



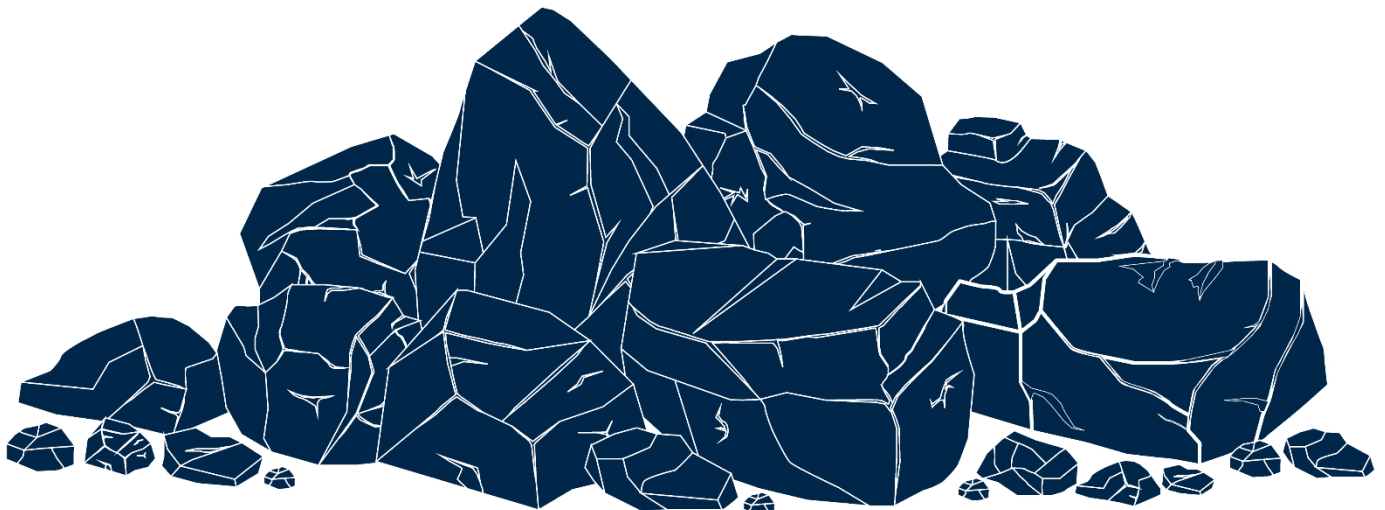
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Karuah Hard Rock Quarry

# Environmental Monitoring Program

September 2023



## Revision History

Version	Date Reviewed	Author	Status	Amendment Details
1A	May 2006	GSSE	Draft	Original draft Environmental Monitoring Program developed to satisfy the requirements of Schedule 4, Condition 3 of the Development Consent
1B	June 2006	GSSE	Draft	Updated draft document for HQPL review.
1C	July 2006	GSSE	Draft for consultation	Updated for DEC & DOP comments.
1D	August 2006	GSSE	Draft for consultation	Updated for additional DOP comments.
1E	August 2006	GSSE	Approved	Final approved document.
2A	August 2008	GSSE	Draft for consultation	Comprehensive review of Karuah Hard Rock Quarry Environmental Management Strategy and associated Management Plans.
2B	October 2008	GSSE	Approved	Updated for DOP comments.
3	January 2012	SLR	Approved	Comprehensive review of Karuah Hard Rock Quarry Environmental Management Strategy and associated Management Plans.
4	June 2014	SLR	Approved	Comprehensive review of Karuah Hard Rock Quarry Environmental Management Strategy and associated Management Plans.
5	December 2014	SLR	Approved	Review following 2014 Independent Environmental Audit.
6A	31/05/2023	IEMA	Draft for Consultation	Draft following comprehensive review of Karuah Hard Rock Quarry Environmental Management Strategy and associated Management Plans.
6B	23/08/2023	IEMA	Draft for Approval	Update for new Hunter Quarries document template.
6C	11/09/2023	IEMA	Approved	Updated for DPE comments.

Document Number	Version Number	Version Date	Review Date	Document Owner	Page
EVN-MP-HQ002	Version 6C	11/09/2023	11/09/2028	E&D Manager	2 of 22

## Contents

<b>1.0</b>	<b>INTRODUCTION</b> .....	<b>6</b>
1.1	Key Legislative Requirements.....	8
<b>2.0</b>	<b>SITE ENVIRONMENTAL MANAGEMENT</b> .....	<b>10</b>
2.1	Environmental Management Plans .....	10
2.2	Monitoring Procedures .....	10
2.3	Air Quality Monitoring Program.....	12
2.3.1	Dust Monitoring .....	12
2.3.2	HVAS Monitoring.....	13
2.4	Water Quality .....	13
2.5	Noise and Blast Monitoring.....	14
2.5.1	Operational Noise .....	14
2.5.2	Monitoring of Operational Blasting (Vibration and Overpressure).....	15
2.6	Monitoring of Climatic Conditions .....	16
2.7	Flora and Fauna .....	16
2.8	Monitoring of Rehabilitation Works.....	16
2.9	Waste Generation .....	16
2.10	General Environmental Inspections .....	17
<b>3.0</b>	<b>REPORTING AND REVIEWING</b> .....	<b>18</b>
3.1	Monitoring Results and Records .....	18
3.2	Reporting Environmental Incidents.....	18
3.3	Annual Reporting .....	18
3.4	Document Review .....	18
3.5	Chain of Custody Documentation .....	18
<b>4.0</b>	<b>RESPONSIBILITIES</b> .....	<b>19</b>
<b>5.0</b>	<b>STANDARDS AND LEGISLATION</b> .....	<b>20</b>
5.1	Australian Standards .....	20
5.2	Other Standards and Guidelines .....	20

