Newman Quarrying Pty Ltd

Quarry Expansion at Lot 2 DP 1055044, Tullymorgan-Jackybulbin Road, Mororo

Air Quality Management Plan

May 2017

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1. Introduction

This Air Quality Management Plan (AQMP) forms part of the Environmental Management Strategy (EMS) for Sly's Quarry located at Lot 2 DP 1055044, Tullymorgan – Jackbulbin Road, Mororo. This AQMP has been prepared to meet the requirements of the Ministers Conditions of Approval (CoA) outlined in Development Consent SSD 6624. This AQMP addresses the CoA, the mitigation measures outlined in the Environmental Impact Statement (EIS) for Sly's Quarry and all relevant legislation.

Air quality may be affected by normal site operations, particularly through dust generation from excavation / blasting, the crushing and screening plant, and vehicle movements on unsealed surfaces. Potential impacts include the degradation of the local air quality and disturbance of soil.

1.1 Objectives

The key objective of the AQMP is to ensure appropriate controls and procedures are implemented in order to minimise the air quality impacts to the local community and the built environment.

To achieve this objective, Newman Quarrying will undertake the following:

- Ensure appropriate controls and procedures are implemented during the operation of the quarry to avoid or minimise dust generation, air quality impacts and potential adverse impacts to sensitive receivers.
- Ensure appropriate measures are implemented to address the relevant CoA outlined in Table 2-1.
- Ensure appropriate measures are implemented to comply with all relevant legislation and other requirements as described in Section 2.1.

1.2 Targets

The following targets have been established for the management of air quality during the operational lifetime of Sly's Quarry:

- Minimise and manage potential air quality/dust impacts from the development in accordance with relevant legislative requirements at CoA.
- Control dust and exhaust emissions of plant and equipment from quarrying activities.
- Achieve particulate matter and dust concentrations that meet the approved air quality criteria.
- No visible offsite dust emissions as a result of site operations.
- No justifiable complaints related to air quality attributable to site operation

2. Environmental requirements

2.1 Legislation

Legislation relevant to air quality management includes:

- Protection of the Environment Operations Act 1997
- Protection of the Environment Operations (Clean Air) Regulation 2000
- National Greenhouse and Energy Reporting Act 2007

Further discussion of the above legislation is covered in Section 2 of the EMS, as well as the EIS.

2.2 Guidelines

The following guidelines have been consulted during development of this AQMP:

- National Environment Protection Council (NEPC) – National Environment Protection Measure (NEPM) for Ambient Air Quality
- AS 3580.1.1:2007 Methods for sampling and analysis of ambient air: Part 1.1: Guide to siting air monitoring equipment
- Approved Methods for the Modelling and Assessment of Air Pollutants in NSW (Department of Environment and Conservation NSW (DEC), 2005)
- Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales (DEC, 2007).

2.3 Conditions of approval

The consent conditions relevant to this AQMP are listed in Table 2-1. A cross reference is also included to indicate where the condition is addressed in this AQMP or other environmental management documents.

Table 2-1 Consent conditions relevant to the AQMP

Condition No.	Requirement	Reference
Schedule 3, Condition 14	The Applicant must prepare an Air Quality Management Plan for the development to the satisfaction of the Secretary. This plan must:	Entire report
	a. Be submitted to the Secretary for approval within 6 months of the date of this consent, unless otherwise agree by the Secretary;	Section 1
	b. Describe the measures that would be implemented to ensure: • Compliance with the relevant 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;	Section 4
	c. Describe the proposed air quality management system;	Section 4
	d. Include an air quality monitoring program that:	Section 5

Condition No.	Requirement	Reference
	• 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.	
Schedule 3, Condition 15	The Applicant must implement the approved Air Quality Management Plan as approved from time to time by the Secretary.	Noted
Schedule 3, Condition 17	The Applicant must implement all reasonable and feasible measures to minimise the release of greenhouse gas emissions from the site.	Section 4
Schedule 5, Condition 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;	Section 3
	(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;	Section 2 Section 5 Section 5
	(c) A description of the measures that would be implemented to comply with the relevant statutory requirements, limits, or performance measures/criteria;	Section 4
	(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);	Section 5.1
	(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;	Section 5.2
	(f) A program to investigate and implement ways to improve the environmental performance of the development over time;	Section 6
	(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	Section 5.3
	(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.*	Section 6

3. Existing environment and impacts

3.1 Existing environment

There are few sensitive receivers in the vicinity of the quarry. The nearest residences are located approximately 1.5 km from the quarry boundary.

