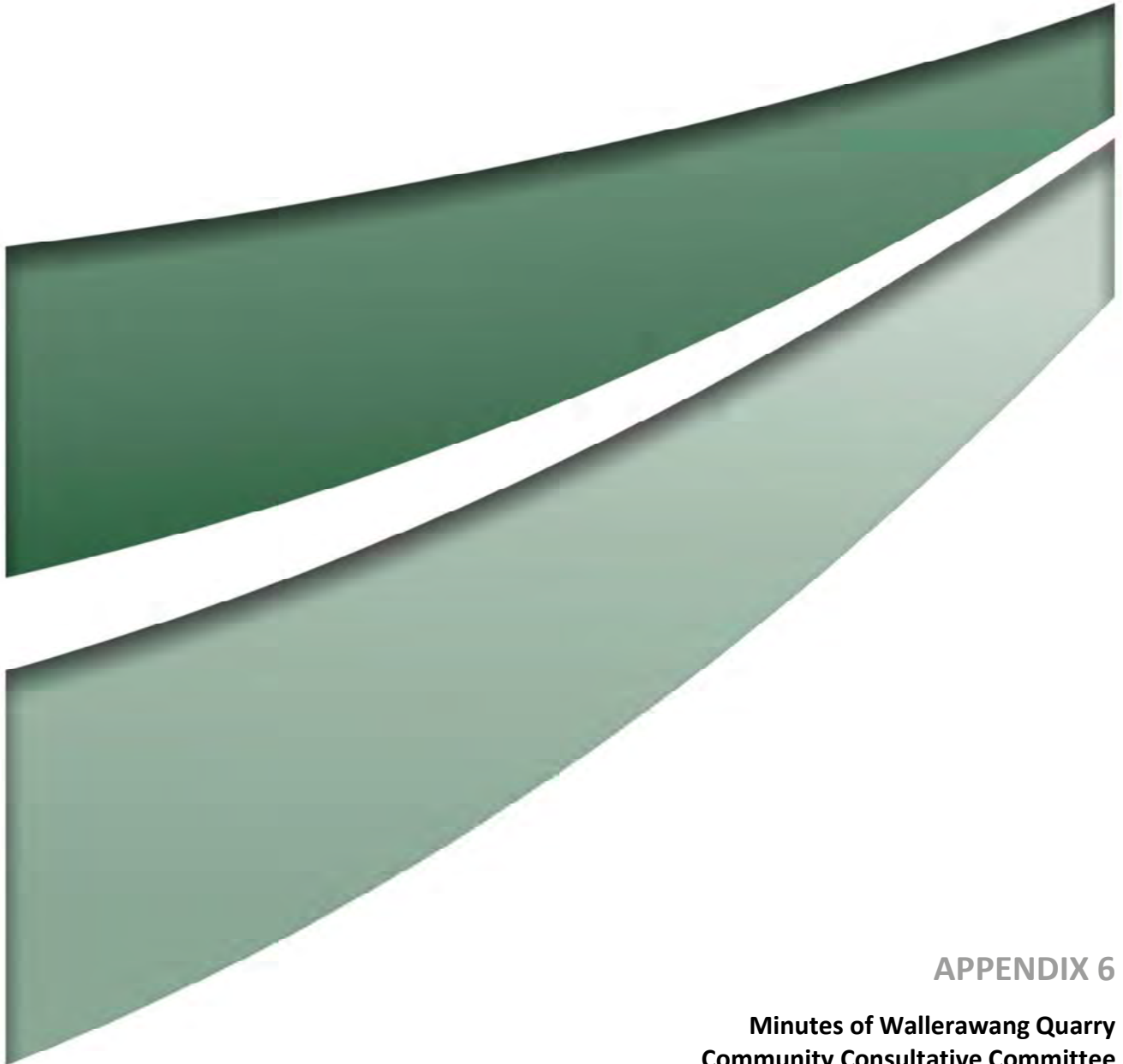
Client Service ID : 353557

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
45-1-0022	Contact	Recorders	R Miller					Permits		
	Pipers Flat Creek;Held Rock;	AGO	56	226630	6300510	Open site	Valid	Grinding Groove :-	Axe Grinding Groove	
45-1-0023	Contact	Recorders	R Miller					Permits		
	Pipers Flat Creek;Held Rock;	AGO	56	226590	6300500	Closed site	Valid	Artifact :-	Shelter with Deposit	
45-1-0040	Contact	Recorders	R Miller					Permits		
	Wallerawang; Lithgow;	AGO	56	226900	6299100	Open site	Valid	Burial :- Modified Tree (Carved or Scarred) :-	Burial/Scarred Tree	
45-1-0545	Contact	Recorders	David Bell,NPWS - Blackheath Office,Betty Meehan					Permits		
	Wallerawang Station Massacre	AGO	56	226600	6298500	Open site	Valid	Burial :-	Burial/s	473
	Contact	Recorders	Ms Adrienne Hower-Penning					Permits		

Report generated by AHIMS Web Service on 27/06/2018 for Thomas Dnoley for the following area at Datum :GDA, Zone : 56, Eastings : 222873 - 232873, Northings : 6291463 - 6301463 with a Buffer of 0 meters. Additional Info : Background Info. Number of Aboriginal sites and Aboriginal objects found is 47

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APPENDIX 6

Minutes of Wallerawang Quarry Community Consultative Committee

**MINUTES OF WALLERAWANG QUARRY COMMUNITY CONSULTATIVE COMMITTEE
HELD AT THE QUARRY, GREAT WESTERN HIGHWAY WALLERAWANG ON 8th November
2018**

PRESENT: Sue Graves (Chairman), John McAuley, Paul Hensley, Emily Honeysett, Lance Gillespie and Lauren Stevens (Lithgow Council).

APOLOGIES: Joe Smith (Lithgow Council), Brad Boyling and Paul Curran.

**MINUTES OF
PREVIOUS
MEETING:** Minutes of the previous meeting held 10th April 2018 were approved as a true and correct record.

**BUSINESS
ARISING FROM
LAST MINUTES:** Walker Quarries have received a Purchase Order from Energy Australia for select fill/overburden.

Independent Environmental Audit has been completed and results are available on the website.

Applied for revised Biodiversity Plan which was approved by the Department of Planning and is available on our website.

**QUARRY
OPERATIONS:** Main crushing equipment is located within the pit to decrease noise levels.

Production and sales are increasing each month.

Select fill/overburden will be supplied to Mt Piper starting 19th November 2018 and will be running 5 trucks back and forth delivering loads for approx. 5 days.

Mulching of trees from clearing may possibly make some noise.

There have been no exceedances on Dust and Noise Monitoring.

ENVIRONMENTAL: Three boreholes have been drilled for monitoring of the Water Table. Probes have been installed down the holes which monitor every 6 hours. Currently the quarry is operating above the water level of Lake Wallace.

**INDEPENDENT
ENVIRONMENTAL
AUDIT:** Walker Quarries were given 3 months to fix any non-compliance issues and an Action Plan has been submitted and is available on our website. There were a few minor admin issues from the audit, however well within normal compliance.

BIODIVERSITY: Walker Quarries are required to have a Biodiversity Plan which is available on our website for viewing.

**DEVELOPMENT
APPROVAL
MODIFICATION:** MOD 2 – Walker Quarries have applied for a 12 month extension, Application is with the Department of Planning and Environment. 12-month extension was advertised in the Newspaper.

Lauren Stevens from Lithgow City Council noted that Council had no issues with the MOD 2 subject to no changes.

MOD 3 – Is ongoing and is a more comprehensive expanded application that Alex Irwin from Umwelt hopes to have submitted by May-June 2019.

**MINING LEASE
EXTENSION:**

Mining Lease extension has been submitted to the Department of Resources and Geoscience – awaiting response.

Current Mining Lease expires 15th July 2019 and it is a requirement to reapply for extension 12 months before expiry date. Application is with the Department for approval.

**COMPLAINTS
REGISTER:**

No complaints have been received since last meeting.

GENERAL

Lance Gillespie expressed concerns that residents can now see the quarry after the approved tree clearing occurred.

Walker Quarries have 2 blasts scheduled for December.

Walker Quarries will have a shutdown period over Christmas New Year and will only be operating a light maintenance crew.

We currently have employed 11 Plant Operators and 5 Administration and Management employees.

October Meeting as mentioned in last minutes was postponed until today's meeting.

NEXT MEETING:

Proposed that the next meeting be held in May 2019.

CLOSE:

There being no further business the meeting was closed.

Signed as a true and correct record

CHAIRPERSON

**MINUTES OF WALLERAWANG QUARRY COMMUNITY CONSULTATIVE COMMITTEE
HELD AT THE QUARRY, GREAT WESTERN HIGHWAY WALLERAWANG ON 5th JUNE
2019**

PRESENT: Sue Graves (Chairman), John McAuley, Trevor Hoffmann, Emily Honeysett, Lance Gillespie, Brad Boyling and Lauren Stevens (Lithgow Council).

APOLOGIES: Paul Curran.

**MINUTES OF
PREVIOUS
MEETING:** Minutes of the previous meeting held 8th November 2018 were approved as a true and correct record.

