SAFETY &
SUSTAINABLE
DEVELOPMENT

ANNUAL ENVIRONMENTAL MANAGEMENT REPORT - 2016

DRAYTON MINE

AngloAmerican

Real Mining. Real People. Real Difference.

Annual Environmental Management Report - 2016

Name of Operation:	Drayton Mine
Name of Operator:	ANGLO COAL (DRAYTON MANAGEMENT) PTY LTD
Development Consent/Project Approval	PA 06_0202 (as modified) and DA 106-04-00
Names of holder of Development Consent / Project Approval	ANGLO COAL (DRAYTON MANAGEMENT) PTY LTD
Titles / Mining Leases:	CL229, CL395, ML153, A173
Names of holder of Titles / Mining Leases:	ANGLO COAL (DRAYTON MANAGEMENT) PTY LTD
Water License:	Various (see **Appendix A**)
Names of holder of Water License:	ANGLO COAL (DRAYTON MANAGEMENT) PTY LTD
MOP Commencement Date:	1st JULY 2015
MOP Completion Date:	30th JUNE 2020
AEMR Commencement Date:	1st JANUARY 2016
AEMR Completion Date:	31st DECEMBER 2016

I, Darren Pisters, certify that this audit report is a true and accurate record of the compliance status of Drayton Mine for the period 1 January 2016 to 31 December 2016 and I am authorised to make this statement on behalf of Anglo Coal (Drayton Management) 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:	Darren Pisters
Title of Authorised Reporting Officer:	Mine Manager
Signature of Authorised Reporting Officer:	
Date:	09/03/2017

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1 STATEMENT OF COMPLIANCE

This Annual Environmental Management Report (AEMR) provides a summary of the performance of Drayton Mine (Drayton) in the period from 1st January 2016 to 31st December 2016 (reporting period). The preparation of this AEMR has been developed to satisfy the relevant requirements of Project Approval (PA) 06_0202 (as modified), Development Application (DA) 106-04-00, Coal Lease's (CL) 229 and 395 and Mining Lease (ML) 1531.

This AEMR has been prepared in accordance with the Department of Planning and Environments (DP&E), *Annual Review Guideline 2015* and outlines any changes from the current *Drayton Mining Operations Plan* (MOP) (December 2016). The Drayton MOP covers a five year period from the 1st July 2015 to the 30th June 2020.

A review of the compliance status of the operation has been included in this AEMR against the applicable approvals (see **Section 3**) as at the end of the reporting period. **Table 1** presents a summary of compliance against key approval documentation with specific detail regarding where non-compliances have occurred during the reporting period is provided in **Table 2**. Approval conditions identified as non-compliances in **Table 2** have been scaled using the *Annual Review Guideline 2015* key as reproduced in **Table 3**.

As identified in **Table 2** an identified non-compliance within the reporting period was identified however was classified as being an administrative non-compliance.

Table 1: Statement of Compliance

Were all conditions of the relevant approval(s) complied with?	
PA 06_0202 (as modified)	YES
DA 106-04-00	NO
CL 229	YES
CL 395	YES
ML 1531	YES
AUTH 173	YES

Table 2: Non-Compliances

Approval	Condition	Condition Description	Compliance Status	Comment	Where addressed in AEMR
DA 106-04-00	6.1(e)	The maximum annual rate of coal haulage shall be calculated from the date of commencement of this consent. The Applicant shall submit a statement every six (6) months regarding the number of daily train movements, quantities and destination of product hauled on the Drayton rail loop and Anitiene Rail Spur in that period to the Director-General, commencing from the date of commencement of this consent.	Administrative non-compliance	Noted that the 2016, 6 monthly statement was not provided to DP&E within the required timeframe.	Section **4.1.3** and **11.2**

Table 3: Compliance Status Key

Risk Level	Colour Code	Description
High	Non-Compliant	Non-compliance with potential for significant environmental consequences, regardless of the likelihood of occurrence
Medium	Non-Compliant	Non-compliance with: • 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)

2 INTRODUCTION

2.1 Location and Operations

Drayton is located near the township of Muswellbrook in the Upper Hunter Valley of NSW (see **Figure 1**). Drayton has been in operation since 1982 commencing coal production in 1983. It is an open cut mine using both dragline and truck and shovel to produce up to eight million tonnes per annum (Mtpa) of Run of Mine (ROM) thermal coal for export markets. During 2016 approximately 1.3 Mt of thermal coal was mined for export to overseas markets.

Figure 2 presents pertinent information associated with Drayton including the authorisation boundaries, Disturbance Boundary, pit names and offset areas.

Landownership surrounding Drayton is presented on **Figure 3**. The closest private residences are located at Antiene approximately 2.5 km north of operations.