Sensitive receivers identified in the vicinity of the site are detailed in Table 3-1.

Figure 3-1 shows a site aerial image and the location of identified isolated rural residence sensitive receivers. These receivers have been identified to represent those with the greatest potential for adverse dust impact (viz. any receptors in the same general direction but further away have a lesser impact).

Table 3-1 Identified sensitive receivers

Receiver	Receiver type	Approximate distance to nearest activity (m)
R1	Residential	1600
R2	Residential	1700
R3	Residential	1500
R4	Residential	2600
R5	Residential	2700
R6	Residential	2800
R7	Residential	3200
R8	Residential	3600
R9	Residential	3300
R10	Residential	3500
R11	Residential	3000

An ambient level of PM_{10} of 15 $\mu g/m^3$ has been assumed for rural coastal NSW areas away from the drier inland, industrial sources and urbanised environments.

GHD are not aware of any complaints regarding dust emissions from current quarry operations.

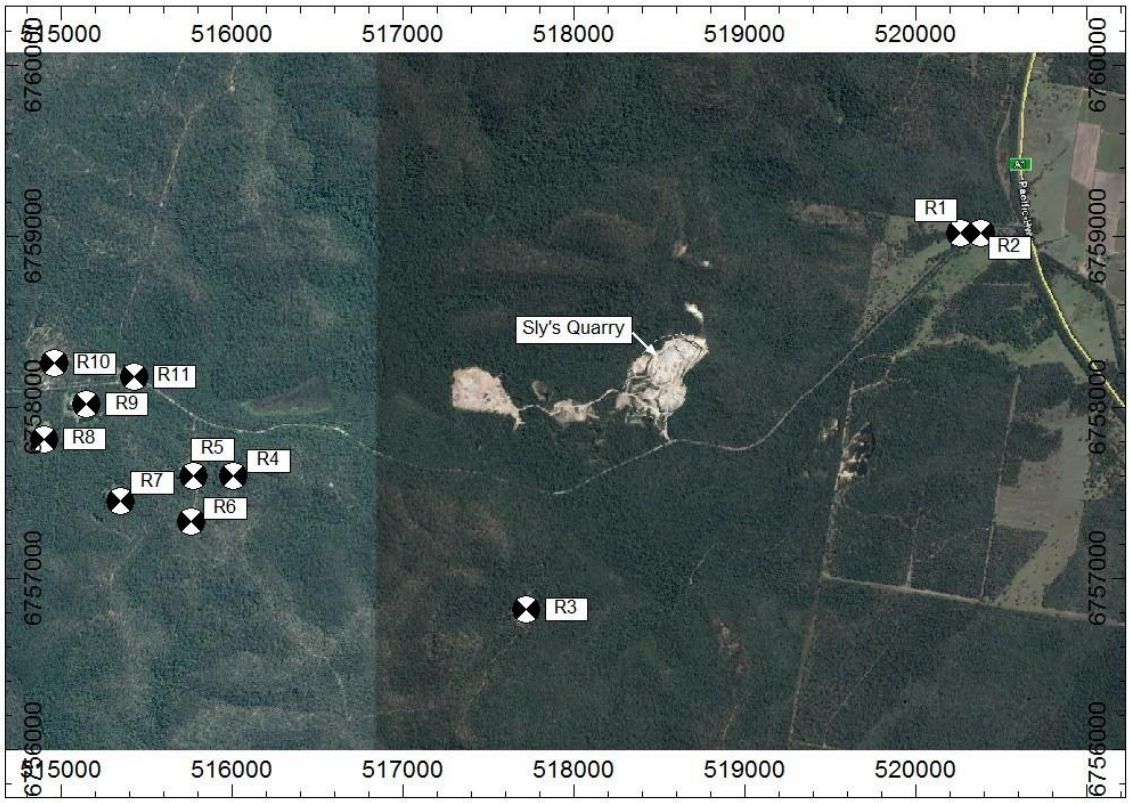

Figure 3-1 Site location and identified sensitive receptors

3.2 Impacts

3.2.1 Assessment criteria

Air quality impact assessment criteria are prescribed within the NSW OEH *Approved Methods*.