Document Number	Version Number	Version Date	Review Date	Document Owner	Page
EVN-MP-HQ002	Version 6C	11/09/2023	11/09/2028	E&D Manager	3 of 22

## Tables

Table 1 - Relevant Conditions of Development Consent .....	8
Table 2 - Long Term Impact Assessment Criteria for Particulate Matter .....	12
Table 3 - Short Term Impact Assessment Criteria for Particulate Matter .....	12
Table 4 - Long Term Impact Assessment Criteria for Deposited Dust .....	12
Table 5 - Surface Water Quality .....	14
Table 6 - Noise Impact Assessment Criteria of the Development .....	15
Table 7- Air Blast Overpressure Limits.....	15
Table 8 - Ground Vibration Limits .....	15
Table 9 - Roles and Responsibilities .....	19

## Figures

Figure 1- HQPL Regional Context.....	7
Figure 2- HQPL Environmental Monitoring Locations .....	11

## Appendices

Appendix 1 – Environmental Monitoring Schedule

Document Number	Version Number	Version Date	Review Date	Document Owner	Page
EVN-MP-HQ002	Version 6C	11/09/2023	11/09/2028	E&D Manager	4 of 22

## Terms, Definitions and Abbreviations

Abbreviation/ Term	Meaning
AEMR	Annual Environmental Management Report
AQMP	Air Quality Monitoring Program
CCC	Community Consultative Committee
DA	Development Application
DDG	Depositional Dust Gauge
DPE	NSW Department of Planning and Environment (former Department of Planning Industry and Environment)
EA	Environmental Assessment
EIS	Environmental Impact Statement
EMP	Environmental Monitoring Program
EMS	Environmental Management Strategy
EPL	NSW Environment Protection Licence
Ha	Hectare
HQPL	Hunter Quarries Pty Ltd
km	Kilometre
L	Litre
LDP	Licensed Discharge Point
MCC	MidCoast Council
NPWS	NSW National Parks and Wildlife Service, now part of Environment, Energy and Science
POEO Act	Protection of the Environment Operations Act 1997
RAR	Response to Audit Recommendations
RFS	NSW Rural Fire Service
SWMP	Site Water Management Plan
tpa	tonnes per annum

## 1.0 Introduction

Mountain Industries obtained approval to operate the Karuah Quarry in 1997, with the site subsequently purchased by Hunter Quarries Pty Ltd (HQPL) in 2002. In October 2004, HQPL applied to the then Department of Infrastructure, Planning and Natural Resources (now known as the Department of Planning and Environment, DPE) for approval to expand the quarry into adjoining lands (the Stage 2 extraction area) to allow the exploitation of further hard rock resources.

Development Consent was granted by the Minister for Infrastructure, Planning and Natural Resources on 3 June 2005, under DA 265-10-2004, with the approved development including:

- Implementing the remainder of the approved Stage 1 quarry operation;
- Extending the quarry operations into the Stage 2 area;
- Upgrading and using existing infrastructure on site;
- Rehabilitating the site by re-contouring and revegetating exposed surfaces; and
- Producing up to 500,000 tonnes of andesite product a year over the next 22 years.

The Karuah Quarry contributes materials to the construction industries in the Hunter, New England, and Sydney Regions. The site is located approximately four kilometres north east of the town of Karuah, NSW. The Karuah Quarry encompasses Lot 21 DP 1024564, Lot 11 DP 1024564 and part of Lot 12 DP 1024564. Quarrying activities take place on Lot 21 and Lot 11 (staged workings) and a conservation offset area has been established on part Lot 12. The overall site covers an area of 78.5 approximately hectares (ha), with the active quarrying area encompassing approximately 11 ha.

Karuah Quarry holds and maintains an Environment Protection Licence 11569 (EPL) with the fee-based licence comprising of:

- Crushing, grinding, or separating works (>100,000-500,000 t processed); and
- Hard-rock gravel quarrying (>100,00-500,000 t obtained).

