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MOUNT PLEASANT OPERATION

2016 ANNUAL REVIEW

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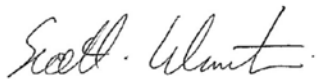
Approved By:	Klay Marchant	**Revision Number:**	V1

MOUNT PLEASANT OPERATION 2016 ANNUAL REVIEW	
Name of Operation	Mount Pleasant Operation
Name of Operator	MACH Energy Australia Pty Ltd
Development Consent	Development Consent DA 92/97
Name of Holder of Development Consent	MACH Energy Australia Pty Ltd
Mining Leases	Mining Lease 1645, Mining Lease 1708, Mining Lease 1709 and Mining Lease 1713
Name of Holder of Mining Leases	MACH Energy Australia Pty Ltd
Water Licences	Water Access Licences – see Table 3 Bore Licence Certificate 20BL168734
Name of Holder of Water Licences	MACH Energy Australia Pty Ltd
MOP Start Date	15 September 2016
MOP End Date	31 December 2017
Annual Review Start Date	1 January 2016
Annual Review End Date	31 December 2016
I, Scott Winter, certify that this audit report is a true and accurate record of the compliance status of the Mount Pleasant Operation for the period 1 January to 31 December 2016 and that I am authorised to make this statement on behalf of MACH Energy Australia Pty Ltd. Note. a) *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.* b) *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); sections 307A, 307B and 307C (False or misleading applications/information/documents—maximum penalty 2 years imprisonment or $22,000, or both).*	
Name of Authorised Reporting Officer	Scott Winter
Title of Authorised Reporting Officer	Managing Director
Signature of Authorised Reporting Officer	
Date	28 February 2017

STATEMENT OF COMPLIANCE

The compliance status of the Mount Pleasant Operation with its relevant approval conditions at the end of the reporting period (31 December 2016) is provided in Table 1.

Table 1
Statement of Compliance

Were all conditions of the relevant approval(s) complied with?	
Development Consent DA 92/97	Yes
EPBC 2011/5795	Yes
Environment Protection Licence 20850	Yes
Authorisation 459	Yes
Mining Lease 1645	Yes
Mining Lease 1708	Yes
Mining Lease 1709	Yes
Mining Lease 1713	Yes
Water licences (as per Table 3)	Yes
Bore Licence Certificate 20BL168734	Yes

Table 2 summarises the non-compliances with the approval conditions.

Table 2
Summary of Non-Compliances

Relevant Approval	Condition Number	Condition Description	Compliance Status	Comment	Report Section
-	-	-	-	-	-

Compliance Status Key for Table 2 – Non Compliances

Risk Level	Colour Code	Comment
High	Non-compliant	Non-compliance with potential for significant environmental consequences, regardless of the likelihood of occurrence.
Medium	Non-compliant	Non-compliance with: • potential for serious environmental consequences, but is unlikely to occur; or • potential for moderate environmental consequences, but is likely to occur.
Low	Non-compliant	Non-compliance with: • 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).

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1 INTRODUCTION

The Mount Pleasant Operation (MPO) area is located in the Upper Hunter Valley of New South Wales (NSW), 3 kilometres (km) north-west of Muswellbrook and approximately 50 km north-west of Singleton (Figure 1). The villages of Aberdeen and Kayuga are located approximately 5 km north-northeast and 1 km north of the MPO boundary, respectively.

The development application for the MPO was made in 1997, supported by an Environmental Impact Statement (EIS). On 22 December 1999, the then Minister for Urban Affairs and Planning granted Development Consent DA 92/97 to Coal and Allied Operations Pty Ltd (Coal & Allied). This allowed for the "Construction and operation of an open cut coal mine, coal preparation plant, transport and rail loading facilities and associated facilities" at Mount Pleasant. The consent allowed for the extraction of 197 million tonnes of run-of-mine (ROM) coal over a 21-year period, at a rate of up to 10.5 million tonnes of ROM coal per year.

An application to modify Development Consent DA 92/97 was submitted on 19 May 2010, with a supporting Environmental Assessment (EA), with the following changes proposed:

- The provision of an infrastructure envelope for siting certain aspects of the mine infrastructure.
- The provision of an optional conveyor/service corridor linking the MPO facilities with the Muswellbrook-Ulan Rail Line.
- Modification of the existing development consent boundaries to accommodate the optional conveyor/service corridor and minor administrative boundary changes.

MOD 1 was approved on 19 September 2011.

The proponent of the MPO is MACH Energy Australia Pty Ltd (MACH Energy). MACH Energy purchased the MPO from Coal & Allied on 26 January 2016 and the acquisition was completed in August 2016.

The general arrangement of the MPO is shown in Figure 2.

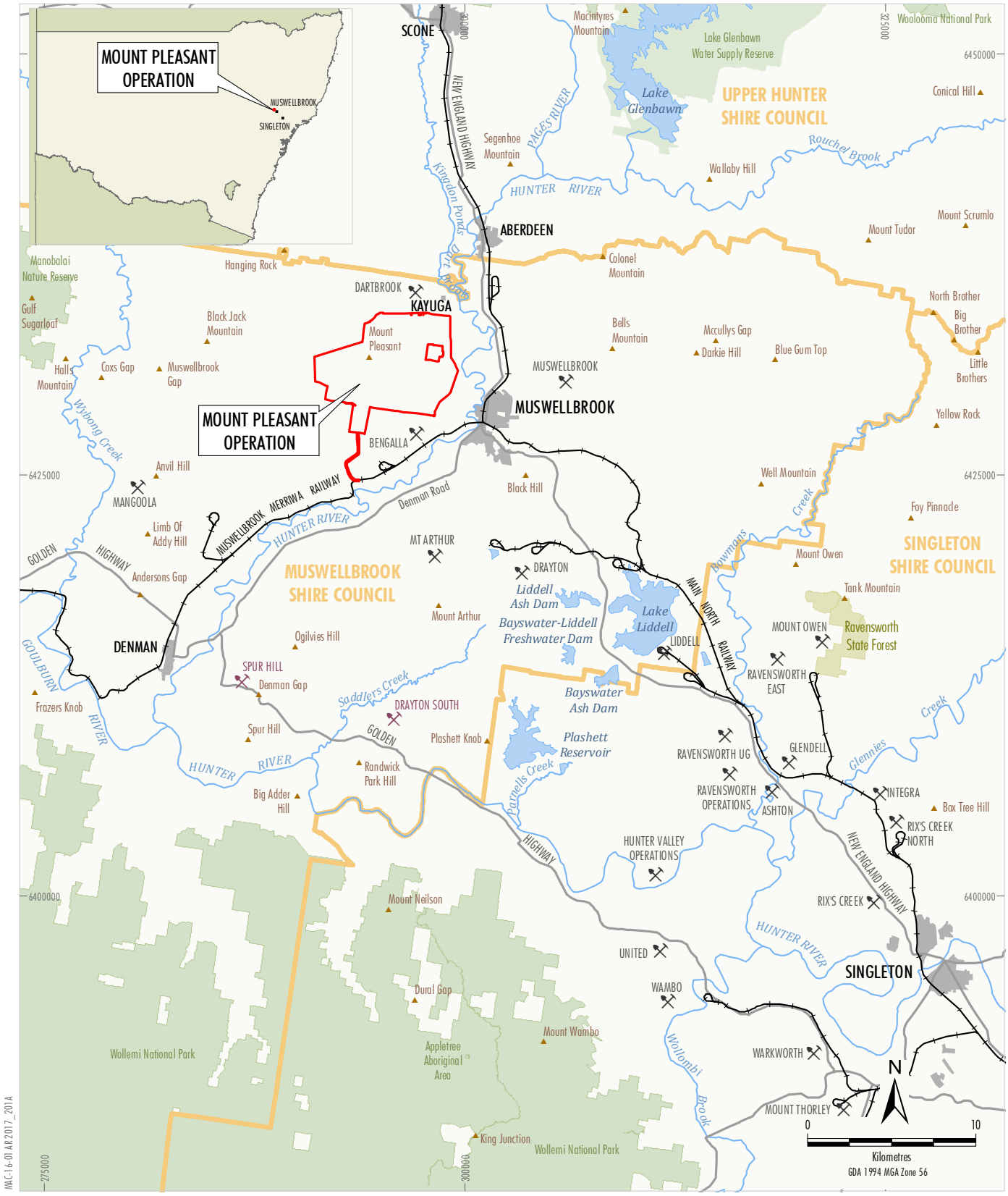
1.1 PURPOSE AND SCOPE

This Annual Review details MACH Energy's environmental and community performance for the reporting period 1 January 2016 – 31 December 2016. This Annual Review has been prepared in accordance with the NSW Department of Planning and Environment (DP&E) *Post-approval requirements for State significant mining developments - Annual Review Guideline – October 2015* (DP&E, 2015) and MACH Energy's statutory approvals (Section 2), specifically Condition 3, Schedule 5 of Development Consent DA 92/97.

In November 2013, the Secretary (then Director-General) of the Department of Planning and Infrastructure (now DP&E) revised the submission timing of the MPO Annual Review from the end of December to 1 March each year.

The Annual Review is not intended to be an exhaustive description of MACH Energy's operations, approvals and activities rather it is a summary of MACH Energy's compliance status with respect to MACH Energy's statutory approvals.

This Annual Review is distributed to a range of stakeholders including government authorities, Muswellbrook Shire Council and members of the Community Consultative Committee (CCC). A copy of the Annual Review will be made publicly available on the MACH Energy website (http://machenergyaustralia.com.au/).



MAC16-01 AR2017_201A

LEGEND

- Mining Operation
- Proposed Mining Operations (Application Lodged)
- Mining Lease Boundary (Mount Pleasant)
- Railway
- Local Government Boundary
- State Forest
- National Parks and Wildlife Estate

Source: Geoscience Australia (2006); NSW Division of Resources & Energy (2016); NSW Land and Property Information (2016)

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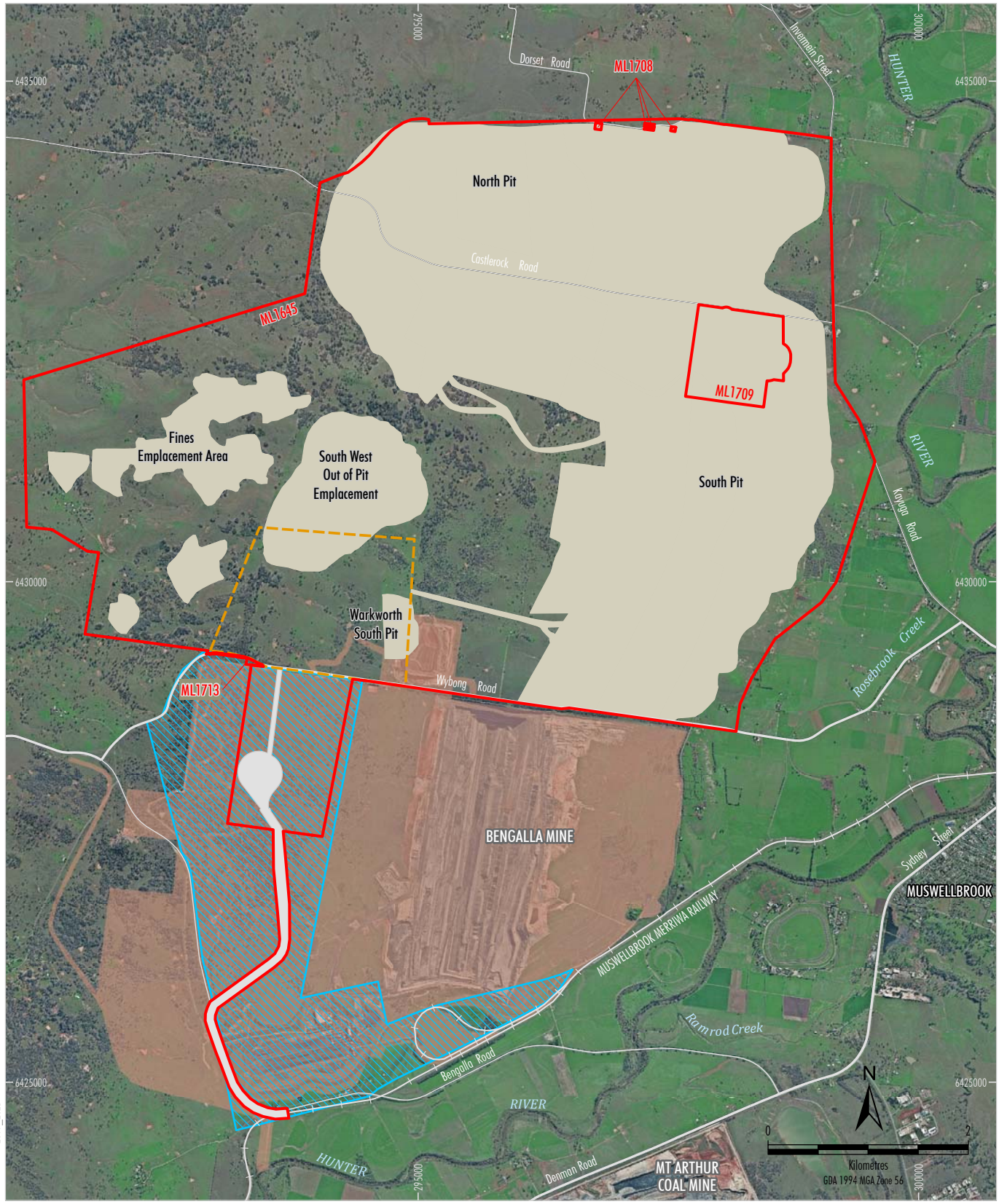
MOUNT PLEASANT OPERATION

Project Location

Figure 1



MAC-16-01 AR 2017_202B

LEGEND

- Mining Lease Boundary
- Infrastructure Area Envelope
- Approximate Extent of Approved Surface Development (1997 EIS Year 20)*
- Indicative Off-site Coal Transport Infrastructure
- Conveyor/Services Corridor Envelope
- Bengalla Mine Approved Disturbance Boundary (SSD-5170)

Note: * Excludes some project components such as water management infrastructure, infrastructure within the Infrastructure Area Envelope, off-site coal transport infrastructure, road diversions, access tracks, topsoil stockpiles, power supply, temporary offices, other ancillary works and construction disturbance.

Source: NSW Division of Resources & Energy (2016); NSW Land & Property Information (2016); Department of Planning & Environment (2016); MACH Energy (2016)
Orthophoto: MACH Energy (Aug 2016)

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MOUNT PLEASANT OPERATION

General Arrangement

Figure 2

1.2 KEY PERSONNEL

Contact details for key MACH Energy personnel responsible for the environmental and community management of the MPO are provided in Table 1.

Table 1
Key Personnel

Position	Contact	Phone Number
Managing Director	Scott Winter	0419 652 179
Project Director	Heather Parry	0488 759 242
Construction Manager	Bruce Birchall	0409 631 921
Health and Safety Superintendent	Beth Viertel	0429 191 652
Environmental Superintendent	Klay Marchant	0400 239 291
External Relations Manager	Julie Fletcher	0412 007 400

2 APPROVALS

The MPO operates under a number of statutory approvals, leases and licences that regulate activities at the MPO (Tables 2 and 3).

Table 2
Consent, Lease and Licence Details

Consent/Lease/Licence	Authority	Grant/Renewal	Expiry Date
Development Consent DA 92/97[1]	DP&E	22/12/1999	-
EPBC Approval 2011/5795	DoE	29/02/2012	28/10/2035
Environment Protection Licence (EPL) 20850	EPA	24/11/2016	-
Authorisation 459	DRE	07/04/1992	08/04/2015 (Renewal pending)
Mining Lease (ML) 1645	DRE	17/12/2010	17/12/2031
ML 1708	DRE	02/02/2015	02/02/2036
ML 1709	DRE	02/02/2015	02/02/2036
ML 1713	DRE	02/02/2015	02/02/2036
Bore Licence Certificate 20BL168734	DPI - Water	13/03/2003	Perpetuity

Note: EPBC = Environment Protection and Biodiversity Conservation, DoE = Department of the Environment, EPL = Environment Protection Licence, ML = Mining Lease, EPA = NSW Environment Protection Authority, DRE = NSW Department of Industry – Division of Resources and Energy, and DPI - Water = NSW Department of Primary Industries – Water.

[1] Development Consent DA 92/97 has been modified once since the original approval was granted in 1999. Approval for the modification was granted in 2010.

Table 3
MACH Energy Water Access Licences (Water Management Act 2000)

Water Sharing Plan	Water Source	Licence Number	Entitlement (ML)
Water Sharing Plan for the Hunter Unregulated and Alluvial Water Sources, 2009	Hunter Regulated River Alluvial Water Source	18253	74
		18266	68
		18206	24
		18199	5
		18122	33
		18131	60
		21503	21
	Muswellbrook Water Source	23935	41
	Hunter Regulated River Water Source	879	224
		880	124
		1113	366
		973	3
		974	210
		975	8
		988	156
		989	8
		1307	37.5
		1229	480
		1230	8

Table 3 (Continued)
MACH Energy Water Access Licences (Water Management Act 2000)

Water Sharing Plan	Water Source	Licence Number	Entitlement (ML)
Water Sharing Plan for the Hunter Unregulated and Alluvial Water Sources, 2009	Hunter Regulated River Water Source (continued)	1259	33.2
		1227	99
		1258	5
		992	75
		7808	36
		702	267
		1260	4.8
		993	265
		1308	15.1
		604	183
		605	8
		677	24
		1338	17.5
		662	275
		663	16
		10775	243

2.1 MANAGEMENT PLANS

The Development Consent DA 92/97 requires the proponent to submit management plans and strategies prior to carrying out any development on-site. The currently approved MPO management plans are summarised in Table 4. MACH Energy is currently reviewing these plans (and revising them where necessary) to develop a contemporary suite of management plans.

Table 4
Approved Management Plans

Plan	Relevant Development Consent DA 92/97 Condition	Approval Date
Mining Operations Plan/ Rehabilitation Management Plan (MOP)[#]	Schedule 3, Condition 56	21 October 2016
Construction Noise Management Plan (CNMP)	Schedule 3, Condition 9	2 December 2015
Construction Air Quality Management Plan (CAQMP)	Schedule 3, Condition 23	2 October 2015
Aboriginal Cultural Heritage Management Plan (ACHMP)	Schedule 3, Condition 36	14 August 2015
Construction Water Management Plan (CWMP)	Schedule 3, Condition 28	23 July 2012
Landscape Management Plan	Schedule 3, Condition 47	23 July 2012
Construction Waste Management Plan	Schedule 3, Condition 52	23 July 2012
Rehabilitation Strategy	Schedule 3, Condition 54	23 July 2012
Biodiversity and Rehabilitation Management Plan (Biodiversity portion only)	Schedule 3, Condition 32	23 July 2012
Environmental Management Strategy	Schedule 5, Condition 1	23 July 2012

[#] The approved MOP meets the requirements for a Rehabilitation Management Plan (RMP) (Condition 56, Schedule 3 of Development Consent [DA 92/97]).

In accordance with Condition 4, Schedule 5 of Development Consent DA 92/97, MACH Energy will review, and if necessary revise, the strategies, plans and programs required under the consent within three months of the submission of this Annual Review, to the satisfaction of the Secretary of the DP&E.

3 OPERATIONS SUMMARY

3.1 MINING OPERATIONS

MACH Energy completed the acquisition of the MPO in August 2016. Prior to MACH Energy acquiring the MPO, Coal & Allied were performing basic ongoing monitoring works. Following acquisition of the MPO, MACH Energy sought and obtained approval for the MOP and was issued EPL 20850. Following receipt of these two secondary approvals, MACH Energy commenced more substantial works at the MPO on 25 November 2016.

These works consisted of clearing and ground preparation within the Mine Infrastructure Area (MIA) envelope to prepare for the construction of various infrastructure elements scheduled for 2017, including the Coal Handling and Preparation Plant (CHPP) and ROM coal pads. Additionally, construction of erosion and sediment control infrastructure (e.g. sediment fences, diversions and contour banks) was commenced. In addition, a number of fences within the MIA were removed and various fence lines were constructed in the ML area.

All works have been conducted within standard hours as defined by the EPA's Interim Construction Noise Guideline (ICNG) (i.e. 7.00 am to 6.00 pm, Monday to Friday, 8.00 am to 1.00 pm, Saturday and no work on Sunday or public holidays). No mining or rehabilitation was undertaken during the reporting period.

The amounts of waste rock, overburden, ROM coal, coarse reject, fine reject and product coal produced during the previous reporting period, current reporting period and forecast for the next reporting period are outlined in Table 5.

Table 5
Production Summary

Material	Approved Limit	2015 Reporting Period (Actual)	2016 Reporting Period (Actual)	2017 Reporting Period (Forecast)
Waste Rock/Overburden (Mbcm)	N/A	0	0	1.31
ROM Coal (Mt)	10.5 Mt per calendar year[1]	0	0	0.02
Coarse Reject	N/A	0	0	0
Fine Reject (Tailings)	N/A	0	0	0
Saleable Product	N/A	0	0	0

Note: Mbcm = million bank cubic metres, N/A = not applicable; and Mt = million tonnes.

[1] Condition 6, Schedule 2 of Development Consent DA 92/97 relevantly states:
The Applicant shall not extract more than 10.5 million tonnes of ROM coal from the site in a calendar year.

3.2 OTHER OPERATIONS

Relevant operational conditions outlined in Development Consent DA 92/97 and their corresponding compliance status during the reporting period are outlined in Table 6.

Table 6
Other Operational Conditions Met

Operational Condition from Development Consent DA 92/97		Condition Met?	Comment
Limits on Consent (Condition 5, Schedule 2).	*5. The Applicant may carry out mining operations on the site until 22 December 2020.* *Note: Under this consent, the Applicant is required to rehabilitate the site and carry out additional undertakings to the satisfaction of both the Director-General and the Executive Director, Mineral Resources in DRE. Consequently this consent will continue to apply in all other respects - other than the right to conduct mining operations - until the rehabilitation of the site and these additional undertakings have been carried out satisfactorily.*	Yes	-
Coal Extraction (Condition 6, Schedule 2)	*6. The Applicant shall not extract more than 10.5 million tonnes of ROM coal from the site in a calendar year.*	Yes	No mining was undertaken during the reporting period.
Coal Transport (Condition 7, Schedule 2).	*7. The Applicant shall transport all coal from the site by either (but not both):* *(a) conveyor to the Bengalla mine; or* *(b) rail via an on-site rail loop.* *Prior to the construction of the coal transport infrastructure on site, the Applicant shall notify the Director-General of the coal transport option chosen.*	Yes	Construction of coal transport infrastructure on-site has not yet commenced.
Structural Adequacy (Condition 9, Schedule 2)	*9. The Applicant shall 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 and MSB.* *Notes:* • *Under Part 4A of the EP&A Act, the Applicant is required to obtain construction and occupation certificates for the proposed building works;* • *Part 8 of the EP&A Regulation sets out the requirements for the certification of the development;* • *The development is located in the Muswellbrook Mine Subsidence District. Under Section 15 of the Mine Subsidence Compensation Act 1961, the Applicant is required to obtain the MSB's approval before constructing any improvements on the site.*	Yes	No buildings or structures were constructed and no alterations or improvements were undertaken on-site during the reporting period.
Demolition (Condition 10, Schedule 2)	*10. The Applicant shall ensure that all demolition work on site is carried out in accordance with AS 2601-2001: The Demolition of Structures, or its latest version.*	Yes	No demolition was undertaken on-site during the reporting period.
Protection of Public Infrastructure (Condition 11, Schedule 2)	*11. Unless the Applicant and the applicable authority agree otherwise, the Applicant shall:* *(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,* *Note: This condition does not include matters that are expressly provided for in the conditions of this consent, such as the maintenance of public roads.*	Yes	No repair or relocation of public infrastructure was undertaken during the reporting period.

Table 6 (Continued)
Other Operational Conditions Met

Operational Condition from Development Consent DA 92/97		Condition Met?	Comment
Operation of Plant and Equipment (Condition 12, Schedule 2)	*12. The Applicant shall ensure that all plant and equipment used on site, or to transport coal from the site, is:* *(a) maintained in a proper and efficient condition; and* *(b) operated in a proper and efficient manner.*	Yes	All plant and equipment in use at the MPO is regularly serviced in accordance with the relevant Industry & Investment NSW Mining Design Guidelines to ensure plant and equipment is maintained in suitable condition. All plant and equipment are operated in a proper and efficient manner.

3.3 ACTIVITIES FORECAST FOR THE NEXT REPORTING PERIOD

The following activities are forecast to be undertaken during the 2017 reporting period:

- construction of the Wybong Road Conveyor Crossing;
- construction of the Mine Access Road to be linked to Wybong Road;
- construction of required mine service and construction roads;
- construction of the Haul Road between the active mining area and the MIA;
- implementation of various water management infrastructure, including mine water storage dams as well as the Hunter River water supply pipeline;
- construction of key infrastructure items within the MIA, including explosive storage facilities;
- construction of the CHPP;
- implementation of copper and fibre cable works, as well as the removal of various 66 kilovolt (kV) and 11 kV overhead powerlines;
- construction of the Stage 1 rail line (comprising a spur and balloon loop);
- commencement of off-site coal transport using the conveyor/rail infrastructure;
- use of borrow pits to assist in construction activities;
- topsoil stripping of disturbed areas; and
- overburden removal and commencement of the extraction of coal in the South Pit.

Further information regarding proposed construction and mining activities in 2017 is provided in the approved MOP.

4 ACTIONS REQUIRED FROM PREVIOUS ANNUAL REVIEW

Following submission of the 2015 Annual Review, there were no actions required to be undertaken from any NSW Government agencies for the 2016 Annual Review.

Specific management measures proposed in the 2015 Annual Review to be undertaken in the reporting period, as well as how they have been implemented, are outlined in Table 7.

Table 7
Actions Required by the 2015 Annual Review

Action	Requested By	Action Taken	Section Reference
Continuation of weed control measures in 2016.	Coal & Allied	Weed control measures were undertaken as part of land management.	Section 5.5.2
Continuation of the environmental monitoring programme developed by Coal & Allied.	Coal & Allied	Environmental monitoring undertaken in 2015 by Coal & Allied was continued during the reporting period.	Sections 5 and 6
Regular newsletters, sustainable development reporting, stakeholder briefing sessions, CCC meetings and other community based activities will continue.	Coal & Allied	MACH Energy continued communication with the local community using a number of methods previously used by Coal & Allied.	Section 8

5 ENVIRONMENTAL PERFORMANCE

5.1 METEOROLOGY

Meteorological monitoring was undertaken during the reporting period at the mine meteorological station (M-WS4) (Figure 3). Data collected included total monthly and cumulative rainfall, monthly maximum and minimum temperatures, maximum wind speed and wind direction.

5.1.1 Rainfall

During the reporting period, approximately 636.4 millimetres (mm) of rain was recorded at the MPO weather station over a period of 93 days. The highest daily rainfall was 45.8 mm on 20 July 2016. Monthly rainfall distribution, number of wet days and cumulative rainfall is summarised in Table 8. Monthly rainfall records and cumulative rainfall over the reporting period are shown in Chart 1.

Table 8
Rainfall Summary 2016

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Monthly Rainfall (mm)	129.8	2.8	40.2	10.2	24.0	94.4	63.6	46.0	81.4	45.4	47.0	51.6
Cumulative Rainfall (mm)	129.8	132.6	172.8	183.0	207.0	301.4	365.0	411.0	492.4	537.8	584.8	636.4
Wet Days*	13	3	5	5	5	11	8	11	14	7	3	8

* Note: Wet days are classified as days receiving rainfall greater than 2 mm.