2.2 Ownership

Drayton is owned by the Drayton Joint Venture of which Anglo American owns an 88.2 per cent share and manages the operation on behalf of the Drayton Joint Venture. Other joint venture partners include: Mitsui Drayton Investment Pty Limited; NCE Australia Pty Limited; Hyundai Australia Pty Limited; and Daesung Australia Limited.

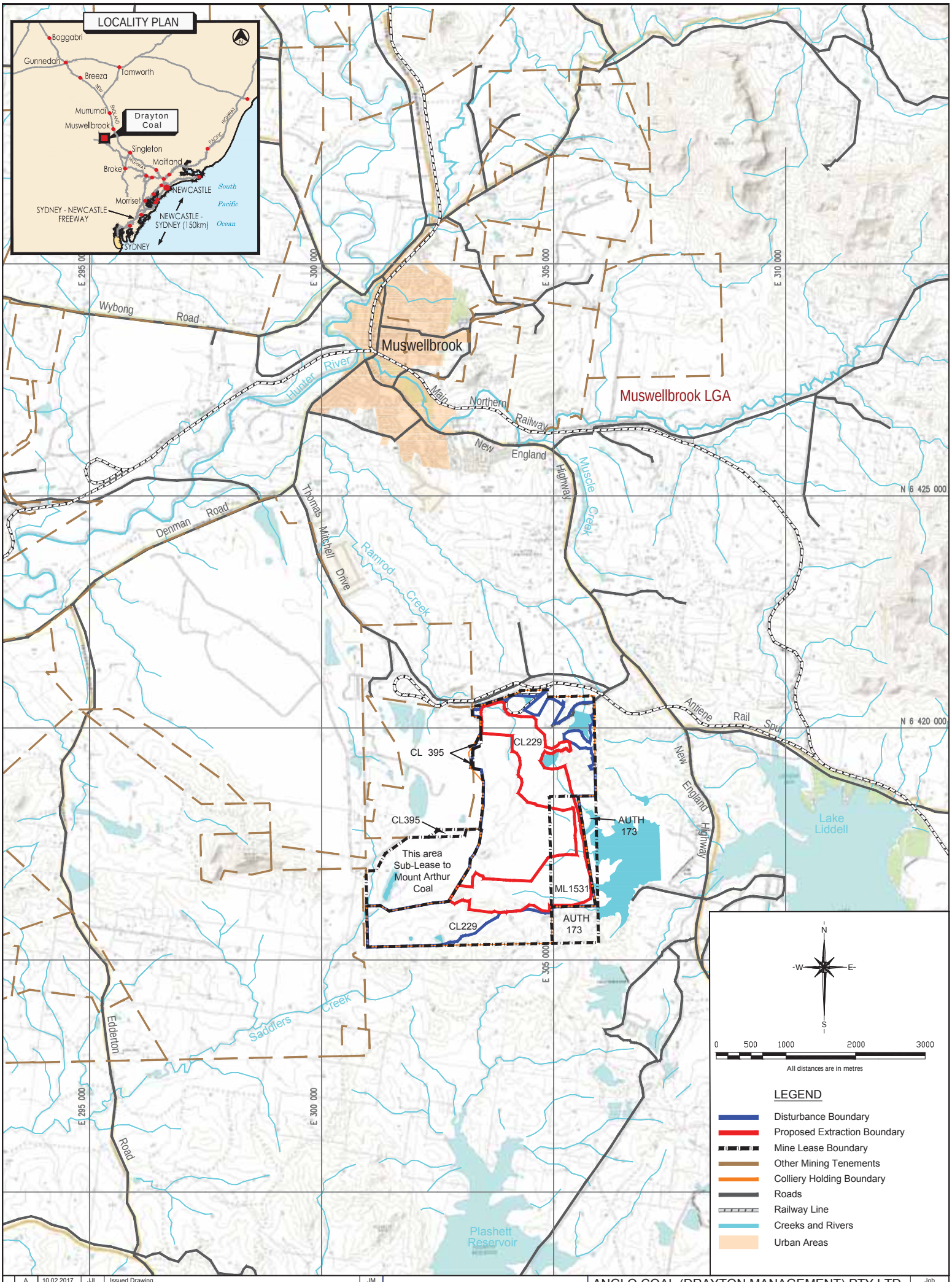
2.3 Drayton Mine and Drayton South Project Update

In May 2015, Anglo American submitted a second Development Application to DP&E for an extension to the Drayton operation referred to as the Drayton South Coal Project (Drayton South) – State Significant Development (SSD) 6875.

In November 2015, Drayton South was subsequently referred to the Planning and Assessment Commission (PAC) where it was recommended that Drayton South should not be approved. DP&E's subsequent Final Assessment Report (DP&E, September 2016) provided further clarification and justification to all of the issues raised in the PAC Report along with a recommendation for approval and associated draft conditions of consent. The Drayton South Project was subsequently refused consent by the determination PAC on 22 February 2017.