**BUSINESS
ARISING FROM
LAST MINUTES:**

All non-compliance from IEA has been actioned and addressed. Report is On the website and everything is now compliant.

Biodiversity Plan is available on the website.

Crushing in the quarry to decrease noise levels in the equipment is working well.

Noise monitoring has been carried out; results revealed that the highway levels of noise are louder than that of the quarry. Report is available to view on the website.

Select Fill was delivered to Mt Piper, no issues.

Three bore holes have been drilled; all results are ok.

Biodiversity Offset has been lodged with the department and paid for.

MOD 2 has been approved.
MOD 3 will be lodged this week. Approvals from Land Owners – Forestry NSW, Sitegoal and Crown Land have all been received.

Mining Lease Extension was approved for further 25 years.

**QUARRY
OPERATIONS:**

Production Sales are steady.

Mulching of trees has been completed and mulch has been spread around site.

Noise Monitoring was carried out, results are good.

No exceedances with any blast noise monitoring.

No ground water or soil erosion issues.

We now have a ground water licence to pump 100 mega litres/year to site. Bore pump is located on the property next to the quarry.

No health and safety incidents have been received since last meeting.

Daily Toolbox talks are carried out at 0630 each morning.

All Truck Drivers are been re-inducted in the Fog Protocol and a notice has been posted at the front desk.

ENVIRONMENTAL: 3 of the 4 Dust Gauges have been relocated to more accessible locations.

Inspection from the Department of Planning and Environment on the 12th March 2019. Overall satisfactory with only a couple of minor issues. All compliance issues have now been addressed, by adding more top soil and seeding around the site. Wedd spraying program will be carried out each season by a regular contractor.

All necessary rehab has been carried out.

The quarry landscape will start to disappear from view of the highway in the near future depending on sales and demand for product.

The Land Owner next door is applying for electricity connection to their property which will allow us to run an electric bore pump.

Clearing along the fence line has been carried out for eventual connection of electricity to site.

BIODIVERSITY: Walker Quarries are required to have a Biodiversity Plan which is available on our website for viewing.

**DEVELOPMENT
APPROVAL
MODIFICATION:** MOD 3 – will be lodged this week. Land Owner approvals have been received.

**COMPLAINTS
REGISTER:** No complaints have been received since last meeting.

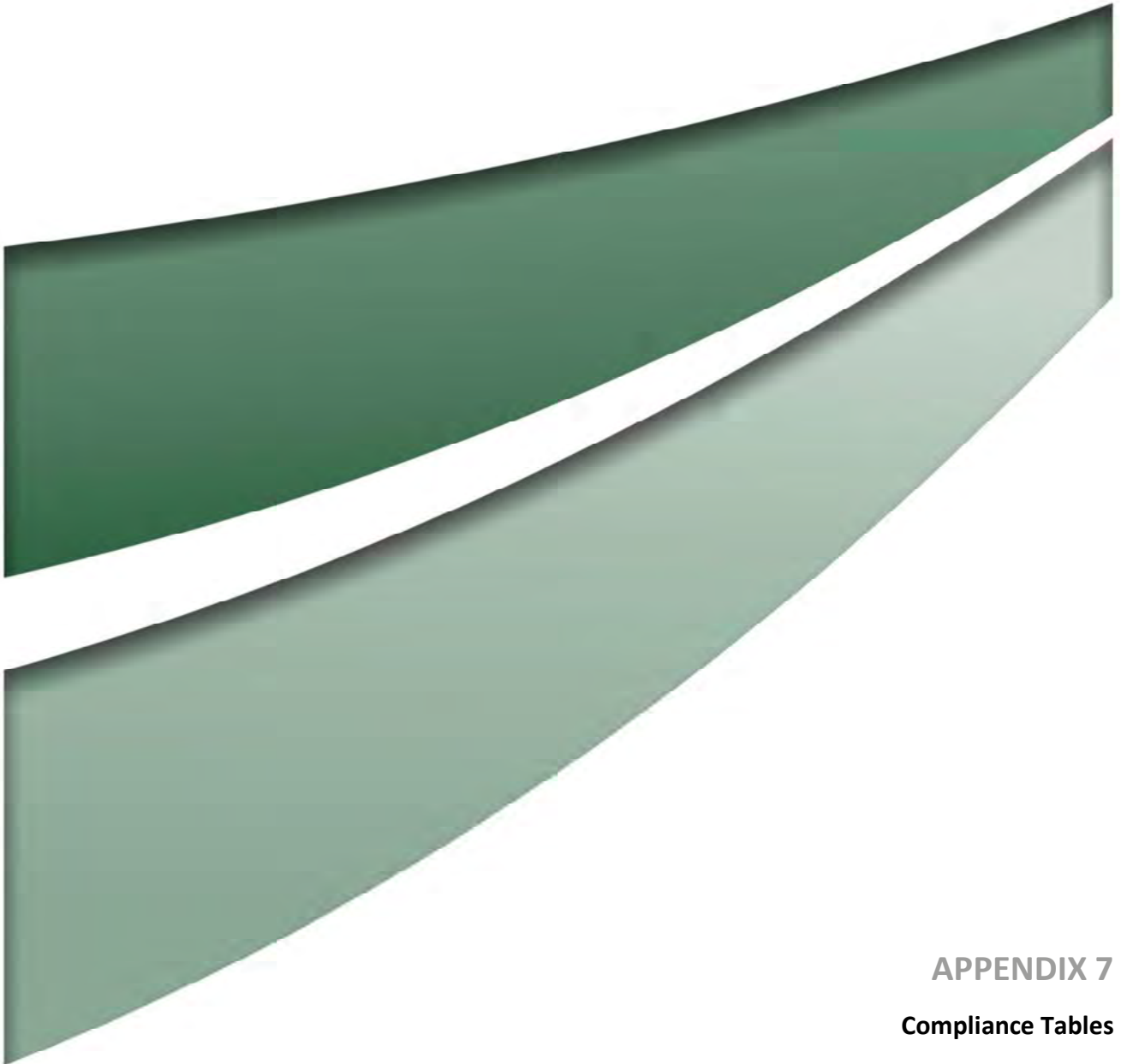
**GENERAL
BUSINESS:** Trevor Hoffmann has been appointed as Mine Manager until further notice.

NEXT MEETING: Proposed that the next meeting be held in November 2019.

CLOSE: There being no further business the meeting was closed at 1749.

Signed as a true and correct record

CHAIRPERSON



APPENDIX 7
Compliance Tables

Table A3-1
Internal Compliance Audit of Relevant Conditions of Development Consent DA 344–11–2001
for Wallerawang Quarry from Start Date to End Date

Condition No.	Paraphrased Requirement	Compliance	Comment	Basis*
SCHEDULE 2 – ADMINISTRATIVE CONDITIONS				
Obligation to Minimise Harm to the Environment				
1.	In addition to meeting the specific performance measures and criteria established under this consent, the Applicant must implement all reasonable and feasible measures to prevent and/or minimise any material harm to the environment that may result from the construction, operation or rehabilitation of the development.	Y		O
Terms of Consent				
2.	The Applicant must carry out the development: a) generally in accordance with the EIS and Environmental Assessment (Mod1); and b) in accordance with the conditions of this consent and Development Layout Plan.	Y		O
3.	If there is any inconsistency between the documents in condition 2(a), the most recent document shall prevail to the extent of the inconsistency. However, the conditions of this consent shall prevail to the extent of any inconsistency.	Noted		
4.	The Applicant must comply with any written requirement/s of the Secretary arising from the Department's assessment of: a) any strategies, plans, programs, reviews, audits, reports or correspondence that are submitted in accordance with this consent (including any stages of these documents); b) any reviews, reports or audits undertaken or commissioned by the Department regarding compliance with this consent; and c) the implementation of any actions or measures contained in these documents.	Y	A site inspection was carried out on Tuesday 18 December by the Department of Environment and Planning (DPE) and the Environment Protection Authority (EPA). Email correspondence from Chris Schultz, Senior Compliance Officer, DPE (dated 21 December 2018) in response to the site inspection, encouraged Walkers Quarry to implement reasonable and feasible measures to promote growth on the Amenity Bund and to provide maintenance to deteriorating erosion and sediment controls. Amenity Bund vegetation has now established and erosion and sediment controls have undergone maintenance since the correspondence was received.	O/D

Condition No.	Paraphrased Requirement	Compliance	Comment	Basis*
			<p>A drum of waste oil identified outside of a bund was rectified at the time.</p> <p>A site inspection was carried out by the NSW Resources Regulator on 12 March 2019.</p> <p>Correspondence from Greg Kininmonth, Manager Environmental Operations (Southern) (dated 30 March 2019) requested actions regarding weed management, ongoing sediment and erosion control management and assessment and repair of identified erosion areas (rilling and cracking). Walkers Quarry responded (13 May 2019) informing works were undertaken in accordance with the Biodiversity Management Plan, erosion controls had been installed, additional daily monitoring implemented, vegetation regrowth had been hampered by little to no rainfall and weed spraying had been undertaken (February 2019).</p>	
Limits on Consent – Quarrying Operations				
5.	The Applicant may carry out quarrying operations on the site until 15 July 2020.	Y		O
6.	The Applicant must not undertake quarrying operations below a level of 930 m AHD.	Y	The current floor level is 945m AHD.	O (inferred)
7.	The Applicant must not extract and/or transport more than 500,000 tonnes of quarry products from the site in any calendar year.	Y	Walkers Quarry transported 173,910 tonnes from the site.	D - Form S1
Structural Adequacy				
8.	The Applicant must ensure that all new buildings and structures, and any alterations or additions to existing buildings and structures, are constructed in accordance with the relevant requirements of the BCA.	Y	Awaiting receipt of Occupational Certificate. Buildings have remained unoccupied	O