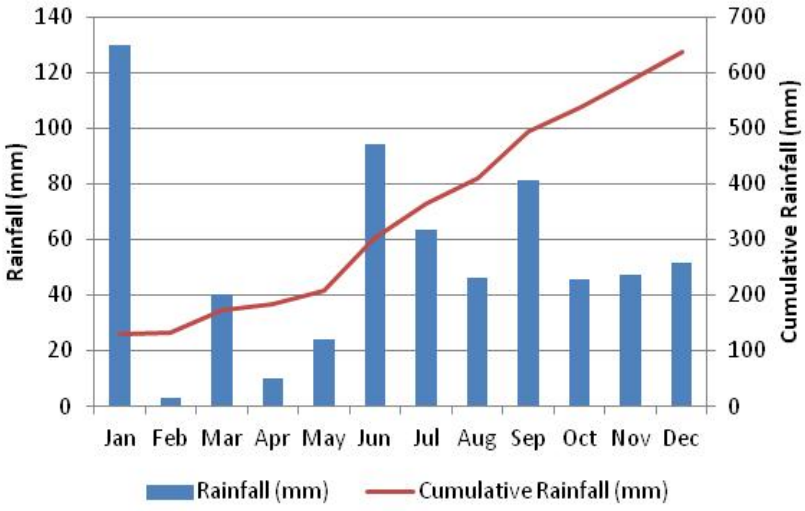
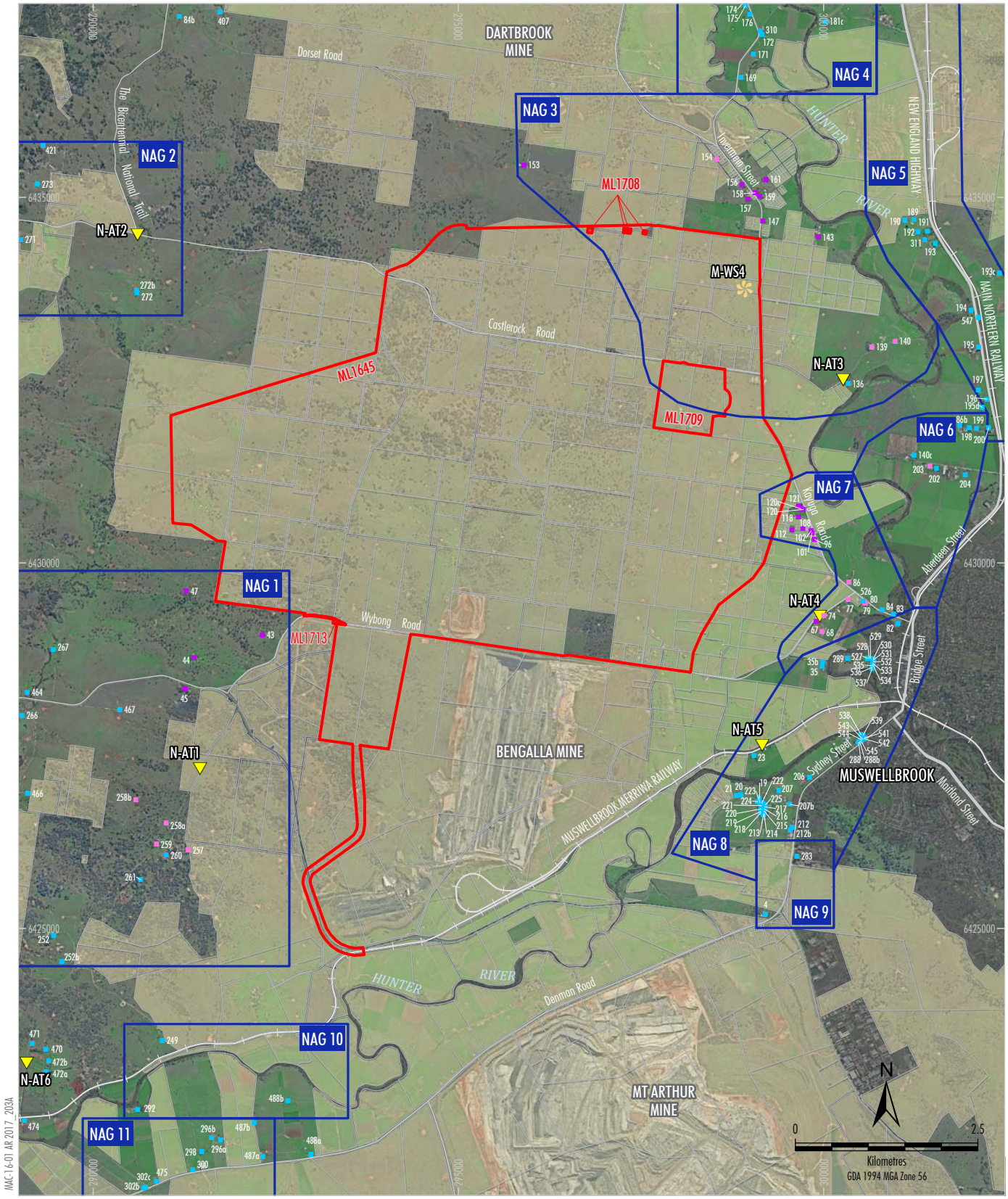


Chart 1: MPO Monthly and Cumulative Rainfall 2016



LEGEND

- Mining Lease Boundary
- Mine Owned
- Privately-owned Residence - MPO Acquisition on Request
- Privately-owned Residence - MPO Mitigation on Request
- Other Privately-owned Residence
- Noise Assessment Group (DA 92/97)

Monitoring Sites

- Attended Noise
- Weather Station

Source: NSW Division of Resources & Energy (2016); NSW Land & Property Information (2016); MACH Energy (2016)
Orthophoto: MACH Energy (Aug 2016)

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Noise and Meteorological Monitoring Sites

Figure 3

5.1.2 Temperature

During the reporting period, the maximum temperature recorded at M-WS4 was 39.7 degrees Celsius (ºC) (25 February) and the minimum temperature recorded was -2.6ºC (30 June). Monthly minimum and maximum temperatures are presented in Table 9. Daily maximum and minimum temperatures are shown in Chart 2.

Table 9
Temperature Summary 2016

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct
Minimum Temperature (ºC)	10.3	10.3	8.4	6.1	-1.1	-2.6	-2.3	-1.0	2.4	3.3
Maximum Temperature (ºC)	38.4	39.7	35.4	33.7	27.1	20.2	23.3	22.4	23.3	31.3

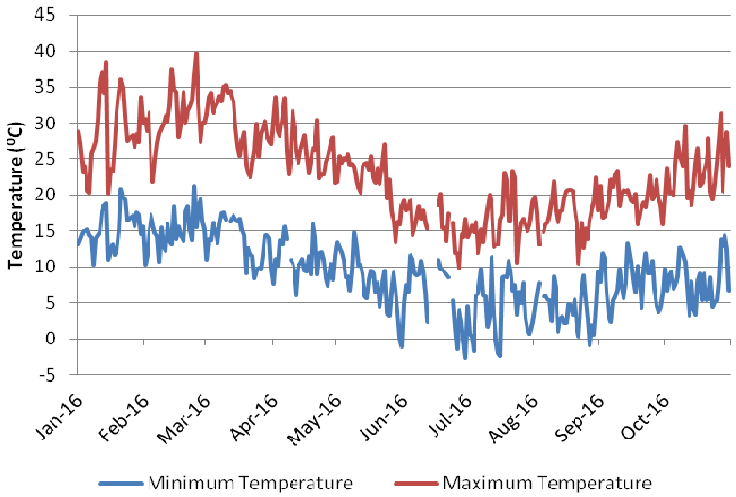


Chart 2: MPO Daily Minimum and Maximum Temperature 2016

Temperature data is not available during November and December 2016, as the station was being calibrated. Additionally, meteorological data was not available for five days in June (13/06 – 17/06) due to a power outage.

5.1.3 Wind Speed and Direction

During the reporting period, the majority of prevailing winds were from the south-southeast and north-west. Only a very minor percentage of winds were generated from the north-east or south-west. This is consistent with trends observed in previous Annual Reviews (Coal & Allied, 2014, 2015 and 2016). Monthly wind speeds averaged from approximately 3.0 to 4.0 metres per second (m/s) (Table 10). Monthly average wind speeds and directions are summarised in Table 10 and an annual wind rose is presented in Chart 3.

Table 10
Wind Speed and Direction Summary 2016

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Average Wind Speed (m/s)	3.7	3.9	3.2	3.1	3.5	4.0	3.6	2.9	3.4	4	3.5	4
Average Wind Direction (degrees)*	191.7	179.7	177.9	196.8	267.5	251.5	263.1	238.5	244.9	252.4	217.2	211.5

* Wind directions are measured in degrees, clockwise from direct North.

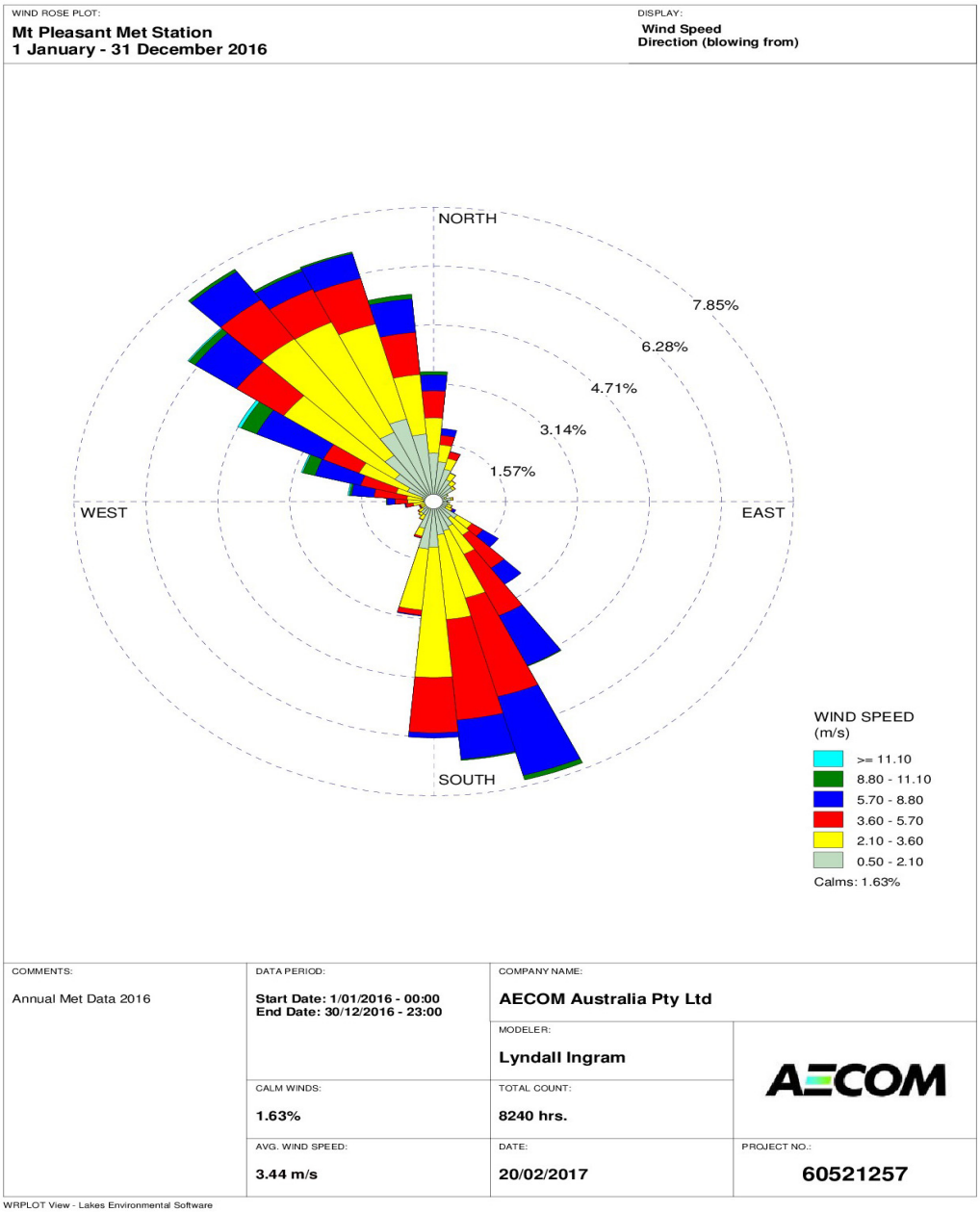


Chart 3: MPO Annual Wind Rose 2016

5.2 NOISE

Key noise criteria for the MPO are defined in Tables 3 and 5 of Development Consent DA 92/97 (Conditions 3 and 5, Schedule 3) and EPL 20850 (Condition L2). Additional noise conditions relating to land acquisition, noise mitigation upon request, rail noise, noise monitoring and preparation of the noise management plan are also detailed in these approval documents.

5.2.1 Approval Criteria and Management Plan Requirements

Development Consent DA 92/97 and Environment Protection Licence 20850

The Noise Impact Assessment Criteria defined in Table 3 of Development Consent DA 92/97 (Condition 3, Schedule 3) and EPL 20850 (Condition L2) are provided in Table 11.

Table 11
Noise Impact Assessment Criteria (dBA)

Location		Day	Evening	Night	
		$L_{Aeq(15min)}$	$L_{Aeq(15min)}$	$L_{Aeq(15min)}$	$L_{A1(1min)}$
NAG 1[1]	260, 261	37	37	37	45
	258[2]	40	40	40	45
	259	39	39	39	45
	All other privately-owned land	35	35	35	45
NAG 2	272	36	36	36	45
	All other privately-owned land	35	35	35	45
NAG 3	139, 154, 240[2]	40	40	40	45
	241[2]	39	39	39	45
	All other privately-owned land	35	35	35	45
NAG 4	169	36	36	36	45
	All other privately-owned land	35	35	35	45
NAG 5	All privately-owned land	41	40	39	45
NAG 6	205[2]	41	41	41	45
	203, 242[2]	40	40	40	45
	202	39	39	39	45
	204	38	38	38	45
	All other privately-owned land	37	37	37	45
NAG 7	68, 74, 279[2]	43	42	42	45
	86, 290[2]	42	42	42	45
	77	42	41	41	45
	79, 80, 231[3]	41	41	41	45
	78[2]	41	40	40	45
	All other privately-owned land	40	37	37	45
NAG 8	35	42	41	41	45
	289	41	40	40	45
	23, 84	40	40	40	45
	All other privately-owned land	41	39	39	45
NAG 9	All privately-owned land	39	38	37	45

Table 11 (Continued)
Noise Impact Assessment Criteria (dBA)

Location		Day	Evening	Night	
		$L_{Aeq(15min)}$	$L_{Aeq(15min)}$	$L_{Aeq(15min)}$	$L_{A1(1min)}$
NAG 10	All privately-owned land	35	35	35	45
NAG 11	All privately-owned land	37	36	35	45
All other privately-owned land		35	35	35	45

Source: Table 3 of Development Consent DA 92/97 (Condition 3, Schedule 3) and Condition L2.1 of EPL 20850.

Note: NAG = Noise Assessment Group, which are defined in Appendix 6 of Development Consent DA 92/97; dBA = A-weighted decibels, $L_{Aeq(15min)}$ = equivalent continuous noise level over a 15 minute period, $L_{A1(1\ min)}$ = the noise level exceeded for 1% of a 1 minute period.

[1] The EA predicted that Receiver 257 (located in NAG 1) would experience noise levels of 38 dB(A) during the daytime and 40 dB(A) during the night-time. The EA predicted that Receiver 140 (located in NAG 3) would experience noise levels of 37 dBA during the day time and 39 dBA during the night time. The EA also predicted that Receiver 86 (located in NAG 7) would experience noise levels of 42 dBA in the day time and 42 dBA in the night time. While these EA predictions are not reflected in Table 11, Receivers 257, 140 and 83 are entitled to noise mitigation upon request under Development Consent DA 92/97.

[2] Following an investigation conducted during preparation of the contemporary MPO Noise Management Plan (NMP), it was established that these receivers are no longer present/inhabited.

[3] Following an investigation conducted during preparation of the contemporary MPO NMP, it was established that Receiver 231 is now an uninhabited mine-owned property.

The cumulative noise criteria defined in Table 5 of Development Consent DA 92/97 (Condition 5, Schedule 3) are provided in Table 12.

Table 12
Approval Criteria for Cumulative Noise (dBA)

Location	Day	Evening	Night
	$L_{Aeq(period)}$	$L_{Aeq(period)}$	$L_{Aeq(period)}$
NAG 8, 9	55	45	40
All other privately-owned land	50	45	40

Note: $L_{Aeq(period)}$ = equivalent continuous noise level over a measured period.

The EA predictions for noise were used to establish the Noise Impact Assessment Criteria in Development Consent DA 92/97, and as such, by complying with the Noise Impact Assessment Criteria, operations at the MPO have remained consistent with the predictions in the EA.

Noise Management Plan

In accordance with Condition 9, Schedule 3 of Development Consent DA 92/97, Coal & Allied prepared a Noise Management Plan for the construction period of the MPO (i.e. prior to coal extraction from the open cut) (the CNMP). The CNMP was approved on 2 December 2015. The CNMP contains relevant performance and management measures for noise generated by construction work undertaken in the reporting period, including:

- construction contracting companies to provide written Construction Environmental Management Plans (CEMPs) which consider noise impacts;
- consideration of noise emissions in awarding all contracts;
- use of 'Quackers' in place of reverse beepers;

- working during standard hours as defined by the ICNG (i.e. 7.00 am to 6.00 pm, Monday to Friday, 8.00 am to 1.00 pm, Saturday and no work on Sunday or public holidays); and
- informing potentially impacted sensitive receptors of the nature and duration of work expected to be undertaken, as well as the expected noise levels.

The following performance indicators are specified in the approved CNMP to track the performance of the MPO:

- compliance with noise criteria; and
- to minimise complaints from near neighbours at the start of construction and to maintain or decrease numbers of complaints.

Construction noise management levels were developed by Coal & Allied (using the noise impact assessment criteria as well as the ICNG) to assist in determining compliance and are detailed in Table 13.

Table 13
Construction Noise Management Levels (dBA)

Noise Assessment Group	Location	$L_{Aeq(15\ min)}$ [1]
NAG 1	All privately-owned residences	40
NAG 2	All privately-owned residences	40
NAG 3	All privately-owned residences	40
NAG 4	All privately-owned residences	40
NAG 5	All other privately-owned residences	46
NAG 6	All privately-owned residences	42
NAG 7	All other privately-owned residences	45
NAG 8	All other privately-owned residences	46
NAG 9	All other privately-owned residences	44
NAG 10	All other privately-owned residences	40
NAG 11	All other privately-owned residences	42
All other privately-owned residences		40

[1] Note: all noise measurements during construction will be undertaken during standard hours, as defined by the ICNG (7.00 am to 6.00 pm, Monday to Friday, 8.00 am to 1.00 pm, Saturday and no work on Sunday or public holidays).

5.2.2 Performance during the Reporting Period

Operator-attended Noise Monitoring

Operator-attended noise monitoring was considered to be unnecessary by Coal & Allied during Quarters 1, 2 and 3 of 2016, as there was no activity within the site boundaries from associated MPO works and sufficient background data already exists for the site.

As MACH Energy did not commence work at the MPO until 25 November 2016, operator-attended noise monitoring was not undertaken until December 2016. This operator-attended noise monitoring was undertaken by Global Acoustics Pty Ltd in accordance with the approved CNMP and the monitoring report is included as Appendix A.

During the reporting period, MACH Energy complied with all statutory conditions relating to noise. MACH Energy also complied with all additional noise requirements detailed in the approved CNMP.

Following the commencement of more substantial works at the MPO on 25 November 2016, MACH Energy organised for operator-attended noise monitoring to be conducted during the day of 19 December 2016, at six representative monitoring locations. Two consecutive 15-minute measurements were taken during scheduled construction hours (i.e. between 7.00 am and 6.00 pm). The locations of the six monitoring sites (Figure 3) were chosen to represent the NAGs listed above, as detailed in Table 14.

Table 14
Construction Noise Monitoring Locations

Monitoring Location	NAG Represented
N-AT1	1
N-AT2	2
N-AT3	3/4/5
N-AT4	6/7
N-AT5	8/9
N-AT6	10/11

A summary of the measured $L_{Aeq,15\ minute}$ noise levels generated by the MPO compared against the criterion specified in the approved CNMP are presented in Table 15.

Table 15
$L_{Aeq,15\ minute}$ Construction Noise Levels Generated by the MPO Against CNMP Noise Criteria

Site	Time	Measured Level $L_{Aeq(15min)}$	Criterion (dB)#	Exceedance (dB)
N-AT1	14:23	IA	40	Nil
N-AT1	14:38	IA		NA[1]
N-AT2	12:47	IA	40	Nil
N-AT2	13:02	IA		Nil
N-AT3	11:35	IA	40	Nil
N-AT3	11:50	IA		Nil
N-AT4	10:47	IA	42	Nil
N-AT4	11:02	IA		Nil
N-AT5	10:07	IA	44	Nil
N-AT5	10:22	IA		Nil
N-AT6	13:43	IA	40	Nil
N-AT6	13:58	IA		Nil

* Measured or estimated $L_{Aeq(15min)}$ levels attributable to the MPO. IA = Inaudible – no site noise was audible at the monitoring location.

\# Where multiple criteria were applicable for monitoring sites (i.e. at site N-AT3, which represented NAGs 3, 4 and 5), for the purposes of being conservative, the lowest noise criterion value was selected.

1 This measurement was not applicable as atmospheric conditions were outside those specified for measurement in the approved CNMP.

All applicable $L_{Aeq(15min)}$ measured noise levels attributable to the MPO were compliant with the relevant noise criteria. As no recorded measurements were within 5 dB of the relevant criterion, no further assessment of low-frequency noise levels was required to be undertaken.

Real-time Noise Monitoring

As described in the approved CNMP, MACH Energy is required to install a permanent, real-time noise monitoring system as construction proceeds. The real-time monitoring system was installed in November prior to work commencing on-site. Real-time noise monitoring was undertaken at three locations, 24 hours per day, seven days per week. This real-time noise monitoring was not used to assess compliance with noise criteria, but instead was used for ongoing performance assessment and to assist in avoiding potential non-compliances.

Complaints

No noise related complaints were received by MACH Energy during 2016.

5.2.3 Trends and Key Management Implications

Noise levels from the MPO complied with the relevant criteria at all monitoring sites during the operator-attended monitoring survey in December 2016.

No environmental performance or management issues arose in regard to noise during the reporting period.

5.2.4 Implemented or Proposed Management Actions

The following noise management measures were implemented in the reporting period to comply with requirements in the approved CNMP:

- noise emissions were considered in construction contracts awarded in the reporting period;
- all contractors who completed construction on-site provided a CEMP to MACH Energy for approval which considered noise impacts from their work;
- ‘Quackers’ were used in place of reverse beepers for construction equipment used on-site;
- MACH Energy provided notice to potentially impacted sensitive receptors prior to construction works being undertaken which included the nature, duration and expected noise levels associated with construction work in late 2016. This included regular discussions with near neighbours of the MPO as well as residents adjacent Wybong Road; and
- all work undertaken during the reporting period was performed during standard hours, as defined by the ICNG (i.e. 7.00 am to 6.00 pm, Monday to Friday, 8.00 am to 1.00 pm, Saturday and no work on Sunday or public holidays).

As no noise related complaints were recorded during the reporting period, no noise complaint management measures were required to be undertaken.

In the next reporting period, operator-attended noise monitoring would be conducted in accordance with Condition M4 of EPL 20850 and real-time noise monitoring would continue.

5.3 BLASTING

Airblast overpressure and ground vibration assessment criteria for the MPO are defined in Table 7 of Development Consent DA 92/97 (Condition 10, Schedule 3) and EPL 20850 (Conditions L3.2, L3.3, L3.4, L3.5 and L3.6). Additional conditions relating to blasting hours and frequency, property inspections and investigations, monitoring locations, measurement methodology, operating conditions and preparation of the Blast Management Plan (BMP), are also detailed in these documents.

During the reporting period, MACH Energy prepared a BMP in accordance with Condition 17, Schedule 3 and submitted the BMP to DP&E for approval.

5.3.1 Approval Criteria and Management Plan Requirements

Development Consent DA 92/97 and Environment Protection Licence 20850

A summary of the approval criteria for blasting is included in Table 16.

Table 16
Assessment Criteria for Blasting

Location	Airblast Overpressure (dB[Lin Peak])	Ground Vibration (mm/s)	Allowable Exceedance
Residence on privately-owned land	120	10	0%
	115	5	5% of the total number of blasts over a period of 12 months
Historic heritage sites	-	10	0%
All public infrastructure	-	50	0%

Source: Table 7 of Development Consent DA 92/97 (Condition 10, Schedule 3).
Note: mm/s = millimetres per second; dB = decibels.

Conditions L3.3, L3.4, L3.5 and L3.6 of EPL 20850 contain the same blasting approval criteria as for private residences specified in Table 16. However, EPL 20850 requires that monitoring does not exceed these criteria at monitoring site B-VOC rather than at all residences on privately-owned land (Figure 4).

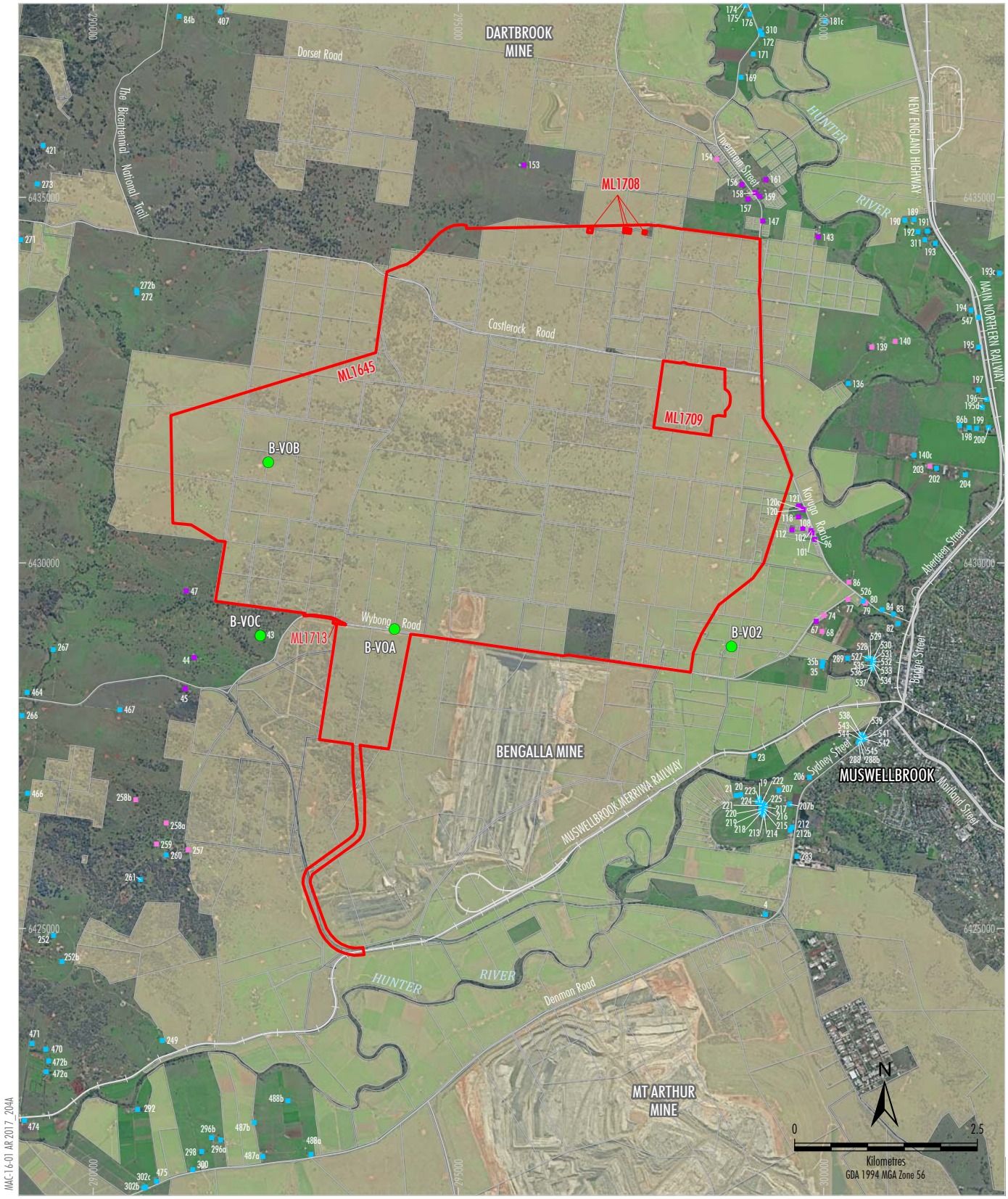
Airblast overpressure, ground vibration and fume monitoring will be conducted for every blast event at the blast monitoring sites shown on Figure 4.