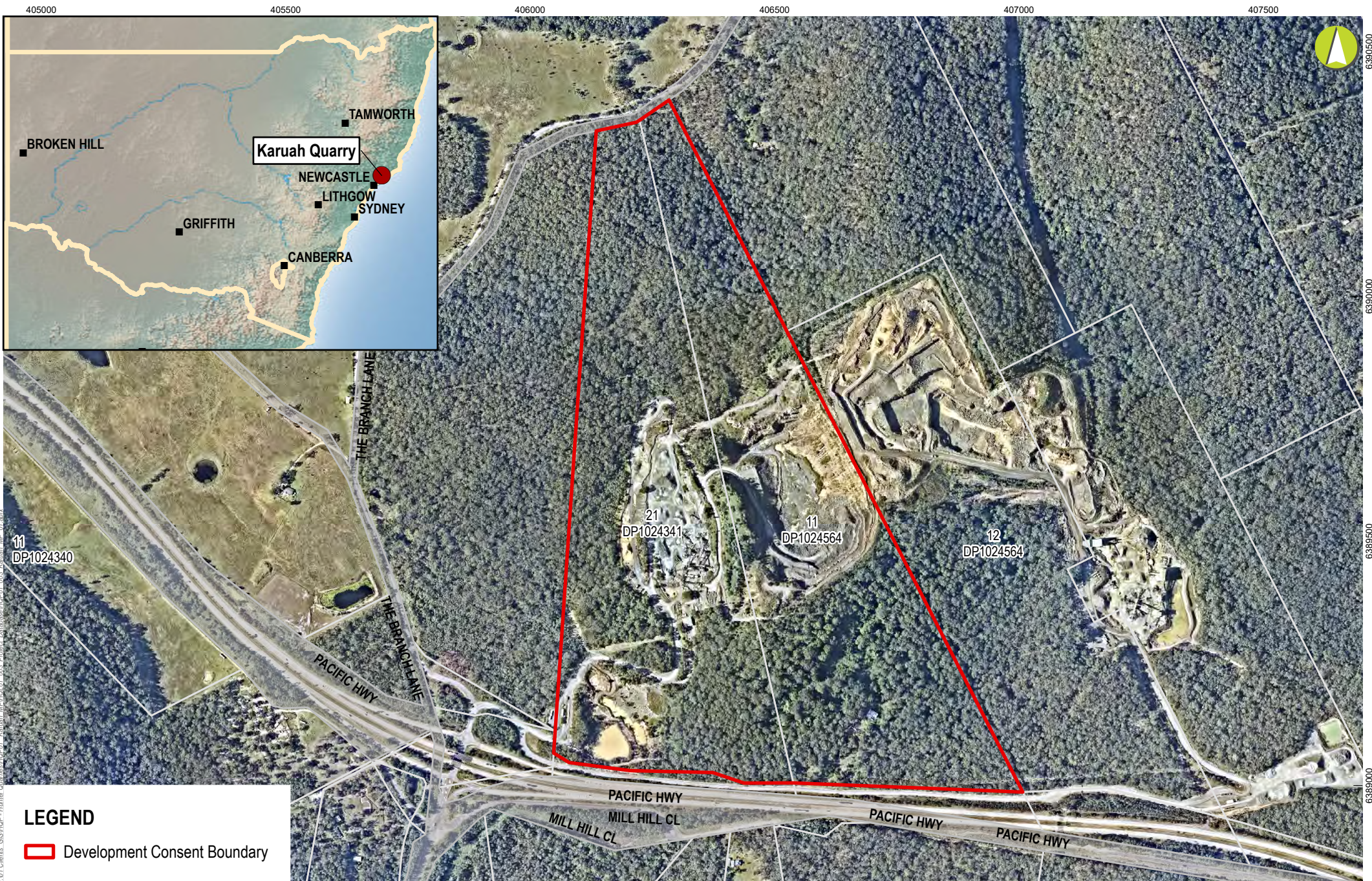
The regional setting and site layout are shown in **Figure 1**.

In accordance with consent condition 3 of Schedule 4 of DA 265-10-2004, Hunter Quarries Pty Ltd (HQPL) has established this Environmental Monitoring Program (EMP) to measure the key environmental parameters for compliance during operation of the Quarry. Further, to integrate the plan with other site monitoring and management commitments, this EMP has been developed in accordance with the following plans:

- *Hunter Quarries Pty Ltd Site Water Management Plan*
- *Hunter Quarries Pty Ltd Rehabilitation and Closure Plan;*
- *Hunter Quarries Pty Ltd Flora and Fauna Management Plan; and*
- *Hunter Quarries Pty Ltd Environmental Management Strategy (EMS).*

Compliance, evaluation and review of the environmental performance of various parameters is carried out in accordance with the specific conditions of the Development Consent and EPL. In accordance with Schedule 4, Condition 1 of the Development Consent, all statutory requirements that apply to the development, environmental performance and management, any incidents, complaints, notifications and reporting is covered in the separate Environmental Management Strategy (EMS). These include a range of environmental aspects with respect to the operation of the quarry.

Document Number	Version Number	Version Date	Review Date	Document Owner	Page
EVN-MP-HQ002	Version 6C	11/09/2023	11/09/2028	E&D Manager	6 of 22



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**LEGEND**

Development Consent Boundary



GDA 1994 MGA Zone 56  
18/05/2023

HQPL Regional and Local Context

Figure 1

## 1.1 Key Legislative Requirements

The purpose of establishing and maintaining documented procedures to monitor key environmental characteristics of the operation of the quarry is to enable HQPL to evaluate and continue to improve its environmental performance and ensure compliance with the Development Consent and EPL during the operational phase. This document satisfies Schedule 4, Condition 3 of the Development Consent, which requires an Environmental Monitoring Program (EMP) be developed and implemented for the quarry.

The relevant conditions of the Development Consent and the section(s) in this document where they are addressed are provided in **Table 1**.

**Table 1 – Development Consent requirements**

Condition	Requirements	Section
Schedule 3, Condition 3	Within 6 months of the date of this consent, the Applicant shall prepare and implement a <b>Noise Monitoring Program</b> for the development to evaluate compliance with the noise impact assessment criteria in this consent, in consultation with the DEC, and to the satisfaction of the Director-General.	Section 2.5
Schedule 3, Condition 15	Within 6 months of the date of this consent, the Applicant shall prepare and implement an <b>Air Quality Monitoring Program</b> for the development to evaluate compliance with the air quality impact assessment criteria in this consent, in consultation with the DEC, and to the satisfaction of the Director-General.	Section 2.3
Schedule 3, Condition 16	Within 6 months of this consent, the Applicant shall ensure that there is a suitable <b>meteorological station</b> operating in the vicinity of the development in accordance with the requirements in Approved Methods for Sampling of Air Pollutants in New South Wales, and to the satisfaction of the DEC and the Director-General.	Section 2.6
Schedule 3, Condition 26(b)	Within 12 months of the date of this consent, the Applicant shall prepare, and subsequently implement, a Site Water Management Plan for the development, in consultation with the DEC, and to the satisfaction of the Director-General. The plan shall detail how site water management on site will be integrated with existing surface water management and erosion and sediment control systems and address surface water management and erosion and sediment control at both the construction and operation phases of the development. This plan must include:  (b) a Surface Water Monitoring Program	Section 2.4
Schedule 3, Condition 28	<b>Surface Water Monitoring</b>  The Applicant shall: a) measure: <ul style="list-style-type: none"> <li>• the volume of water discharged from the site via licensed discharge points;</li> <li>• water use on the site;</li> <li>• water transfers across the site; and</li> <li>• dam and water structure storage levels.</li> </ul> b) regularly monitor the quality of the surface water discharged from the licensed discharge points on the site;  to the satisfaction of the DEC and the Director-General.	Section 2.9