Condition No.	Paraphrased Requirement	Compliance	Comment	Basis*										
Demolition														
9.	The Applicant must ensure that all demolition work is carried out in accordance with AS 2601-2001: <i>The Demolition of Structures</i> , or its latest version.	Not Triggered												
Protection of Public Infrastructure														
10.	Unless the Applicant and the applicable authority agree otherwise the Applicant must: (a) repair, or pay the full costs associated with repairing, any public infrastructure that is damaged by the development; and (b) relocate, or pay the full costs associated with relocating, any public infrastructure that needs to be relocated as a result of the development.	Not Triggered												
Operation of Plant and Equipment														
11.	The Applicant must ensure that all plant and equipment at the site, or to monitor the performance of the development is: a) maintained in a proper and efficient condition; and b) operated in a proper and efficient manner.	Y	Plant and equipment serviced every 250 hours. No new plant and equipment purchased during the reporting period.	C										
Production Data														
12.	The Applicant must: (a) from the commencement of quarrying operations provide calendar year annual quarry production data to Resources Regulator using the standard form for that purpose; and (b) include a copy of this data in the Annual Review.	Y	Annual quarry production data provided in Section 4.2 of the Annual Review.	D – Form S1										
Compliance														
13.	The Applicant must ensure that all employees, contractors and sub-contractors are aware of, are instructed to and comply with, the conditions of this consent relevant to their respective activities.	Y	Site induction required for all employees, contractors and sub-contractors.	C										
SCHEDULE 3 – SPECIFIC ENVIRONMENTAL CONDITIONS														
Noise - Hours of Operation														
1.	<div>The Applicant must comply with the operating hours set out in Table 1.</div> <div>Table 1: Operating Hours</div> <table><tr><th>Activity</th><th>Permissible Hours</th></tr><tr><td>Quarrying operations</td><td><ul style="list-style-type: none">7 am to 6 pm Monday to Friday8 am to 1 pm SaturdayAt no time on Sundays or public holidays</td></tr><tr><td>Loading and dispatch of trucks</td><td><ul style="list-style-type: none">May be conducted at any time, provided these activities comply with the noise criteria in Table 2</td></tr><tr><td>Blasting</td><td><ul style="list-style-type: none">9 am to 5 pm Monday to Friday9 am to 1 pm on SaturdaysAt no time on Sundays or public holidays</td></tr><tr><td>Maintenance</td><td><ul style="list-style-type: none">May be conducted at any time, provided that these activities are not audible at any privately-owned residence</td></tr></table>	Activity	Permissible Hours	Quarrying operations	<ul style="list-style-type: none">7 am to 6 pm Monday to Friday8 am to 1 pm SaturdayAt no time on Sundays or public holidays	Loading and dispatch of trucks	<ul style="list-style-type: none">May be conducted at any time, provided these activities comply with the noise criteria in Table 2	Blasting	<ul style="list-style-type: none">9 am to 5 pm Monday to Friday9 am to 1 pm on SaturdaysAt no time on Sundays or public holidays	Maintenance	<ul style="list-style-type: none">May be conducted at any time, provided that these activities are not audible at any privately-owned residence	Y	Operating hours complied with during the reporting period. Daily Toolbox meeting at 7.00 am undertaken prior to operations commencing. General maintenance activities occasionally undertaken on Saturdays.	C
Activity	Permissible Hours													
Quarrying operations	<ul style="list-style-type: none">7 am to 6 pm Monday to Friday8 am to 1 pm SaturdayAt no time on Sundays or public holidays													
Loading and dispatch of trucks	<ul style="list-style-type: none">May be conducted at any time, provided these activities comply with the noise criteria in Table 2													
Blasting	<ul style="list-style-type: none">9 am to 5 pm Monday to Friday9 am to 1 pm on SaturdaysAt no time on Sundays or public holidays													
Maintenance	<ul style="list-style-type: none">May be conducted at any time, provided that these activities are not audible at any privately-owned residence													
2.	The following activities may be carried out outside the hours specified in Condition 1 above: (a) delivery or dispatch of materials as requested by Police or other public authorities; and (b) emergency work to avoid the loss of lives, property or to prevent environmental harm.	Not Triggered												

Condition No.	Paraphrased Requirement	Compliance	Comment	Basis*				
	In such circumstances, the Applicant must notify the Secretary and affected residents prior to undertaking the activities, or as soon as is practical thereafter.							
Noise Impact Assessment Criteria								
3.	<p>The Applicant must ensure that the noise generated by the development does not exceed the criteria in Table 2 at any residence on privately-owned land.</p> <p>Table 2: Noise Criteria dB(A)</p> <table><tr><th>Day / Evening</th><th>Night L_{Aeq} (15 min)</th></tr><tr><td>43 dB(A)</td><td>39 dB(A)</td></tr></table> <p>Noise generated by the development is to be measured in accordance with the relevant requirements and exemptions (including certain meteorological conditions) of the <i>NSW Industrial Noise Policy</i>. Appendix 3 sets out the meteorological conditions under which these criteria apply and the requirements for evaluating compliance with these criteria.</p> <p>However, the noise criteria in Table 2 do not apply if the Applicant has an agreement with the relevant landowner to exceed the noise criteria, and the Applicant has advised the Department in writing of the terms of this agreement.</p>	Day / Evening	Night L _{Aeq} (15 min)	43 dB(A)	39 dB(A)	Y	<p>Noise monitoring results and blasting noise data are provided in Section 6.3 and Appendix 3 of the Annual Review.</p> <p>Monitoring results are maintained on the Walker Quarries website.</p>	D - Noise monitoring
Day / Evening	Night L _{Aeq} (15 min)							
43 dB(A)	39 dB(A)							
Operating Conditions								
4.	<p>The Applicant must:</p> <p>(a) implement best practice management to minimise the construction, operational and road transportation noise of the development;</p> <p>(b) minimise the noise impacts of the development during meteorological conditions when the noise criteria in this consent do not apply (see Appendix 3);</p> <p>(c) carry out noise monitoring (at least every 3 months or as otherwise agreed with the Secretary) to determine whether the development is complying with the relevant conditions of this consent; and</p> <p>(d) regularly assess noise monitoring data and modify and/or stop operations on site to ensure compliance with the relevant conditions of this consent, to the satisfaction of the Secretary.</p>	Y	<p>Operations were generally undertaken in accordance with the consent.</p> <p>The Noise management Plan, approved by the Secretary, requires noise monitoring every six months. The period in between monitoring during the reporting period was 7 months and 5 days</p> <p>Noise monitoring results provided in Section 6.3 and Appendix 3 of the Annual Review.</p>	D - Noise monitoring				
Noise Management Plan								
5.	<p>The Applicant must prepare a Noise Management Plan for the development to the satisfaction of the Secretary. This plan must:</p> <p>(a) be prepared in consultation with the EPA;</p> <p>(b) be submitted to the Secretary within three months of the determination of Modification 1, unless otherwise agreed by the Secretary;</p> <p>(c) describe the measures to be implemented to ensure:</p> <ul style="list-style-type: none">• compliance with the noise criteria and operating conditions of this consent;• best practice management is being employed; and	Y	<p>A Noise Management Plan has been prepared and approved.</p> <p>A copy of the plan is maintained on the Walker Quarries website.</p>	D - NMP / Approval letter				