5.3.2 Performance during the Reporting Period

No blasting was undertaken during the reporting period and therefore all approval criteria were complied with.

5.3.3 Trends and Key Management Implications

As no blasting was undertaken during the reporting period, no trends or key management implications have been identified.



MAC-16-01 AR 2017_204A

LEGEND

- Mining Lease Boundary
- Mine Owned
- Privately-owned Residence - MPO Acquisition on Request
- Privately-owned Residence - MPO Mitigation on Request
- Other Privately-owned Residence
- Blast Monitoring Site (Vibration/Overpressure)

Source: NSW Division of Resources & Energy (2016); NSW Land & Property Information (2016); MACH Energy (2016)
Orthophoto: MACH Energy (Aug 2016)

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Blast Monitoring Sites

Figure 4

5.3.4 Implemented or Proposed Management Actions

During the reporting period, MACH Energy prepared a Blast Management Plan (BMP) in accordance with Condition 17, Schedule 3 and submitted the BMP to DP&E for approval. Any blasting undertaken at the MPO during 2017 will be conducted in accordance with the approved BMP.

5.4 AIR QUALITY

Air quality criteria for the MPO are presented in Tables 8, 9 and 10 of Development Consent DA 92/97 (Condition 20, Schedule 3) and EPL 20850 (Condition P1). Additional conditions relating to operating conditions, greenhouse gas emissions, odour, acquisition criteria and preparation of the air quality management plan are also provided in Development Consent DA 92/97 and EPL 20850.

5.4.1 Approval Criteria and Management Plan Requirements

Development Consent DA 92/97 and Environment Protection Licence 20850

A summary of the approval criteria for air quality is included in Table 17.

Table 17
Approval Criteria for Particulate Matter

	Pollutant	Averaging Period	Criterion[a]
Long-term Impact Assessment Criteria	TSP	Annual	[b]90 µg/m^3
	PM_{10}	Annual	[b]30 µg/m^3
	Deposited Dust [d]	Annual	[c]2 g/m^2/month
			[b]4 g/m^2/month
Short-term Impact Assessment Criteria	PM_{10}	24 hour	[a]50 µg/m^3

Source: Development Consent DA 92/97 (Condition 20, Schedule 3).

Note: TSP = Total Suspended Particulate Matter; PM_{10} = particulate matter less than or equal to 10 micrograms; µg/m^3 = micrograms per cubic metre; g/m^2/month = grams per square metre per month.

[a] Excludes extraordinary events such as bushfires, prescribed burning, dust storms, sea fog, fire incidents or any other activity agreed by the Secretary of the DP&E.

[b] Total impact (i.e. incremental increase in concentrations due to the development plus background concentrations due to all other sources).

[c] Incremental impact (i.e. incremental increase in concentrations due to the development on its own).

[d] Deposited dust is to be assessed as insoluble solids as defined by Standards Australia, *AS/NZS 3580.10.1:2003: Methods for Sampling and Analysis of Ambient Air - Determination of Particulate Matter - Deposited Matter - Gravimetric Method.*

Air quality criteria and other air quality related conditions stipulated in EPL 20850 are generally consistent with those prescribed in Development Consent DA 92/97, with the exception of Conditions O3.4 to O3.8, which state:

> ***O3 Dust***
>
> *...*
>
> *O3.4 The licensee must cease all dust generating activities during adverse conditions being the occurrence of both the adverse wind conditions set out in Condition O3.5 (b) and the adverse PM_{10} concentrations set out in Condition O3.5(c).*
>
> *O3.5 For the purpose of Condition O3.4 the following definitions apply.*

(a) 'dust generating activities' means drilling, blasting, earthworks, construction activities, all hauling activities on unsealed haul roads, all overburden and coal extraction operations including loading and dumping activities and grader, loader, dozer and dragline operations.

(b) 'adverse wind conditions' means a rolling 1-hour average wind direction between 270 degrees and 360 degrees (inclusive) measured at the meteorological station (EPA Identification No.4). Australian Standard AS3580.14-2014 is to be used to calculate the rolling 1 hour average wind direction

(c) 'adverse PM_{10} concentrations' means a rolling 24-hour average PM_{10} concentration of equal to or greater than 44 micrograms per cubic metre measured at the Muswellbrook NW Upper Hunter Air Quality Monitoring Network monitor.

(d) Operation of watercarts is permitted at all times.

O3.6 Shutdown of dust generating activities required by Condition O3.4 must be completed within 1 hour of receiving data that triggers action required by Condition O3.4.

O3.7 The licensee may resume dust generating activities at the premises when:

(a) adverse wind conditions as defined in Condition O3.5(b); or

(b) adverse PM_{10} concentrations as defined in Condition O3.5(c) are not measured for a minimum time period of 1 hour from the time that cessation of dust generation activities is completed.

O3.8 The licensee must cease dust generating activities at the premises at any time when there is no access to the meteorological monitoring data required by Condition M5.1 and / or when there is no access to the PM10 monitoring data at the Muswellbrook NW Upper Hunter Air Quality Monitoring Network monitor.

Note: An alternate PM10 monitor location and associated trigger value is to be negotiated with the EPA. This alternate monitor and PM10 trigger value is to be used for Condition O3.5(c), in the event that there is no access to the PM10 monitoring data at the Muswellbrook NW Upper Hunter Air Quality Monitoring Network.

Construction Air Quality Management Plan

The approved CAQMP specifies the following management measures relevant to works undertaken in the reporting period:

- monitoring of dust levels to be conducted prior to and during construction;
- the implementation of two real time portable dust monitors upwind and downwind of construction activities which measure annual TSP, annual PM_{10} and 24 hour PM_{10}; and
- site inductions to include air quality requirements to ensure awareness of potential dust impacts.

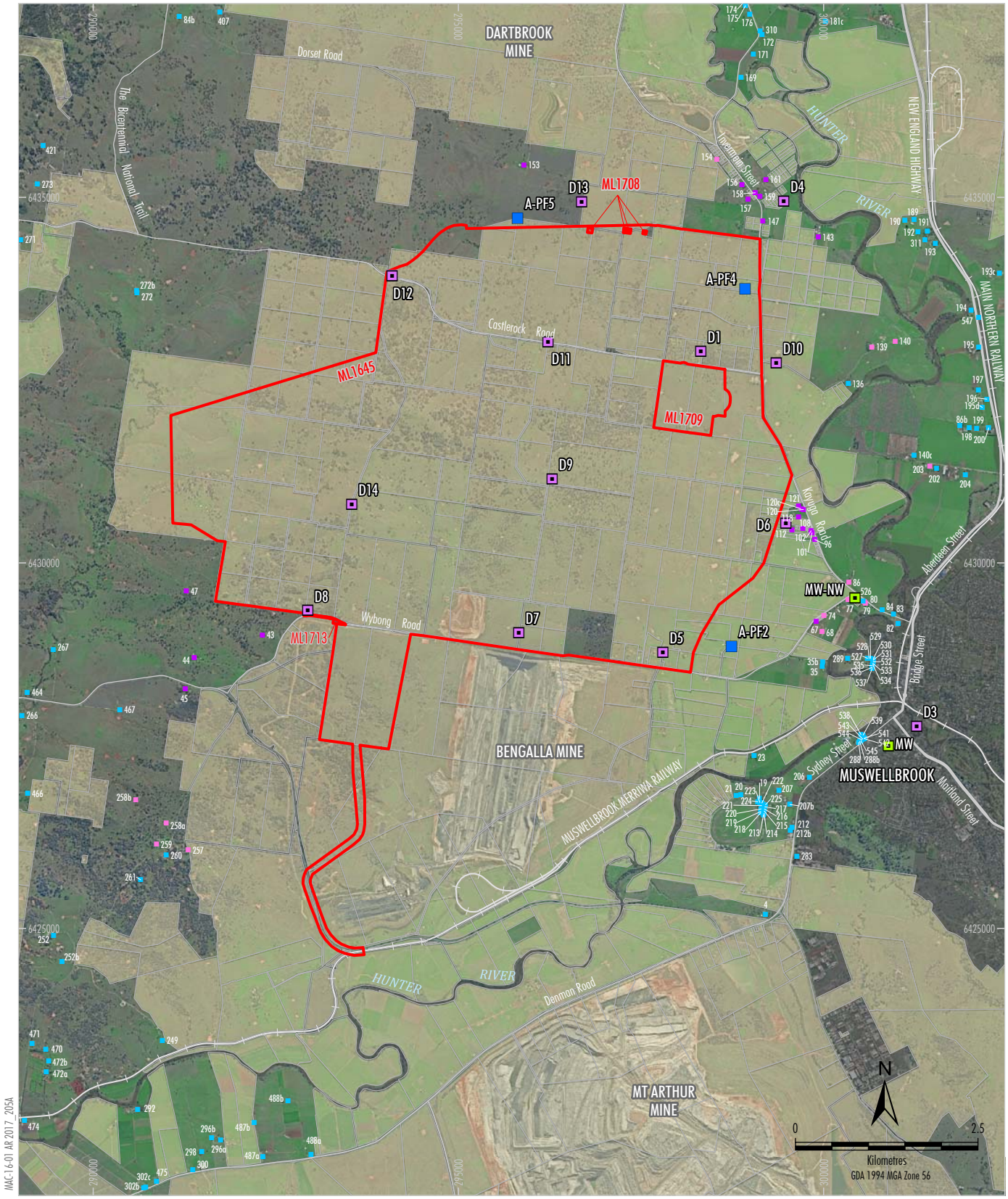
5.4.2 Performance during the Reporting Period

Dust Deposition

During the reporting period, dust deposition levels were collected at 13 dust deposition gauges situated around the MPO boundary (Figure 5). The gauges are sited in accordance with *Australian Standard (AS) 3580.1.1:2007* and analysed for mass of total insoluble matter and ash in accordance with *AS 3580.10.1-2003*.

Annual average levels of insoluble solids (i.e. dust deposition) are presented in Chart 4.

Chart 5 provides a comparison between annual average dust deposition levels at each of the monitoring sites from 2013 to 2016.



MAC-16-01 AR 2017_205A

LEGEND

- Mining Lease Boundary
- Mine Owned
- Privately-owned Residence - MPO Acquisition on Request
- Privately-owned Residence - MPO Mitigation on Request
- Other Privately-owned Residence

Monitoring Sites

- Air Quality TEOM
- Dust Deposition Gauge
- Upper Hunter Air Quality Monitoring Network

Source: NSW Division of Resources & Energy (2016); NSW Land & Property Information (2016); MACH Energy (2016)
Orthophoto: MACH Energy (Aug 2016)

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Air Quality Monitoring Sites

Figure 5

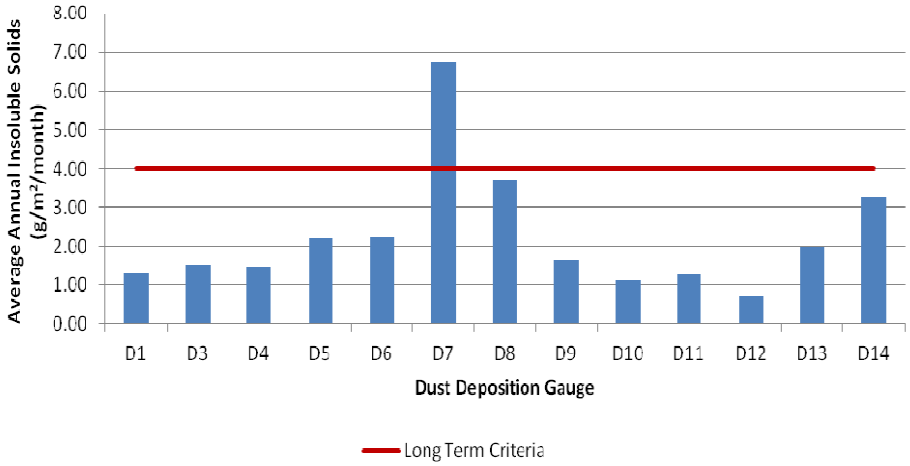


Chart 4: 2016 Annual Average Insoluble Solids

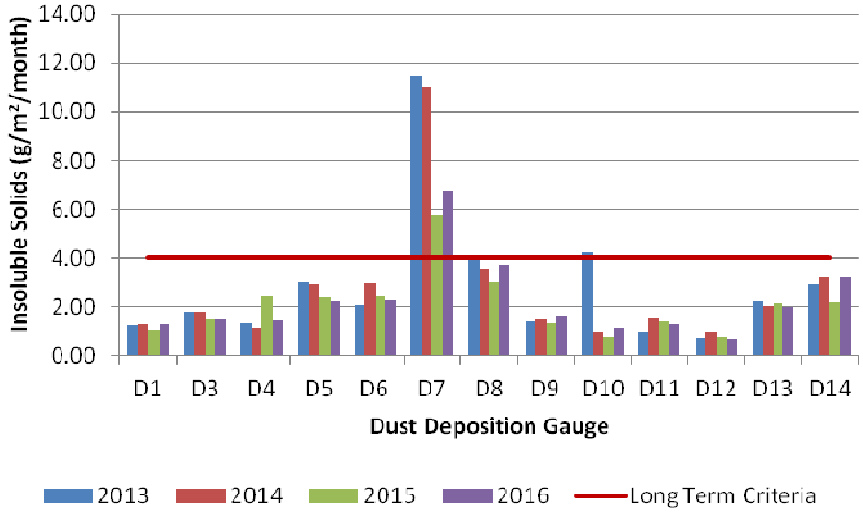


Chart 5: 2013 - 2016 Annual Average Insoluble Solids

PM_{10} and $PM_{2.5}$

Portable Tapered Element Oscillating Mass Balance (TEOM) monitoring systems were installed at three locations (Figure 5) on 11 November 2016. In consultation with the EPA, the TEOMs were generally sited to the south-east and north-west of the MPO open cut operations in consideration of prevailing wind conditions (i.e. in order to be capturing data both upwind and downwind). The TEOM systems collect PM_{10}[1] data continuously that is averaged over 24 hours (Chart 6) and annually (Chart 7).

Due to the TEOM monitoring systems only collecting two months of data, the PM_{10} monitoring shown in Chart 7 is technically not annual average data, but the available data from the year averaged over the year. In the next Annual Review, a full year of PM_{10} data will be available to present full annual average particulate matter levels.

[1] PM_{10} refers to particulate matter with an aerodynamic diameter less than 10 micrometres (µm).

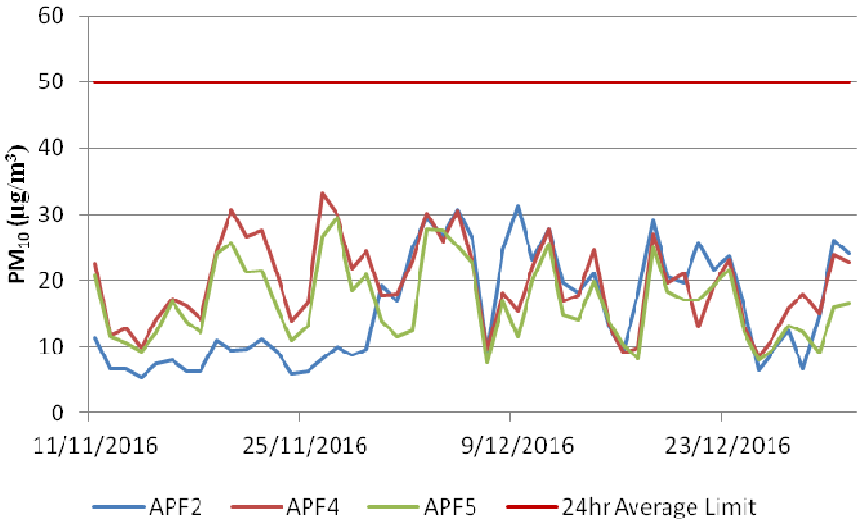


Chart 6: 24 hour Average PM_{10} Levels

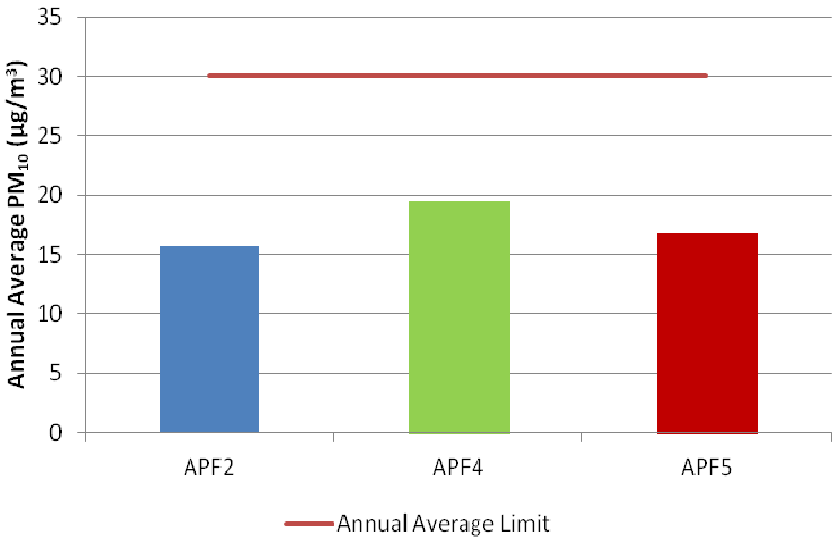


Chart 7: Annual Average PM_{10} Levels

As shown, both 24 hour and annual average PM_{10} levels were compliant with approval criteria during the reporting period.

EPL 20850 requires monitoring of PM_{10}. MACH Energy understands that the EPA does not consider that additional TSP monitoring is warranted given the strong focus on monitoring of fine particles in the area. Notwithstanding, in the absence of Palas Fidas monitors, estimated TSP can be derived from measured PM_{10} levels. It has been assumed that the measured PM_{10} is approximately 40% of TSP, based on a study of co-located TSP and PM_{10} monitors conducted in the Hunter Valley (NSW Minerals Council, 2000). These derived annual TSP levels are presented in Chart 8.

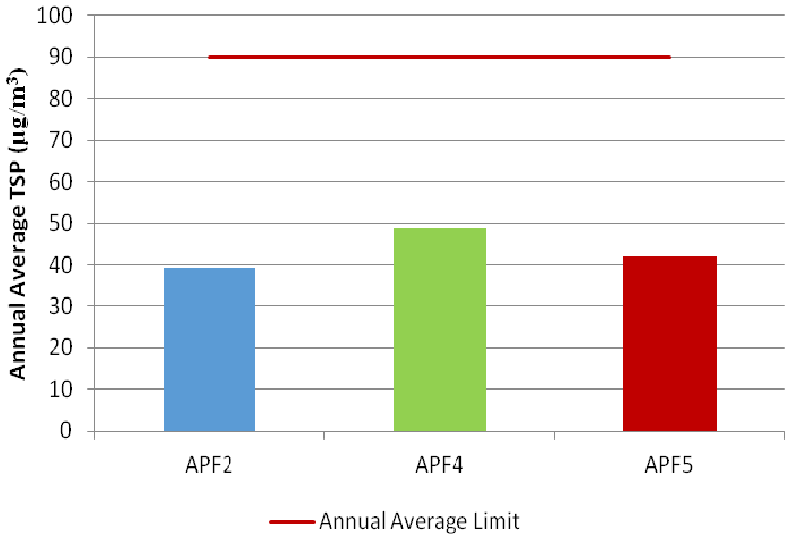


Chart 8: Annual Average TSP Levels

After construction commenced on-site (25 November 2016), PM_{10} levels at the Muswellbrook NW Upper Hunter Air Quality Monitoring Network monitor did not exceed a rolling 24 hour average of 44 µg/m^3. Therefore, dust generating activities were not required to be discontinued during the reporting period (i.e. in accordance with EPL 20850 Condition O3.4).

Monitoring of $PM_{2.5}$[2] and TSP was not undertaken during the reporting period. $PM_{2.5}$ and TSP will be monitored following the installation of the Palas Fidas monitoring systems in the next reporting period.

5.4.3 Trends and Key Management Implications

All deposited dust monitoring sites recorded annual average insoluble solid levels below the long term criteria in the reporting period, with the exception of site D7, which recorded an annual dust deposition level of 6.75 g/m^2/month.

During baseline recording years where no activity was undertaken at the MPO site, dust gauge D7 has consistently recorded levels above the long term total impact criteria. Site D7 is located in close proximity to the Bengalla Mine (Figure 5), and lies within the Bengalla Mine's predicted impact area. Additionally, the site is located directly between the MPO and the Bengalla Mine, and is not in the near vicinity of any privately-owned residence.

As site D7 is not representative of any privately-owned residence and recorded dust levels have consistently been above long term criteria prior to operations commencing at the site, the elevated levels recorded in 2016 are not considered a non-compliance.

Although increased dust levels were recorded at sites D1, D7, D8, D9, D10 and D14, from the 2015 to 2016 reporting periods, none of these increases were equal to or above the incremental long term impact assessment criteria of 2 g/m^2/month.

[2] $PM_{2.5}$ refers to particulate matter with an aerodynamic diameter less than 2.5 µm.

During the reporting period, 24 hour average PM_{10} levels fluctuated between approximately 10 and 30 $\mu g/m^3$ and no significant change is apparent following the commencement of more substantial works on 25 November 2016. This is with the exception of monitoring site A-PF5, which was averaging 10 $\mu g/m^3$ prior to construction commencing, before increasing to fluctuate between 10 and 30 $\mu g/m^3$ after construction commenced. Given the distance between site A-PF5 and the 2016 construction areas (approximately 5 km), as well as the limited works undertaken in 2016 (Section 3.1), it is deemed unlikely that construction activities undertaken at the MPO contributed to these fluctuations.

Annual average derived TSP levels were all compliant with approval criteria.

EIS predictions for air quality were modelled based upon five years of the mine life (i.e. Years 2, 5, 10, 15 and 20 of mine production). These predictions were based upon dust levels from mining activities and there is no scenario for construction only air quality predictions. Therefore, EIS predictions for this stage of the MPO are not relevant, and have not been considered in this review.

5.4.4 Implemented or Proposed Management Actions

In 2017, further air quality monitoring is proposed to be undertaken using three High Volume Air Samplers (HVAS) and three Palas Fidas air quality monitoring systems. The HVAS systems will measure PM_{10} levels continuously for 24 hours, once every six days, commencing once installation occurs in early 2017. The Palas Fidas systems will continuously measure PM_{10}, TSP and $PM_{2.5}$ levels and are scheduled to be installed in early 2017. The Palas Fidas systems will replace the current TEOM monitoring systems and will monitor air quality at the same locations.

Monitoring results collected by the HVAS and Palas Fidas monitoring systems in the next reporting period will be detailed in the 2017 Annual Review.

Site inductions undertaken in the reporting period included consideration of air quality requirements to ensure employee and contractor awareness of potential dust impacts, especially with respect to the nearest receptors. All contractors either submitted a CEMP for approval from MACH Energy which considered how dust would be managed during construction work, or operated under the MPO CAQMP.

5.5 BIODIVERSITY

In accordance with Condition 32, Schedule 3 of Development Consent DA 92/97, Coal & Allied prepared a Biodiversity and Rehabilitation Management Plan (Biodiversity portion only) for the MPO in 2012, which was approved on 23 July 2012.

No development is currently planned within the conveyor/service corridor and therefore as per Condition 29, Schedule 3 of Development Consent DA 92/97 an offset strategy is not required.

5.5.1 Approval Criteria and Management Plan Requirements

The approved Biodiversity and Rehabilitation Management Plan (Biodiversity portion only) contains a number of performance measures and indicators which have been developed in accordance with the EIS and EA. Relevant performance measures and associated indicators for work undertaken on-site during the reporting period are provided in Table 18. No rehabilitation was commenced on-site during the reporting period and therefore performance measures and indicators relating to rehabilitation have not been included in Table 18.

Table 18
Relevant Biodiversity Management Plan Performance Measures and Indicators

Criteria	Performance Measure	Performance Indicator
Topsoil conservation and reuse	Topsoil resources pre mining are defined.	• Topsoil is stripped and placed in accordance with the topsoil stripping plan.
Weed Control	Weeds are controlled to appropriate levels.	• Regular inspections of the MPO lands to identify areas requiring the implementation of weed management measures. • Management of cattle movement to mitigate the risks associated with the control of weeds in manure, around stockyards, and key access corridors. • Regular inspections and maintenance of topsoil stockpiles. Management of cattle movement to mitigate the risks associated with the control of weeds in manure, around stockyards, and key access corridors. • Consultation with neighbouring land owners and the relevant government stakeholders, such as the Upper Hunter Weeds Authority, regarding regional weed management strategies. • Implementation of appropriate weed management measures which may include mechanical removal, application of approved herbicides and biological control. • Control of noxious weeds identified on the MPO owned land in accordance with the relevant Department Primary of Industries control category and the regional Weed Management Plan. • Identification of weed infestations adjacent to or within the proposed disturbance area during preclearance surveys. • Follow-up inspections to assess the effectiveness of the weed management measures implemented and the requirement for any additional management measures.
Pest animal species	Pest animal control for any declared pest animal species known on the MPO lands.	• Mandatory pest control for any declared pests known to occur on MPO owned land. • Use a range of appropriate pest control measures as determined (e.g. the destruction of habitat, trapping, targeted shooting programs and baiting). • Follow-up inspections to assess the effectiveness of control measures implemented and the requirement for any additional control measures.