This lengthy assessment period, and ultimate refusal, has resulted in the cessation of active mining operations at Drayton in October 2016 and the loss of approximately 400 jobs.

Following the cessation of active mining operations in October 2016 a small project team remains to continue to progress rehabilitation activities, earthworks and to ensure the ongoing functional capability of equipment and infrastructure. Anglo American is currently reviewing final options in regard to the configuration of the rehabilitation program with a decision set to be made in Q2 2017.



REVISIONS	REV.	DATE	BY	DESCRIPTION	CHK.
	A	10.02.2017	JJL	Issued Drawing	JM

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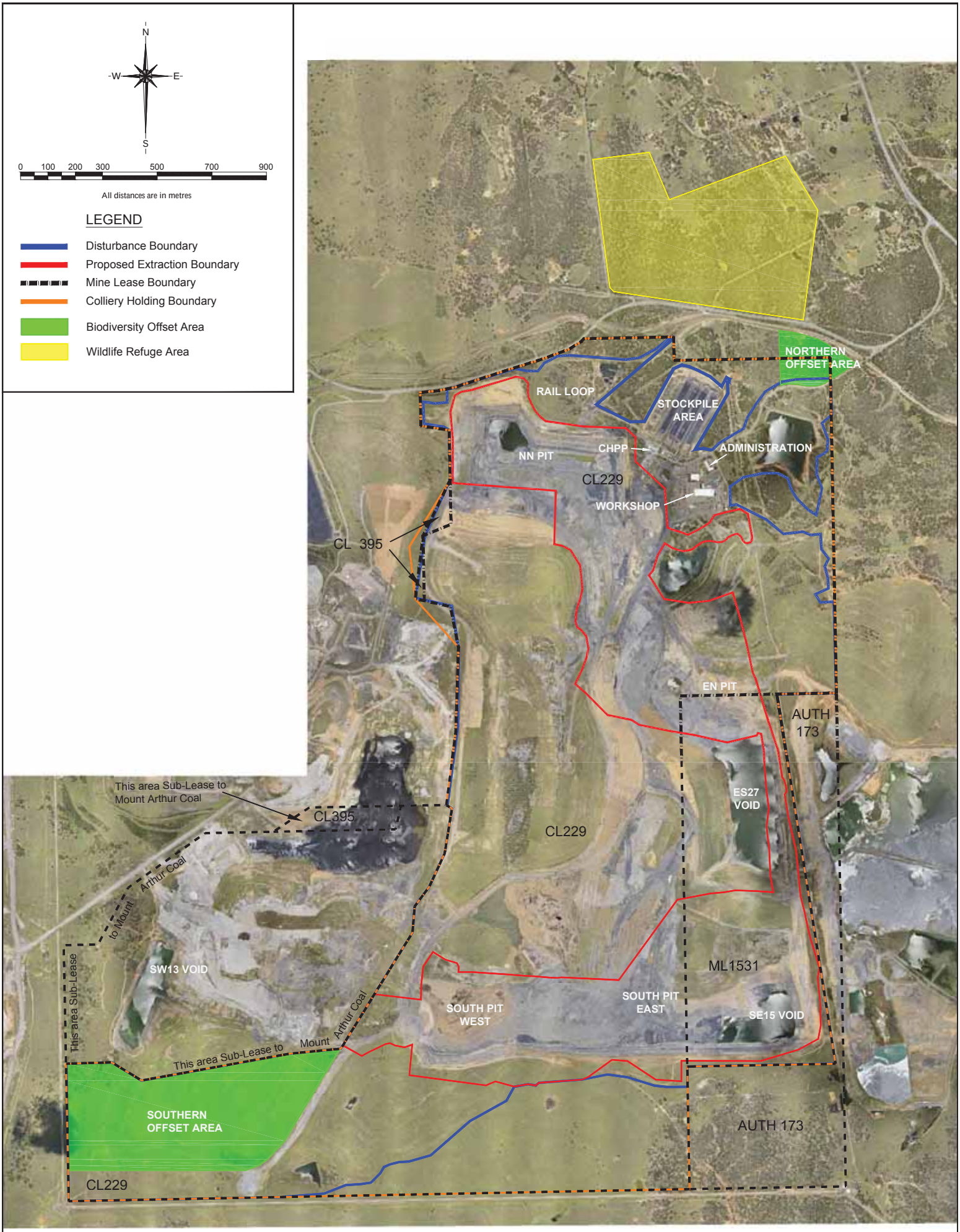
ANGLO COAL (DRAYTON MANAGEMENT) PTY LTD

Annual Environmental Management Report
Figure 1 - Regional Locality

Job	Dwg. No.	Rev.	Sheet
DM500	996-01	A	A0

Date	Scale:	Drawn	Checked	Approved
10.02.2017	1:100,000	JJL	JM	DP



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	A	10.02.2017	JJL	Issued Drawing	JM