To ensure the environmental outcomes are achieved, dust emissions from a site must be assessed against the assessment criteria given in Table 3-2.

Table 3-2 Dust assessment criteria

Pollutant	Averaging period	Criterion
PM10	24 hours	50 µg/m3
	Annual	30 µg/m3
TSP	Annual	90 µg/m3
Dust deposition (insoluble fraction)	Annual	2 g/m2/month*

** Maximum Increment. Maximum allowable cumulative impact of 4 g/m^2/month.*

The above criteria are provided as cumulative (incremental plus background) concentration levels.

3.2.2 Impact assessment

An analysis of the predicted results from dispersion modelling is presented below.

Maximum predicted ground level concentrations and deposition rates at each of the identified receptors have been predicted and added to the adopted background levels to determine the cumulative impact, which can then be compared against the assessment criteria.

In addition to the conservative approach taken in the dispersion modelling, it is acknowledged that tall, thick vegetation surrounds the site in all directions. This would assist to dampen wind speeds (the meteorological models used do account substantially to this 'drag' on the wind speeds) and filter airborne dust as it travels from the site. These conditions cannot be fully represented in the dispersion model and therefore adds a level of conservatism to model predictions.

Table 3-3 displays the predicted 24-hour average PM_{10} concentrations at each receptor – highest one-day event in the year. Predicted results indicate compliance with the 24-hour average PM_{10} criterion at all receptors for both average and peak production rates.

Table 3-3 Predicted PM10 24-hour average ground level concentration (µg/m3)

Receiver	Cumulative criterion	Adopted background	Adopted incremental impact criterion	Peak production rate		Average production rate	
				No controls	With controls	No controls	With controls
R1	50	15	35	10	2	4	1
R2				10	3	4	1
R3				6	2	2	<1
R4				5	1	2	<1
R5				5	1	2	<1
R6				3	1	1	<1
R7				4	1	1	<1
R8				5	1	2	<1
R9				5	1	2	<1
R10				3	1	1	<1
R11				4	1	2	<1

PM_{10} concentration levels over an annual average are well below the adopted criterion.

Total suspended particles (TSP)

Predictions of maximum ground level TSP concentrations have been made based on peak production rates without dust control measures.

Table 3-4 shows the maximum predicted ground level TSP concentration levels, which indicate that even without dust control measures, the predicted incremental impact at the most exposed sensitive receptor is well below the TSP annual average criterion of 90 µg/m^3. It is also evident from the results that even with the addition of a typical TSP background concentration of 30 µg/m^3, the total (cumulative) impact would still be well below the assessment criterion.

Table 3-4 Predicted TSP annual average concentrations at peak production rate

Receptor	TSP concentration (µg/m3)
R1	3
R2	3
R3	2
R4	1
R5	<1
R6	<1
R7	<1
R8	<1

Receptor	TSP concentration (μg/m3)
R9	<1
R10	<1
R11	<1

Dust deposition

Predictions of dust deposition rates have been made based on the peak production rate.

In the absence of site-specific dust deposition data, a conservative background dust deposition level of 2 g/m^2/month was adopted. Table 3-5 shows the maximum predicted incremental dust deposition rates at sensitive receptors for emissions with no controls. The incremental dust deposition criterion of 2 g/m^2/month is expected to be comprehensively met at all identified receptors.