Table 18 (Continued)
Relevant Biodiversity Management Plan Performance Measures and Indicators

Criteria	Performance Measure	Performance Indicator
Bushfire preparedness and risk mitigation	Vegetation is managed to control fire.	• Indicators as described in Bushfire Management Plan (Coal & Allied, June 2007). • Monitoring of fuel loads as per the Bushfire Management Plan (Coal & Allied, June 2007). • A hazard reduction burning program to reduce fuel levels may be considered in conjunction with advice and assistance from the NSW Rural Fire Service. • Controlled burns are undertaken at intervals across the site to create a mosaic fire pattern to allow fauna refuge in unburnt vegetation. • The rotation of cattle grazing provides an effective management option for reducing fuel loads. • Fire bans, as determined by the NSW Rural Fire Service, will be adhered to by all personnel and will be enforced. • Potential ignition sources such as those resulting from hot work practices including welding and cutting will be restricted where possible to workshop areas or within active parts of the mine where vegetation is non-existent. If this is not possible due to the remoteness of the location a Hot Work Permit is to be approved by the project supervisor. Hot Work Permits are not to be issued for work outside of workshops when 'Total Fire Bans' are in place. • Water carts with fire fighting equipment capable of extinguishing fire outbreaks shall be maintained. This fire fighting equipment, together with graders and bulldozers used for mining, provides effective bushfire fighting capability. • Responsiveness is enhanced by emergency preparedness training for mine-site personnel. Ready access is maintained for vehicles to engage in water abstractions at dams on-site or at defined water fill points. Outlets are compatible with fire fighting equipment. Firebreaks are established around the operations to prevent the spread of bushfires onto or from adjacent properties. These firebreaks are inspected annually for adequacy. Where the creation and maintenance of proposed firebreaks has the potential to interact with areas of Aboriginal Cultural Heritage Sites or Archaeologically Sensitive Areas, these activities will be undertaken in accordance with the Mount Pleasant Open Cut Coal Mine Aboriginal Cultural Heritage Management Plan (Rio Tinto Australia, February 2011). Any incident of unplanned bushfire will be reported directly to the Site Supervisor who will initiate an emergency response. If required, the Mine Manager will notify the local Rural Fire Service.
Seed collection	Seed Calendar to be developed for the site.	• Seed Calendar contains information relating to: – Species flowering time, which can be referenced in terms of habitat value; – Fruiting and seed collection time; – Additional information on collection; – Viability data - where available.

Table 18 (Continued)
Relevant Biodiversity Management Plan Performance Measures and Indicators

Criteria	Performance Measure	Performance Indicator
Seed collection (continued)	Data on seed collection.	• Collated via the use of Geographic Information System (GIS) data including: – Date; – Species; – Location.
	Audits of the mine path in terms of seed availability.	• Undertaken 12 months prior to mining. • Resultant data is incorporated into the site GIS. • The location of key trees and or stands of plants are recorded on GIS and marked in the field for future detection and assessment. • The area to be cleared is inspected as per the Ground Disturbance Permit (GDP) and Pre-Clearance Surveys with the occurrence of plants in fruit relayed to the sites environment staff. • Seed collectors are advised as to the timing of proposed clearing. • Plants located at accessible heights to enable seed collection are accessed with maximum harvesting of fruit / seed. • For overstorey species and those not previously accessible, the seed collectors are to be on site on the day of clearing of vegetation. • In close liaison with the earthmoving operators, the site is under-scrubbed, removing all vegetative material not containing fruit/seed. The targeted plants are then fallen enabling ready access to the seed collectors. • In the case of eucalypts, the harvested brush material is placed on tarpaulins ideally located in immediate proximity to the fallen tree to enable the fruit to dry and release the seed. To ensure reduced time and cost this material is to remain on site for approximately two to seven days – this will be seasonally dependent. Once the fruit is opened and seed released and harvested the brush material is either placed onto the topsoil for subsequent removal via the topsoil stripping process or used as brush matting in other areas. • Regular monitoring is undertaken of areas for appropriate, timely and cost effective seed collection.
Seed collection – grass species	Optimum use of the onsite grass seed resource.	• A grass seed audit is undertaken defining distribution and density of resources of native grass seed. • Grass seed should be harvested by vehicle mounted harvesters with the goal of maintaining a healthy production area. • Grass seed production areas will be managed to improve the targeted seed. The areas will be monitored for the incursion of key weed species, including though not limited to thistles, St John's Wort (*Hypericum perforatum*), Fleabane, Fireweed and exotic grasses.

Table 18 (Continued)
Relevant Biodiversity Management Plan Performance Measures and Indicators

Criteria	Performance Measure	Performance Indicator
Germination and establishment of vegetation	Utilisation of seed.	• Records sheets and GIS databases are developed to track the collection, storage and utilisation of the MPO seed resource.
Minimise site impact in terms of compaction of soil, the spread of weeds and disturbance to vegetation	No uncontrolled entry of livestock or vehicles.	• Vehicle access is restricted to defined access pathways for use by authorised vehicles. • The main arterial tracks are maintained in good condition. • Layout of surface works such as roads, survey lines, drill tracks and fencing, are planned and authorised to minimise dissection of habitat areas.
	Ground Disturbance.	• All works will be undertaken in accordance with the GDP system.
Maximising salvage and beneficial use of resources	Optimum harvesting of fencing timber.	• Vegetation deemed suitable for fencing will be selectively cleared and stockpiled out of the disturbance area.
	Habitat trees.	• Habitat trees are managed according to the GDP process.
Habitat augmentation	Fallen timber.	• Fallen timber is left in situ in areas not impacted by mining.
Aboriginal heritage	No conflict between rehabilitation works / biodiversity and Aboriginal cultural heritage.	• Site is managed according to the GDP process.

Appendix 3 of Development Consent DA 92/97 requires that during the construction phase, pre-clearance surveys of relevant forest and woodland areas for threatened flora and fauna species are to be undertaken.

5.5.2 Implemented or Proposed Management Actions

In 2016, the following biodiversity related management actions were undertaken:

- A specialist seed contractor completed an audit of the land within the MPO boundaries to identify available seeds for collection and also review the current seed management infrastructure (discussed further below) at the site. Seed collection is intended to be undertaken in 2017.
- A pre-clearance survey of the proposed Mine Access road, construction pad and MIA was undertaken by ecologists from Narla Environmental prior to construction activities commencing. The pre-clearance survey included site assessments over ten days during August and November 2016. The ecologists inspected the entire GDP area on foot, performing detailed searches for fauna habitat, threatened flora and fauna. During construction, ecologists from Narla Environmental remained on-site to manage the clearing of habitat trees and provide assistance to clearing contractors on a daily basis.
- Weed control measures undertaken in the reporting period included two days of land based spot spraying of St John's Wort.
- Targeted flora surveys were undertaken in the MPO boundary relevant to various modification applications in preparation.
- Pest control measures were implemented over the MPO area.
- Topsoil stripped in the reporting period was in accordance with the approved MOP.

In 2013, a permanent base for native grass seed harvesting was established at the Warrawee Homestead, which was used for a native seed harvesting operation undertaken in 2014. Native grasslands in the MPO boundary were prepared by specialist contractors for the purpose of harvesting the grass seed to be used in future rehabilitation activities at the MPO.

5.6 HERITAGE

MACH Energy manages Aboriginal heritage on site in accordance with Aboriginal Heritage Impact Permit #C0002053 (AHIP #C0002053) issued by the Office of Environment and Heritage and in accordance with the approved ACHMP, prepared in accordance with Condition 36, Schedule 3 of Development Consent DA 92/97.

5.6.1 Approval Criteria and Management Plan Requirements

Management measures included in the approved ACHMP which are relevant to work undertaken in the reporting period are listed below:

- Construction personnel must undergo a cultural heritage module as part of their site induction, which has been prepared in consultation with the MPO Cultural Heritage Working Group.
- Where available, the MPO must utilise the services of Administration Coordinators (part of the Upper Hunter Valley Aboriginal community or private incorporated entities) for assistance in undertaking administrative services associated with the management of Aboriginal heritage at the MPO.
- Salvage of Aboriginal heritage sites within areas to be disturbed.
- Excavation of select Aboriginal heritage sites within areas to be disturbed.

- A GDP must be issued prior to any ground disturbance activity being undertaken on-site.

5.6.2 Implemented or Proposed Management Actions

During the reporting period, the following on-ground management measures relevant to heritage (Aboriginal and historic heritage) were undertaken at the MPO:

- Salvage excavations were undertaken at six AHIMS registered sites. These excavations were undertaken in accordance with the currently approved ACHMP and the requirements of AHIP #C0002053, and involved representatives from a number of the Registered Aboriginal Parties (RAPs)[3]. The six sites subject to salvage excavation during the reporting period included:
  - 37-2-0596 (B27, Artefact Scatter and Potential Archaeological Deposit [PAD]).
  - 37-2-1467 (A1-A4, Artefact Scatter and PAD).
  - 37-2-1468 (A7-A8, Artefact Scatter and PAD).
  - 37-2-1474 (B29, Artefact Scatter and PAD).
  - 37-2-1475 (B32, Artefact Scatter and PAD).
  - 37-2-1462 (C1, Artefact Scatter and PAD).
- Salvage of a majority of Aboriginal heritage sites within the AHIP #C0002053 area occurred during the reporting period. This accounted for salvage of approximately 618 Aboriginal heritage sites.
- Re-assessments were undertaken of six previously recorded historic heritage sites to determine appropriate and contemporary heritage recommendations. A reassessment report for these six sites was provided to the DP&E in November 2016. The sites subject to re-assessment include:
  - MP07 (Bates 1, hut site).
  - MP08 (Bates 2, hut site).
  - MP11 (Seabrook's, lime kiln).
  - MP12 (Bollibon Nowland's, house site).
  - MP17 (Clayden's, house site).
  - MP37 (Berrywood, house site).
- A test excavation of the lime kiln (site MP11 above) was undertaken during the reporting period.
- The GDP process was undertaken prior to any surface disturbance undertaken within the AHIP #C0002053 area during the reporting period, and included consideration of all Aboriginal and historic heritage sites.
- All new site specific employees and contractors were required to undertake an induction which included an Aboriginal cultural heritage component. MACH Energy maintains a record of all employee and contractor inductions in accordance with Condition 36(c), Schedule 3 of Development Consent DA 92/97.

During the next reporting period, MACH Energy will lodge an updated Aboriginal Heritage Management Plan (including an Aboriginal Heritage Conservation Strategy) to the DP&E, following consultation with RAPs (commenced within the reporting period), in accordance with Conditions 35 and 36, Schedule 3 of Development Consent DA 92/97.

[3] Administrative coordinators selected from the Register of Administrative Coordinators assisted in selecting the RAPs suitable for participation in the salvage excavations.

5.7 EXPLORATION

No exploration activities were undertaken during the reporting period.

5.8 WASTE

During the reporting period, approximately 6,390 kilograms (kg) of waste was generated by the MPO. Of this, approximately 87% was recycled and 13% was taken to landfill or disposed of off-site as hazardous waste.

5.9 VISUAL AMENITY AND LIGHTING

All work during the reporting period has been conducted during standard hours as defined by the ICNG (i.e. 7.00 am to 6.00 pm, Monday to Friday, 8.00 am to 1.00 pm, Saturday and no work on Sunday or public holidays).

No complaints relating to visual amenity or lighting from the MPO were received during the reporting period.

5.10 CONTAMINATED LAND

No contaminated land event, that posed a potential or material harm to the environment, occurred during the reporting period.

5.11 SPONTANEOUS COMBUSTION MANAGEMENT

There were no spontaneous combustion incidents at the MPO during the reporting period. Inspections for spontaneous combustion will be undertaken regularly when stockpiling of coal has commenced.

6 WATER MANAGEMENT

Open cut mining has not yet commenced at the MPO.

Construction activities in 2016 were undertaken in accordance with the erosion and sediment control provisions of the approved CWMP. Construction activities have been primarily restricted to works in the catchment of the unnamed tributary, commonly referred to as Dry Creek. The unnamed tributary was dry during each monthly sampling event (sampled at W10 on Figure 6).

Mine water is not currently discharged from the MPO. Any future discharges of mine water will be undertaken in accordance with Development Consent DA 92/97 (Condition 26, Schedule 3) and an EPL.

6.1 SURFACE WATER

6.1.1 Approval Criteria and Management Plan Update

Surface water monitoring undertaken at the MPO to date has focused on establishing the baseline condition of key watercourses prior to the commencement of mining. As reported in previous Annual Reviews, monitoring data has been reviewed against the default criteria for lowland rivers in slightly disturbed ecosystems in south-east Australia, as defined in the *Australian and New Zealand Guidelines for Fresh and Marine Water Quality* (Australian and New Zealand Environment and Conservation Council & Agriculture and Resource Management Council of Australia and New Zealand, 2000). These default trigger values are listed in Table 19.

Table 19
Surface Water Quality Trigger Values

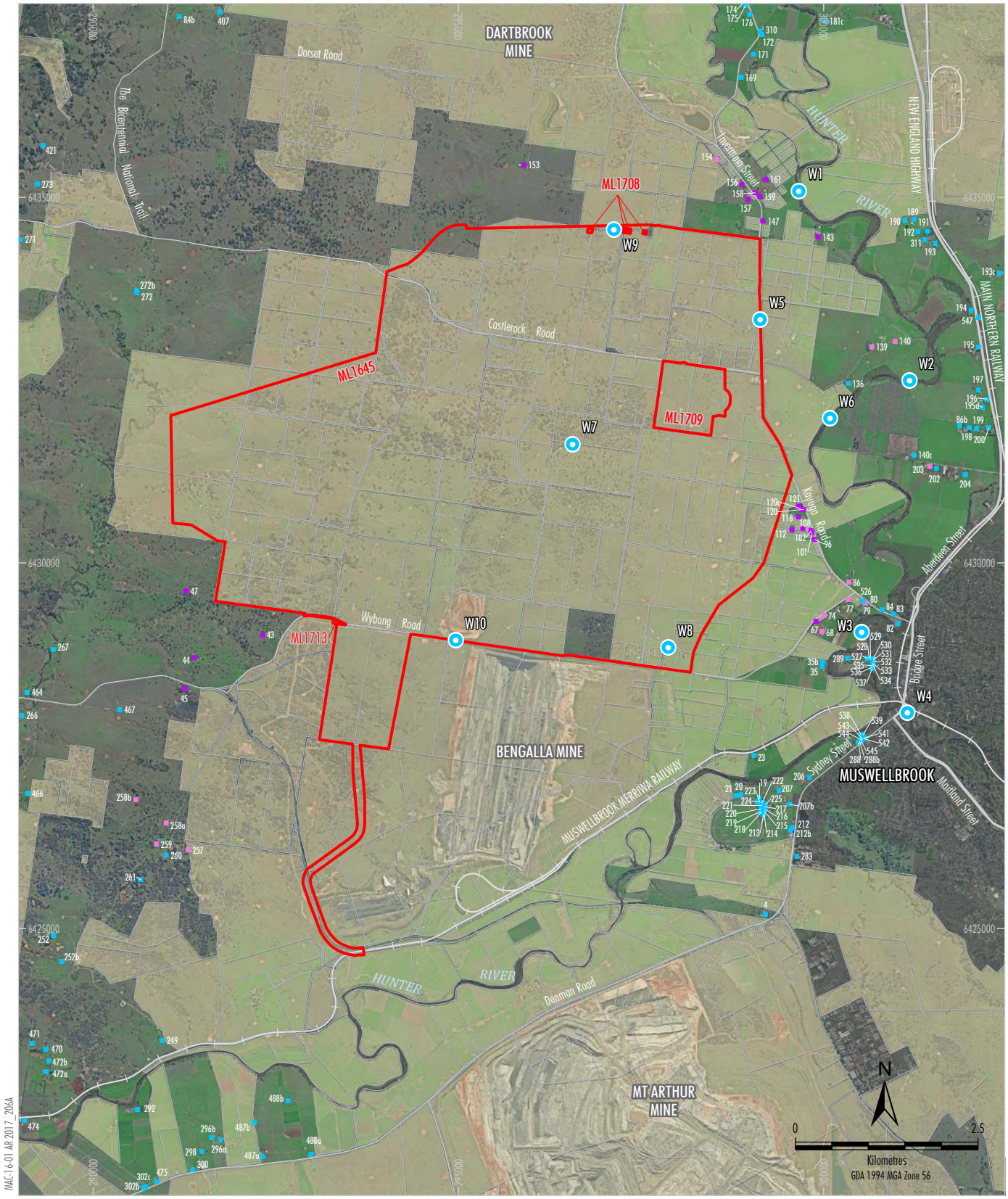
Parameter	Trigger Values	
	Lower Value	Upper Value
pH	6.5	8.0
Electrical Conductivity (µS/cm)	125	2,200
Total Suspended Solids (mg/L)	N/A	50

Note: µS/cm = microsiemens per centimetre and mg/L = milligrams per litre.

Given baseline monitoring data is frequently outside the default criteria (including prior to the commencement of construction), site specific monitoring criteria have been developed in a revised Water Management Plan, which was submitted for consultation to relevant stakeholders in the reporting period. Once the revised Water Management Plan is approved, future Annual Reviews will include a summary of the MPO's performance against the site specific monitoring criteria.

Surface water monitoring is undertaken monthly at ten locations (as shown on Figure 6) for pH, Electrical Conductivity (EC) and Total Suspended Solids (TSS). Water samples are also collected annually at these sites for laboratory analysis.

The majority of sites are located on ephemeral drainage lines and therefore do not regularly experience flow for sampling. During the reporting period only sites W2, W4, W8 and W9 had sufficient water for manual sampling. Sites W1 and W6 are no longer available due to unsafe access and were not monitored during the reporting period. Site W3 is an automatically monitored site.



MAC-16-01 AR 2017_206A

LEGEND

- Mining Lease Boundary
- Mine Owned
- Privately-owned Residence - MPO Acquisition on Request
- Privately-owned Residence - MPO Mitigation on Request
- Other Privately-owned Residence
- Surface Water Monitoring Site

Source: NSW Division of Resources & Energy (2016); NSW Land & Property Information (2016); MACH Energy (2016)
Orthophoto: MACH Energy (Aug 2016)

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Surface Water Monitoring Sites

Figure 6

6.1.2 Performance during the Reporting Period

Monitored pH values for the reporting period are shown in Chart 9. Additionally, a comparison between 2015 and 2016 pH values are provided in Chart 10.

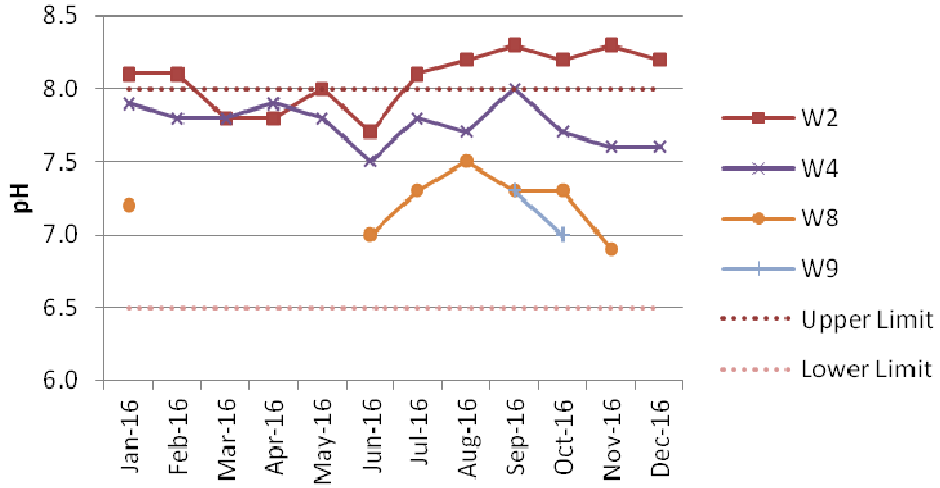


Chart 9: Surface Water pH Levels 2016

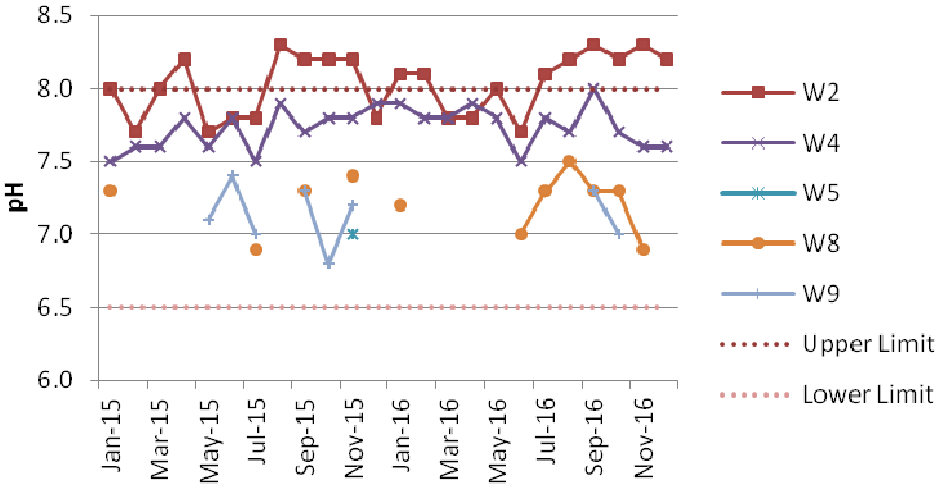


Chart 10: Surface Water pH Levels 2015 – 2016

EC values for the 2016 monitoring period are shown in Chart 11. Additionally, a comparison between 2015 and 2016 EC values are provided in Chart 12.

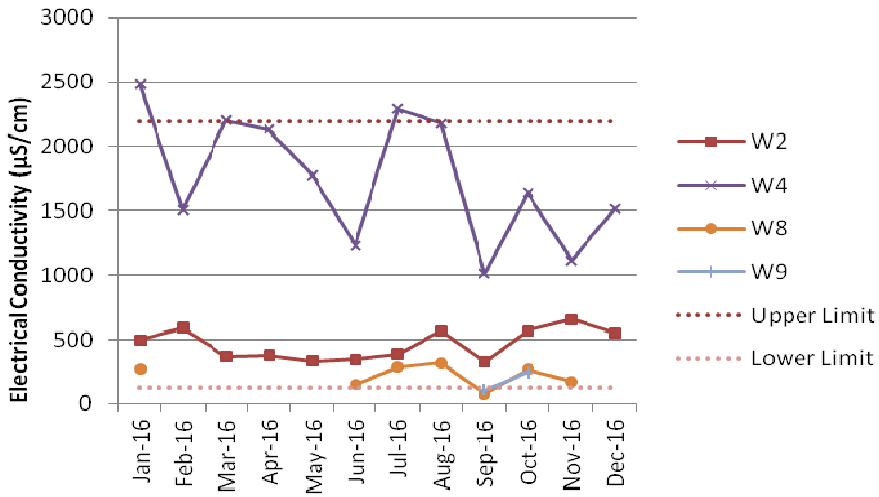


Chart 11: Surface Water EC Levels 2016

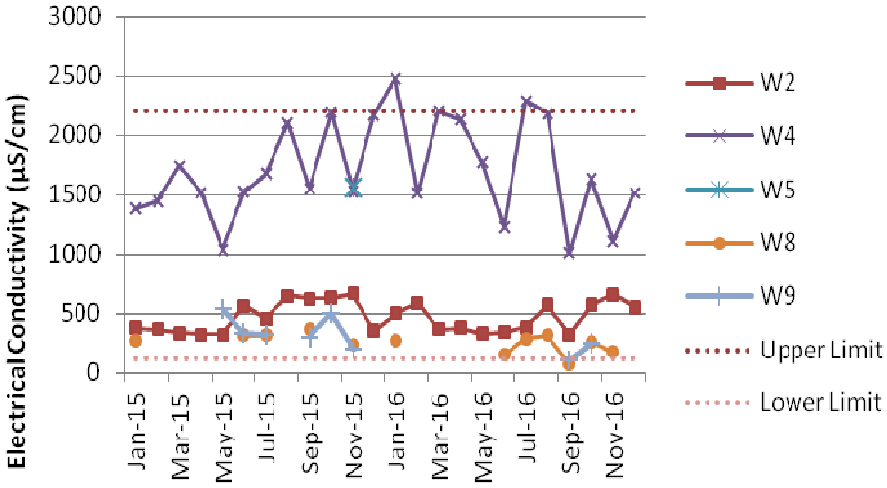


Chart 12: Surface Water EC Levels 2015 – 2016

TSS values for the 2016 monitoring period are shown in Chart 13. Additionally, a comparison between 2015 and 2016 TSS values are provided in Chart 14. Charts 13 and 14 are plotted on a logarithmic scale.

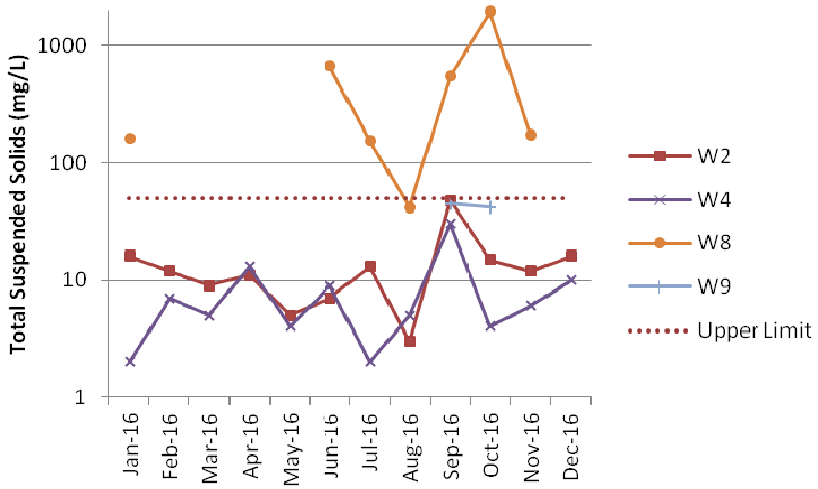


Chart 13: Surface Water TSS Levels 2016

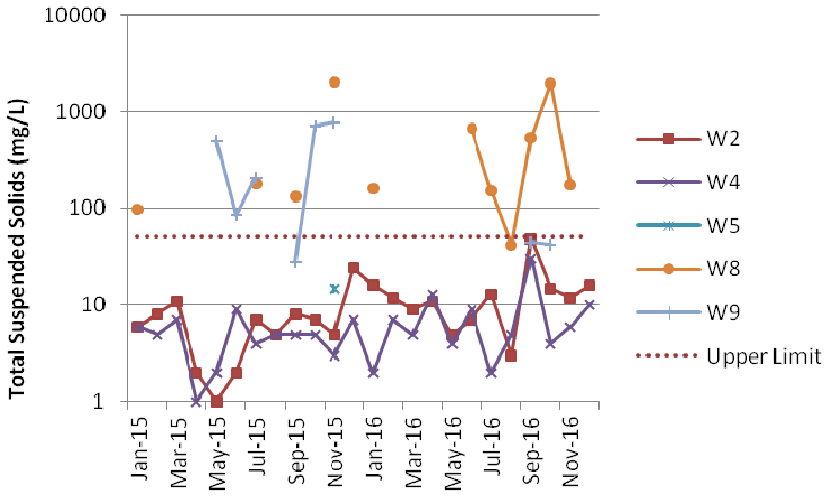


Chart 14: Surface Water TSS Levels 2015 - 2016

6.1.3 Trends and Key Management Implications

During the reporting period, pH levels ranged from 6.9 to 8.3. All sites stayed within the trigger value range with the exception of site W2, which was frequently above the 8.0 trigger. A comparison with 2015 pH levels shows that pH levels at all monitored sites has remained generally consistent over the previous two years, with site W2 frequently fluctuating over the trigger value. These pH trends are consistent with trends presented in the 1997 EIS (ERM Mitchell McCotter, 1997).