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Figure 2 - Existing Operations

Job	Dwg. No.	Rev.	Sheet
DM500	996-02	A	A0

Date	Scale:	Drawn	Checked	Approved
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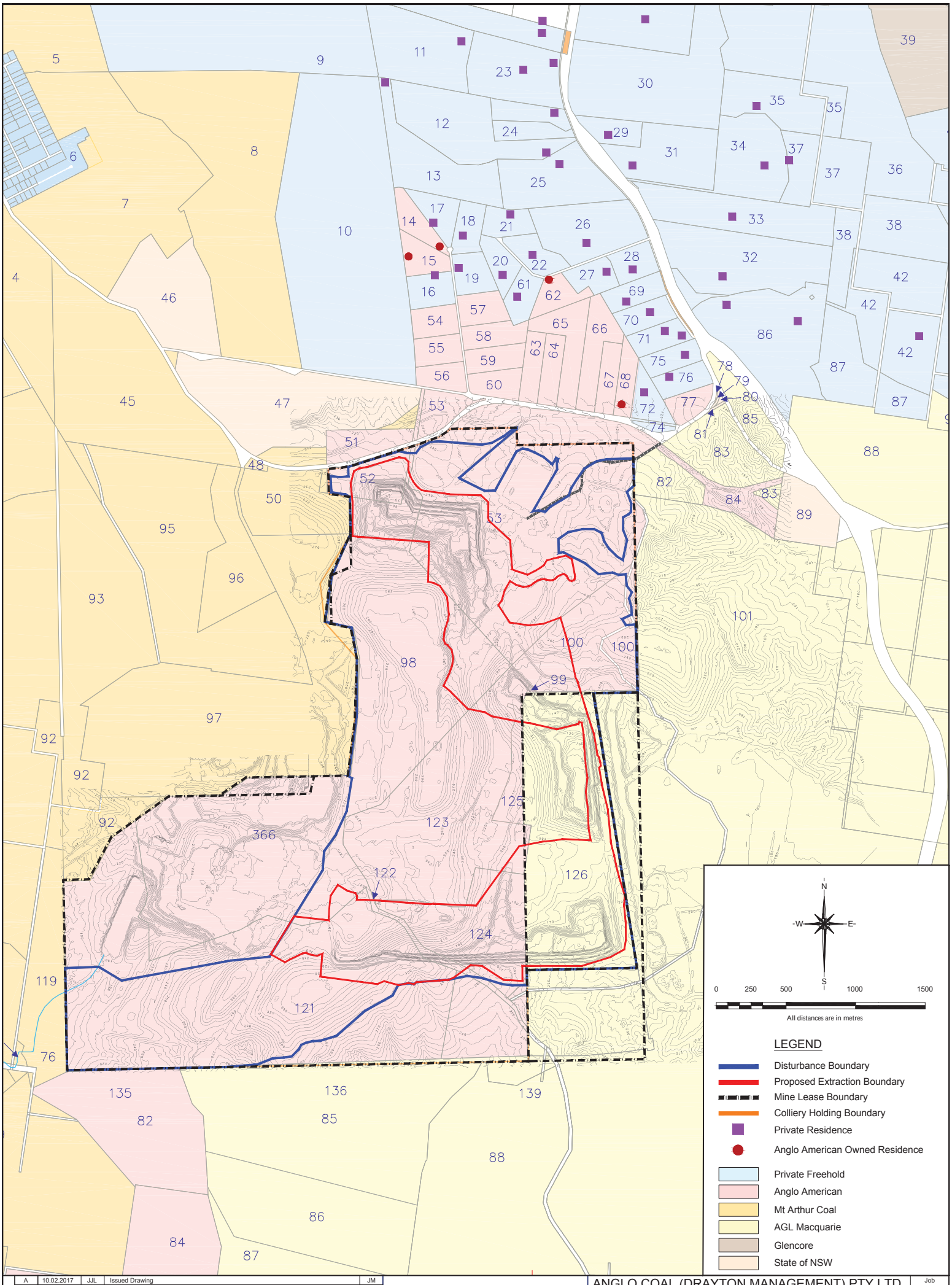


REVISIONS	REV.	DATE	BY	DESCRIPTION	CHK.
	A	10.02.2017	JJL	Issued Drawing	JM

AngloAmerican

ANGLO COAL (DRAYTON MANAGEMENT) PTY LTD

Annual Environmental Management Report
Figure 3 - Land Ownership

Date	Scale:	Drawn	Checked	Approved	Sheet
10.02.2017	1:40,000	JJL	JM	DP	A0

Job DM500
Dwg. No. 996-03
Rev. A

2.4 Mine Contacts

Rehabilitation and closure is now the primary focus of Drayton Mine. The Mine Manager and Environment Superintendent are primarily responsible for environmental outcomes; however, they are supported by all remaining site personnel with additional support provided by the corporate office in Brisbane.