Condition No.	Paraphrased Requirement	Compliance	Comment	Basis*																
	<ul style="list-style-type: none">the noise impacts of the development are minimised during meteorological conditions under which the noise criteria in this consent do not apply (see Appendix 3); <p>(d) describe the proposed noise management system; and</p> <p>(e) include a monitoring program to be implemented to measure noise from the development against the noise criteria in Table 2, and which evaluates and reports on the effectiveness of the noise management system on site.</p> <p>The Applicant must implement the Noise Management Plan as approved from time to time by the Secretary.</p>																			
Blasting																				
Blasting Impact Assessment Criteria																				
6.	<p>The Applicant must ensure that blasting on site does not cause any exceedance of the criteria in Table 3.</p> <p><i>Table 3: Blasting Criteria</i></p> <table><tr><th>Receiver</th><th>Airblast overpressure (dB(Lin Peak))</th><th>Ground vibration (mm/s)</th><th>Allowable exceedance</th></tr><tr><td></td><td>120</td><td>10</td><td>0%</td></tr><tr><td>Any residence on privately-owned land</td><td>115</td><td>5</td><td>5% of the total number of blasts over a period of 12 months</td></tr><tr><td>All public infrastructure</td><td>-</td><td>50</td><td>0%</td></tr></table> <p>However, these criteria do not apply if the Applicant has a written agreement with the relevant landowner or infrastructure owner to exceed the limits in Table 3, and the Applicant has advised the Department in writing of the terms of this agreement.</p>	Receiver	Airblast overpressure (dB(Lin Peak))	Ground vibration (mm/s)	Allowable exceedance		120	10	0%	Any residence on privately-owned land	115	5	5% of the total number of blasts over a period of 12 months	All public infrastructure	-	50	0%	Y	<p>Blast monitoring undertaken during the reporting period complied with criteria. Results are provided in Section 6.4 of the Annual Review.</p> <p>Monitoring results are maintained on the Walker Quarries website.</p>	D - Monitoring Results
Receiver	Airblast overpressure (dB(Lin Peak))	Ground vibration (mm/s)	Allowable exceedance																	
	120	10	0%																	
Any residence on privately-owned land	115	5	5% of the total number of blasts over a period of 12 months																	
All public infrastructure	-	50	0%																	
Property Inspections																				
7.	<p>If the Applicant receives a written request from the owner of any privately-owned land within 2 kilometres of the site for a property inspection to establish the baseline condition of any buildings and structures on their land, or to have a previous property inspection updated, then within 2 months of receiving this request the Applicant must:</p> <p>(a) commission a suitably qualified, experienced and independent person, whose appointment is acceptable to both parties to:</p> <ul style="list-style-type: none">establish the baseline condition of any buildings and other structures on the land, or update the previous property inspection report; andidentify measures that should be implemented to minimise the potential blasting impacts of the development on these buildings and structures; and <p>(b) give the landowner a copy of the new or updated property inspection report.</p> <p>If there is a dispute over the selection of the suitably qualified, experienced and independent person, or the Applicant or the landowner disagrees with the findings of the property inspection report, either party may refer the matter to the Secretary for resolution.</p>	Not Triggered	No written requests received during the reporting period.	C																

Condition No.	Paraphrased Requirement	Compliance	Comment	Basis*
Property Investigations				
8.	<p>If the owner of any privately-owned land within 2 kilometres of the site or any other landowner where the Secretary is satisfied an investigation is warranted, or claims in writing that buildings or structures on their land have been damaged as a result of blasting on the site, then within 2 months of receiving this written claim the Applicant must:</p> <p>(a) commission a suitably qualified, experienced and independent person, whose appointment is acceptable to both parties to investigate the claim; and</p> <p>(b) give the landowner a copy of the property investigation report.</p> <p>If this independent property investigation confirms the landowner's claim, and both parties agree with these findings, then the Applicant must repair the damage to the satisfaction of the Secretary.</p> <p>If there is a dispute over the selection of the suitably qualified, experienced and independent person, or the Applicant or the landowner disagrees with the findings of the independent property investigation, then either party may refer the matter to the Secretary for resolution.</p>	Not Triggered		C
Operating Conditions				
9.	<p>During blasting operations, the Applicant must:</p> <p>(a) implement best practice management to:</p> <ul style="list-style-type: none"> • protect the safety of people and livestock; • protect public or private infrastructure and property from damage; and • minimise the dust and fume emissions; <p>(b) operate a suitable system to enable the local community to get up-to-date information on the proposed blasting schedule on site; and</p> <p>(c) carry out regular monitoring to determine whether the development is complying with the relevant conditions of this consent, to the satisfaction of the Secretary.</p>	Y	Blasting operations undertaken in accordance with the Blasting Management Plan during the reporting period.	C/O
Blast Management Plan				
10.	<p>The Applicant must prepare a Blast Management Plan for the development to the satisfaction of the Secretary. This plan must:</p> <p>(a) be submitted to the Secretary for approval within three months of the determination of Modification 1, unless otherwise agreed by the Secretary;</p> <p>(b) describe the measures to be implemented to ensure compliance with the blast criteria and operating conditions of this consent;</p> <p>(c) include measures to manage flyrock to ensure the safety of people and livestock and to protect properties;</p> <p>(d) include a monitoring program for evaluating and reporting on compliance with the blasting criteria in this consent;</p>	Y	<p>A Blast Management Plan has been prepared and approved.</p> <p>A copy of the plan is maintained on the Walker Quarries website.</p>	D - BMP

Condition No.	Paraphrased Requirement	Compliance	Comment	Basis*																		
	(e) include local community notification procedures for the blasting schedule, in particular to nearby residences; and (f) include a protocol for investigating and responding to complaints related to blasting operations. The Applicant must implement the Blast Management Plan as approved from time to time by the Secretary.																					
AIR QUALITY																						
Air Quality Impact Assessment Criteria																						
11.	The Applicant must ensure that all reasonable and feasible avoidance and mitigation measures are employed so that particulate matter emissions generated by the development do not cause exceedances of the criteria in Table 4 at any residence on privately-owned land.	Y	Mitigation measures employed during the reporting period include spray carts and water sprays on plant and equipment.	O D - Monitoring Results																		
12.	Table 4: Air quality criteria <table><tr><th>Pollutant</th><th>Averaging Period</th><th>Criterion</th></tr><tr><td>Particulate matter <10 μm (PM_{10})</td><td>Annual</td><td>$\pm 25 \mu\text{g}/\text{m}^3$</td></tr><tr><td>Particulate matter <10 μm (PM_{10})</td><td>24 hour</td><td>$\pm 50 \mu\text{g}/\text{m}^3$</td></tr><tr><td>Particulate matter <2.5 μm ($\text{PM}_{2.5}$)</td><td>Annual</td><td>$\pm 8 \mu\text{g}/\text{m}^3$</td></tr><tr><td>Total suspended particulates (TSP)</td><td>Annual</td><td>$\pm 90 \mu\text{g}/\text{m}^3$</td></tr><tr><td>Deposited dust</td><td>Annual</td><td>$\pm 2 \text{ g}/\text{m}^2/\text{month}$ $\pm 4 \text{ g}/\text{m}^2/\text{month}$</td></tr></table>	Pollutant	Averaging Period	Criterion	Particulate matter <10 μm (PM_{10})	Annual	$\pm 25 \mu\text{g}/\text{m}^3$	Particulate matter <10 μm (PM_{10})	24 hour	$\pm 50 \mu\text{g}/\text{m}^3$	Particulate matter <2.5 μm ($\text{PM}_{2.5}$)	Annual	$\pm 8 \mu\text{g}/\text{m}^3$	Total suspended particulates (TSP)	Annual	$\pm 90 \mu\text{g}/\text{m}^3$	Deposited dust	Annual	$\pm 2 \text{ g}/\text{m}^2/\text{month}$ $\pm 4 \text{ g}/\text{m}^2/\text{month}$	Y	Four dust monitoring events during the reporting period were performed outside the recommended 30 days ± 2 days (AS/NZS 3580.10.1:2003 Methods for Sampling and Analysis of Ambient Air – Determination of Particulate Matter – Deposited Matter – Gravimetric Method). Recommendation: Walker Quarries to ensure the period of analysis complies with AS/NZS 3580.10.1:2003).	D - Monitoring Results
Pollutant	Averaging Period	Criterion																				
Particulate matter <10 μm (PM_{10})	Annual	$\pm 25 \mu\text{g}/\text{m}^3$																				
Particulate matter <10 μm (PM_{10})	24 hour	$\pm 50 \mu\text{g}/\text{m}^3$																				
Particulate matter <2.5 μm ($\text{PM}_{2.5}$)	Annual	$\pm 8 \mu\text{g}/\text{m}^3$																				
Total suspended particulates (TSP)	Annual	$\pm 90 \mu\text{g}/\text{m}^3$																				
Deposited dust	Annual	$\pm 2 \text{ g}/\text{m}^2/\text{month}$ $\pm 4 \text{ g}/\text{m}^2/\text{month}$																				
Operating Conditions																						
13.	The Applicant must: (a) implement best practice management to minimise the dust emissions of the development; (b) regularly assess meteorological and air quality monitoring data and relocate, modify and/or stop operations on site to ensure compliance with the air quality criteria in this consent; (c) minimise the air quality impacts of the development during adverse meteorological conditions and extraordinary events (see note d under Table 4); (d) monitor and report on compliance with the relevant air quality conditions in this consent; and (e) minimise the area of surface disturbance and undertake progressive rehabilitation of the site, to the satisfaction of the Secretary.	Y		O D - Monitoring Results																		