EC monitoring results for site W2 consistently stayed within the trigger values for the reporting period. Site W4 exceeded the upper limit of 2,200 µS/cm during two monitoring rounds. This site is located on Muscle Creek within Muswellbrook, which commonly has variability in EC levels. This site has naturally occurring salts in surrounding soils and rocks, and data from previous annual reviews indicates that large fluctuations at this site are normal (Coal & Allied, 2016). Sites W8 and W9 recorded very low EC (i.e. under 125 µS/cm). Both sites are located on ephemeral streams within the MPO boundary and only flow after heavy rainfall events. The low EC values monitored at these sites are typical of heavy rainfall events.

Comparison with 2015 data shows that the EC values collected during the reporting period are generally consistent with previous monitoring. Monitoring site W4 is shown to regularly fluctuate between approximately 1,000 to 2,500 µS/cm, while sites W8 and W9, when able to be monitored, show consistently low EC values, ranging from approximately 100 to 500 µS/cm. Monitoring at site W2 showed EC remains below 1000 µS/cm.

Analysis of the TSS data indicates that sites W2, W4 and W9 stayed within the trigger values for the monitoring period. Site W8 exceeded the trigger values for six of the seven monitoring events which occurred at the site. As stated above, site W8 is located on an ephemeral stream and rainfall events typically cause increased runoff and TSS levels in streams. Comparison with the 2015 results indicate that the monitoring data for the reporting period are typical, with sites W8 and W9 generally showing elevated TSS levels. Sites W2 and W4 display low TSS levels.

Monitoring data outside of the trigger values is considered to reflect baseline conditions and is not an effect of the MPO. Updated trigger values in the revised Water Management Plan have been prepared in consideration of the natural variability from the default trigger values.

6.2 GROUNDWATER

6.2.1 Approval Criteria and Management Plan Requirements

The groundwater monitoring network for the MPO includes quarterly monitoring of pH, EC and standing water levels (SWL) at 29 sites situated within the MPO boundary (Figure 7). The MPO groundwater monitoring network has been separated into three monitoring zones according to aquifer and potential future disturbance types:

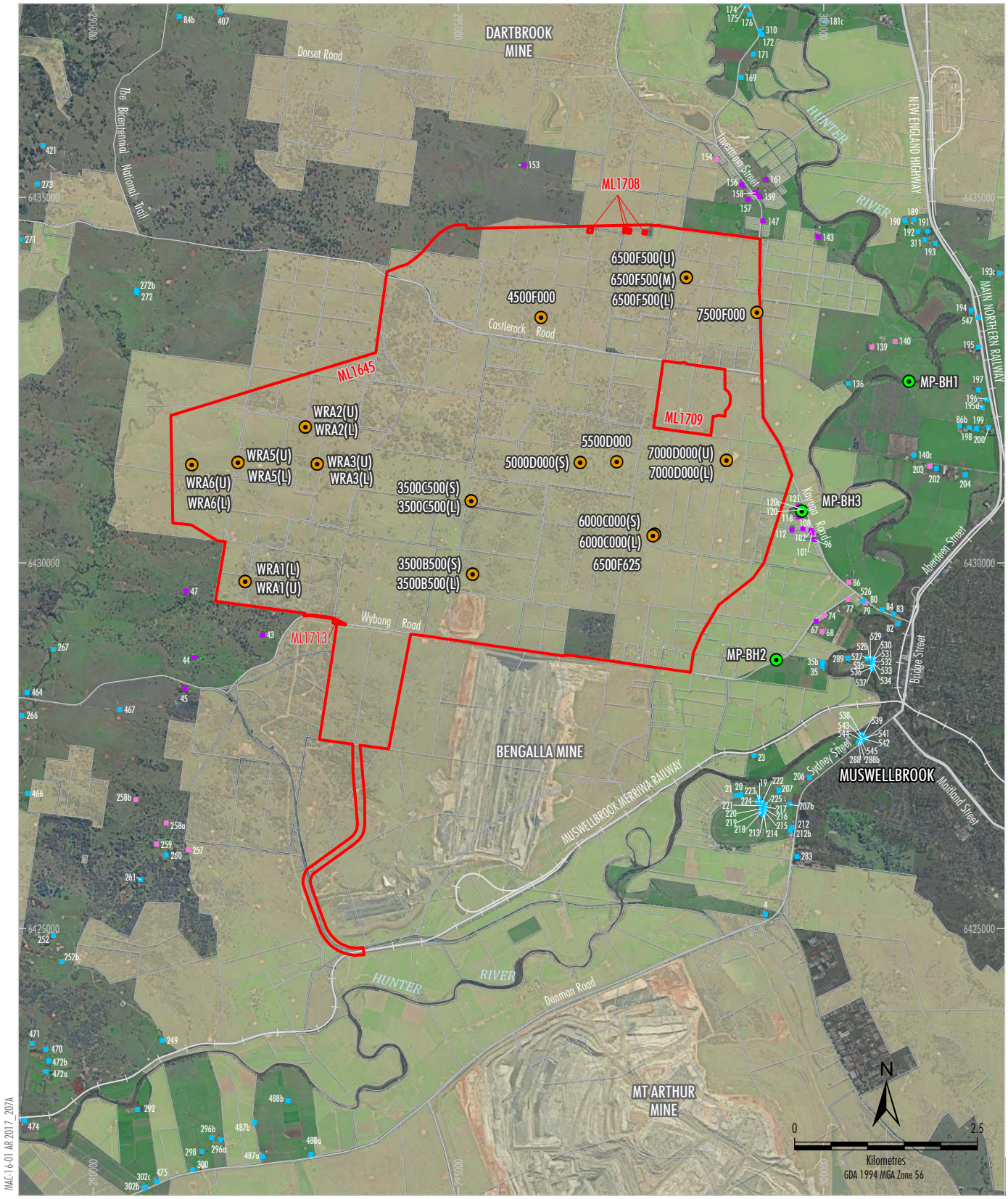
- Central Groundwater Sites: representative of the hard rock aquifer.
- Eastern Groundwater Sites: representative of the alluvial aquifer.
- Western Groundwater Sites: representative of the hard rock aquifer in the proposed fines emplacement area.

SWLs are recorded as depth from ground surface level, as well as depth from the top of the standpipe casing.

The CWMP does not include groundwater impact assessment criteria as open cut mining has not yet commenced. Impact assessment criteria are being developed in the Groundwater Management Plan currently under develop by MACH Energy, and will be used in future Annual Reviews.

6.2.2 Performance during the Reporting Period

The results from monitoring SWL, EC and pH from 2014 to 2016 for the central groundwater bores are shown in Charts 15, 16 and 17 respectively.



LEGEND

- Mining Lease Boundary
- Mine Owned
- Privately-owned Residence - MPO Acquisition on Request
- Privately-owned Residence - MPO Mitigation on Request
- Other Privately-owned Residence

Monitoring Sites

- Standpipe
- Standpipe - Alluvium

Source: NSW Division of Resources & Energy (2016); NSW Land & Property Information (2016); MACH Energy (2016)
Orthophoto: MACH Energy (Aug 2016)

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Groundwater Monitoring Sites

Figure 7

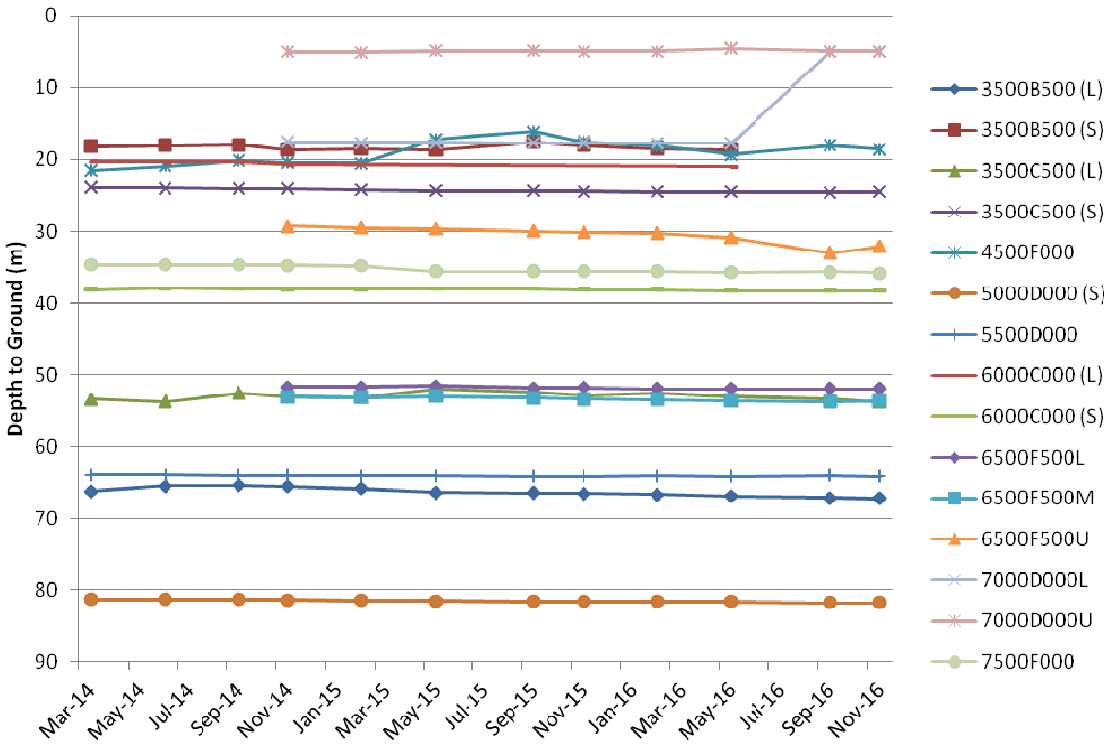

Chart 15: Groundwater Central Bores SWL 2014 – 2016

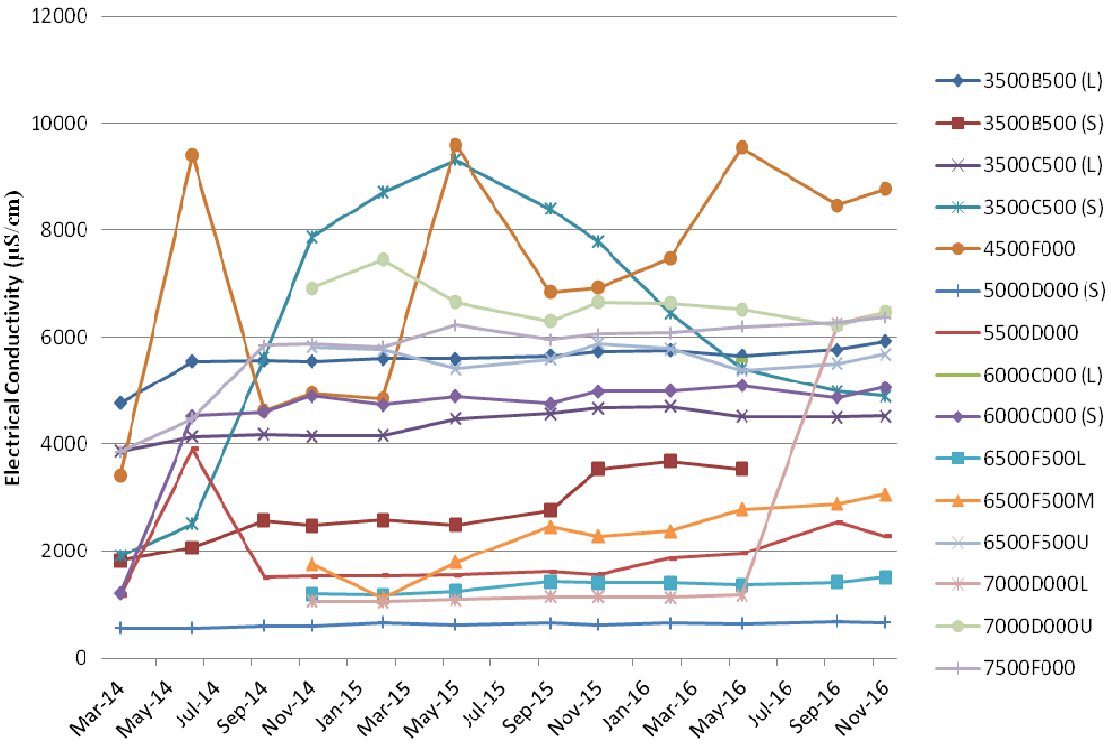

Chart 16: Groundwater Central Bores EC 2014 – 2016

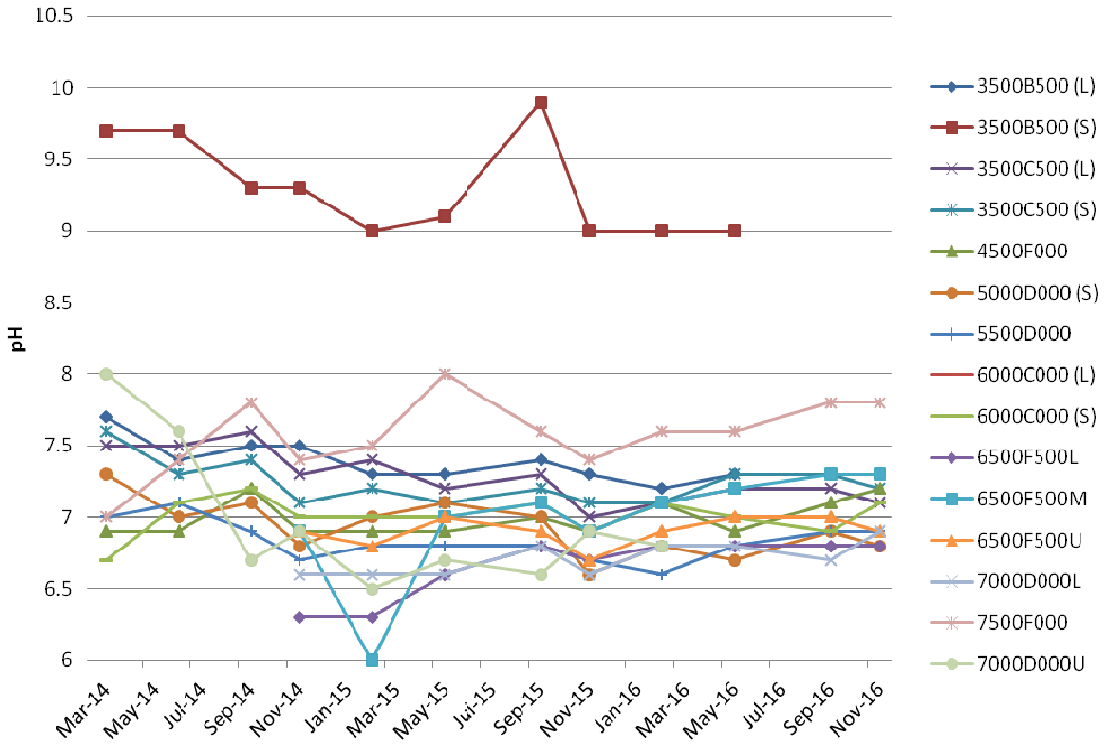

Chart 17: Groundwater Central Bores pH 2014 - 2016

The results from monitoring SWL, EC and pH from 2014 to 2016 for the eastern groundwater bores are shown in Charts 18, 19 and 20 respectively.

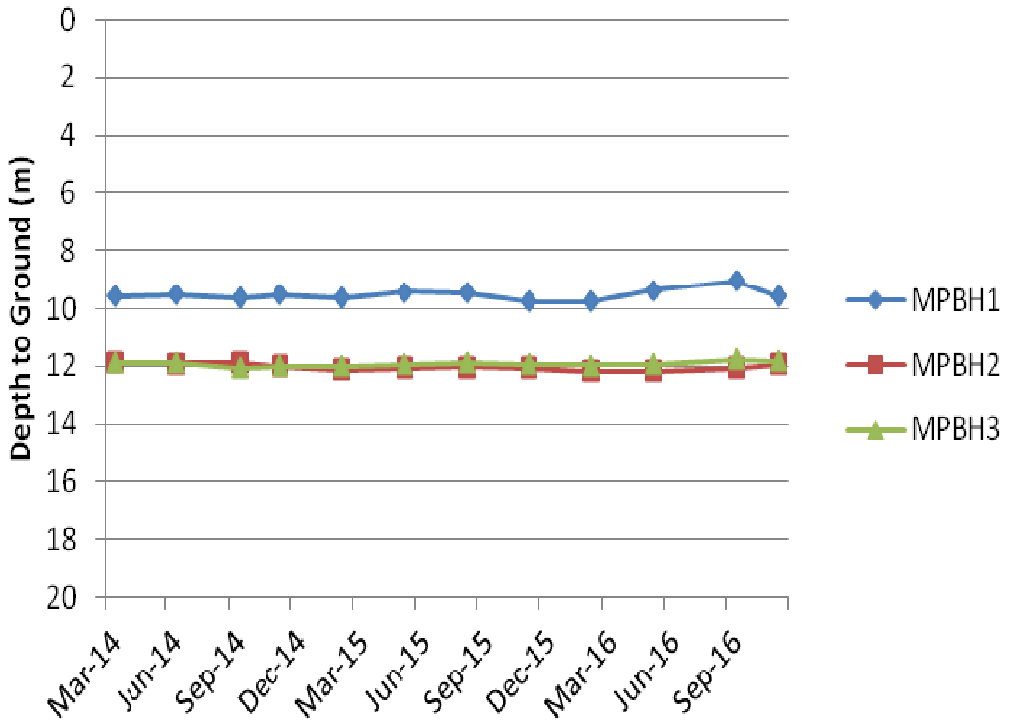

Chart 18: Groundwater Eastern Bores SWL 2014 - 2016

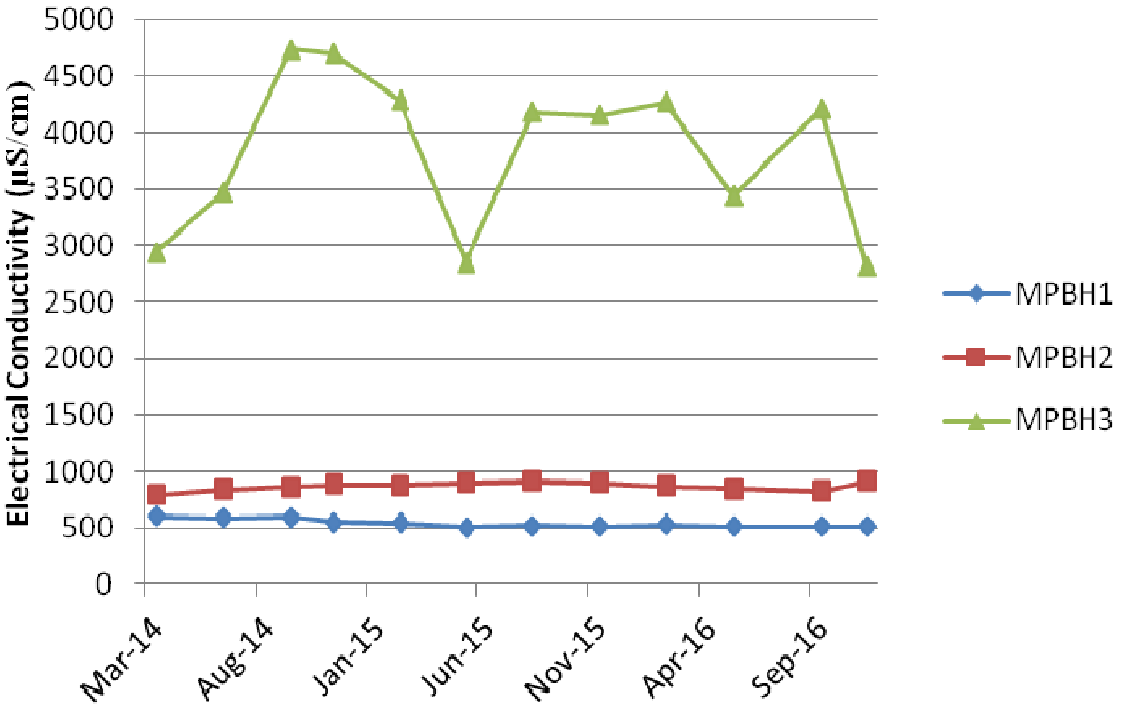

Chart 19: Groundwater Eastern Bores EC 2014 - 2016

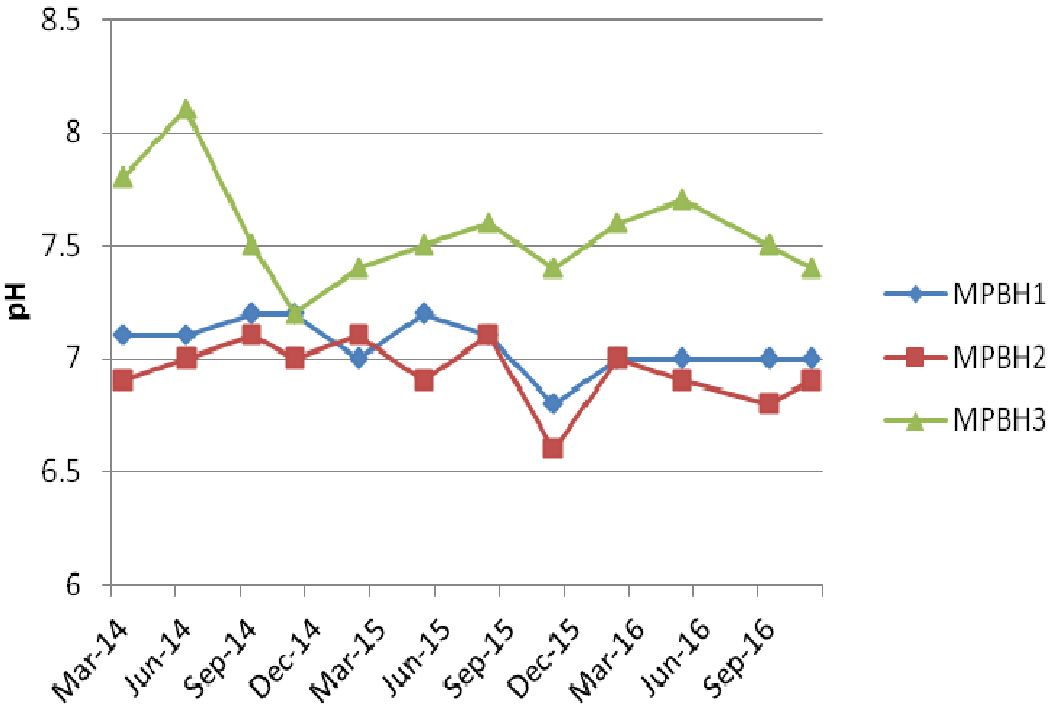

Chart 20: Groundwater Eastern Bores pH 2014 - 2016

The results from monitoring SWL, EC and pH from 2014 to 2016 for the western groundwater bores are shown in Charts 21, 22 and 23 respectively.

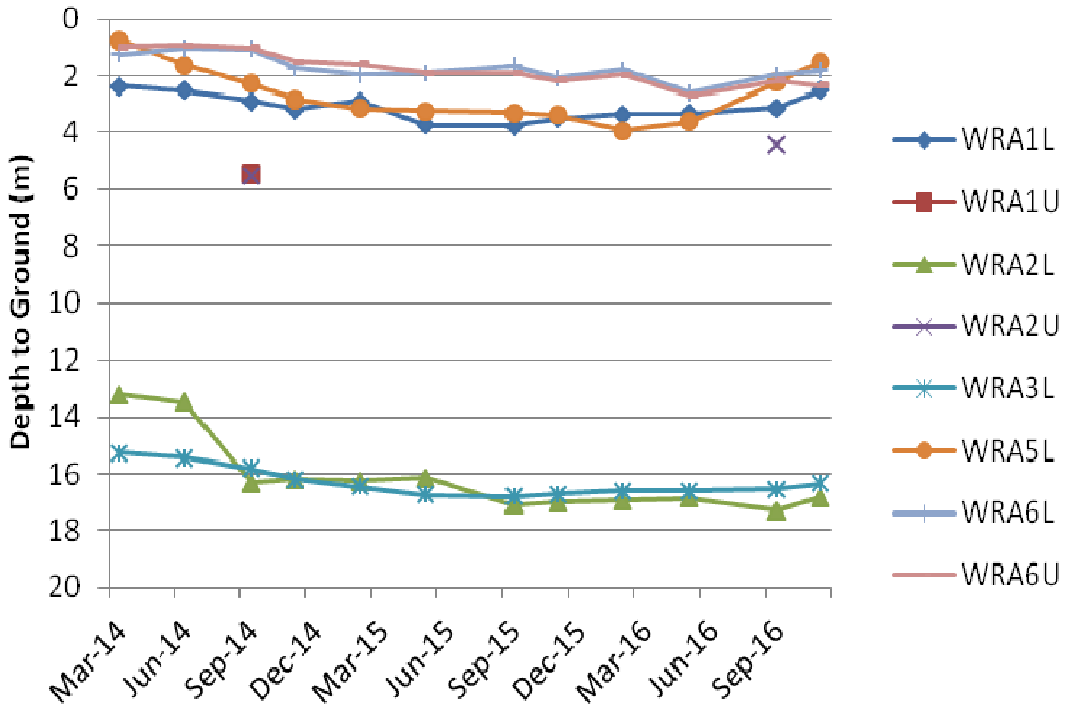

Chart 21: Groundwater Western Bores SWL 2014 - 2016

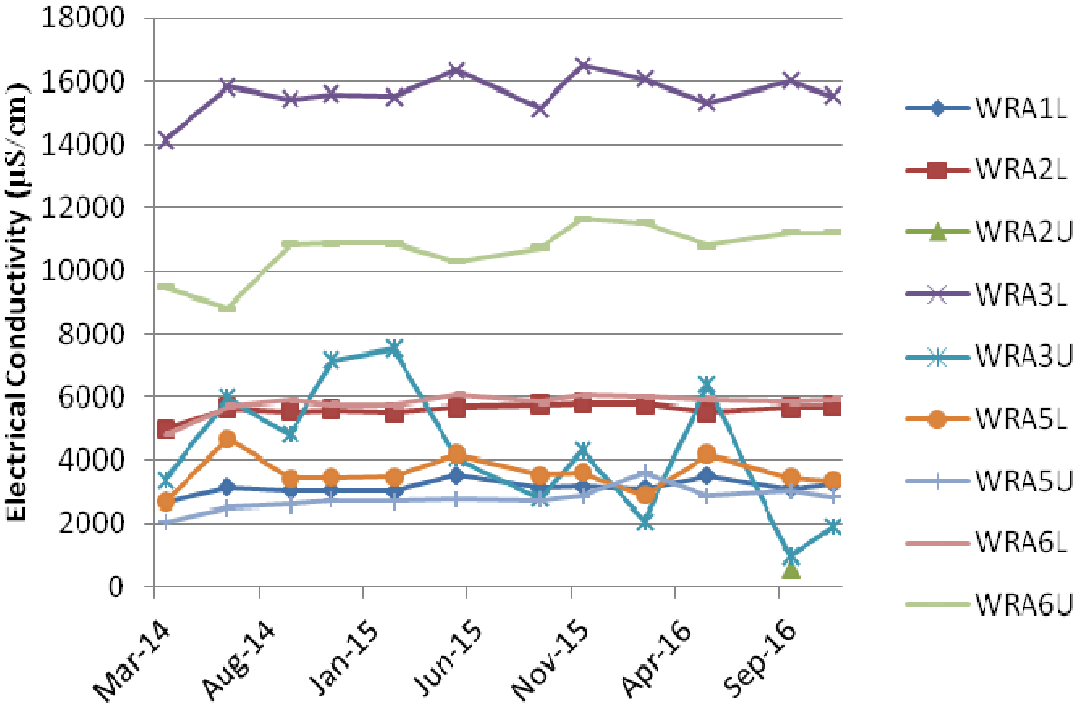

Chart 22: Groundwater Western Bores EC 2014 - 2016

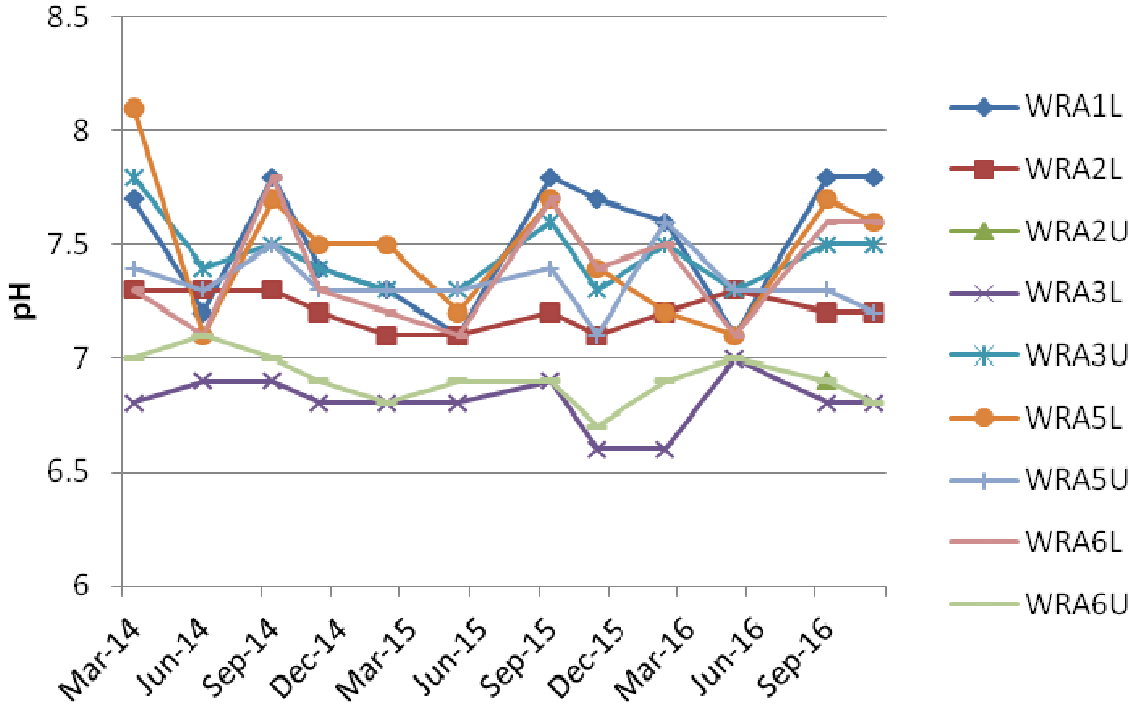

Chart 23: Groundwater Western Bores pH 2014 – 2016

During the reporting period, monitoring was not undertaken at central groundwater site 6500F625 as the site was unable to be located.