Contact details of the Mine Manager and the Environmental Superintendent are given in **Table 4** below.

Table 4: Mine Contacts

Anglo American Contacts	
Mine Manager	Darren Pisters (02) 6542 0203 Darren.pisters@angloamerican.com
Environment Superintendent	Matt Lord (02) 6542 0298 Matt.lord@angloamerican.com
Drayton Mine Contacts	
Drayton Mine Address	Thomas Mitchell Drive Muswellbrook
Phone Number	(02) 6542 0245
Facsimile Number	(02) 6542 0245
Drayton 24 hr Environmental Hotline	1800 814 195

2.5 Distribution

In accordance with conditions of PA 06_0202 (as modified) and DA 106-04-00 this AEMR will be distributed to the following agencies:

- Department of Planning and Environment (DP&E);
- NSW Department of Industry – Division of Resource and Energy (DRE);
- Muswellbrook Shire Council (MSC);
- Office of Environment and Heritage (OEH);
- Environment Protection Authority (EPA);
- NSW Dam Safety Committee (DSC); and
- The Drayton Community Consultative Committee (CCC).

A copy of the AEMR will also be made publicly available on the Drayton website:

http://australia.angloamerican.com/our-operations/operating-sites-subpage/drayton-environment.

3 APPROVALS

3.1 Consents, Leases and Licences

Appendix A lists Drayton's consents, approvals, leases and licenses (Approvals), with the principle approvals being:

- Project Approval (PA) 06_0202 issued on the 1st February 2008, under Section 75J of the (now repealed) Part 3A of the *Environmental Planning and Assessment Act 1979*, (EP&A Act). Modified under Section 75W in 2009 to add a further 8 ha to the existing approval area and again in 2012 for the construction of an explosive storage facility and placing tailings in the east pit.
- Development Consent (DA) 106-04-00 issued in 2000 under Section 76 (A), 9 and 80 of Part 4 of the EP&A Act authorising the Drayton mine use of the Antiene Joint Rail User Facility in conjunction with the adjoining Mt Arthur coal mine.
- Coal Lease (CL) 229 granted on the 24th June 1992 by the Minister for Mineral Resources under the *Mining Act 1973*, which was renewed in 2003 to 2nd February 2024. Mining Lease (ML) 1531 grated on 26 February 2003 by the Minister for Mineral Resources under the *Mining Act 1992.* The majority of operations occur within CL 229 and ML 1531. The additional CL 395 covers two small portions of land on the north western boundary of the mining operations.
- Section 100 and Section 101 applications, relating to an emplacement area for washery reject material, were granted in 2007 and 2011. This approval remained in place for 2016.
- Drayton's Mining Operations Plan (MOP) was amended in December 2016 and covers the period of 1st July 2015 to 30th June 2020. The amendment to the MOP was subsequently approved by DRE on the 7th February 2017. As agreed with the DRE and the DP&E, the current Drayton MOP includes an approved Mine Closure Plan and Final Void Management Plan.

3.1.1 Mt Arthur Sublease

In 2006 Drayton Mine granted a sublease over part of CL 229 to Mt Arthur Coal for the deposition of overburden and tailings. The sublease was registered by DRE on 17th December 2008 and the Mt Arthur sublease area was moved from the Drayton Mine colliery holding to the HVEC colliery holding (see **Figure 2**). During the 2016 reporting period, Mt Arthur Coal had full management obligations over the Sublease. Mt Arthur Coal maintains a MOP and associated rehabilitation security deposit for the Sublease area.

4 OPERATIONS SUMMARY

4.1 Exploration

No exploration activities occurred at Drayton during the reporting period. All mining areas have been drilled and no further exploration drilling will be required in CL 229, ML 1531 and CL 395.

4.2 Land Preparation

There was no additional area of land cleared for mineral extraction activities during the 2016 reporting period.

4.3 Construction

No major construction works occurred during the 2016 reporting period.

4.4 Mining

4.4.1 Coal Extraction

During the reporting period the Drayton mining operation advanced north and south to extract the remaining viable coal reserves within the South Pit area, NN Pit area and the ROM Pit area. During the reporting period approximately 1.8 Mt of ROM coal was extracted. Detailed mining statistics for 2016 are shown in **Table 5**.

The remaining resource within the currently approved mine plan footprint is approximately 4.55 Mt. The bulk of remaining reserves are located in the South Pit, West and EN Pits. A small amount remains in the NN area. These areas contains complex geology including multiple faults, steeply dipping coal seams and silling.

As at 31st October 2016 no further coal extraction is planned to occur (see **Section 2.3**). As a result the Drayton MOP was updated in December 2016 to reflect this schedule. Previous scheduling and approvals permitted coal extraction through to the end of 2017; however, the MOP amendment, approved by DRE on 7th February 2017, now describes the transition from active mining to rehabilitation and closure.