Condition No.	Paraphrased Requirement	Compliance	Comment	Basis*
Air Quality Management Plan				
14.	<p>The Applicant must prepare an Air Quality Management Plan for the development to the satisfaction of the Secretary. This plan must:</p> <p>(a) be submitted to the Secretary for approval within three months of the determination of Modification 1, unless otherwise agree by the Secretary;</p> <p>(b) describe the measures to be implemented to ensure:</p> <ul style="list-style-type: none"> compliance with the air quality criteria and operating conditions of this consent; best practice management is being employed; and the air quality impacts of the development are minimised during adverse meteorological conditions and extraordinary events; <p>(c) describe the proposed air quality management system;</p> <p>(d) include an air quality monitoring program that:</p> <ul style="list-style-type: none"> is capable of evaluating the performance of the development; includes a protocol for determining any exceedances of the relevant conditions of consent; effectively supports the air quality management system; and evaluates and reports on the adequacy of the air quality management system. <p>The Applicant must implement the approved Air Quality Management Plan as approved from time to time by the Secretary.</p>	Y	<p>An Air Quality Management Plan has been prepared and approved.</p> <p>A copy of the plan is maintained on the Walker Quarries website.</p>	D - AQMP
Meteorological Monitoring				
15.	For the life of the development, the Applicant must ensure that there is a suitable meteorological station operating in the vicinity of the site that complies with the requirements in the Approved Methods for Sampling and Analysis of Air Pollutants in New South Wales guideline.	Y	A meteorological station was operating onsite during the reporting period. Results are provided in Section 6.2.	O D – Station output download
SOIL AND WATER				
Water Supply				
16.	The Applicant must ensure that it has sufficient water for all stages of the development, and if necessary, adjust the scale of operations under the consent to match its available water supply, to the satisfaction of the Secretary.	Y	No water purchased for operations during the reporting period.	C
Water Discharges				
17.	The Applicant must comply with the discharge limits in any EPL, or with section 120 of the POEO Act.	Y	No discharges occurred during the reporting period.	C
Soil and Water Management Plan				
18.	<p>The Applicant must prepare a Soil and Water Management Plan for the development to the satisfaction of the Secretary. This plan must:</p> <p>(a) be prepared by suitably qualified and experienced person/s approved by the Secretary;</p>	Y	A Soil and Water Management Plan has been prepared and approved.	D - SWMP

Condition No.	Paraphrased Requirement	Compliance	Comment	Basis*
	(b) be prepared in consultation with the EPA, DoI and WaterNSW; (c) be submitted to the Secretary for approval within three months of the determination of Modification 1, unless otherwise agreed by the Secretary; and (d) include a: <ul style="list-style-type: none"> • Site Water Balance that includes: • details of: <ul style="list-style-type: none"> ○ sources and security of water supply; ○ water use and management on site; ○ any off-site water transfers; and ○ reporting procedures; and ○ measures to be implemented to minimise clean water use on site 		A copy is maintained on the Walker Quarries website.	
	<ul style="list-style-type: none"> • Surface Water Management Plan, that includes: <ul style="list-style-type: none"> ○ a program for obtaining detailed baseline data on surface water flows and quality in water bodies that could potentially be affected by the development; ○ a detailed description of the surface water management system on site including the: <ul style="list-style-type: none"> – clean water diversion system; – erosion and sediment controls; – dirty water management system; and – water storages; and ○ a program to monitor and report on: <ul style="list-style-type: none"> – any surface water discharges; – the effectiveness of the water management system, – the quality of water discharged from the site to the environment; – surface water flows and quality in local watercourses; 	Y	Surface Water Management Plan included as part of the Soil and Water Management Plan.	D – Monitoring results O
	<ul style="list-style-type: none"> • Groundwater Management Plan that includes: <ul style="list-style-type: none"> ○ a provision that requires the Applicant to obtain appropriate water licence(s) to cover the volume of any unforeseen groundwater inflows into the quarry from the quarry face or floor; and ○ a monitoring program to manage potential impacts, if any, on any alluvium and associated surface water source near the proposed extraction area that includes: <ul style="list-style-type: none"> – identification of a methodology for determining threshold water level criteria; – contingency measures in the event of a breach of thresholds; and – a program to regularly report on monitoring. <p>The Applicant must implement the approved Soil and Water Management Plan as approved from time to time by the Secretary.</p>	Y	A Groundwater Management Plan is included as part of the Soil and Water Management Plan. Three groundwater bores were drilled (see Figure 6.1) and groundwater monitoring commenced during the reporting period.	D – Monitoring results

Condition No.	Paraphrased Requirement	Compliance	Comment	Basis*
TRANSPORT				
Monitoring of Product Transport				
19	The Applicant must keep accurate records of all laden truck movements to and from the site and publish a summary of records on its website every 6 months.	Y		D - Website
Operating Conditions				
20.	The Applicant must: (a) ensure that all laden trucks entering or exiting the site have their loads covered, with the exception of loads consisting solely of boulders greater than one tonne in weight; (b) ensure that all laden trucks exiting the site are cleaned of material that may fall from vehicles, before leaving the site; and (c) use its best endeavours to ensure that appropriate signage is displayed on all trucks used to transport product from the development so they can be easily identified by road users.	Y	All loads were covered and trucks cleaned via wheel wash on exit.	O
ABORIGINAL HERITAGE				
21.	The Applicant must not disturb the area marked "Aboriginal Heritage Site" on the Development Layout Plan in Appendix 1 .	Y	The Aboriginal Heritage Site remained undisturbed during the reporting period.	O
22.	Throughout the life of the development, the Applicant must protect and conserve the area subject to condition 20, in consultation with the Bathurst Local Aboriginal Land Council, and to the satisfaction of the Secretary.	Y	OzArk and Bathurst Local Aboriginal Land Council reviewed the site during the reporting period. The review was included as part of the Aboriginal and Historic Cultural Heritage Assessment.	D – SEE for MOD 3
23.	If any item or object of Aboriginal heritage significance is identified on site, the Applicant must ensure that: (a) all work in the immediate vicinity of the suspected Aboriginal item or object ceases immediately; (b) a 10 m buffer area around the suspected item or object is cordoned off; and (c) the OEH is contacted immediately. Work in the immediate vicinity of the Aboriginal item or object may only recommence in accordance with the provisions of Part 6, <i>National Parks and Wildlife Act 1974</i> .	Not Triggered	The application to modify DA 344-11-2001 submitted during the reporting period includes an application to disturb an identified Aboriginal heritage site.	O
BIODIVERSITY AND REHABILITATION				
Biodiversity Offset Strategy (BOS)				
24.	By 28 February 2018, the Applicant must provide a Biodiversity Offset Strategy (BOS) in accordance with the Framework for Biodiversity Assessment - NSW Biodiversity Offsets Policy for Major Projects, for the retirement of ecosystem and species credits as set out in Table 5, to the satisfaction of the Secretary and OEH.	Y		D – BOS and associated invoice

Condition No.	Paraphrased Requirement	Compliance	Comment	Basis*												
24.	Table 5: Biodiversity credits to be retired <table><tr><th>Credit type</th><th>No. Credits</th></tr><tr><td colspan="2">Ecosystem Credits</td></tr><tr><td>PCT 732 – Broad-leaved Peppermint - Ribbon Gum grassy open forest in the north east of the South Eastern Highlands Bioregion</td><td>120</td></tr><tr><td>PCT 1093 – Red Stringybark – Brittle Gum – Inland Scribbly Gum dry open forest of the tablelands, South Eastern Highlands Bioregion</td><td>34</td></tr><tr><td colspan="2">Species Credits</td></tr><tr><td>Purple Copper Butterfly</td><td>184</td></tr></table>	Credit type	No. Credits	Ecosystem Credits		PCT 732 – Broad-leaved Peppermint - Ribbon Gum grassy open forest in the north east of the South Eastern Highlands Bioregion	120	PCT 1093 – Red Stringybark – Brittle Gum – Inland Scribbly Gum dry open forest of the tablelands, South Eastern Highlands Bioregion	34	Species Credits		Purple Copper Butterfly	184			
Credit type	No. Credits															
Ecosystem Credits																
PCT 732 – Broad-leaved Peppermint - Ribbon Gum grassy open forest in the north east of the South Eastern Highlands Bioregion	120															
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Species Credits																
Purple Copper Butterfly	184															
Security of Offsets																
25.	By 31 December 2018, unless otherwise agreed with the Secretary, the Applicant must make suitable arrangements to provide appropriate long-term security for the Biodiversity Offset Strategy, to the satisfaction of the Secretary. Any mechanism must remain in force in perpetuity.	Y	Biodiversity Offset arrangements finalised prior to 31 December 2018.	D - BOS												
Biodiversity Management Plan																
26.	The Applicant must prepare a Biodiversity Management Plan for the development to the satisfaction of the Secretary. This plan must: (a) be prepared by suitably qualified and experienced persons whose appointment has been endorsed by the Secretary; (b) be prepared in consultation with OEH; (c) be submitted to the Secretary within three months of providing a satisfactory BOS or by 31 March 2018, whichever is earlier; (d) describe the short, medium, and long term measures to be undertaken to manage the remnant vegetation and fauna habitat on the site, including within any biodiversity offset areas;	Y	A Biodiversity Management Plan (BDMP) has been prepared and approved. A copy is maintained on the Walker Quarries website.	D - BDMP												
26.	(e) include a detailed description of the measures described in paragraph (d) to be implemented over the next 3 years (to be updated for each 3 year period following initial approval of the plan) including the procedures to be implemented for: <ul style="list-style-type: none">maximising the salvage of environmental resources within the approved disturbance area, including tree hollows, vegetative and soil resources, for beneficial reuse in the enhancement of any biodiversity offset areas or site rehabilitation;restoring and enhancing the quality of native vegetation and fauna habitat in any biodiversity offset and rehabilitation areas through assisted natural regeneration, targeted vegetation establishment and the introduction of fauna habitat features;protecting vegetation and fauna habitat outside the approved disturbance area on-site;minimising the impacts on native fauna, including undertaking pre-clearance surveys;	Y	Weed spraying undertaken during the reporting period by Bill Grabham.	C												