Western groundwater monitoring site WRA1U was too dry to sample during any monitoring rounds in the reporting period.

6.2.3 Trends and Key Management Implications

No open cut mining was undertaken at the MPO during the reporting period.

Monitored SWLs have stayed generally consistent from 2014 – 2016. This is with the exception of site 7000D000L, which experienced a sharp increase in depth from May to September 2016. Given that the measurements for 7000D000L and 7000D000U are identical for the two monitoring rounds during September and November 2016, it is likely that this decline is due to an incorrect measurement at 7000D000U for both monitoring sites. Although site WRA2L experienced a decline in early 2014, the SWL for the site has since remained relatively stable.

Monitored EC values remained stable for the eastern bore sites, with the exception of site MPBH3, which fluctuated regularly between approximately 2,500 and 5,000 µS/cm. Trends from previous Annual Reviews have shown that EC values at this site have been historically inconsistent (Coal & Allied, 2014, 2015 and 2016).

Consistent with trends observed in the 2015 Annual Review (Coal & Allied, 2016), the majority of EC values for the central bores have trended upwards (Chart 16). This is with the exception of site 3500C500(S) which peaked in May 2015, and has since steadily declined. Site 7000D000L recorded a sharp increase in September 2016 however, as described above, this is likely due to a measurement or recording error (i.e. as it recorded the same EC value as site 7000D000U). Site 4500F000 fluctuated regularly during the reporting period. This has been typical for these sites in recent years (Coal & Allied, 2016).

EC values remained relatively stable throughout the reporting period for the western bores (Chart 22). Continuing from trends observed in the 2015 Annual Review (Coal & Allied, 2016), site WRA3U showed the most variation. Long term trends at the western bores indicate that yearly fluctuations in EC are most common at the western bores compared to the eastern and central bores (Coal & Allied, 2016). Sites WRA6U and WRA3L showed higher EC levels than other western bores during the reporting period, which has been consistent in recent years.

Consistent with trends observed in the 2015 Annual Review (Coal & Allied, 2016), the pH values for the majority of sites have generally remained within the pH range of 6.5 to 8.0. This is with the exception of site 3500B500 (S), which has consistently recorded a pH above the other central bores (Chart 17), fluctuating between 9.0 and 10.0. Sites 6500F500M and 6500F500L have previously recorded pH levels below 6.5, however remained stable between the 6.5 to 8.0 range in the reporting period, with a slight upward trend observed for site 6500F500M. A number of western bores including WRA1L, WRA5L, WRA5U, WRA6L and WRA3U have historically shown frequent fluctuations between recording rounds and this continued in the reporting period (Coal & Allied, 2016).

6.2.4 Implemented or Proposed Management Actions

No management measures were implemented during the reporting period.

During the next reporting period, MACH Energy will continue to implement the approved CWMP.

6.3 HUNTER RIVER SALINITY TRADING SCHEME DISCHARGES

MACH Energy has 15 credits under the Hunter River Salinity Trading Scheme, however, no discharges to the Hunter River occurred during the reporting period.

6.4 WATER TAKE

No open cut mining was undertaken at the MPO during the reporting period.

Water take at the MPO during the reporting period is summarised in Tables 3 and 20.

Table 20
MPO Water Take

Water Licence	Entitlement	Passive Take/Inflows	Active Pumping	Total
18253	74	0	0	0
18266	68	0	0	0
18206	24	0	0	0
18199	5	0	0	0
18122	33	0	0	0
18131	60	0	0	0
21503	21	0	0	0
23935	41	0	0	0
879	224	0	0	0
880	124	0	0	0
1113	366	0	0	0
973	3	0	0	0
974	210	0	0	0
975	8	0	0	0
988	156	0	0	0
989	8	0	0	0
1307	37.5	0	0	0
1229	480	0	0	0
1230	8	0	0	0
1259	33.2	0	0	0
1227	99	0	0	0
1258	5	0	0	0
992	75	0	0	0
7808	36	0	0	0
702	267	0	0	0
1260	4.8	0	0	0
993	265	0	0	0
1308	15.1	0	0	0
604	183	0	0	0
605	8	0	0	0
677	24	0	0	0
1338	17.5	0	0	0
662	275	0	0	0
663	16	0	0	0
10775	243	0	0	0

As shown in Table 20, no water was drawn from any water licences during the reporting period for mining purposes. Mine water was sourced on-site from farm dams (approximately 9,065 kilolitres [kL]), as well as off-site from Muswellbrook (approximately 212 kL), contributing to a total usage of approximately 9,277 kL in the reporting period. On-site water usage was below MACH Energy's Harvestable Rights under the *Water Management Act, 2000*.

7 REHABILITATION

Proposed rehabilitation activities for the MPO are defined in the approved MOP, which has been developed to meet the requirements for a RMP (Condition 56, Schedule 3 of Development Consent DA 92/97).

As per the rehabilitation schedule in the approved MOP, no rehabilitation was completed during the reporting period, and no rehabilitation has been previously completed at the site. Mining operations have not yet commenced, and are not scheduled to commence until 2017.

Details of the activities completed during the reporting period are outlined in Section 3.1. Construction work undertaken prior to the reporting period included an environmental dam, a sedimentation dam and a gravel access track in 2004, which accounted for approximately 9 hectares (ha) of disturbance. No renovation or removal of buildings occurred on-site during the reporting period.

The rehabilitation status for the previous, current and following reporting periods are outlined in Table 21, consistent with the approved MOP.

Table 21
Rehabilitation Status

Mine Area Type	Previous Reporting Period (Actual)	This Reporting Period (Actual)	Next Reporting Period (Forecast)
	2015	2016	2017
Total Mine Footprint[1]	9 ha	27.2 ha	533 ha
Total Active Disturbance[2]	9 ha	27.2 ha	533 ha
Land being prepared for Rehabilitation[3]	0	0	0
Land under active rehabilitation[4]	0	0	0
Completed rehabilitation[5]	0	0	0

1 Total mine footprint includes all areas within a mining lease that either have at some point in time or continue to pose a rehabilitation liability due to mining and associated activities. As such it is the sum of total active disturbance, decommissioning, landform establishment, growth medium development, ecosystem establishment, ecosystem development and relinquished lands (as defined in DRE MOP/RMP Guidelines). Please note that subsidence remediation areas are excluded.

2 Total active disturbance includes all areas ultimately requiring rehabilitation such as: on-lease exploration areas, stripped areas ahead of mining, infrastructure areas, water management infrastructure, sewage treatment facilities, topsoil stockpile areas, access tracks and haul roads, active mining areas, waste emplacements (active/unshaped/in or out-of-pit), and tailings dams (active/unshaped/uncapped).

3 Land being prepared for rehabilitation – includes the sum of mine disturbed land that is under the following rehabilitation phases – decommissioning, landform establishment and growth medium development (as defined in DRE MOP/RMP Guidelines).

4 Land under active rehabilitation - includes areas under rehabilitation and being managed to achieve relinquishment - includes the following rehabilitation phases as described in the DRE MOP/RMP Guidelines – “ecosystem and land use establishment” (area seeded OR surface developed in accordance with final land use) and “ecosystem and land use sustainability” (revegetation assessed as showing signs of trending towards relinquishment OR infrastructure development).

5 Completed rehabilitation – requires formal sign-off by DRE that the area has successfully met the rehabilitation land use objectives and completion criteria.

Post rehabilitation land uses for the MPO are defined in Appendix 7 of the Development Consent DA 92/97.

As per the approved MOP, no final landform rehabilitation is planned for the next reporting period. Final landform rehabilitation of the mine site is predicted to commence in 2018. Notwithstanding, hydromulching and seeding of temporary landforms (e.g. mine access road versions etc.) will be undertaken across the site to minimise erosion and sediment management.

7.1 EROSION AND SEDIMENT MANAGEMENT

Initial erosion and sediment control measures implemented on-site include the construction of an environmental dam in 2004 and installation of the high-level spillway for the dam in 2005. Following this, regular inspections of these structures to assess cover growth and stability and to ensure there is sufficient capacity for sediment containment, have been undertaken.

General erosion and sediment management measures undertaken in the reporting period included:

- installation of sediment fences in the MPO boundary;
- installation of rock checks and sediment traps;
- reparation of existing farm dams in the MPO boundary; and
- construction of an environmental dam in the MIA (EDMIA).

7.2 TOPSOIL STRIPPING, LANDSCAPE AND LAND MANAGEMENT

As described in Section 3.1, fences within the MIA were removed prior to construction commencing and various fence lines were introduced in the MPO boundary. Topsoil stripping occurred over an area of approximately 7.43 ha for the proposed mine access road. This topsoil was stored within the topsoil stockpile area.

Weed and pest control measures undertaken during the reporting period are outlined in Section 5.5.2.

7.3 BUSHFIRE MANAGEMENT

The main objectives of bushfire management at the MPO are to minimise the risk of bushfires and to rapidly control any outbreaks that might occur. Control measures are in place to:

- minimise potential spreading of bushfires in and around the MPO;
- protect people, property and assets;
- protect areas of heritage value; and
- protect areas of threatened fauna and/or flora.

The control measures implemented to prevent and manage bushfires focus on minimising the amount of fuel available at the MPO and its surrounding land. These measures include:

- slashing of vegetation along roads and internal tracks which are used as fire trails and assist dividing the site into control zones;
- the use of livestock to reduce pasture based fuel loads on land suitable for grazing; and
- a network of water supply points to assist the NSW Rural Fire Service with logistical support.

During the reporting period, the following activities were undertaken in respect to fire preparation:

- maintenance of approximately 20 km of boundary and roadside firebreaks;
- maintenance of approximately 5 km of internal firebreaks and trails; and
- slashing of paddocks in the MPO boundary to control bushfire risk.

On 20 December 2016, a grassfire occurred along Wybong Road, in the south-east corner of ML 1645 (Figure 2). The fire was caused by the malfunction of a quad bike owned by an adjacent landowner and was not caused by MACH personnel or operations. Approximately 10 fire-fighting units from the NSW Rural Fire Service worked to control the fire. These units were assisted by an MPO water cart. No damage to infrastructure or livestock occurred as a result of the fire.

No further bush or grass fires occurred during the reporting period.

8 COMMUNITY

MACH Energy's approach to community relations is focused on extending and strengthening the relationships that Mount Pleasant representatives have already formed with the local community. Principles, expectations and targets for using locals, Aboriginal workers (7.5%) and women (20%), have been included within contracts relating to work on-site. Furthermore, nearly $1.5 million (M) worth of purchase orders have been issued to businesses in the Muswellbrook area during the reporting period.

During the reporting period, MACH Energy undertook community relations in five key areas: communication, consultation and engagement, community development, business development, and relationships with the local Aboriginal community. These activities are outlined in detail in the following sections.

8.1 COMMUNICATION

A number of points of communication have been established with the community. Members of the local community are encouraged to engage MACH Energy in the way that proves most convenient for them.

MACH Energy maintains a website (http://machenergyaustralia.com.au/) which is used to provide information to stakeholders and interested parties about the operation and environmental performance of the MPO. Information provided on the website includes key environmental management documentation, monthly environmental monitoring reports, an environmental complaints register which is updated on a monthly basis, and CCC meeting minutes.

MACH Energy maintains a Community Hotline (1800 886 889) that is dedicated to the receipt of community complaints, enquiries or information. The Community Hotline is publicly advertised in a variety of MACH Energy's public communication tools and will be available during construction and operating hours, to receive any complaints or enquiries from anyone seeking information about the MPO. Communication received from the hotline is recorded in a Community and Stakeholder Engagement Database. This database records all necessary information regarding the nature of the communication, and if necessary, any action taken by MACH Energy as a result of the communication.

Since acquisition of the hotline (4 August 2016), MACH Energy has received 99 calls from 56 individuals in the local community. The majority of calls were enquiries and requests for information. Four community complaints were received during this time and related to:

- supplier options;
- closure of roads (Local Council strategy for mines in the area);
- selection process for allocating Aboriginal parties to clearance work; and
- a requested property acquisition outside the zone of acquisition.

Calls to the hotline peaked upon commencement of work on-site and generally related to the removal of artefacts from within the AHIP #C0002053 footprint and discussions about land uses. In total, 40% of calls were linked to the removal of artefacts, while 19% related to land uses. Multiple Aboriginal parties requested information about the selection process used to allocate work. The approach used by Coal & Allied during previous archaeological studies at site was adopted during the nine-week clearance work. This methodology was described in the Terms of Reference and posted to all RAPs prior to work commencing, including those who sought clarity through the hotline. Discussions about land access primarily related to managing properties owned by MACH Energy (ML and offset land) and interest for maintaining interface land/infrastructure and purchasing property.

Potential suppliers, contractors and employees from Australia and overseas often use the hotline to access MPO updates or to register their interest for particular scopes of work. From 26 January to 31 December 2016, 220 callers made contact with MACH Energy via the hotline in relation to these interests. The months of February, August and September attracted the most calls which reflected interest triggered by the sale of the MPO.

MACH Energy maintains a shop front at 77 Bridge Street Muswellbrook, which is open for community consultation regarding the MPO. This shop front was used to host CCC meetings during the reporting period. In the reporting period, a media release regarding the sale of the MPO was released and is available on the MACH Energy website.

8.2 CONSULTATION AND ENGAGEMENT

A CCC is administered by MACH Energy, with a membership comprised of an independent chair, as well as appropriate representation from MACH Energy and the general community. The CCC is operated in general accordance with the *Community Consultative Committee Guidelines* (DP&E, 2016).

In 2016, the CCC met seven times during February, March, May, July, September, October and December. These meetings provided regular updates about the MPO, as well as an avenue to discuss aspects of the MPO which concerned community stakeholders. Specific discussions from these meetings related to:

- implications linked to the change of ownership and intention to develop the MPO;
- progress of the Wybong Road upgrade;
- employment and supplier opportunities;
- current status of approvals, management plans and supporting environmental documents; and
- land management activities.

MACH Energy invites a range of its team members to present updates to the committee as direct contact enhances the two-way communication between both parties. During the final meeting of 2016 committee members provided positive feedback about the information shared with the committee.

Full meeting minutes for the 2016 CCC meetings are provided on the MACH Energy website (Section 8.1).

8.3 COMMUNITY DEVELOPMENT

As part of acquisition of the MPO, MACH Energy has maintained the Aboriginal Community Development Fund (ACDF) developed by Coal & Allied. The fund was a community benefit specified in the Native Title Agreement made with the Wonnarua People in 2005. Since its commencement in 2006, the ACDF has contributed more than $4 M into projects which benefit the Upper Hunter Valley Aboriginal community.

Since the acquisition, MACH Energy representatives have joined the existing ACDF community members to administer funds, manage its current projects and to seek-out new partnerships. Partnerships formed in 2016 as part of the ACDF are presented in Table 22.

Table 22
Aboriginal Community Development Fund Partnerships

Partner	Description
Many Rivers Microfinance	A not-for-profit microenterprise organisation which assists Indigenous and other Australians to establish and develop small businesses.
Gundi Programme – St Helier's Correctional Centre	Launched in mid-2011 with the aim of helping Indigenous inmates gain trade skills while in custody and secure jobs post release. Through funding from Housing NSW and Corrections NSW the project builds culturally appropriate housing for remote Aboriginal communities, provides building qualifications and work experience for inmates whilst in custody and supports them towards employment upon release.
Muswellbrook South School – Warrae Wanni School Readiness Program	A school readiness programme for children three to five years that is instilling the value of early education and preparing Aboriginal children and their families for entry to kindergarten. The programme commenced in 2010 – since then, participant numbers have increased significantly, results have been impressive and the programme is working effectively with the Parents and Learning programme (another ACDF funded partnership).
Polly Farmer Foundation – Enrichment Centre	Graham (Polly) Farmer Foundation assists aspiring Aboriginal students who have the capacity to complete school, but potentially in the absence of additional support, are unlikely to do so. Project staff work closely with students to provide them with intensive and targeted support throughout their secondary schooling.
Parents and Learning (PAL)	The PAL program builds capacity in Indigenous communities by supporting parents to become engaged in their children's learning, especially in the development of early literacy and numeracy skills. PAL kits are provided to parents who are taught to use the kits as well as techniques to encourage full engagement of their children in their learning.

During the reporting period, MACH Energy appointed a new Chair to the CCC following the sale of the MPO. MACH Energy's appointment of Deirdre Heitmeyer as the new Chair was made in mid-September 2016 after receiving support from the existing committee members. Deirdre is a Koamu woman who is part of the stolen generation and a leading educator in NSW. MACH Energy has appointed two internal resources to join the committee, including an Executive Officer and financial representative. Following the acquisition of Mount Pleasant, committee members accepted MACH Energy's invitation to remain members of the committee until 30 September 2018.

8.4 BUSINESS DEVELOPMENT

On 31 August 2016, the Muswellbrook Chamber of Commerce & Industry hosted an event to introduce MACH Energy to local businesses. More than 80 members of the local community attended the event and were given the opportunity to meet and consult with management staff involved at the MPO. MACH Energy intends to introduce local businesses to contractors once work has been awarded. An informal gathering was held on 14 December and plans are underway for another event to be conducted in early 2017.

The contact details for contractors who have been awarded work at site are also shared with those who show interest sub-contracting or providing supply options.

8.5 RELATIONSHIPS WITH LOCAL ABORIGINAL COMMUNITY

MACH Energy works closely with the local Aboriginal community, including undertaking regular consultation with the RAPs.

The list of RAPs identified for the MPO was based on previous consultation undertaken for the original EIS (ERM Mitchell McCotter, 1997), the MPO Modification EA (EMGA Mitchell McLennan, 2010), the applications (including variations and transfer applications) for AHIP #C0002053 and AHIP #C0000247, and the on-going management of Aboriginal heritage on-site. MACH Energy maintains a contact register, containing up to date contact details for the 84 RAPs, and is committed to maintaining on-going consultation with these RAPs throughout the life of the MPO.

During 2016, two meetings were held with the RAPs in August and December. On 11 August 2016, Coal & Allied held a meeting with the RAPs regarding the application for AHIP #C0002053 and the Aboriginal Heritage Conservation Strategy. On 13 December 2016, MACH Energy held a meeting regarding preparation of a revised draft of the Aboriginal Heritage Management Plan and Aboriginal Heritage Conservation Strategy. Prior to acquisition, Coal & Allied held numerous meetings in Bulga with the Aboriginal Cultural Heritage Working Group. This included meetings on 17 March, 28 April and 9 June 2016, which were also attended by representatives of MACH Energy.

The currently approved ACHMP requires the use of Administrative Coordinators for the provision of administrative services associated with the management of aboriginal heritage at the MPO. In 2016, Administrative Coordinators were sourced from the Aboriginal community and assisted in selecting appropriate RAPs for use in field work undertaken (Section 5.6.2).

During 2016, appropriate notice was given to RAPs before the salvage works described in Section 5.6 were commenced, and, as described in Section 5.6.2, RAPs had a strong presence in the works being undertaken. A number of RAPs were selected as suitably qualified, and assisted in the field work undertaken as representatives of the local Aboriginal community.

9 INDEPENDENT ENVIRONMENTAL AUDIT

No Independent Environmental Audit or one-on-one compliance review was required to be undertaken in the reporting period.

On 6 January 2014, in a letter to Coal & Allied, the DP&E approved an amendment to Condition 9, Schedule 5 of Development Consent DA 92/97, allowing the provision of a one-on-one compliance review in place of an independent environmental audit, prior to construction:

The Independent Environmental Audit requirements for Mt Pleasant mine site will be as follows:

- *A one-on-one compliance review will be undertaken as suggested in your letter by the end of March 2014. Any outcomes of this review will be completed in a time agreed to during the review;*
- *Further one-on-one reviews will be undertaken every 3 years from March 2014 whilst construction works for the mine are yet to commence;*
- *Should construction commence then a full Independent Environmental Audit will be undertaken within 12 months of the date of commencement and every 3 years thereafter, as described in Condition 9, Schedule 5. The Director General approves this change to auditing requirements, but reserves the right to make further changes if required.*

To satisfy the above requirement, Coal & Allied submitted a compliance review to the DP&E on 13 March 2014. Observations from the 2014 Compliance Review and a summary of how these observations have been subsequently addressed are provided in Table 23.

As construction commenced on 25 November 2016, MACH Energy is required to commission and pay the full cost of an Independent Environmental Audit by 25 November 2017.

Table 23
Compliance Summary

Development Consent DA 92/97	Condition	Observation	Action/Comment
Schedule 3, Condition 8	Regularly assess the real-time noise monitoring and meteorological forecasting data and relocate, modify, and/or stop operations on site to ensure compliance with the relevant conditions of this consent.	*Observation: environmental monitoring results need to be extracted/copied from the annual review and separately added to website in new section to be more user friendly.*	Environmental monitoring results are available on the MACH Energy website (http://machenergyaustralia.com.au).
Schedule 3, Condition 9	The Applicant shall prepare and implement a Noise Management Plan for the development to the satisfaction of the Director-General.	*Observation: Plan yet to be approved, undergoing review by Coal & Allied. P&I satisfied with the progress.*	The CNMP was approved in December 2015.
Schedule 3, Condition 23	The Applicant shall prepare and implement an Air Quality and Greenhouse Gas Management Plan for the development to the satisfaction of the Director- General.	*Observation: Plan yet to be approved, undergoing review by Coal & Allied. P&I satisfied with the progress.*	The CAQMP was approved in October 2015.
Schedule 3, Condition 32	The Applicant shall prepare and implement a Biodiversity Management Plan for the development to the satisfaction of the Director-General.	*Observation: P&I have requested all mining companies to review their respective BMPs. MTP will undertake this review and also add an agenda item to a CCC meeting to ask the members their views on the current land management of the MTP footprint.*	As described in the 2014 and 2015 Annual Reviews (Coal & Allied, 2015; 2016), Biodiversity Management Plan land usage was a standing agenda item in previous CCC meetings. A contemporary version of the Biodiversity Management Plan is currently under preparation and will be submitted in 2017.
Schedule 3, Condition 36	The Applicant shall prepare and implement an Aboriginal Heritage Management Plan for the development to the satisfaction of the Director-General.	*Observation: Plan yet to be approved, undergoing review by Coal & Allied. P&I satisfied with the progress.*	The ACHMP was approved in August 2015.
Schedule 5, Condition 11	The Applicant shall make the following information publicly available on its website.	*Observation: environmental monitoring results need to be extracted/copied from the annual review and separately added to website in new section to be more user friendly.*	Environmental monitoring results are available on the MACH Energy website (http://machenergyaustralia.com.au).

10 INCIDENTS AND NON-COMPLIANCES DURING THE REPORTING PERIOD

No official cautions, warning letters, penalty notices or prosecution proceedings in regards to the MPO were received in 2016.

MACH Energy did not report any incidents and did not record any non-compliances during the reporting period.

11 ACTIVITIES TO BE COMPLETED IN THE NEXT REPORTING PERIOD

As described in Section 2.1, a suite of contemporary operational management plans is currently under preparation by MACH Energy and is planned for approval in 2017. These management plans are being prepared in line with contemporary standards, to improve the environmental and community performance of the MPO, and to be consistent with current best practice. Key management measures proposed to be implemented during the next reporting period from these management plans include:

- the replacement of the TEOM air quality monitoring systems with Palas Fidas systems (Section 5.4.4). The Palas Fidas systems will continuously measure PM_{10}, TSP and $PM_{2.5}$ levels;
- the implementation of three HVAS systems which will continuously measure PM_{10} for 24 hours, once every six days;
- the addition of six surface water monitoring sites to the surface water monitoring network;
- the implementation of biannual stream health monitoring at four locations on watercourses surrounding the MPO boundary. This includes a new stream health monitoring location on Sandy Creek; and
- the development of design concepts to improve the integration of final landforms into regional landforms.

12 REFERENCES

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Coal & Allied Operations Pty Ltd (2007) *Hunter Valley Operations – Bushfire Management Plan*.

Coal & Allied Operations Pty Ltd (2014) *Mount Pleasant Project Annual Review 2013.*

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Department of Planning and the Environment (2015) *Post-approval requirements for State significant mining developments - Annual Review Guideline – October 2015.*

Department of Planning and the Environment (2016) *Community Consultative Committee Guidelines.*

EMGA Mitchell Mclennan (2010) *Mount Pleasant Project Modification Environmental Assessment Report.* Prepared for Coal and Allied Operations Pty Limited.