4.4.2 Overburden Handling

During the production phase of the operation overburden and interburden was predominantly removed by the dragline and excavators, with assistance where required from front-end loaders. Overburden, parting and coal thicker than two metres was blasted. All overburden and parting material was moved to tips located within the previously mined areas. Placement of this material follows the guidelines in Drayton's Spontaneous Combustion Management Plan. Detailed mining statistics for 2016 are shown in **Table 5**.

Table 5: Production Summary (Extraction)

	Approved Limit	Previous Reporting Period (Actual)	This Reporting Period (Actual)	Next Reporting Period (Forecast)
Waste Rock / Overburden (Mbcm)	49.42 pa (Drayton EA 2007)	27.036	15.473	0*
ROM Coal (Mt)	8.0 pa (PA 06_0202)	3.061	1.797	0
Coarse Reject (t)	950,000 (Drayton EA 2007)	432,021	350,257	0
Fine Reject / Tailings (t)		204,609	131,511	0
Product (saleable) (Mt)	7.0 pa (DA 106-04-00)**	2.423	1.361	0

** Consistent with Drayton MOP and excludes reshape and rehandle associated with rehabilitation activities proposed.*
***Associated with coal transported on the Drayton Rail Loop.*

4.4.3 ROM Production History and Forecast

ROM coal production for the reporting period was 1,797,069 t with a total prime waste and rehandle of 15,473,092 bcm. A comparison showing the ROM production at Drayton for the past reporting periods is provided in **Table 6**.

No coal extraction at Drayton is anticipated in the next reporting period.

Table 6: History of ROM Coal Production

Year	Production (Mt)	Year	Production (Mt)
1985	1	**2002**	4.84
1986	2	**2003**	5.04
1987	3	**2004**	4.98
1988	3	**2005**	4.73
1989	3.55	**2006**	5.021
1990	3.48	**2007**	4.691
1991	3.96	**2008**	4.171
1992	3.85	**2009**	4.821
1993	3.97	**2010**	5.425
1994	3.77	**2011**	5.312
1995	3.85	**2012**	5.456
1996	3.5	**2013**	5.488
1997	4.2	**2014**	4.758
1998	4.5	**2015**	3.1
1999	4.8	**2016**	1.8
2000	5.07	**2017**	0
2001	5.23	**2018**	-

4.4.4 Changes in Mining Equipment and Method

During 2016, there were minimal changes to the Drayton owned fleet, however Drayton did continue to use a variety of contract equipment as necessary. Some HME was sold or removed from site associated with reduced production and following the completion of coal extraction.

As at the end of the 2016 reporting period the major remaining equipment onsite consists of:

- BE 1370 Electric Dragline
- Two Hitachi EX 5500 Excavators
- Hitachi EX 3600 Excavator
- Hitachi EX 3500 Excavator
- One Le Tourneau L1400 Loader
- One Cat 992 Front End Loader
- 25 Caterpillar 789B / 789C Trucks
- One Sandvik DK45S (in working order but parked up)
- One Sandvik DR460 (in working order but parked up)
- One Altas Copco PV235 Drill (in working order but parked up)
- One Hire Drill
- Two Cat 777D water carts
- One Cat 777F Water Cart
- 7 D11R track dozers
- Three D10T track dozers
- One 834 rubber tyre dozer
- 3 Cat 16H graders

4.5 Mineral Processing and Transportation

Mineral processing at Drayton was undertaken through the Drayton Coal Handling Plant (CHP). This facility comprises of a washery, fines plant, crushers, two stackers, two bucket-wheel reclaimers and a series of overland conveyor belts. In 2011 a coal fines plant within the existing coal handling plant was commissioned.

Rear dump coal trucks delivered ROM coal into a 400 t capacity ROM hopper. ROM coal was crushed and then washed in the coal preparation plant or bypassed straight to product. This decision was based on the expected quality of the feed coal reconciled with online ash analyser trends. The washed product was then sampled before reporting to the export coal stockpiles.

In 2016, 1.32 Mt of saleable coal was produced, all of which was exported. Export coal from Drayton was loaded onto trains at the Drayton Rail Loop, transported via the Antiene Rail Spur to the Main Northern Railway line and then to the Port of Newcastle. Associated with the completion of coal extraction the last remaining product coal was transported from the Drayton load out facility on 9 November 2016.

During the reporting period all tailings were deposited into the ES void, which is also the primary water storage location on site. The tailings discharge point has formed a tailings beach against the northern endwall of the ES void. Tailings disposal in 2016 totalled 131,511 t with all tailings placed in the ES void.

Associated with the cessation of mining no further tailings emplacement is anticipated in 2017.