Condition	Requirements	Section
Schedule 3, Condition 34	<p><b>Waste Management</b></p> <p>The Applicant shall:</p> <ul style="list-style-type: none"> <li>a) monitor the amount of waste generated by the development;</li> <li>b) investigate ways to minimise waste generated by the development;</li> <li>c) implement reasonable and feasible measures to minimise waste generated by the development; and</li> <li>d) report on waste management and minimisation in the AEMR.</li> </ul> <p>to the satisfaction of the Director-General.</p>	Section 2.9
Schedule 4, Condition 3	<p>Within 6 months of the date of this consent, the Applicant shall prepare an Environmental Monitoring Program for the development, in consultation with the relevant agencies, and to the satisfaction of the Director-General. This program must consolidate the various monitoring requirements in Schedule 4 of this consent into a single document.</p>	Whole document
Schedule 4, Condition 4	<p>Within 3 months of the completion of the Independent Environmental Audit (see condition 6 below), the Applicant shall review, and if necessary, revise, the Environmental Monitoring Program to the satisfaction of the Director-General.</p>	Section 3.0

Document Number	Version Number	Version Date	Review Date	Document Owner	Page
EVN-MP-HQ002	Version 6C	11/09/2023	11/09/2028	E&D Manager	9 of 22

## 2.0 Site Environmental Management

### 2.1 Environmental Management Plans

Environmental management plans provide details and controls for a specific environmental aspect or activity. It is a responsibility of HQPL to comply with the commitments set out in each individual management plan. Monitoring requirements are consolidated into this plan.

### 2.2 Monitoring Procedures

The scope of environmental monitoring is directed towards key environmental aspects as per the requirements within the Development Consent. Criteria has been developed as part of studies undertaken during the preparation of the Environmental Impact Statement (EIS) (Asquith & deWitt, 2004).

This monitoring program has been developed entirely for “operational phase”. This is defined as the period of active quarrying including drilling, blasting, processing (crushing) and haulage of rock material from the site.

The environmental aspects that require monitoring and management include the following:

- Air quality – depositional dust (required); and TSP & PM10 (as required).
- Water quality – surface water quality (Sediment Dam 2); and Land integrity & stability (ESC);
- Blast monitoring;
- Noise monitoring;
- Meteorological conditions; and
- Flora and fauna monitoring.

**Appendix 1** contains the monitoring schedule for the site; and

**Figure 2** contains a map showing the location of environmental monitoring sites.

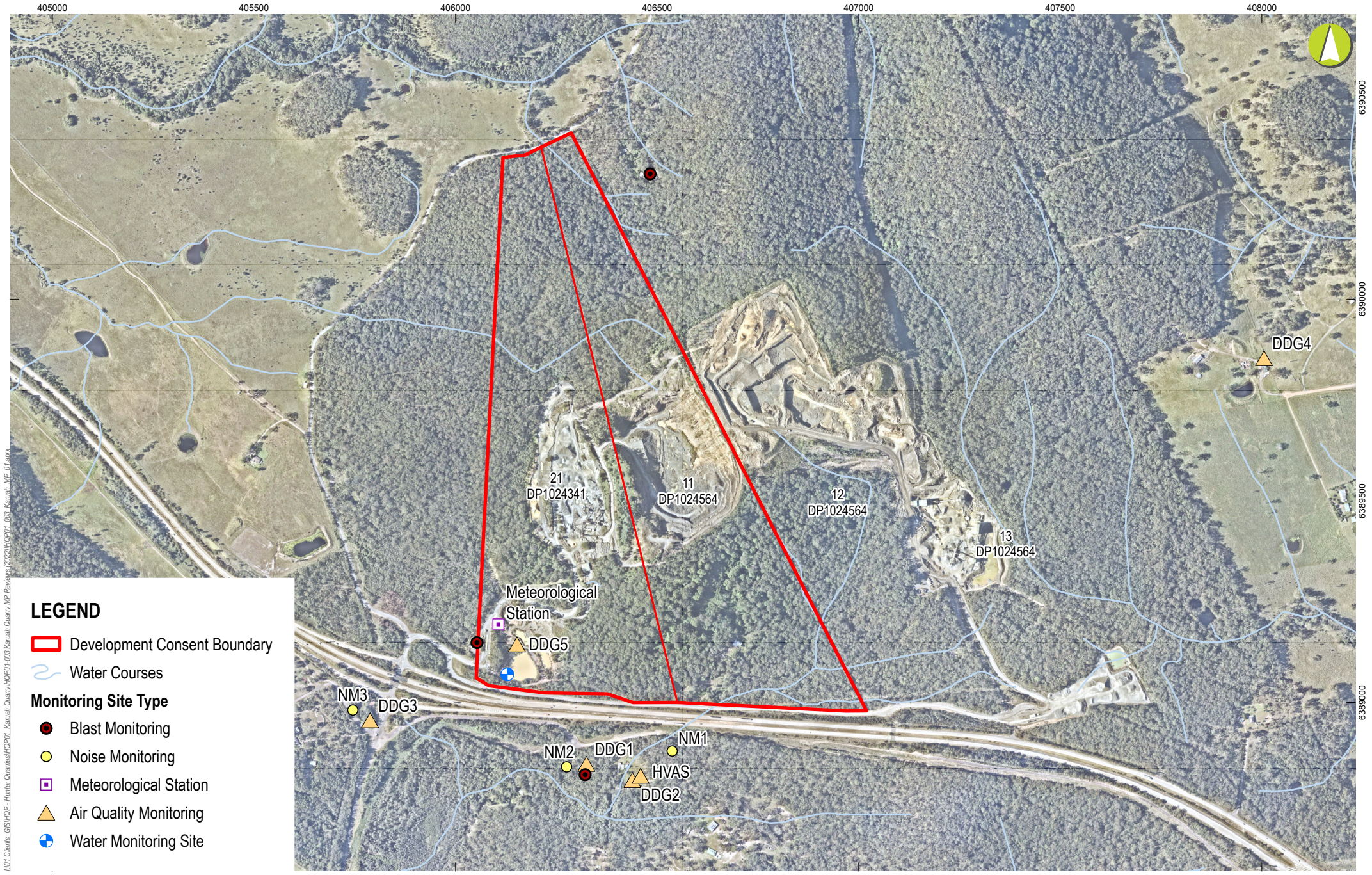
All monitoring is carried out in accordance with the Development Consent, EPL and endorsed Management Plans. Where a standard or guideline is not specifically mentioned, HQPL will adopt the appropriate industry standard in liaison with appropriate regulatory authorities (e.g., NSW DPE). Relevant standards and guidelines to this plan are detailed in **Section 5.0**.