Condition No.	Paraphrased Requirement	Compliance	Comment	Basis*
	<ul style="list-style-type: none"> ensuring minimal environmental consequences for threatened species, populations and habitats, including the Purple Copper Butterfly; collecting and propagating seed; controlling weeds and feral pests; controlling erosion; and managing bushfire risk; <p>(f) include a program to monitor and report on the effectiveness of these measures, and progress against the performance and completion criteria;</p> <p>(g) identify the potential risks to the successful implementation of the BOS, and include a description of the contingency measures to be implemented to mitigate these risks; and</p> <p>(h) include details of who is responsible for monitoring, reviewing, and implementing the plan.</p> <p>The Applicant must implement the Biodiversity Management Plan as approved from time to time by the Secretary.</p>			
Conservation Bond				
27.	<p>Within 6 months of the approval of the BOS, unless otherwise agreed by the Secretary, the Applicant must lodge a Conservation Bond with the Department to ensure that the BOS is implemented in accordance with the performance and completion criteria in the Biodiversity Management Plan. The sum of the bond must be determined by:</p> <p>(a) calculating the full cost of implementing the BOS at third party rates (other than land acquisition costs); and</p> <p>(b) employing a suitably qualified, independent and experienced person to verify the calculated costs.</p> <p>The calculation of the Conservation Bond must be submitted to the Department for approval at least 1 month prior to the lodgement of the bond.</p>	NR	Biodiversity obligations retired through payment into the Biodiversity Conservation Fund.	D
28.	<p>The Conservation Bond must be reviewed and if required, an updated bond must be lodged with the Department within 3 months following:</p> <p>(a) an update or revision to the Biodiversity Management Plan;</p> <p>(b) the completion of an Independent Environmental Audit in which recommendations relating to the implementation of the BOS have been made; or</p> <p>(c) in response to a request by the Secretary.</p> <p>If the BOS is completed generally in accordance with the completion criteria in the Biodiversity Management Plan to the satisfaction of the Secretary, the Secretary will release the bond.</p> <p>If the BOS is not completed generally in accordance with the completion criteria in the Biodiversity Management Plan, the Secretary will call in all, or part of, the conservation bond, and arrange for the completion of the relevant works.</p>	Not Triggered	See above	D

Condition No.	Paraphrased Requirement	Compliance	Comment	Basis*										
Rehabilitation Objectives														
29.	<p>The Applicant must rehabilitate the site to the satisfaction of Resources Regulator. This rehabilitation must be generally consistent with the proposed rehabilitation activities described in the documents listed in condition 2 of Schedule 2 (and shown conceptually in the Rehabilitation Plan in Appendix 2), and comply with the objectives in Table 6.</p> <p>Table 6: Rehabilitation Objectives</p> <table><tr><th>Feature</th><th>Objective</th></tr><tr><td>All areas of site affected by the development</td><td><ul style="list-style-type: none">SafeHydraulically and geotechnically stableNon-pollutingFit for the intended post-mining land use(s)Final landform integrated with surrounding natural landforms as far as is reasonable and feasible, and minimising visual impacts when viewed from surrounding land</td></tr><tr><td>Surface Infrastructure</td><td><ul style="list-style-type: none">Decommissioned and removed, unless otherwise agreed by the Secretary</td></tr><tr><td>Quarry benches and pit floor</td><td><ul style="list-style-type: none">Landscaped and vegetated using native tree and understorey species</td></tr><tr><td>Final Void</td><td><ul style="list-style-type: none">Minimise the size, depth and slope of the batters of the final voidMinimise the drainage catchment of the final void</td></tr></table>	Feature	Objective	All areas of site affected by the development	<ul style="list-style-type: none">SafeHydraulically and geotechnically stableNon-pollutingFit for the intended post-mining land use(s)Final landform integrated with surrounding natural landforms as far as is reasonable and feasible, and minimising visual impacts when viewed from surrounding land	Surface Infrastructure	<ul style="list-style-type: none">Decommissioned and removed, unless otherwise agreed by the Secretary	Quarry benches and pit floor	<ul style="list-style-type: none">Landscaped and vegetated using native tree and understorey species	Final Void	<ul style="list-style-type: none">Minimise the size, depth and slope of the batters of the final voidMinimise the drainage catchment of the final void	Y	<p>Quarry operations complied with the rehabilitation objectives during the reporting period.</p> <p>The Mining Operations Plan includes the final land use plan.</p> <p>Rehabilitation under maintenance occurred throughout the site during the reporting period.</p>	D – MOP O
Feature	Objective													
All areas of site affected by the development	<ul style="list-style-type: none">SafeHydraulically and geotechnically stableNon-pollutingFit for the intended post-mining land use(s)Final landform integrated with surrounding natural landforms as far as is reasonable and feasible, and minimising visual impacts when viewed from surrounding land													
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Final Void	<ul style="list-style-type: none">Minimise the size, depth and slope of the batters of the final voidMinimise the drainage catchment of the final void													
Progressive Rehabilitation														
30.	<p>The Applicant must rehabilitate the site progressively, that is, as soon as reasonably practicable following disturbance. All reasonable and feasible measures must be taken to minimise the total area exposed for dust generation at any time. Interim stabilisation measures must be implemented where reasonable and feasible to control dust emissions in disturbed areas that are not active and which are not ready for final rehabilitation.</p>	Y	<p>Native regrowth and application of topsoil observed on disturbed areas (see Figure 4.1).</p> <p>Successful tubestock establishment on the amenity bund wall (approximately 60-80% success rate observed) and application of hydroseed.</p> <p>Rehabilitation under maintenance on the western stockpile area batters including application of hydroseed.</p> <p>Landscaping using mulch and native tree and understorey species observed on the haul ramp batter.</p> <p>Stable batters observed throughout the site.</p> <p>Monitoring of rehabilitation on dam walls and cleared areas near the quarry entrance were undertaken during the reporting period.</p>	O										

Condition No.	Paraphrased Requirement	Compliance	Comment	Basis*
Rehabilitation Management Plan				
31.	<p>The Applicant must prepare a Rehabilitation Management Plan for the project to the satisfaction of Resources Regulator. This plan must:</p> <ul style="list-style-type: none"> (a) be prepared by suitably qualified and experienced persons whose appointment has been endorsed by the Secretary; (b) be prepared in consultation with the Department, DoI, FCNSW, OEH, DPI, and Council; (c) be submitted to Resources Regulator for approval within three months of the determination of Modification 1, unless the Secretary agrees otherwise; (d) be prepared in accordance with any relevant Resources Regulator Guideline; (e) describe how the rehabilitation of the site would achieve the objectives identified in Table 6 and be integrated with the BOS described in condition 24; (f) include a detailed soil and growing medium balance for the development; (g) include a detailed plan for the reinstatement and review of the proposed rehabilitated woodland areas and fauna habitat, including a protocol for periodic trials to demonstrate that the target vegetation community is being achieved; (h) include detailed performance and completion criteria for evaluating the performance of the rehabilitation of the site, and for triggering remedial action (if necessary); (i) describe the measures to be implemented to ensure compliance with the relevant conditions of this consent, and address all aspects of rehabilitation including mine closure, final landform (including final voids), final land uses; (j) include procedures for the use of interim stabilisation and temporary vegetation strategies, where reasonable to minimise the area exposed for dust generation; (k) include a program to monitor, independently audit and report on the effectiveness of the measures in paragraph (h) above, and progress against the detailed performance and completion criteria in paragraph (g) above; and (l) build on to the maximum extent practicable and integrate with the other Management Plans required under this consent. 	Y	<p>A Rehabilitation Management Plan has been prepared as part of the Mining Operations Plan.</p> <p>A copy of the plan is maintained on the Walker Quarries website.</p>	D - Approved MOP
VISUAL				
32.	<p>The Applicant must implement all reasonable and feasible measures to minimise the visual and off-site lighting impacts of the development to the satisfaction of the Secretary.</p>	Y	<p>The quarry is visible from Great Western Highway. Tubestock establishment and vegetation establishment on the amenity bund has started to reduce visual impacts.</p>	O

Condition No.	Paraphrased Requirement	Compliance	Comment	Basis*
			The site is maintained in a neat and tidy manner with no dust observed.	
33.	Prior to utilising the WSEA, the Applicant must construct a visual bund between the north-western boundary of the WSEA and the Great Western Highway, as described in EA (Mod 1). The visual bund must be maintained to the satisfaction of the Secretary.	Y		O
34.	The Applicant must install bunds at strategic locations around the site and plant additional trees along the boundary of the development site to screen, so far as is reasonable and feasible, the development from external viewers, to the satisfaction of the Secretary	Y	Recommendation: Relocate stockpiles and crushing train at northern end of the extraction area or vegetate the stockpiles as a bund to screen extraction and crushing operations.	O
WASTE				
35.	The Applicant must: (a) manage on-site sewage treatment and disposal in accordance with the requirements of its EPL, and to the satisfaction of the EPA and Council; (b) minimise the waste generated by the development; (c) ensure that the waste generated by the development is appropriately stored, handled, and disposed of; and (d) report on waste management and minimisation in the Annual Review, to the satisfaction of the Secretary.	Y	On site waste managed in accordance with requirements. Waste management and minimisation reported in Section 6.10 of the Annual Review. Recommendation: Implement recycling program to include material such as paper, cardboard, aluminium cans, glass jars and bottles, plastic containers, steel and tin.	O
36.	Except as expressly permitted in an EPL, the Applicant must not receive waste at the site for storage, treatment, processing, reprocessing or disposal.	Not Triggered		