4.1 ROM & Product Coal Handling

During production Drayton had four product coal stockpiles, each with a nominal capacity of 80,000 tonnes. Coal from different areas of the pit was blended on the stockpiles to meet customer specifications.

Export coal was stacked in piles of up to 40,000 tonnes. The reclaimer was transferred between stockpiles using a rail-mounted transfer car, which is located at the northern end of the stockpiles. Coal is typically not stored for longer than twelve weeks due to the risk of self-heating.

Drayton operated a ROM stockpile pad adjacent to the feed hopper to the CHP. This stockpile was used to temporarily store coal hauled from the pit during times when the CHP was not available. It was also used to store coal that must be mined due to sequencing issues but was inappropriate for the product stocks being assembled. The ROM stockpile pad was generally divided into five different areas to accommodate five different qualities of coal. It has a capacity of some 200,500 t in total. This level of inventory allowed some coal to be available for processing during periods of rain and poor weather conditions which may shut down coal hauling from the pit. It also facilitated the final blending of export cargoes by providing a ready source of different quality coals.

There were no changes to the management of stockpiles during the reporting period however as at 4 November 2016 no more ROM or product coal was located on the CHP stockpiles.

4.1.1 Antiene Joint Rail User Facility

The Antiene Rail Spur is wholly owned and operated by Drayton Mine in accordance with DA 106-04-00. DA 106-04-00 was obtained in November 2000 to increase the authorised tonnage of the Drayton Loop to 7 Mtpa and the Antiene Spur to 20 Mtpa. During the reporting period 1.32 Mt of saleable coal was transported on the Drayton Rail Loop, below the maximum approved limit (see **Section 4.1.3**).

DA 106-04-00 permits up to a combined total of 20 Mtpa coal and up to 30 train movements per day on the Antiene Rail Spur, per the condition below:

> *6.1 Limits on Transportation of Coal*
>
> *(b) Coal transported along the Antiene Rail Spur is limited to twenty (20) million tonnes per annum;*

(d) The peak number of train movements along the Antiene Rail Spur are limited to 30 per day.

There were no variations to Drayton approvals relating to the rail facility during the 2016 reporting period.

Additionally, condition 8.1 of DA 106-04-00 requires that the following additional information is supplied in relation to environmental management of the Drayton Rail Loop and Antiene Rail Spur development.

4.1.2 Management

Dust mitigation measures were proposed in the EA for both the construction and operation of the Bayswater Rail Loading Facility and operation of the Antiene Joint User Rail Facility. Mitigation measures have included enclosing conveyors, loading trains using a telescopic chute, train carriages designed with small aperture and equipping transfer points with dust suppression structures.

In addition to the dust mitigation measures, which can assist with noise abatement, noise barricades have been constructed at the northern face at the base of the rail loadout bins. In the 2016 reporting period, there were no noise related complaints made in regards to rail activity (see **Section 9.2**).

Offsite lighting is restricted to certain parts of the rail loader and rail loop. The lighting is similar to street lighting and was predicted to have minimal impacts on neighbours or motorists using Thomas Mitchell Drive. A dense surrounding of native trees is in place to mitigate the impacts on the surrounding residents. In 2016 no complaints were made in regards to lighting.

The joint Drayton and Mt Arthur Coal CCC held two scheduled meetings during 2016 where the environmental performance of the rail spur was discussed and reviewed, together with any environmental enquiries and other issues.

Environmental targets and strategies are detailed in Drayton's Environment Management Plans (EMP) and include:

- Adhere to all conditions as set out in development consent;
- Ensure all monitoring is undertaken per EMP and consent conditions;
- Ensure all enquiries are dealt with promptly and efficiently;
- Ensure all reporting requirements are met within the required timeframe;
- Ensure, if required, that any requirements outside of this consent, as directed by the Director General are undertaken; and
- Ensure active community consultation continues on a regular basis.

4.1.3 Monitoring

In accordance with DA 106-04-00 consent condition 6.1 (e) coal haulage reports are required to be provided to DP&E on a six monthly basis. During 2016 the mid-year six monthly report was not provided to DP&E and as a result is considered a minor administrative non-compliance (see **Section 11.2**). It is noted that no exceedance of rail limits had occurred in this period. A summary of all rail movements and tonnages is provided for the entire 2016 reporting period and is contained within **Appendix H.**

Condition 6.1(a) and (b) states that Coal transported along the Antiene Rail Spur is limited to twenty (20) million tonnes per annum of which Drayton is approved to rail seven (7) million tonnes per annum. In the 2016 reporting period, 16,205,358 t of coal was transported on the Antiene Rail Spur. This comprised of 1,361,527 t from Drayton and 14,843,830 t from Mt Arthur Coal and remained below the maximum levels described in DA 106-04-00. It should be noted that Mt Arthur Coal has a more recent development approval allowing up to 27 Mt of coal to be transported along the Antiene Rail Spur.