Monitoring equipment is installed and maintained to meet nominated standards by qualified consultants, and HQPL maintains equipment calibration records which are available upon request.

In addition, any monitoring equipment controlled by HQPL that requires periodic calibration (e.g., weather station) is to be calibrated in the field and, when required, sent to the original equipment manufacturer (or equivalent) for full calibration tests and services.

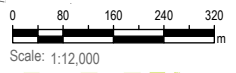
Only NATA (or equivalent) accredited laboratories will be used for the analysis of the various parameters required as part of the environmental monitoring and measurement for the quarry.

Document Number	Version Number	Version Date	Review Date	Document Owner	Page
EVN-MP-HQ002	Version 6C	11/09/2023	11/09/2028	E&D Manager	10 of 22



**LEGEND**

- Development Consent Boundary
- ~ Water Courses
- Monitoring Site Type**
- Blast Monitoring
- Noise Monitoring
- Meteorological Station
- ▲ Air Quality Monitoring
- ⊕ Water Monitoring Site



GDA2020 MGA Zone 56  
11/09/2023

**HQPL Environmental Monitoring Locations**

**FIGURE 2**

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## 2.3 Air Quality Monitoring Program

Schedule 3, Condition 13 of the Development Consent requires that dust emissions do not cause additional exceedances of the ambient air quality criteria at any resident on, or more than 25 percent of, any privately owned land. This criteria was established during the environmental impact assessment and is listed in **Table 2**, **Table 3**, and **Table 4**.

**Table 2 - Long Term Impact Assessment Criteria for Particulate Matter**

Pollutant	Averaging Period	Criterion
Total suspended particulate (TSP) matter	Annual	90 $\mu\text{g}/\text{m}^3$
Particulate Matter < 10um (PM <sub>10</sub> )	Annual	30 $\mu\text{g}/\text{m}^3$

**Table 3 - Short Term Impact Assessment Criteria for Particulate Matter**

Pollutant	Averaging Period	Criterion
Particulate Matter < 10um (PM <sub>10</sub> )	24 hour	50 $\mu\text{g}/\text{m}^3$

**Table 4 - Long Term Impact Assessment Criteria for Deposited Dust**

Pollutant	Averaging Period	Maximum increase in deposited dust level	Maximum total deposited dust level
Deposited Dust	Annual	2 $\text{g}/\text{m}^2/\text{month}$	4 $\text{g}/\text{m}^2/\text{month}$

The positioning of dust monitoring equipment (dust gauges) is influenced by several factors, including:

- Prevailing seasonal wind regimes;
- The location of the nearest potential dust receptors;
- Practical limitations (including items such as clear siting as required by the Australian Standards, access, security, etc); and
- Previous dust management issues in the vicinity (e.g., complaints).

To ensure compliance with Schedule 3, Condition 13 of DA 265-10-2004, HQPL have developed an Air Quality Monitoring Program (AQMP) to monitor the Quarry's activities. The AQMP consists of monitoring for depositional dust, total suspended particulates (TSP) and PM10 particulates.

### 2.3.1 Dust Monitoring

Four (4) depositional dust gauges are located nearby the site. These are monitored by a suitably qualified contractor. The locations of the gauges are shown on the Environmental Monitoring Plan in **Figure 2**. The results of the depositional dust monitoring shall be reported as per **Section 3.0** of this EMP.

Document Number	Version Number	Version Date	Review Date	Document Owner	Page
EVN-MP-HQ002	Version 6C	11/09/2023	11/09/2028	E&D Manager	12 of 22

### 2.3.2 HVAS Monitoring

High Volume Air Sampler (HVAS) will be used by HQPL in the event that they are required to investigate any air quality complaints unless otherwise directed by the DPE. In the event a complaints is received regarding air quality, TSP and PM10 monitoring will be undertaken to investigate the complaint (i.e., HVAS would run every second quarry working day for the duration of the complaint investigation). This approach has been previously confirmed acceptable with the NSW DPE.