Table 3-5 Predicted dust deposition rates at peak production rate

Receptor	Dust deposition (g/m^2/month)
R1	0.02
R2	0.02
R3	0.02
R4	0.01
R5	0.01
R6	0.01
R7	0.01
R8	0.01
R9	0.01
R10	0.01
R11	0.01

Greenhouse gas

The greenhouse gas (GHG) assessment estimated the emissions associated with construction activities and quarry operation (including downstream emissions) based on previous similar projects.

The greenhouse gas estimate considered emissions from the major emission sources during construction and operation activities as follows:

- Construction emission sources:
  - Fuel consumption during construction activities
  - Vegetation removal
- Operation emission sources:
  - Fuel consumption during operation of the plant
  - Transport of product 50 km off site

The greenhouse gas emissions are estimated to be approximately 44,500 t CO_2-e over a 20 year life (approximately 2,225 t CO_2-e per annum on average). Emissions associated with the transportation of material from the facility were estimated to be about 66% of emission for the proposal. The next greatest source of emissions at 32% was fuel consumption during operations.

4. Environmental control measures

Environmental requirements and control measures are identified in the Conditions of Approval and the EIS. Specific measures and requirements to address air quality impacts are outlined in Table 4-1.

Table 4-1 Environmental controls and mitigation measures

EMS Ref.	Environmental Management Measure	Timing	Responsibility
AQ01	The air quality criteria specified in the consent conditions and outlined in Table 3-2 are not to be exceeded.	Operation	Quarry Manager
AQ02	During adverse meteorological conditions and extraordinary events (i.e., bushfires, prescribed burning, dust storms, sea fog, fire incidents) quarry operations will reduce and ultimately cease.	Operation	Quarry Manager
AQ03	Monitoring and reporting on compliance with the relevant air quality conditions is required, refer to Section 5.	Operation	Quarry Manager
AQ04	The area of surface disturbance is to be minimised and progressive rehabilitation must be undertaken at the site.	Operation	Quarry Manager
AQ05	Water sprays are required on crushing and screening plant, when dust is visible.	Operation	Quarry Manager
AQ06	Haul truck routes will be watered as required, particularly during peak periods of high frequency vehicle movements and extended dry spells.	Operation	Quarry Manager
AQ07	Loaded trucks leaving the construction site will be covered to minimise the transport of dust off site	Operation	Quarry Manager
AQ08	If off-site dust impacts are noted as being an issue (e.g. complaints from neighbours or visible and extensive dust plumes), dust monitoring (refer Section 5.1) should be undertaken.	Operation	Quarry Manager
AQ09	The following mitigation measures are to be implemented to assist in minimising the off-site dust impacts from blasting at the quarry. • Identified sensitive receptors should be notified when blasting is planned to occur. • Where possible, blasting should not occur during times when winds are in the direction of the nearest receptors, and should preferably occur during times when winds are calm or blowing away from the nearest receptors. • Water sprays should be used as dust suppression just before and during the blast. • Blast mats such as hessian or rubber matting may be used to suppress impacts from	Operation	Quarry Manager

EMS Ref.	Environmental Management Measure	Timing	Responsibility
	blasting, including fly rock and particulate emissions.		
AQ10	Mitigation measures to reduce greenhouse gas emissions are: • Opportunities for the use of biodiesel will be investigated and used where possible. • Efficient plant and vehicles will be used where reasonable and feasible to do so. • Turn off engines when not in use. All machinery and vehicles will be maintained in good working order and made to comply with relevant exhaust standards	Operation	Quarry Manager

5. Monitoring and reporting

5.1 Environmental inspections and monitoring

Routine weekly inspections by the Quarry Manager (or delegate) will occur throughout the operational lifetime of the quarry to identify any ad-hoc air quality issues such as dust emissions.

Deposited dust is an indicator of the effectiveness of site dust management practices and the potential for off-site dust nuisance. Deposited dust is typically monitored in a number of locations around the site boundary. Monitoring is conducted with dust deposition gauges that should be located both upwind and downwind of the activity area to reflect the impact of the quarry operations during the most predominant wind directions.