Environmental Resources Management Mitchell McCotter (1997) *Mt Pleasant Mine Environmental Impact Statement*.

NSW Minerals Council (2000) *Technical Paper – Particulate Matter and Mining Interim Report.*

Rio Tinto Australia (2011) *Mount Pleasant Open Cut Coal Mine Aboriginal Cultural Heritage Management Plan.*

APPENDIX A

CONSTRUCTION NOISE MONITORING, DECEMBER 2016

Mount Pleasant Operation

Construction Noise Monitoring

December 2016

Prepared for

MACH Energy Australia Pty Ltd

Global Acoustics

Noise and Vibration Analysis and Solutions

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Mount Pleasant Operation

Construction Noise Monitoring
December 2016

Reference: 16468_R01_Draft01
Report date: 19 January 2017

Prepared for

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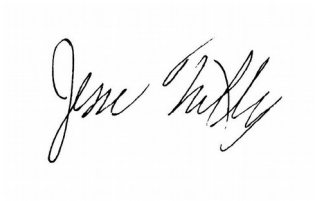

Prepared:	Jesse Tribby Scientist (Acoustics)	QA Review:	Katie Weekes Environmental Scientist (Acoustics)

Global Acoustics Pty Ltd ~ Environmental noise modelling and impact assessment ~ Sound power testing ~ Noise control advice ~ Noise and vibration monitoring ~ OHS noise monitoring and advice ~ Expert evidence in Land and Environment and Compensation Courts ~ Architectural acoustics ~ Blasting assessments and monitoring ~ Noise management plans (NMP) ~ Sound level meter and noise logger sales and hire

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Appendices

1 INTRODUCTION

1.1 Background

Global Acoustics was engaged by MACH Energy Australia to conduct construction noise monitoring around the development of Mount Pleasant Operation (MTP) near Muswellbrook NSW.

Construction noise monitoring as described in this report was undertaken during the day of 19 December 2016 at six monitoring locations, in accordance with the MTP 'Construction Noise Management Plan' (CNMP).

The purpose of the survey was to quantify and describe the acoustic environment around the site and compare results with specified limits.

1.2 Attended Noise Monitoring Locations

Monitoring locations are detailed in Table 1.1 and shown on Figure 1. It should be noted that this figure shows the actual monitoring position, not the location of residences. Monitoring locations were selected to represent Noise Affected Groups (NAG) as detailed in the CNMP. The location of each NAG is shown in Appendix A of this report.

Table 1.1: ATTENDED NOISE MONITORING LOCATIONS

Descriptor	NAG Represented	Monitoring Location
N-AT1	1	120 Roxburgh Road
N-AT2	2	Castlerock Road, Kayuga
N-AT3	3/4/5	Wiltons Lane, Kayuga
N-AT4	6/7	381 Wybong Road, Muswellbrook
N-AT5	8/9	Logues Lane, Muswellbrook
N-AT6	10/11	599 Roxburgh Road, Mangoola

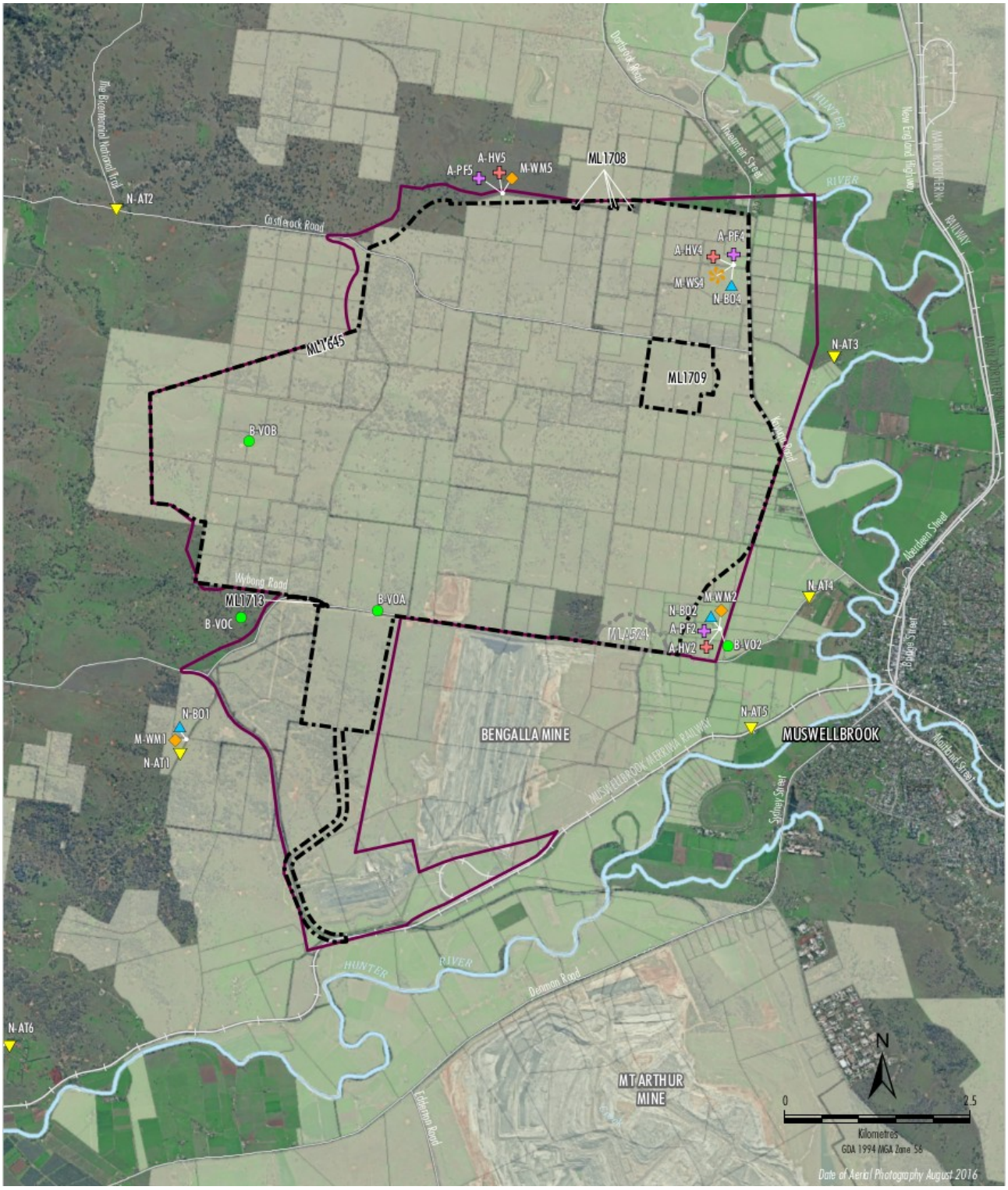


Figure 1: Mount Pleasant Construction Noise Monitoring Locations

1.3 Terminology & Abbreviations

Some definitions of terms and abbreviations, which may be used in this report, are provided in Table 1.2.

Table 1.2: TERMINOLOGY & ABBREVIATIONS

Descriptor	Definition
L_A	The A-weighted root mean squared (RMS) noise level at any instant
L_{Amax}	The maximum A-weighted noise level over a time period or for an event
L_{A1}	The noise level which is exceeded for 1 per cent of the time
L_{A10}	The noise level which is exceeded for 10 percent of the time, which is approximately the average of the maximum noise levels
L_{A50}	The noise level which is exceeded for 50 per cent of the time
L_{A90}	The level exceeded for 90 percent of the time, which is approximately the average of the minimum noise levels. The L_{A90} level is often referred to as the "background" noise level and is commonly used to determine noise criteria for assessment purposes
L_{Amin}	The minimum A-weighted noise level over a time period or for an event
L_{Aeq}	The average noise energy during a measurement period
dB(A)	Noise level measurement units are decibels (dB). The "A" weighting scale is used to describe human response to noise
SPL	Sound pressure level (SPL), fluctuations in pressure measured as 10 times a logarithmic scale, the reference pressure being 20 micropascals
Hertz (Hz)	Cycles per second, the frequency of fluctuations in pressure, sound is usually a combination of many frequencies together
VTG	Vertical temperature gradient in degrees Celsius per 100 metres altitude. Estimated from wind speed and sigma theta data
IA	Inaudible. When site noise is noted as IA then there was no site noise at the monitoring location
NM	Not Measurable. If site noise is noted as NM or <30 dB, this means some noise was audible but could not be quantified
Day	This is the period 7:00am to 6:00pm
Evening	This is the period 6:00pm to 10:00pm
Night	This is the period 10:00pm to 7:00am

2 PROJECT APPROVAL AND CRITERIA

2.1 Mount Pleasant Project Approval

The most current project approval associated with construction activities at Mount Pleasant Operation is the development application 'DA 92/97 MOD1' (19 September 2011). Sections 1 to 9 of Schedule 3 of the development application detail specific environmental conditions relating to noise related to construction and operation at MTP. Relevant sections of the project approval are reproduced in Appendix A.

2.2 Construction Noise Management Plan

Construction noise monitoring requirements are detailed in the Mount Pleasant 'Construction Noise Monitoring Plan' (CNMP). The most recent version of the CNMP was approved in September 2015. Relevant sections are reproduced in Appendix A.

From Appendix A.4 'Noise monitoring programme' of the CNMP:

> *"Attended monitoring will be completed for a day, collecting 15-minute samples from representative residences most affected by noise from the prevailing activity. "*

The recurrence/frequency of attended monitoring occasions has not been specified, however:

> *"There will be a minimum of two short term attended readings on each monitoring occasion. The instrument will include third-octave band centre frequency filters to aid in removing non-Project related noise. The attendant will be a suitably trained person in the practice of compliance noise monitoring. The attendant will document and quantify the activities contribution to noise levels at the monitoring location. … The instrument will meet Australian Standard Type 1 class sound meter specifications."*

Consecutive 15-minute measurements have been taken at each location during the day period (7:00am to 6:00pm), as construction activities are only scheduled for this period.

2.3 Construction Noise Criteria

Construction noise criteria, sourced from the CNMP, are detailed in Table 2.1.

Table 2.1: CONSTRUCTION NOISE CRITERIA, dB

Descriptor	Monitoring Location	NAG	NAG Criteria $L_{Aeq,15min}$ [1]	Applicable Criterion $L_{Aeq,15min}$ [1]
N-AT1	120 Roxburgh Road	1	40	40
N-AT2	Castlerock Road, Kayuga	2	40	40
N-AT3	Wiltons Lane, Kayuga	3/4/5	40/40/46	40
N-AT4	381 Wybong Road, Muswellbrook	6/7	42/45	42
N-AT5	Logues Lane, Muswellbrook	8/9	46/44	44
N-AT6	599 Roxburgh Road, Mangoola	10/11	40/42	40

Notes:

1. *The most conservative NAG criterion represented by each monitoring location was selected.*

2.4 Meteorological Conditions

The CNMP outlines meteorological conditions that need to be met in order for noise criteria to apply. As outlined in Appendix A.4 of the CNMP:

> *"Weather conditions including wind speed at the microphone position will be quantified and any data collected during wind speeds above 5 m/s at the microphone will be deemed unsuitable. Similarly, 10m elevation wind speed, wind direction, and sigma-theta data will be report for the during of monitoring using the Project's automatic weather station located as shown in Figure A.1. The weather data will be used for assess compliance."*

2.5 INP Modifying Factors

Noise monitoring and reporting is carried out generally in accordance with the Environment Protection Authority (EPA) 'Industrial Noise Policy' (INP). Chapter 4 of the INP deals specifically with modifying factors that may apply to industrial noise. The most common modifying factors are addressed in detail below.

2.5.1 Tonality, Intermittent and Impulsive Noise

As defined in the Industrial Noise Policy:

> *Tonal noise contains a prominent frequency and is characterised by a definite pitch.*
>
> *Impulsive noise has high peaks of short duration and a sequence of such peaks.*

> *Intermittent noise is characterised by the level suddenly dropping to the background noise levels several times during a measurement, with a noticeable change in noise level of at least 5 dB. Intermittent noise applies to night-time only.*

Years of monitoring have indicated that noise levels from mining operations, particularly those levels measured at significant distances from the source can be relatively continuous. Given this, noise levels from MTP at the monitoring locations are unlikely to be intermittent. In addition, there is no equipment on site that is likely to generate tonal or impulsive noise as defined in the INP.

2.5.2 Low Frequency Noise

INP Method

As defined in the Industrial Noise Policy:

> *Low frequency noise contains major components within the low frequency range (20 Hz to 250 Hz) of the frequency spectrum.*

As detailed in Chapter 4 of the INP, low frequency noise should be assessed by measuring the site only C-weighted and site only A-weighted level over the same time period. The correction/penalty of 5 dB is applied *if the difference between the two levels is 15 dB or more*.

Broner Method

Low frequency noise can also be assessed against criteria specified in the paper 'A Simple Method for Low Frequency Noise Emission Assessment' (Broner JLFNV Vol29-1 pp1-14 2010). If the total predicted C-weighted noise level at a receptor exceeds the relevant criterion, a 5 dB penalty (modifying factor) is added to predicted levels.

2.6 Low Frequency Criteria

As detailed in the notes below Condition 2, Schedule 3 of the project approval:

> *Noise generated by the project is to be measured in accordance with the relevant requirements, and exemptions (including certain meteorological conditions), of the NSW Industrial Noise Policy.*

Low frequency assessment methods and criteria are detailed in Table 2.2.

Table 2.2: LOW FREQUENCY ASSESSMENT METHODS AND MODIFYING FACTOR TRIGGERS

Assessment Method	Calculation Method	Night Period Modifying Factor Trigger	Day Period Modifying Factor Trigger
Broner, 2010	Site only L_{Ceq}	>60	>65
INP, total	Site only L_{Ceq} minus site only L_{Aeq}	>=15	>=15

The EPA is currently undertaking a review of the assessment of low frequency noise. While a Draft Industrial Noise Guideline (ING) was released in September 2015, low frequency noise results from MTP have been compared to the assessment methods and modifying factor triggers presented above. The applicability of these triggers have been considering when applying low frequency modifying factor corrections.

3 METHODOLOGY

3.1 Overview

Attended monitoring was conducted in accordance with the Environment Protection Authority (EPA) 'Industrial Noise Policy' (INP) guidelines and Australian Standard AS1055 'Acoustics, Description and Measurement of Environmental Noise'. Atmospheric condition measurement was also undertaken.

Meteorological data was obtained from the MTP weather station. This data allowed correlation of atmospheric parameters and measured noise levels.

3.2 Attended Noise Monitoring

The duration of each measurement was 15 minutes. During this survey attended environmental noise monitoring was undertaken during the day period, twice at each location.

Attended monitoring is preferred to the use of noise loggers when determining compliance with prescribed limits as it allows an accurate determination of the contribution, if any, to measured noise levels by the source of interest (in this case Mount Pleasant Operation).

The terms 'Inaudible' (IA) or 'Not Measurable' (NM) may be used in this report. When site noise is noted as IA, no site noise was audible at the monitoring location. NM indicates that some site noise was audible, but indeterminate due to one of the following reasons:

- site noise levels were insignificant and unlikely, in many cases, to be even noticed; or
- site noise levels were masked by another relatively loud noise source, but were estimated to be less than L_{Aeq} 30 dB, which is insignificant in terms of any applicable criterion.

If site noise were NM due to masking but estimated to be significant in relation to a relevant criterion, we would employ methods as per the Industrial Noise Policy (e.g. measure closer and back calculate) to determine a value for reporting. All sites noted NM in this report are due to insignificant absolute values.

3.3 Attended Noise Monitoring Equipment

Table 3.1 lists the equipment used to measure environmental noise levels. Calibration certificates are provided in Appendix B.

Table 3.1: ATTENDED NOISE MONITORING EQUIPMENT

Model	Serial Number	Calibration Due Date
Rion NA-28 sound level analyser	30921858	23/06/2017
ARL ND-9 acoustic calibrator	N435847	26/02/2018

4 RESULTS

4.1 Operational Information

Planned construction activities during the month of December 2016 were supplied by MTP and are detailed in Table 4.1.

Table 4.1: MTP CONSTRUCTION ACTIVITIES – DECEMBER 2016

Site	Equipment	Period
Construction Pad & Mine Access Road	CAT D6 bulldozer	Continuous (Day)
	CAT D10 bulldozer	Continuous (Day)
	Vibrating roller	Continuous (Day)
	Compactor	Continuous (Day)
	Pumping	Intermittent (Day)
	Water cart	Continuous (Day)

4.2 Attended Noise Monitoring

Overall noise levels measured at each location during attended measurements are provided in Table 4.2.

Table 4.2: MEASURED NOISE LEVELS – DECEMBER 2016

Location	Start Date and Time	L_{Amax} dB	L_{A1} dB	L_{A10} dB	L_{A50} dB	L_{Aeq} dB	L_{A90} dB	L_{Amin} dB	L_{Ceq} dB
N-AT1	19/12/2016 14:23	50	48	44	39	41	37	33	61
N-AT1	19/12/2016 14:38	55	50	43	39	41	37	34	61
N-AT2	19/12/2016 12:47	51	46	41	34	37	29	24	53
N-AT2	19/12/2016 13:02	53	46	41	33	37	29	25	54
N-AT3	19/12/2016 11:35	57	44	42	40	41	39	37	59
N-AT3	19/12/2016 11:50	64	46	43	41	42	39	37	58
N-AT4	19/12/2016 10:47	85	72	47	39	60	35	31	64
N-AT4	19/12/2016 11:02	82	77	51	41	61	36	31	67
N-AT5	19/12/2016 10:07	49	42	40	38	38	36	34	53
N-AT5	19/12/2016 10:22	57	52	42	39	42	37	35	54
N-AT6	19/12/2016 13:43	56	54	52	45	48	41	39	62
N-AT6	19/12/2016 13:58	55	52	50	43	46	41	37	60

Notes:

1. *Levels in this table are not necessarily the result of activity at MTP.*

Table 4.3 compares measured $L_{Aeq,15minute}$ levels for MTP with construction noise criteria detailed in the CNMP.

Table 4.3: $L_{Aeq,15minute}$ GENERATED BY MTP AGAINST CONSTRUCTION NOISE CRITERIA – DECEMBER 2016

Location	Start Date and Time	Wind Speed m/s	Rainfall mm	Criterion dB	Criterion Applies [1]	MTP L_{Aeq} dB [2,4]	Exceedance dB [3,4]
N-AT1	19/12/2016 14:23	3.7	0	40	Yes	IA	Nil
N-AT1	19/12/2016 14:38	5.6	0	40	No	IA	NA
N-AT2	19/12/2016 12:47	4.3	0	40	Yes	IA	Nil
N-AT2	19/12/2016 13:02	3.8	0	40	Yes	IA	Nil
N-AT3	19/12/2016 11:35	3.1	0	40	Yes	IA	Nil
N-AT3	19/12/2016 11:50	2.7	0	40	Yes	IA	Nil
N-AT4	19/12/2016 10:47	2.7	0	42	Yes	IA	Nil
N-AT4	19/12/2016 11:02	3.0	0	42	Yes	IA	Nil
N-AT5	19/12/2016 10:07	2.2	0	44	Yes	IA	Nil
N-AT5	19/12/2016 10:22	2.7	0	44	Yes	IA	Nil
N-AT6	19/12/2016 13:43	3.5	0	40	Yes	IA	Nil
N-AT6	19/12/2016 13:58	4.2	0	45	Yes	IA	Nil

Notes:

1. *Noise emission limits do not apply during periods of rainfall or winds greater than 5 metres per second (at a height of 10 metres);*
2. *Estimated or measured $L_{Aeq,15minute}$ attributed to MTP;*
3. *NA in exceedance column means atmospheric conditions outside those specified in project approval and so criterion is not applicable; and*
4. *Bolded results in red indicate exceedance of criteria.*

4.3 Low Frequency Assessment

Table 4.4 provides statistics for attended noise monitoring undertaken around MTP during December 2016.

Table 4.4: ATTENDED MEASUREMENT STATISTICS FOR MOUNT PLEASANT OPERATIONS – DECEMBER 2016

Conditions	Total for December 2016
Number of measurements	12
Number of measurements where criterion applied	11
Number of measurements where MTP was measurable, was within 5 dB of the criterion and criterion applied	0

None of the twelve measurements occurred during which construction activities from MTP were directly measurable (not "inaudible", "not measurable" or less than a maximum cut-off value of 30 dB), was within 5 dB of the relevant criterion and where meteorological conditions resulted in criteria applying (in accordance with the project approval). No further assessment of low frequency noise was required.

4.4 Atmospheric Conditions

Atmospheric condition data measured by the operator at each location using a Kestrel hand-held weather meter is shown in Table 4.5. Atmospheric condition data is routinely recorded on a site-by-site basis to show conditions near the microphone during the monitoring period. The wind speed, direction and temperature were measured at 1.8 metres.

Table 4.5: MEASURED ATMOSPHERIC CONDITIONS – DECEMBER 2016

Location	Start Date and Time	Temperature ° C	Wind Speed m/s	Wind Direction ° MN	Cloud Cover 1/8s
N-AT1	19/12/2016 14:23	26	2.1	75	1
N-AT1	19/12/2016 14:38	27	2.6	130	1
N-AT2	19/12/2016 12:47	25	1.3	105	1
N-AT2	19/12/2016 13:02	25	1.4	150	1
N-AT3	19/12/2016 11:35	23	2.4	95	1
N-AT3	19/12/2016 11:50	25	2.1	110	1
N-AT4	19/12/2016 10:47	23	2.6	145	1
N-AT4	19/12/2016 11:02	24	1.2	225	1
N-AT5	19/12/2016 10:07	24	0.8	150	1
N-AT5	19/12/2016 10:22	26	0.8	165	1
N-AT6	19/12/2016 13:43	28	1.1	180	1
N-AT6	19/12/2016 13:58	29	1.5	135	1

Notes:

1. *Temperature, wind speed and direction measured at 1.8 metres.*

MTP weather station data is used to determine compliance with specified noise criteria.

5 SUMMARY OF COMPLIANCE

A monthly construction noise survey was conducted around Mount Pleasant Operation during the day period of 19 December 2016.

The survey purpose is to quantify and describe the existing acoustic environment around the mine project and compare results with relevant construction limits.

5.1 Construction Noise Assessment

Construction noise levels from Mount Pleasant Operation complied with $L_{Aeq,15minute}$ criteria at all monitoring locations during the December 2016 monitoring.

5.2 Low Frequency Assessment

None of the twelve measurements during the December 2016 survey occurred when MTP was measurable (not "inaudible", "not measurable or less than a maximum cut-off value of 30 dB), was within 5 dB of the relevant criterion and where meteorological conditions resulted in criteria applying (in accordance with the project approval). No further assessment of low-frequency noise was required.

Global Acoustics Pty Ltd

APPENDIX

A PROJECT APPROVAL AND NOISE MANAGEMENT PLAN

A.1 MOUNT PLEASANT PROJECT APPROVAL (DA 92/97)

SCHEDULE 3
ENVIRONMENTAL PERFORMANCE CONDITIONS

ACQUISITION UPON REQUEST

1. Upon receiving a written request for acquisition from the owner of the land listed in Table 1, the Applicant shall acquire the land in accordance with the procedures in conditions 6-7 of schedule 4.

Table 1: Land subject to acquisition upon request

Receiver	Receiver
43, 44 – J.B. Moore	143, 161, 237 – J.S. & N.M. Lonergan
45 – B.A. & T.E. Strachan	147 – M.J. & R.G. Adnum
47 – B.L. & M.L. Bates	156 – J.E. & J.L. Lonergan
67 – J.M. Simpson	158 – J.M. Hoath
96 – R.P. Grey	159, 236 – J.E. & M.S. Ducey
101 – C. Austin	129 – R.M. & S.D. Farrell
102 – A. Mather	130 – M.J. Farrell
107 – B.L. Wilton	135, 309 – K.J. & G.M. Yore
108 – J.S. Gibson	146 – C.R & N.J. Hoath
112 – B.D. Barry	153 – G.M. Casey
118 – J. & C. Hayes	157 – R.B. Parkinson & S.A. Peberdy
120, 308 – D.L. & P.A. Moore	229 – C. Horne
121 – C & J.M. Moore	263 – R.R. & J.M. Hamilton
137, 138 A – D.H. MacIntyre	C – P.M. Yore
D – S. Yore	

Notes:

- *To identify the locations referred to in Table 1, see the figures in Appendix 5; and*
- *All land is noise affected, except receiver 67 which is air quality affected.*

ADDITIONAL NOISE AND DUST MITIGATION UPON REQUEST

2. Upon receiving a written request from the owner of any residence on the land listed in Table 1 or Table 2, the Applicant shall implement additional noise and/or dust mitigation measures (such as double-glazing, insulation, air filters, first flush roof water drainage system and/or air conditioning) at the residence in consultation with the landowner. These measures must be reasonable and feasible and related to the noise and/or dust impacts on the residence.

If within 3 months of receiving this request from the owner, the Applicant and the owner cannot agree on the measures to be implemented, or there is a dispute about the implementation of these measures, then either party may refer the matter to the Director-General for resolution.

Table 2: Land where additional noise mitigation measures are available on request

Receiver	Receiver
68 – Googe	203 – Millard
74 – Sormaz	205 – Dapkos Pty Ltd
77 – Purser	231 – Wicks
78, 80 – W.J. Adnum	240 – MacIntyre
79 – W.J. & D.W. Adnum	242 – Raphael
86, 290 – Cowtime Investments Pty Ltd	257 – Lane
139 – Upton	258 – Ellis
140 – Dapkos Pty Limited	259 – Peel
154 – Standing	279 – Parkinson

Note: To identify the locations referred to in Table 2, see the figures in Appendix 5.

NOISE

Noise Criteria

3. Except for the noise-affected land referred to in Table 1, the Applicant shall ensure that the noise generated by the development does not exceed the criteria in Table 3 at any residence on privately-owned land or on more than 25 percent of any privately-owned land.

Table 3: Noise criteria dB(A)

Location		Day	Evening	Night	
		$L_{Aeq(15min)}$	$L_{Aeq(15min)}$	$L_{Aeq(15min)}$	$L_{A1(1min)}$
NAG 1	260, 261	37	37	37	45
	258	40	40	40	45
	259	39	39	39	45
	All other privately-owned land	35	35	35	45
NAG 2	272	36	36	36	45
	All other privately-owned land	35	35	35	45
NAG 3	139, 154, 240	40	40	40	45
	241	39	39	39	45
	All other privately-owned land	35	35	35	45
NAG 4	169	36	36	36	45
	All other privately-owned land	35	35	35	45
NAG 5	All privately-owned land	41	40	39	45
NAG 6	205	41	41	41	45
	203, 242	40	40	40	45
	202	39	39	39	45
	204	38	38	38	45
	All other privately-owned land	37	37	37	45
NAG 7	68, 74, 279	43	42	42	45
	86, 290	42	42	42	45
	77	42	41	41	45
	79, 80, 231	41	41	41	45
	78	41	40	40	45
	All other privately-owned land	40	37	37	45
NAG 8	35	42	41	41	45
	289	41	40	40	45
	23, 84	40	40	40	45
	All other privately-owned land	41	39	39	45
NAG 9	All privately-owned land	39	38	37	45
NAG 10	All privately-owned land	35	35	35	45
NAG 11	All privately-owned land	37	36	35	45
All other privately-owned land		35	35	35	45

Notes:

- *To identify the locations referred to in Table 3, see the figures in Appendices 5 and 6.*
- *Noise generated by the development is to be measured in accordance with the relevant procedures and exemptions (including certain meteorological conditions), of the NSW Industrial Noise Policy.*

However, these criteria do not apply if the Applicant has a written agreement with the relevant landowner to exceed the criteria, and the Applicant has advised the Department in writing of the terms of this agreement.