The results of the HVAS monitoring shall be reported as per Section 3.0 of this EMP.

## 2.4 Water Quality

Potential impacts on water quality are most likely to be related to erosion and sedimentation in the areas of progressive extraction and processing (including stockpiling and bulk material transfer). The continued use of the fuel storage area may present potential oil and grease to waters.

HQPL operates in accordance with a Site Water Management Plan which includes a surface water monitoring program and erosion and sediment control measures. Water from the site reports to Sediment Dam 2 for settlement of suspended solids prior to discharge (if required) from the site. The monitoring program for the Stage 2 extraction area is undertaken in conjunction with the existing monitoring program.

In order to measure the water quality impacts resulting from the operation, the following monitoring is undertaken, as summarised by **Table 5**:

- Surface water quality is monitored every six months in Sediment Dam 2, with samples analysed for Total Suspended Solids (TSS), pH and Electrical Conductivity (EC).
- The collection and review of the water quality data over time will allow a good set of baseline data.
- Where sediment dam water quality exceeds this benchmark, flocculation is undertaken to assist sediment removal.
- In addition to the six-monthly samples, regular visual checks are made to ensure that there is no noticeable increased discoloration or sediment build up in the sediment dams.

Document Number	Version Number	Version Date	Review Date	Document Owner	Page
EVN-MP-HQ002	Version 6C	11/09/2023	11/09/2028	E&D Manager	13 of 22

**Table 5 - Surface Water Quality**

Monitoring Type	Frequency	Other Comment
Surface Water Quality	<p>Surface Water Quality will be monitored every six months in Sediment Dam 2, with samples analysed for TSS, pH and Electrical Conductivity (EC).</p> <p>In addition to the six-monthly samples, regular visual checks are made to ensure that there is no noticeable increased discoloration or sediment build up in the sediment dams. Water quality sampling would be undertaken where visual impacts were observed.</p> <p>The depth of the dams will also be reviewed at least once a month to determine if the storage capacity of the dams has been reduced.</p> <p>The Quarry Manager (or suitable delegate) completes a daily site inspection of all site components.</p>	<p>Where the storage capacity has been reduced by thirty (30) percent or more the dam will be desilted.</p> <p>Water samples at Sediment Dam 2 are taken from the edge of the dam, adjacent to the pump. Water quality bottles are sent to a NATA accredited laboratory for testing.</p>
Water Discharge	As required.	<p>The dam has been previously surveyed so that estimated volumes can be calculated.</p> <p>There are no volume limits specified in EPL 11569 for this licensed discharge point. However, it is a requirement of Development Consent (DA 265-10-2004) that the volume of water discharged from the site via a licensed discharge point be measured. The flow of water can be estimated based on the flow through the discharge pipeline.</p>
Opportunistic	Opportunistic Grab Samples may also be taken during significant rainfall events. These samples will be analysed for TSS, pH and EC.	Significant rainfall events are defined as receiving more than 20mm of rain in a 24-hour period.
Water Use	Flow metre readings will be recorded by the Environmental Officer during the environmental inspection completed every two months.	Water for dust suppression by water cart, and sprays on the crushing facility is sourced from Sediment Dam 2. Water usage will therefore be measured via a flow metre to be installed on the pump in Sediment Dam 2.

The results of the water quality monitoring program are reported as per **Section 3.0** of this EMP.

## 2.5 Noise and Blast Monitoring

### 2.5.1 Operational Noise

Schedule 3, Condition 1 of the Development Consent requires HQPL to ensure noise generated by the development does not exceed the criteria at any residence or noise receptor on privately owned land, as summarised by **Table 6**.

Document Number	Version Number	Version Date	Review Date	Document Owner	Page
EVN-MP-HQ002	Version 6C	11/09/2023	11/09/2028	E&D Manager	14 of 22

**Table 6 - Noise Impact Assessment Criteria of the Development**

Time Period	Noise Limits (dB(A) LAeq (15 min))
Day (7am to 6pm) Mon to Fri and 7am to 1pm Saturday	48
Evening (6pm to 10pm) Monday to Friday	47
At all other times	46

To measure noise impacts from quarrying operations, the following monitoring is undertaken at the two (2) nearest receptors (64 & 74 Mill Hill Cl). These residences are not owned or under agreement with HQPL.

- An unattended (continuous 24hr) noise monitor is placed in the field to measure noise for at least four (4) full days of monitoring each six months.
- An attended survey is undertaken at the two nearest residences on a six-monthly basis. This survey will be undertaken in conjunction with the unattended survey described above.
- A suitably qualified noise consultant will be engaged to undertake 15-minute attended noise surveys (as per EPA standards) to investigate any complaints received by HQPL. and
- Onsite logged climatic data (particularly winds) will be utilised to assist with a timely management response to any noise issue that may arise. This is further discussed in **Section 2.6**.

During attended surveys, where the noise from operations is measured to be greater than approved criteria, a review of operational activities which resulted in exceedances shall be undertaken. Where appropriate, the offending activity will cease until conditions or controls improve. This could include improvement in meteorological conditions (i.e. inversion lift) or other appropriate controls. In addition, the frequency of noise monitoring may be increased as appropriate, or until such time that it can be demonstrated that noise levels are well below required limits.