Condition No.	Paraphrased Requirement	Compliance	Comment	Basis*
LIQUID STORAGE				
37.	The Applicant must ensure that all tanks and similar storage facilities (other than for water) are protected by appropriate bunding or other containment, in accordance with the relevant Australian Standards.	Y	Tanks and storage facilities bunded.	O
DANGEROUS GOODS				
38.	The Applicant must ensure that the storage, handling, and transport of dangerous goods is done in accordance with the relevant Australian Standards, particularly AS1940 and AS1596, and the Dangerous Goods Code.	Y		O
BUSHFIRE				
39.	The Applicant must: (a) ensure that the development is suitably equipped to respond to any fires on site; and (b) assist the Rural Fire Service and emergency services to the extent practicable if there is a fire in the vicinity of the site.	Y	Water cart, dams and pumps provided on site.	O
40.	The Applicant must prepare a Bushfire Management Plan for the site, in consultation with FCNSW, to the satisfaction of the Rural Fire Service.	Y	A Bushfire Management Plan (BFMP) has been prepared and approved. A copy of the plan is maintained on the Walker Quarries website.	D - BFMP
SCHEDULE 4 – ADDITIONAL PROCEDURES				
NOTIFICATION OF LANDOWNERS				
1.	As soon as practicable, and no longer than 7 days, after obtaining monitoring results showing: (a) an exceedance of any criteria in Schedule 3, the Applicant must notify the affected landowners in writing of the exceedance, and provide regular monitoring results, at least every 3 months, to each affected landowner until the development is again complying with the relevant criteria; and (b) an exceedance of any air quality criteria in Schedule 3, the Applicant must send a copy of the NSW Health fact sheet entitled "Mine Dust and You" (as may be updated from time to time) to the affected landowners and current tenants of the land (including the tenants of land which is not privately owned).	Y	No exceedances occurred during the reporting period.	D – Monitoring results
INDEPENDENT REVIEW				
2	If an owner of privately-owned land considers the development to be exceeding the relevant criteria in Schedule 3, then he/she may ask the Secretary in writing for an independent review of the impacts of the development on his/her land.	Not Triggered	No requests or complaints were received during the reporting period.	C D – Complaints register

Condition No.	Paraphrased Requirement	Compliance	Comment	Basis*
	<p>If the Secretary is satisfied that an independent review is warranted, then within 2 months of the Secretary's decision, the Applicant must:</p> <p>(a) commission a suitably qualified, experienced and independent person, whose appointment has been approved by the Secretary, to:</p> <ul style="list-style-type: none"> consult with the landowner to determine his/her concerns; conduct monitoring to determine whether the development is complying with the relevant criteria in Schedule 3; and if the development is not complying with these criteria, then identify measures that could be implemented to ensure compliance with the relevant criteria; and <p>(b) give the Secretary and landowner a copy of the independent review; and</p> <p>(c) comply with any written requests made by the Secretary to implement any findings of the review.</p>	Not Triggered		C
VISUAL IMPACT MITIGATION				
3.	<p>If an owner of privately-owned land located to the west or north-west of the site, considers that the visual impacts of the development at his/her land could be minimised, then he/she may ask the Secretary in writing for a review of the visual impacts of the development on his/her land.</p> <p>If the Secretary is satisfied that a review is warranted, then within 2 months of the Secretary's decision, the Applicant must:</p> <p>(a) commission a suitably qualified and experienced person, whose appointment has been approved by the Secretary, to:</p> <ul style="list-style-type: none"> consult with the landowner to determine his/her concerns; investigate ways to minimise the visual impacts of the development on land; and prepare a visual mitigation report detailing the outcomes of the investigation and the proposed mitigation measures. <p>(b) give the Secretary and landowner a copy of the review; and</p> <p>(c) comply with any written requests made by the Secretary to implement any findings of the review.</p>	Not Triggered	No requests or complaints were received during the reporting period.	D – Complaints register
SCHEDULE 5 – ENVIRONMENTAL MANAGEMENT, REPORTING AND AUDITING				
ENVIRONMENTAL MANAGEMENT				
Environmental Management Strategy (EMS)				
1.	<p>The Applicant must prepare an Environmental Management Strategy (EMS) for the development to the satisfaction of the Secretary. This strategy must:</p> <p>(a) be submitted to the Secretary for approval within 6 months of the Secretary requiring preparation of the strategy by notice to the Applicant;</p> <p>(b) provide the strategic framework for environmental management of the development;</p>	Y	<p>An Environmental Management Strategy has been prepared and approved.</p> <p>A copy is maintained on the Walker Quarries website.</p>	D - EMS

Condition No.	Paraphrased Requirement	Compliance	Comment	Basis*
	(c) identify the statutory approvals that apply to the development; (d) describe the role, responsibility, authority and accountability of all key personnel involved in the environmental management of the development; (e) describe the procedures to be implemented to: <ul style="list-style-type: none"> keep the local community and relevant agencies informed about the operation and environmental performance of the development; receive, record, handle and respond to complaints; resolve any disputes that may arise during the course of the development; respond to any non-compliance; respond to emergencies; and (f) include: <ul style="list-style-type: none"> copies of any strategies, plans and programs approved under the conditions of this consent; and a clear plan depicting all the monitoring to be carried out under the conditions of this consent. The Applicant must implement any EMS as approved from time to time by the Secretary. 			
Evidence of Consultation				
2.	Where consultation with any public authority is required by the conditions of this consent, the Applicant must: <ul style="list-style-type: none"> (a) consult with the relevant public authority prior to submitting the required document; (b) submit evidence of this consultation as part of the relevant document; (c) describe how matters raised by the authority have been addressed and any matters not resolved; and (d) include details of any outstanding issues raised by the authority and an explanation of disagreement between any public authority and the Applicant. 	Y	Consultation undertaken during Modification Proposal process and during review and update of site management plans.	D – SEE for MOD 3
Management Plan Requirements				
3.	The Applicant must ensure that the management plans required under this consent are prepared in accordance with any relevant guidelines, and include: <ul style="list-style-type: none"> (a) detailed baseline data; (b) a description of: <ul style="list-style-type: none"> the relevant statutory requirements (including any relevant approval, licence or lease conditions); any relevant limits or performance measures/criteria; and the specific performance indicators that are proposed to be used to judge the performance of, or guide the implementation of, the development or any management measures; 	Y	Management Plans have been prepared and approved. Copies are maintained on the Walker Quarries website.	D

Condition No.	Paraphrased Requirement	Compliance	Comment	Basis*
3. (cont)	<p>(c) a description of the measures that to be implemented to comply with the relevant statutory requirements, limits, or performance measures/criteria;</p> <p>(d) a program to monitor and report on the:</p> <ul style="list-style-type: none"> impacts and environmental performance of the development; and <p>effectiveness of any management measures (see (c) above); a contingency plan to manage any unpredicted impacts and their consequences and to ensure that ongoing impacts reduce to levels below relevant impact assessment criteria as quickly as possible;</p> <p>(f) a program to investigate and implement ways to improve the environmental performance of the development over time;</p> <p>(g) a protocol for managing and reporting any:</p> <ul style="list-style-type: none"> incidents; complaints; non-compliances with statutory requirements; and exceedances of the impact assessment criteria and/or performance criteria; and <p>(h) a protocol for periodic review of the plan.</p>	Y		
Application of Existing Management Plans				
4.	The Applicant must continue to apply existing approved management plans, strategies or monitoring programs that have most recently been approved under this consent, until the approval of a similar plan, strategy or program under this consent.	N	<p>The Soil and Water Management Plan requires sediment basins to be cleaned of sediment to ensure design capacities. Observations found three sediment basins onsite requiring maintenance. Sediment Basin 5 (SB5) requires dewatering, desilting and enlargement. Sediment Basin 7a (SB7a) and 7b (SB7b) require desilting and enlargement.</p> <p>All other approved management plans were complied with during the reporting period.</p>	O
Revision of Strategies, Plans & Programs				
5.	<p>Within 3 months of the submission of an:</p> <p>(a) incident report under condition 9 below;</p> <p>(b) Annual Review under condition 11 below;</p> <p>(c) audit report under condition 12 below; and</p> <p>(d) any modifications to this consent,</p> <p>the Applicant must review the strategies, plans and programs required under this consent, to the satisfaction of the Secretary. The applicant must notify the Department in writing of any such review being undertaken.</p>	Y		D – MPs