Based on the separation distance between the nearest sensitive receptors and the site operations, it is considered that monitoring of deposited dust will provide the best indicator for site impacts on local amenity. Adverse health impacts due to fine particulate matter from an operation of this size usually have an impact zone measured in tens of metres rather than hundreds of metres. However, the Consent Conditions require PM_{10} and TSP be monitored.

The process detailed below will be followed to enable assessment of compliance with the dust criteria:

- Install dust monitoring devices around the quarry site, as shown on Figure 5-1, as follows:
  - DML1 - one each for PM_{10}, TSP and dust deposition
  - DML2 - dust deposition
- Collect dust samples, as required for PM_{10}, TSP and dust deposition
- Review results for preliminary comparison against the criteria in Table 3-2
- If results indicate an exceedance of the dust criteria, identify and implement additional dust mitigation measures on site
- Continue dust monitoring, as required.

A review of the monitoring results will be undertaken following completion of the three-month monitoring report. The requirement for further dust monitoring will be determined based on findings of the first three months (PM_{10} and TSP) or 12 months (dust deposition) of monitoring. If monitoring results clearly indicate that no dust impacts have been recorded, annual dust monitoring will cease. Dust monitoring will then only occur following:

- A justifiable dust complaint
- A change in operating conditions that are likely to increase dust emissions from the site

LEGEND

DML# DUST MONITORING LOCATION

N

NEWMAN QUARRYING
SLYS QUARRY

DUST MONITORING LOCATIONS

Job Number 22-17528
Revision A
Date OCT 2016

Figure 5-2

Plot Date: 17 October 2016 - 4:50 PM Plotted by: Steve Young Cad File No: N:\AU\Coffs Harbour\Projects\22\17528\CADD\Drawings\22-17528-FIG5-2.dwg

5.2 Contingency plan

If the above monitoring detects an impact or there is a justified community, dust related, complaint, a contingency plan or trigger and response plan is to be implemented, as shown below.

Aspect	Trigger	Response
Routine dust monitoring	Excessively dusty conditions or dust blown offsite	Quarry Manager to stop work and implement additional controls e.g. watering, cover stockpiles, revegetate unused areas.
Compliance monitoring/Community complaint	Non-compliance with dust criteria	Identifying the dust source that has caused the exceedance. Reassess the mitigation measures employed at the site to reduce the impact of the dust source Following the adoption of additional dust mitigation, conduct further dust monitoring to ensure the success of the mitigation measure

5.3 Reporting

The general reporting requirements are described in Section 8.5 of the EMS. In relation to the dust monitoring, the routine dust monitoring will be recorded on the *Environmental Inspection Checklist*.

A report will be prepared by the Quarry Manager following the 12 months of compliance monitoring. This is to include, as a minimum:

- The date(s) of the monitoring
- The time(s) of the monitoring
- The location of the monitoring
- The activities occurring during the monitoring
- A comparison of the results with the adopted dust criteria

If an exceedance of the criteria is recorded, the affected resident is to be notified in writing and provided with regular monitoring results until the quarry is again complying with the relevant criteria. A copy of the NSW Health fact sheet entitled “Mine Dust and You” (as may be updated from time to time) is also to be sent to the affected landowners and current tenants of the land (including the tenants of land which is not privately-owned).

A summary of these results will be presented in the Annual Report (refer to Section 8.5 of the EMS). All records will be:

- Maintained in a legible form
- Kept for at least 4 years
- Produced to any authorised officer of the EPA and/or DPE upon request

6. Review and improvement

Continuous improvement of this AQMP will be achieved in accordance with Section 9 of the EMS, through the ongoing evaluation of environmental management performance against environmental policies, objectives and targets.

The continuous improvement process is designed to:

- Identify areas of opportunity for improvement of environmental management and performance
- Determine the cause or causes of non-conformances and deficiencies
- Develop and implement a plan of corrective and preventative action to address any non-conformances and deficiencies
- Verify the effectiveness of the corrective and preventative actions
- Document any changes in procedures resulting from process improvement; and make comparisons with objectives and targets

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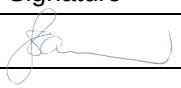
0	S Martin	E Smith		S Lawer		03/05/2017

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