#### 2.5.2 Monitoring of Operational Blasting (Vibration and Overpressure)

In accordance with Schedule 3, Condition 6 of the Development Consent, blasts will only occur:

- Between 9am and 3pm Monday to Friday inclusive;
- Once a week; and
- At other times as approved by the NSW DPE.

HQPL will ensure that the air blast overpressure level and peak particle velocity from blasting does not exceed the criteria below in **Table 7** and **Table 8** respectively at any residence, or sensitive receiver on privately owned land.

**Table 7 – Air Blast Overpressure Limits**

Air blast overpressure [dB (Lin Peak)]	Allowable exceedance
115	5% of the total number of blasts over a period of 12 months
120	0%

**Table 8 – Ground Vibration Limits**

Peak Particle Velocity (mm/s)	Allowable exceedance
5	5% of the total number of blasts over a period of 12 months
10	0%

Document Number	Version Number	Version Date	Review Date	Document Owner	Page
EVN-MP-HQ002	Version 6C	11/09/2023	11/09/2028	E&D Manager	15 of 22

Blast monitoring will be undertaken at the nearest affected residence from the quarry to ensure Schedule 3, Conditions 4 and 5 of the Development Consent are satisfied. Blast monitoring will also be completed at the front gate of the quarry.

In accordance with Schedule 3, Condition 7 of the Development Consent, a blasting notification register has been established, with all registered individuals notified of upcoming blasting operations at the site.

The results of the noise and blasting monitoring program for the Quarry shall be reported as per **Section 3.0** of this EMP.

## 2.6 Monitoring of Climatic Conditions

Schedule 3, Condition 16 of the Development Consent DA 265-10-2004 requires meteorological conditions to be provided for the site to specified DPE standards. The collation of this data will allow HQPL to respond to climatically influenced environmental issues such as noise and dust, and to assist in planning blasting activities to ensure that offsite impacts are minimised.

A meteorological monitoring station has been installed at the Quarry, measuring a number of parameters including wind speed, wind direction, temperature, humidity and rainfall.

Information from the meteorological station is checked daily by the Quarry Manager (or suitable delegate). Appropriate consultants periodically review the information for environmental reporting and assessment. Climatic information (e.g., winds) are also be checked prior to blasting. Information from the meteorological station is also reported in the Annual Review.

## 2.7 Flora and Fauna

Biennial (every two years) flora and fauna monitoring is conducted in the remnant vegetation and the conservation offset areas as required under Schedule 3 Conditions 21, 22 and 23 of the Development Consent and the approved *Flora and Fauna Management Plan* (IEMA, 2023). Ecological monitoring is scheduled for the flowering period (August – December) for optimum results. Fauna monitoring is scheduled for the summer months when most fauna species are generally active. The complete methodology for ecological monitoring is outlined in the *Flora and Fauna Management Plan* (IEMA, 2023). The results of ecological monitoring are reported as per **Section 3.0** of this EMP.

## 2.8 Monitoring of Rehabilitation Works

Monitoring of the site's rehabilitation works are undertaken in accordance with the HQPL *Rehabilitation and Closure Management Plan* (IEMA, 2023). This plan outlines the proposed rehabilitation methodology, monitoring, and reporting.

## 2.9 Waste Generation

In accordance with Schedule 3, Condition 34 of the Development Consent, waste volumes or tonnages removed from site is to be recorded by the site's waste contractor with records regularly provided to HQPL.

Material recycled or reused offsite (volumes/tonnages, e.g., diverted from landfill) should also be recorded to illustrate waste minimisation and management performance of the site. Waste minimisation strategies are included in the Annual Review.

Document Number	Version Number	Version Date	Review Date	Document Owner	Page
EVN-MP-HQ002	Version 6C	11/09/2023	11/09/2028	E&D Manager	16 of 22



## 2.10 General Environmental Inspections

The Environment Officer will undertake environmental inspections every six months to ensure that mitigation controls, protected/conservation areas, and management procedures and protocols are functioning as required. The findings from the inspections will be reported internally.

The working order of mitigation controls for surface drainage and storm water runoff, sediment controls, and potential dust sources are also to be inspected by the Environment Officer as part of the six-monthly environmental inspections. The Environment Officer will ensure that any contractors onsite are operating within the environmental controls as required for their activities.

Document Number	Version Number	Version Date	Review Date	Document Owner	Page
EVN-MP-HQ002	Version 6C	11/09/2023	11/09/2028	E&D Manager	17 of 22

## 3.0 Reporting and Reviewing

### 3.1 Monitoring Results and Records

To ensure that the EMP is effective and complying with specific statutory requirements and key objectives of this EMP, the Quarry Manager (or suitable delegate), will review monitoring results as required, particularly when activities change, and an environmental impact is possible.

All monitoring records and reports are to be kept on site for a minimum period of four (4) years, in accordance with EPL 11569 and statutory requirements.

### 3.2 Reporting Environmental Incidents

As required under environmental legislation and the Development Consent, HQPL is required to notify the DPE by phone 'immediately' after becoming aware of any incident that may cause significant or adverse environmental harm, and to provide written details within seven (7) days. Incident management and reporting is completed in accordance with the *Pollution Incident Response Management Plan (PIRMP) and Environmental Management Strategy (EMS)*.

### 3.3 Annual Reporting

An annual report on environmental monitoring activities will be included within the Annual Review, to be submitted to the DPE annually, as per Schedule 4, Condition 5 of the Development Consent.

### 3.4 Document Review

This EMP will be reviewed at a minimum of every five (5) years, i.e., following an Independent Environmental Audit, to assess its effectiveness, in accordance with the Schedule 4, Condition 4 & 5 of the Development Consent.