Condition No.	Paraphrased Requirement	Compliance	Comment	Basis*
	Where this review leads to revisions in any such document, then within 6 weeks of the review the revised document must be submitted for the approval of the Secretary.			
Updating and Staging of Strategies, Plans or Programs				
6.	<p>To ensure that strategies, plans or programs required under this consent are updated on a regular basis, and that they incorporate any appropriate additional measures to improve the environmental performance of the development, the Applicant may at any time submit revised strategies, plans or programs for the approval of the Secretary. With the agreement of the Secretary, the Applicant may also submit any strategy, plan or program required by this consent on a staged basis.</p> <p>The Secretary may approve a revised strategy, plan or program required under this consent, or the staged submission of any of these documents, at any time. With the agreement of the Secretary, the Applicant may prepare the revised or staged strategy, plan or program without undertaking consultation with all parties nominated under the applicable condition in this consent.</p> <p>While any strategy, plan or program may be submitted on a staged basis, the applicant will need to ensure that the operations associated with the development are covered by suitable strategies, plans or programs at all times.</p> <p>If the submission of any strategy, plan or program is to be staged; then the relevant strategy, plan or program must clearly describe the specific stage/s of the development to which the strategy, plan or program applies; the relationship of this stage/s to any future stages; and the trigger for updating the strategy, plan or program.</p>	Noted		
Adaptive Management				
7.	<p>The Applicant must assess and manage development-related risks to ensure that there are no exceedances of the criteria and/or performance measures in Schedule 3. Any exceedance of these criteria and/or performance measures constitutes a breach of this consent and may be subject to penalty or offence provisions under the EP&A Act or EP&A Regulation.</p> <p>Where any exceedance of these criteria and/or performance measures has occurred, the Applicant must as soon as becoming aware of any exceedance:</p> <ul style="list-style-type: none"> (a) take all reasonable and feasible steps to ensure that the exceedance ceases and does not reoccur; (b) consider all reasonable and feasible options for remediation (where relevant); (c) within 14 days of the exceedance occurring, submit a report to the Secretary describing these remediation options and any preferred remediation measures or other course of action; and (d) implement remediation measures as directed by the Secretary; <p>to the satisfaction of the Secretary.</p>	NA	<p>No exceedances of criteria occurred during the reporting period.</p> <p>A copy of the Pollution Incident Response Management Plan (PIRMP) is maintained on site and on the Walker Quarries website.</p>	D - PIRMP

Condition No.	Paraphrased Requirement	Compliance	Comment	Basis*
COMMUNITY CONSULTATIVE COMMITTEE				
8.	The Applicant must establish and operate a Community Consultative Committee (CCC) for the development to the satisfaction of the Secretary. The CCC must be operated in general accordance with the Department's Community Consultative Committee Guidelines, November 2016 (or later version).	ANC	Community Consultative Committee (CCC) Meetings undertaken in November 2018 and June 2019. Copy of the meeting minutes maintained on the Walker Quarries website. June 2019 minutes has not been provided on the Walker Quarries website.	D – CCC minutes
REPORTING				
Incident Reporting				
9.	The Applicant must immediately notify the Secretary (using the contact name, email address and phone number provided by the Department from time to time) and any other relevant agencies of any incident.	Not Triggered		
10.	Within 7 days of the date of the incident, the Applicant must provide the Secretary and any relevant agencies with a detailed report on the incident, and such further reports as may be requested. This report must include the time and date of the incident, details of the incident, measures implemented to prevent re-occurrence and must identify and non-compliance with this consent.	Not Triggered		

Condition No.	Paraphrased Requirement	Compliance	Comment	Basis*
Regular Reporting				
11	The Applicant must provide regular reporting on the environmental performance of the development on its website, in accordance with the reporting arrangements in any plans or programs approved under the conditions of this consent.	Y	Environmental performance reports maintained on the Walker Quarries website.	D - Website
Annual Review				
12.	<p>By the end of September each year, or other timing as may be agreed by the Secretary, the Applicant must submit a review to the Department reviewing the environmental performance of the development to the satisfaction of the Secretary. This review must:</p> <ul style="list-style-type: none"> (a) describe the development (including any progressive rehabilitation) that was carried out in the previous financial year, and the development that is proposed to be carried out over the current financial year; (b) include a comprehensive review of the monitoring results and complaints records of the development over the previous financial year, which includes a comparison of these results against the: <ul style="list-style-type: none"> • relevant statutory requirements, limits or performance measures/criteria; • requirements of any plan or program required under this consent; • monitoring results of previous years; and • relevant predictions in the documents listed in condition 2(a) of Schedule 2; (c) identify any non-compliance over the past financial year, and describe what actions were (or are being) taken to ensure compliance; (d) identify any trends in the monitoring data over the life of the development; (e) identify any discrepancies between the predicted and actual impacts of the development, and analyse the potential cause of any significant discrepancies; and (f) describe what measures will be implemented over the current [financial/calendar] year to improve the environmental performance of the development. <p>The Applicant must ensure that copies of the Annual Review are submitted to Council and are available to the Community Consultative Committee (see condition 7 of Schedule 5) and any interested person upon request.</p>	Y		D
INDEPENDENT ENVIRONMENTAL AUDIT				
13.	<p>Within a year of the date of this consent, and every 3 years thereafter, unless the Secretary directs otherwise, the Applicant must commission, commence and pay the full cost of an Independent Environmental Audit of the development. This audit must:</p> <ul style="list-style-type: none"> (a) be led and conducted by a suitably qualified, experienced and independent team of experts whose appointment has been endorsed by the Secretary; (b) include consultation with the relevant agencies and the CCC; 	Y	<p>Independent Environmental Audit undertaken in the 2017/18 reporting period by SLR Consulting.</p> <p>Findings of the audit are maintained on the Walker Quarries website.</p>	D

Condition No.	Paraphrased Requirement	Compliance	Comment	Basis*
	(c) assess the environmental performance of the development and whether it is complying with the relevant requirements in this consent and any relevant EPL or necessary water licences for the development (including any assessment, strategy, plan or program required under these approvals); (d) review the adequacy of strategies, plans or programs required under the abovementioned approvals; (e) recommend appropriate measures or actions to improve the environmental performance of the development, and/or any assessment, strategy, plan or program required under the abovementioned approvals; and (f) be conducted and reported to the satisfaction of the Secretary.			
14.	Within 12 weeks of commencing this audit, or as otherwise agreed by the Secretary, the Applicant must submit a copy of the audit report to the Secretary and any other NSW agency that requests it, together with its response to any recommendations contained in the audit report, and a timetable for the implementation of these recommendations as required. The Applicant must implement these recommendations, to the satisfaction of the Secretary.	Y		D
ACCESS TO INFORMATION				
15.	Within 6 months of the date of this consent, until the completion of all works, including rehabilitation and remediation the Applicant must: (a) make the following information publicly available on its website: ¹ <ul style="list-style-type: none"> the documents listed in condition 2(a) of Schedule 2; current statutory approvals for the development; all approved strategies, plans and programs required under the conditions of this consent; a comprehensive summary of the monitoring results of the development, reported in accordance with the specifications in any conditions of this consent, or any approved plans and programs; a complaints register, updated monthly; the annual reviews of the development; any independent environmental audit as described in condition 12 above, and the Applicant's response to the recommendations in any audit; and any other matter required by the Secretary; and (b) keep this information up-to-date, to the satisfaction of the Secretary.	Y	Monitoring results provided on the Walker Quarries website. Recommendation: Provide a comprehensive summary/explanation of the monitoring results of the development on the Walker Quarries website.	D - website

Condition No.	Paraphrased Requirement	Compliance	Comment	Basis*
APPENDIX 3 – NOISE COMPLIANCE ASSESSMENT				
Applicable Meteorological Conditions				
1.	The noise criteria in Table 2 are to apply under all meteorological conditions except the following: (a) wind speeds greater than 3 m/s at 10 m above ground level; or (b) temperature inversion conditions between 1.5°C and 3°C/100 m and wind speed greater than 2 m/s at 10 m above ground level; or (c) temperature inversion conditions greater than 3°C/100 m.	Noted		
Compliance Monitoring				
2.	A noise compliance assessment must be undertaken within three months of the determination of Modification 1. The assessment must be conducted by a suitably qualified and experienced acoustical practitioner and must assess compliance with noise criteria presented above. A report must be provided to the Department and EPA within 1 month of the assessment.	NA	Completed during previous reporting period in accordance with the condition	
4.	Unless the Secretary agrees otherwise, this monitoring is to be carried out in accordance with the relevant requirements for reviewing performance set out in the NSW Industrial Noise Policy (as amended from time to time), in particular the requirements relating to: (a) monitoring locations for the collection of representative noise data; (b) equipment used to collect noise data, and conformity with Australian Standards relevant to such equipment; (c) modifications to noise data collected, including for the exclusion of extraneous noise and/or penalties for modifying factors apart from adjustments for duration; and (d) the use of an appropriate modifying factor for low frequency noise to be applied during compliance testing at any individual residence if low frequency noise is present (in accordance with the INP) and before comparison with the specified noise levels in the consent.	NA	Completed during previous reporting period in accordance with the condition	
LEGEND				
Y = Complied with during YEAR NA = Not Applicable during YEAR NR = Not Required N = Not complied with during YEAR NYA = Not Yet Applicable Noted = Condition Acknowledged ND = Not Determined ANC = Administrative Non-Compliance Note * Basis for assessment of compliance O = Observation during audit D = Documentation Retained C = Confirmed by Quarry Manager				
Yes#/No# = Complied/not complied with and compliance no longer required to be assessed				

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