Noise Acquisition Criteria

4. If the noise generated by the development exceeds the criteria in Table 4 at any residence on privately-owned land or on more than 25 percent of any privately-owned land, then upon receiving a written request for acquisition from the landowner, the Applicant shall acquire the land in accordance with the procedures in conditions 6-7 of schedule 4.

Table 4: Noise acquisition criteria dB(A)

Location	Day	Evening	Night
	$L_{Aeq(15min)}$	$L_{Aeq(15min)}$	$L_{Aeq(15min)}$
All privately-owned land in NAG 1, NAG 2, NAG 3, NAG 4, and NAG 10	40	40	40
All privately-owned land in NAG 5	46	45	44
All privately-owned land in NAG 6	42	42	42
All privately-owned land in NAG 7	45	42	42
All privately-owned land in NAG 8	46	44	44
All privately-owned land in NAG 9	44	43	42
All privately-owned land in NAG 11	42	41	40
All other privately-owned land	40	40	40

Notes:
- *To identify the locations referred to in Table 4, see the figures in Appendices 5 and 6;*
- *Noise generated by the development is to be measured in accordance with the relevant procedures and exemptions (including certain meteorological conditions), of the NSW Industrial Noise Policy; and*
- *For this condition to apply, the exceedances of the criteria must be systematic.*

Cumulative Noise Criteria

5. Except for the noise-affected land referred to in Table 1, the Applicant shall implement all reasonable and feasible measures to ensure that the noise generated by the development combined with the noise generated by other mines in the area does not exceed the criteria in Table 5 at any residence on privately-owned land or on more than 25 percent of any privately-owned land.

Table 5: Cumulative noise criteria dB(A) $L_{Aeq\ (period)}$

Location	Day	Evening	Night
NAG 8, 9	55	45	40
All other privately-owned land	50	45	40

Notes:
- *To identify the locations referred to in Table 5, see the figures in Appendices 5 and 6; and*
- *Cumulative noise is to be measured in accordance with the relevant procedures and exemptions (including certain meteorological conditions) of the NSW Industrial Noise Policy.*

Cumulative Noise Acquisition Criteria

6. If the noise generated by the development combined with the noise generated by other mines in the area exceeds the criteria in Table 6 at any residence on privately-owned land or on more than 25 percent of privately-owned land, then upon receiving a written request for acquisition from the landowner, the Applicant shall acquire the land on as equitable basis as possible with the relevant mines in accordance with the procedures in conditions 6-7 of schedule 4.

Table 6: Cumulative noise acquisition criteria dB(A) $L_{Aeq\ (period)}$

Location	Day	Evening	Night
NAG 8, 9	60	50	45
All other privately-owned land	55	50	45

Notes:
- *To identify the locations referred to in Table 6, see the figures in Appendices 5 and 6;*
- *Cumulative noise is to be measured in accordance with the relevant procedures and exemptions (including certain meteorological conditions), of the NSW Industrial Noise Policy; and*
- *For this condition to apply, the exceedances of the criteria must be systematic.*

Operating Conditions

8. The Applicant shall:
   (a) implement best practice noise management, including all reasonable and feasible noise mitigation measures to minimise the operational, low frequency, and rail noise generated by the development;
   (b) minimise the noise impacts of the development during temperature inversions;
   (c) regularly assess the real-time noise monitoring and meteorological forecasting data and relocate, modify, and/or stop operations on site to ensure compliance with the relevant conditions of this consent; and
   (d) co-ordinate the noise management on site with the noise management at nearby mines (including the Bengalla mine) to minimise the cumulative noise impacts of the mines,

   to the satisfaction of the Director-General.

Noise Management Plan

9. The Applicant shall prepare and implement a Noise Management Plan for the development to the satisfaction of the Director-General. This plan must:
   (a) be submitted to the Director-General for approval prior to carrying out any development on site;
   (b) describe the noise mitigation measures that would be implemented to ensure compliance with the relevant conditions of this consent, including a real-time noise management system that employs both reactive and proactive mitigation measures;
   (c) include a noise monitoring program that:
      - uses a combination of real-time and supplementary attended monitoring to evaluate the performance of the development;
      - includes a protocol for determining exceedances of the relevant conditions of this consent; and
   (d) include a protocol that has been prepared in consultation with the owners of the nearby mines (including the Bengalla mine) to minimise the cumulative noise impacts of the mines.

A.2 MOUNT PLEASANT CONSTRUCTION NOISE MANAGEMENT PLAN

The most recent draft of the Construction Noise Monitoring Program was sent to the Department of Planning for approval in October 2016. Relevant sections are reproduced below.

1. INTRODUCTION

1.1 Description of locality

The Mount Pleasant Project (the Project) is located in the Upper Hunter Valley of New South Wales, approximately three kilometres (km) north-west of Muswellbrook and approximately 50 km north-west of Singleton. The villages of Aberdeen and Kayuga are located 12 km north-north-east and 3 km north of the Project boundary, respectively.

The Project boundary is taken to be that shown as the modified development consent boundary in Figure 3.2 (Figure 1.1 below) of the Project's Development Consent (DA 92/97), as modified.

This Construction Noise Management Plan (CNMP) has been developed per the Statement of Commitments and the Development Consent (DA 92/97) for Coal & Allied Operations Pty Limited's (Coal & Allied) Mount Pleasant Project (the Project). It forms part of the Environmental Management Strategy for the proposed Project.

As permitted by Schedule 2, Section 13 of the Development Consent, the noise management plan is submitted in a staged process. The CNMP will cover the construction stage, approximately the first 18 to 24 months of the project. This stage will cover the construction of all infrastructure, including the CHPP, roads, rail, workshops and other buildings, dam walls, diversion drains, water pipelines, power lines and earthworks.

1.2 Scope of the Construction Noise Management Plan

The scope of the CNMP applies to the Project boundary and all construction activities within it. This includes:

- upgrade of Wybong Road from Bengalla Link Road through to the mine access;
- installation of the Hunter River water supply and associated pipeline;
- establishment of site access roads ;
- temporary facilities required for construction activities, eg offices, workshops, laydown areas;
- construction of all permanent infrastructure, including but not limited to the CHPP, administration buildings, workshops, sediment dams, power lines, haul roads, light vehicle access roads, dam walls, diversion drains, storage areas and fuel farms predominantly located within the Mine Industrial Area as shown on Figure 1.1;
- construction of the standalone rail loop from the Ulan line, and associated load out structures;
- installation of appropriate fencing and barriers to ensure public safety and security for mining and construction.

Construction activities exclude the development of the box-cut and any activities related to the extraction of coal (eg overburden stripping associated with mining).

Representative construction activities have been modelled in detail and these include Wybong Road realignment, Mine Infrastructure Area (MIA) works, rail loop and spur, conveyor between MIA and rail loop, and 66kV power line realignment as shown in Figure 1.1. This was done to produce predicted noise levels at representative assessment locations (ie residences) to quantify potential construction noise levels.

The Development Consent (DA 92/97) includes noise conditions for the operational phase of the project, but does not address the construction phase. Consent conditions that are relevant to construction are represented in Table 1.2 below. The conditions have been updated where they specifically mentioned operational phase aspects. The conditions have been, cross-referenced to the corresponding CNMP sections where they are addressed.

4. EXISTING CHARACTER / IMPACT ASSESSMENT

4.1 Existing Character / Infrastructure and Activities

The Project is located approximately 3 km to the west-north-west of the town of Muswellbrook with its commercial hub and surrounding suburbs. Further south east is South Muswellbrook, which is predominantly a residential area, and the Muswellbrook Racecourse, which includes residential neighbours. To the north-north-east is the town of Kayuga, with residential properties located along its eastern boundary. More isolated residences are located further afield to the east, south west and south.

Located to the south of the Project are the neighbouring mines Bengalla and Mt Arthur Coal, and further to the west, Muswellbrook Coal Company. To the south-east, towards Singleton, are the Bayswater and Liddell power stations, along with a number of other open cut and underground coal mines.

Land-use in the vicinity of the Project includes coal mining, grazing, viticulture and rural residential holdings. Other features of interest include the Hunter River Valley which is in a general north to south alignment in this area and intersects with the general north-west to south-east alignment of the Hunter Valley.

The terrain surrounding the Project is dominated by the Hunter Valley landform which is, for the most part, gently undulating within the valley with steeper slopes found along the valley walls. Much of the higher ground and steeper slopes retain moderately dense woodland cover which forms part of the national parks and state forests found within the region.

4.2 Impact Assessment Criteria

4.2.1 Introduction

Noise impacts as a result of construction activities may potentially affect residences to the west and south west of the infrastructure areas, including the rail loop, and residences to the east and south east of the power line realignment works.

The sources of noise during construction and early works may include:

- vegetation clearing and grubbing and topsoil stripping using dozers and other earthmoving equipment;
- excavation and transport of soil and fill;
- equipment used for general construction and handling of materials for the construction of the rail loop, CHPP, 66kV power line realignment and upgrade of Wybong Road from Bengalla Link Road through to the mine access;
- road transport and offloading of construction materials;
- generators; and
- general vehicle noise including start up and dozer tracks.

These aspects need to be managed to minimise impacts to sensitive receivers, and to allow Coal & Allied to work effectively amongst its neighbours and the broader community.

4.2.2 Objectives and performance criteria

The objectives of the CNMP are to:

- manage the noise impacts of the construction phase to minimise impacts to sensitive receivers; and
- ensure that statutory requirements, including performance criteria, and corporate standards are met;

The effectiveness of noise management actions will be determined by a series of key performance indicators (KPIs) set to meet the objectives.

Table 4.1 highlights the objective and performance criteria.

Table 4.1 Objectives and performance criteria

Parameter	Target	KPI
Compliance with criteria	Compliance with noise criteria	Noise management levels (NMLs) as specified in Table 4.2.
Manage near neighbour relationships	Minimise complaints from near neighbours at the start of construction and maintain or decrease numbers over time.	Manage construction noise levels at sensitive receivers

4.3 Noise management levels

The EPA's Interim Construction Noise Guideline (ICNG) provides Noise Management Levels (NMLs) of background plus 10dB for standard ICNG hours (ie 7am to 6pm Monday to Friday, 8am to 1pm Saturdays and no work on Sundays or public holidays). With the exception of some maintenance activities, works are not anticipated outside standard hours although restrictions on hours do not apply if works are in audible at residences. The NMLs are listed below in Table 4.2 (refer to Figure A.1 for NAG locations). The ICNG also states that residences are considered to be 'Highly Affected' by construction noise if levels exceed 75dB(A).

The Noise acquisition criteria are provided in the Operational Noise Management Plan (ONMP). For acquisition criteria to be adopted, the exceedances need to be considered systematic. Acquisition is considered only relevant to the operational phases of the project as construction is not a permanent noise source and in any case is restricted to daytime hours. However, if mining operations commence while construction is ongoing, and construction were to occur out of daytime hours, it would then be difficult to separate these impacts at a receiver if they originate in the same general direction. In these situations acquisition criteria would apply. To determine systematic exceedance, monitoring must show a regular or frequent pattern of exceedance for the monitoring period being sampled.

In the context of a mine site, systematic exceedance of noise criteria is considered to be sustained exceedances caused by noise from site as a whole. This aligns with the INP where it states that *"In general, the types of noise sources dealt with in the policy are…facilities (encompassing all the activities taking place within the property boundary of the facility), usually comprising many sources of sound".* As construction activities that may produce intrusive noise will be relatively short term, will generally involve single pieces of equipment, and will be limited to daylight hours (as defined in the Development Consent), any short-term exceedances should not be considered to be systematic. All reasonable and feasible noise mitigation measures will be implemented to minimise noise impacts. Tables 1 and 2 in Schedule 3 of the Development Consent identify properties which are either subject to acquisition or subject to noise mitigation. Letters were sent to these property owners prior to 31 December 2011 to notify them of their rights under the Development Consent.

The definition of exceedance of noise management levels includes a field measurement tolerance of 2dB, as per the Industrial Noise Policy (INP, 2000).

Appendix A discusses the protocol for determining exceedances.

Notwithstanding the above conditions, construction works may be undertaken outside the hours specified in the following circumstances:

- where they can be shown to be inaudible at residences;
- where a negotiated agreement has been arranged with affected receivers;
- for the delivery of materials required by the police or other authorities for safety reasons;
- where it is required in an emergency to avoid the loss of lives, property and/or to prevent environmental harm; and
- out of hours construction works from time to time (for example commissioning activities) as

approved by the DP&E (including an approved Out-Of-Hours Work Protocol prepared as part of the Construction Noise and Vibration Management Plan). The protocol must include notification of the relevant Council, local residents and other affected stakeholders and sensitive receivers of the timing and duration at least 48 hours prior to the commencement of the works.

Location		Standard Hours $L_{Aeq(15min)}$
NAG1	All privately-owned residences	40
NAG 2	All privately-owned residences	40
NAG 3	All privately-owned residences	40
NAG 4	All privately-owned residences	40
NAG 5	All other privately-owned residences	46
NAG 6	All privately-owned residences	42
NAG 7	All other privately-owned residences	45
NAG 8	All other privately-owned residences	46
NAG 9	All other privately-owned residences	44
NAG 10	All other privately-owned residences	40
NAG 11	All other privately-owned residences	42
All other privately-owned residences		40

Notes: 1. Standard hours, defined as per the ICNG (ie standard = 7am to 6pm Monday to Friday, 8am to 1pm Saturdays.

A.1 Objective

This Noise Monitoring Programme outlines the noise monitoring required to assess compliance with this Construction Noise Management Plan.

The objectives of minimising noise caused by construction must be recognised by all personnel and contractors.

A.2 Scope

The NSW EPA's ICNG contains the noise management levels for privately owned, occupied residences. Schedule 3, Condition 9 (as modified to suit construction activities in Table 1.2 herein) outlines the requirements of the noise monitoring program.

The noise management levels are replicated in Section 4.3 of this CNMP.

A.3 Standards and policies

The noise monitoring at the Project must be undertaken in accordance with all relevant Australian Standards and EPA policies. At the time of writing this CNMP these include:

- Australian Standard AS 1055: Acoustics – A description and measurement of environmental noise;
- Interim Construction Noise Guideline (ICNG 2009), EPA; and
- NSW Industrial Noise Policy (INP 2000), EPA.

A.4 Noise monitoring programme

Noise monitoring during construction will be targeted for different types of work, therefore the exact locations will vary depending on the location of the work, and its position relative to any sensitive receptors and prevailing weather. Indicative and representative monitoring locations are shown in Figure A.1

The following notes apply to the noise monitoring:

- Monitoring will be targeted for the start of different types of work, for example, the start of earthworks.
- Attended monitoring will be completed for a day, collecting 15-minute samples from representative residences most affected by noise from the prevailing activity.
- There will be a minimum of two short term attended readings on each monitoring occasion. The instrument will include third-octave band centre frequency filters to aid in removing non-Project related noise. The attendant will be a suitably trained person in the practice of compliance noise monitoring. The attendant will document and quantify the activities contribution to noise levels at the monitoring location. Where this is not deemed possible, an adequate data set will be captured to allow determination of whether NMLs are achieved through the observations documented by the attendant. The instrument will meet Australian Standard Type 1 class sound meter specifications.
- If the monitoring exceeds the relevant NMLs, the TARP will be enacted to ensure a consistent approach is taken to mitigation measures.
- If the work changes, for example, different equipment is introduced; further monitoring will be completed to ensure the change has not caused an exceedance of the criteria.
- Weather conditions including wind speed at the microphone position will be quantified and any data collected during wind speeds above 5 m/s at the microphone will be deemed unsuitable. Similarly, 10 m elevation wind speed, wind direction and sigma-theta data will be reported for the duration of monitoring using the Project's automatic weather station located as shown in Figure A.1. The weather data will be used to assess compliance.
- In addition to the noise parameters listed in Table 2.2, the monitoring will also capture background noise levels including $L_{90,15minute}$ and whether this is influenced by construction noise or not.
- Monitoring locations will be subject to landowner agreement.

A permanent, real time noise monitoring system will be installed as construction proceeds, these will be operational prior to the commencement of mining activities and the implementation of the Operational Noise Management Plan.

A.4.1 Compliance issues identified through monitoring

Where noise monitoring identifies an exceedance of the NMLs, the following protocol will be followed.

- quantify the level of the exceedance to the nearest decibel and compare against the relevant NMLs in Chapter 2, and define the exceedance as either within field measurement tolerance (ie 1-2 dB), or above the tolerance level (ie greater than 2 dB);
- document the date and time of the exceedance(s);
- confirm that weather conditions prevailing at the time of the exceedance were applicable according to the consent;
- identify the activities at the time of the exceedance, with the view to isolate the likely item of plant or activity that caused the exceedance;
- notify the affected landowner and tenants in writing of the exceedance, and provide regular monitoring results to each of these parties until the development is complying with the relevant NML again; and
- log and report all the details of the exceedance including final resolution outcomes. The report will be provided to the regulator and the landowner within two weeks of the exceedance.

Where an exceedance occurs during attended monitoring, the appropriate construction works manager will be contacted to discuss immediate noise control options. Following any changes to the operation, another 15 minute measurement will be undertaken at the location of the exceedance. All results will be included for reporting purposes.

A.4.2 Complaints driven noise monitoring

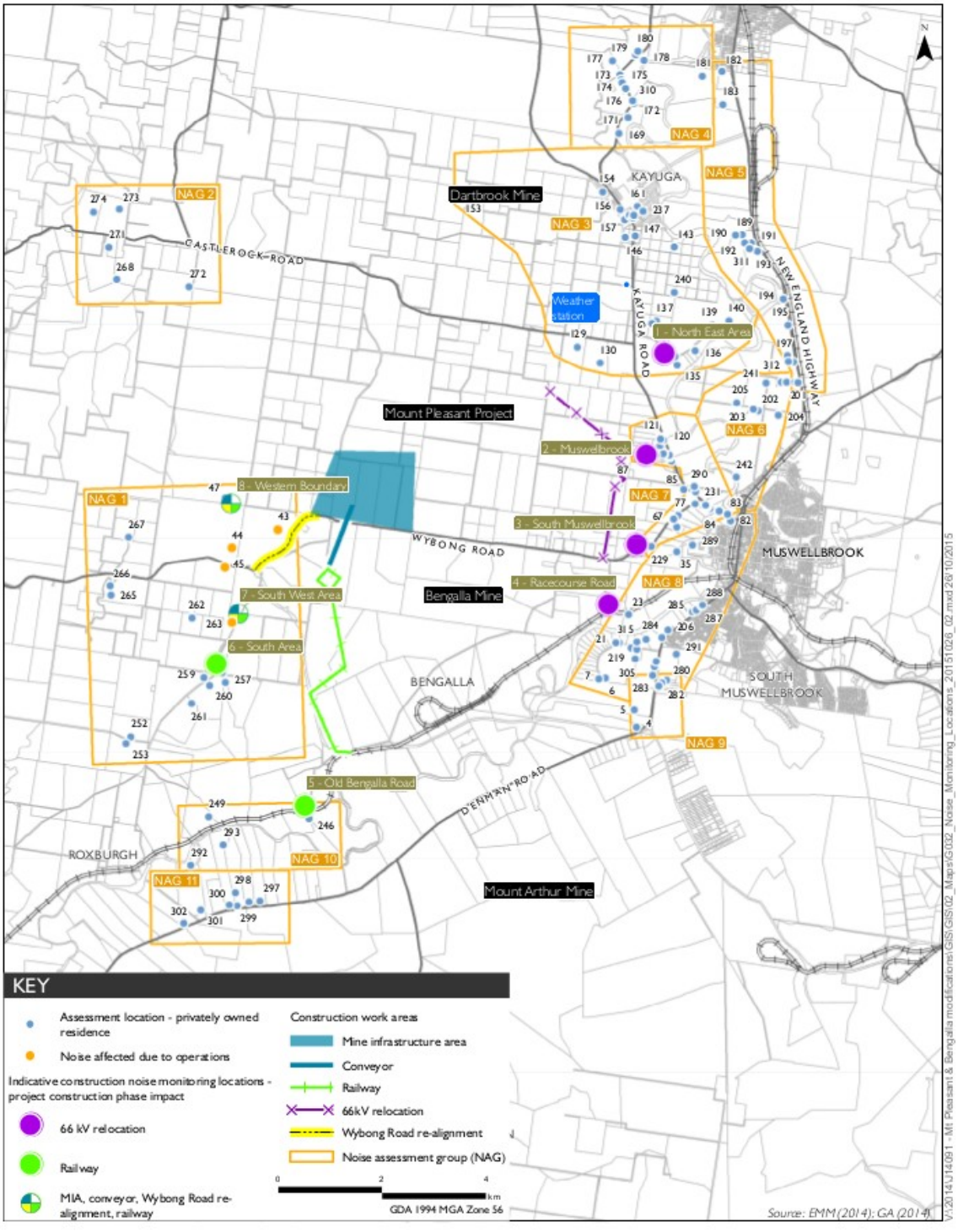
Noise complaints will be received through a Mount Pleasant Project Contact Line, maintained by Coal & Allied 24 hours a day, 365 days a year. All complaints lodged with the Contact Line will be investigated and responded to promptly.

Should a complaint be received due to noise generated from construction related activities, the TARP as outlined in Appendix B will be enacted.

Where complaints due to construction noise require additional monitoring this will be undertaken at a location representative of the complainant's residence as described in Table A.1.

Table A.1 Construction complaints driven noise monitoring

Location	Type	Period	Duration	Frequency
Complainant's location	Attended short term	Day/Evening/Night	1 hour in each period (where relevant)	Upon request. Further monitoring will be undertaken as required on a case by case basis.


Dartbrook Mine
Mount Pleasant Project
Bengalla Mine
Mount Arthur Mine
KAYUGA
MUSWELLBROOK
SOUTH MUSWELLBROOK
BENGALLA
ROXBURGH
CASTLEROCK ROAD
WYBONG ROAD
KAYUGA ROAD
NEW ENGLAND HIGHWAY
DENMAN ROAD
Weather station
1 - North East Area
2 - Muswellbrook
3 - South Muswellbrook
4 - Racecourse Road
5 - Old Bengalla Road
6 - South Area
7 - South West Area
8 - Western Boundary
NAG 1
NAG 2
NAG 3
NAG 4
NAG 5
NAG 6
NAG 7
NAG 8
NAG 9
NAG 10
NAG 11
KEY
Assessment location - privately owned residence
Noise affected due to operations
Indicative construction noise monitoring locations - project construction phase impact
66 kV relocation
Railway
MIA, conveyor, Wybong Road re-alignment, railway
Construction work areas
Mine infrastructure area
Conveyor
Railway
66kV relocation
Wybong Road re-alignment
Noise assessment group (NAG)
0 2 4 km
GDA 1994 MGA Zone 56
Source: EMM (2014); GA (2014)

APPENDIX

B CALIBRATION CERTIFICATES

Acoustic Research Labs Pty Ltd
Level 7 Building 2 423 Pennant Hills Rd
Pennant Hills NSW AUSTRALIA 2120
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www.acousticresearch.com.au

Sound Level Meter
IEC 61672-3.2006

Calibration Certificate

Calibration Number C15284

Client Details ARL Hire
423 Pennant Hills Rd
Pennant Hills

Equipment Tested/ Model Number : 30921838
Instrument Serial Number : Rion NA-28
Microphone Serial Number : 04128
Pre-amplifier Serial Number : 11893

Pre-Test Atmospheric Conditions		Post-Test Atmospheric Conditions	
Ambient Temperature :	20.8°C	**Ambient Temperature :**	22.4°C
Relative Humidity :	46.9%	**Relative Humidity :**	43%
Barometric Pressure :	100.47kPa	**Barometric Pressure :**	100.38kPa

Calibration Technician : Dennis Kim
Calibration Date : 23/06/2015
Secondary Check: Kate Alchin
Report Issue Date : 24/06/2015

Approved Signatory : Ken Williams

Clause and Characteristic Tested	Result	Clause and Characteristic Tested	Result
10: Self-generated noise	*Pass*	14: Level linearity on the reference level range	*Pass*
11: Acoustical tests of a frequency weighting	*Pass*	15: Level linearity incl. the level range control	*Pass*
12: Electrical tests of frequency weightings	*Pass*	16: Toneburst response	*Pass*
13: Frequency and time weightings at 1 kHz	*Pass*	17: Peak C sound level	*Pass*
		18: Overload Indication	*Pass*

The sound level meter submitted for testing has successfully completed the class 1 periodic tests of IEC 61672-3:2006, for the environmental conditions under which the tests were performed.

As public evidence was available, from an independent testing organisation responsible for approving the results of pattern evaluation test performed in accordance with IEC 61672-2:2003, to demonstrate that the model of sound level meter fully conformed to the requirements in IEC 61672-1:2002, the sound level meter submitted for testing conforms to the class 1 requirements of IEC 61672-1:2002.

Least Uncertainties of Measurement -

Acoustic Tests		Environmental Conditions	
31.5 Hz to 8kHz	*±0.120dB*	*Temperature*	*±0.3°C*
12.5kHz	*±0.165dB*	*Relative Humidity*	*±4.1%*
16kHz	*±0.245dB*	*Barometric Pressure*	*±0.1kPa*
Electrical Tests			
31.5 Hz to 20 kHz	*±0.121dB*		

All uncertainties are derived at the 95% confidence level with a coverage factor of 2.

NATA
WORLD RECOGNISED ACCREDITATION

This calibration certificate is to be read in conjunction with the calibration test report.

Acoustic Research Labs Pty Ltd is NATA Accredited Laboratory Number 14172.
Accredited for compliance with ISO/IEC 17025.

The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/National standards.

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Sound Calibrator

IEC 60942-2004

Calibration Certificate

Calibration Number C16082

Client Details Acoustic Research Labs
423 Pennant Hills Road
Pennant Hills NSW 2120

Equipment Tested/ Model Number : ARL ND9
Instrument Serial Number : N435847

Atmospheric Conditions
Ambient Temperature : 22.3°C
Relative Humidity : 57.1%
Barometric Pressure : 99.52kPa

Calibration Technician : Dennis Kim
Calibration Date : 26/02/2016
Secondary Check: Tim Williams
Report Issue Date : 26/02/2016
Approved Signatory : Juan Aguero

Clause and Characteristic Tested	Result	Clause and Characteristic Tested	Result
5.2.2: Generated Sound Pressure Level	*Pass*	5.3.2: Frequency Generated	*Pass*
5.2.3: Short Term Fluctuation	*Pass*	5.5: Total Distortion	*Pass*

Nominal Level	Nominal Frequency	Measured Level	Measured Frequency
94.0	1000.0	93.9	1000.18
114.0	1000.0	114.1	1000.18

The sound calibrator has been shown to conform to the class 1 requirements for periodic testing, described in Annex B of IEC 60942:2004 for the sound pressure level(s) and frequency(ies) stated, for the environmental conditions under which the tests were performed.

Least Uncertainties of Measurement -

Specific Tests

Generated SPL	*±0.09dB*
Short Term Fluct.	*±0.02dB*
Frequency	*±0.01%*
Distortion	*±0.51%*

Environmental Conditions

Temperature	*±0.3°C*
Relative Humidity	*±4.1%*
Barometric Pressure	*±0.1kPa*

All uncertainties are derived at the 95% confidence level with a coverage factor of 2.

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WORLD RECOGNISED ACCREDITATION

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