### 3.5 Chain of Custody Documentation

All samples collected and sent from the Quarry for further analysis must be accompanied by Chain of Custody (CoC) documentation. Contractors will provide their own CoC documentation for monitoring.

Document Number	Version Number	Version Date	Review Date	Document Owner	Page
EVN-MP-HQ002	Version 6C	11/09/2023	11/09/2028	E&D Manager	18 of 22

## 4.0 Responsibilities

Environmental responsibilities associated with this EMP for the quarry personnel are outlined in **Table 9**.

**Table 9 - Roles and Responsibilities**

Personnel	Responsibilities
Quarry Manager	<ul style="list-style-type: none"> <li>■ Implementation of this Plan, ensuring that all required monitoring programs required under this program are being undertaken;</li> <li>■ Have a working knowledge of this EMP; and</li> <li>■ Be aware of the environmental legislative requirements associated with the Karuah Quarry and take measures to ensure compliance.;</li> </ul>
Environment Officer	<ul style="list-style-type: none"> <li>■ Coordinate the environmental and rehabilitation monitoring requirements of this plan;</li> <li>■ The management and co-ordination of specialist consultants and contractors related to the routine monitoring and measurement program for the quarry;</li> <li>■ Providing a primary point of contact for the various stakeholders in relation to the environmental performance of the operation;</li> <li>■ Undertaking additional monitoring (as required) that compliments the routine monitoring program;</li> <li>■ Collating and interpreting all monitoring &amp; measurement data as provided by the specialist consultants and/or gathered on site and ensuring that it is made publicly available through the reporting process (i.e., AEMR);</li> <li>■ Ensuring access to all environmental monitoring sites is maintained and/or re-instated following any works associated with construction and operational activities;</li> <li>■ Taking care to ensure all monitoring points are not damaged or destroyed by construction and operational activities where practical; and</li> <li>■ Assist with the review of this plan.</li> </ul>
All employees and contractors	<ul style="list-style-type: none"> <li>■ Comply with all requirements of this EMP;</li> <li>■ Report all potential environmental incidents to the Environment Officer and Quarry Manager immediately; and</li> <li>■ Seek approval from the Environment Officer and Quarry Manager prior to making changes to infrastructure/processes which may result in increased environmental impacts.</li> </ul>

## 5.0 Standards and Legislation

### 5.1 Australian Standards

The following is a summary list of the Australian Standards (AS) relevant to monitoring and measurement at the Quarry including:

- AS/NZS 3580.1.1:2016 – *Methods for sampling and analysis of ambient air Guide to siting air monitoring equipment*;
- AM-18 AS 3580.9.6-1990 “*Particulate Matter – PM10 – high volume sampler with size selective inlet*”;
- AS/NZS 3580.9.6:2015 “*Methods for Sampling and Analysis of Ambient Air – Determination of suspended particulate matter – PM10 high volume air sampler with size selective inlet – gravimetric method*”;
- AS/NZS 3580.9.3:2015 “*Methods for sampling and analysis of ambient air Determination of suspended particulate matter – Total suspended particulate matter (TSP) – High volume sampler gravimetric method*”; and
- AS 2187.2-2006 *Explosives – Storage and use of explosives*.

### 5.2 Other Standards and Guidelines

The following is a summary list of other standards & guidelines relevant to monitoring and measurement at the Quarry including:

- NSW EPA (2022) “*Approved Methods for the Sampling and Analysis of Water Pollutants in NSW*”;
- National Environmental Protection Council (NEPC) “*National Environmental Protection Measure for Ambient Air Quality (1998)*”;
- NSW EPA (2013) *Framework for Noise Control*; and
- NSW EPA (2017) *Noise Policy for Industry (NPfi)*.

Document Number	Version Number	Version Date	Review Date	Document Owner	Page
EVN-MP-HQ002	Version 6C	11/09/2023	11/09/2028	E&D Manager	20 of 22

# Appendix 1

## Environmental Monitoring Schedule

Document Number	Version Number	Version Date	Review Date	Document Owner	Page
EVN-MP-HQ002	Version 6C	11/09/2023	11/09/2028	E&D Manager	21 of 22

Environmental Aspect	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
<b>Water Quality and Use</b>												
- Sediment Dam Water Quality	■					■						
-Sediment Dam Water Use	■	■	■	■	■	■	■	■	■	■	■	■
- Sediment Dam Water Levels	■	■	■	■	■	■	■	■	■	■	■	■
<b>Flora &amp; Fauna Surveys</b>												
- Surveys	As per site Flora and Fauna Management Plan											
<b>Blast Monitoring</b>												
- Overpressure Monitoring	Every blast at nominated blast monitoring location											
- Vibration Monitoring												
<b>Air Quality Monitoring</b>												
- Depositional Dust Gauges (DG)	As required under Air Quality Monitoring Program											
- TSP and PM10												
<b>Climatic Monitoring</b>												
-- Onsite Weather Station	■	■	■	■	■	■	■	■	■	■	■	■
<b>Noise Monitoring</b>												
- Unattended (logger) & Attended Survey			■					■				
Complaint-based Surveys	As required.											
<b>Waste Monitoring</b>												
- Waste Removed (Volumes/Tonnages)	Every waste and/or recycling collection											
- Offsite Recycling/Reuse (volumes/tonnages)												
<b>Rehabilitation Works Monitoring</b>												
-revegetated and landscaped areas including the monitoring program parameters in Table 8 of this document.	Monitoring to be undertaken in accordance with the Rehabilitation and Closure Plan.											
- rehabilitation works (fencing, weed control, etc)												