General environmental monitoring also continued throughout 2016 with regards to both Drayton's mining operation and the use of the Drayton Rail Loop Facility. Impacts to water quality within the Rail Loading Facility and the Rail Spur have been minimal.

The EA predicted only low level air quality impacts as a result of the construction of the Bayswater Rail Loading Facility and operation of the Antiene Joint User Rail Facility. As predicted, no significant amounts of dust have been observed from the rail loop or spur. This is anticipated to further reduce during the next reporting period as clean-up of the coal load-out facility is progressing and no further production is planned unless the Drayton South Project is approved.

Noise assessments indicated that there would not be a significant noise impact from these areas provided that appropriate noise abatement measures were adopted. Noise monitoring in 2016 has supported these assessments (see **Section 6.8**). This is anticipated to further reduce during the next reporting period.

4.2 Hours of Operation

During the 2016 reporting period active mining operations were conducted 24 hours per day, five days per week for the period January to October. Associated with the cessation of coal extraction in October 2016 remaining site activities beyond this date were conducted 12 hours per day, five days per week.

It is anticipated that during the next reporting period operations will initially be conducted 12 hours per day, five days per week before transitioning to a 24 hour per day, five days a week work pattern to enable the final landform development and rehabilitation activities to occur.

4.3 Forecast Activities for the Next Reporting Period

It is anticipated that during the next reporting period site activity will focus on the final landform development, rehabilitation and environmental monitoring. Bulk earthworks will occur associated with highwall stabilisation and may include blasting.

5 ACTIONS REQUIRED FROM PREVIOUS AEMR REVIEW

The 2015 AEMR was provided to the DP&E, DRE, EPA, MSC and DSC for review and comment. Responses were provided from both DP&E and DRE in correspondence dated 31st May 2016 and 18 July 2016 respectively. These comments, associated actions and how they have been addressed are presented in **Table 7**.

Table 7: Actions from the previous AEMR

Department / Action Number	Action Required from previous AEMR	Due Date specified in correspondence.	Response from Drayton
DP&E 31st May 2016			
DP&E / 1a	The department notes that the 2015 AEMR has not been prepared as per the Annual Review Guideline, 2015. Future AEMRs should be prepared in accordance with this guideline.	Next AEMR	This AEMR has been prepared in accordance with the Annual Review Guidelines, 2015. See **Section 2.1**
DP&E / 1b	There is no current figure showing the operational disturbance footprint, pit names, rehabilitation areas, active mining areas and offset areas. This should be added to future reports.	Next AEMR	This AEMR. See **Figure 1** and **Figure 2**
DP&E / 2	The data in Table 13, Table 14 and Table 50 (Appendix C) is not consistent for Sites 2197, 2208, 2230, 2235, 2247. Please review the data and resubmit to the Department by 30 June 2016.	30 June 2016	Data amended and provided to DP&E.
DP&E / 3	Section 3.10 Blasting does not report on the SPW Fume event of Thursday 9 June 2015, reported to the Department as per Schedule 5 Conditions 3 and 4. Schedule 5(h) requires the Proponent to identify and discuss any non-compliance.	N/A	This AEMR **Section 11**
DP&E / 4	It is noted that the Drayton Independent Environmental Audit was undertaken in late 2015 and the report was not finalised until after the 2015 reporting period. The key audit outcomes should be reported in the next AEMR.	Next AEMR	This AEMR **Section 10**
DP&E / 5	It is noted that the coal transported on the Antiene Rail Spur continues to exceed Drayton consent requirement, due to Mt Arthur coal transport. As has occurred in the past could you please provide the department regular reports on this, so this exceedance can be monitored and accepted.	N/A	This AEMR **Section 4.1.1** and **Section 4.1.3**.
DRE 18 July 2016			
DRE / 1	There has been widespread failure of tubestock tree plantings. In certain instances, the response to this issue has been to undertake replacement plantings. The mine operator should undertake a review of this rehabilitation approach where replacement plantings also fail.	Next AEMR	This AEMR **Section 8.2**

Department / Action Number	Action Required from previous AEMR	Due Date specified in correspondence.	Response from Drayton
DRE / 2	The Drayton Mine relies heavily upon the use of imported organic material to supplement limited topsoil reserves. The ability for this growth media to support the sustainable achievement of the nominated final land use should be continually monitored over time such that a potential failure to meet and maintain final land use completion criteria is avoided.	Next AEMR	This AEMR **Section 12.1.1**
DRE / 3	Capping with inert waste sufficient to extinguish existing outbreaks of spontaneous combustion or future instances of spontaneous combustion within current or future rehabilitation areas is being undertaken. Rigorous quality control should be afforded this capping placement such that a future unacceptable degree of spontaneous combustion does not persist beyond site closure.	Next AEMR	This AEMR **Section 12.1.1**

6 ENVIRONMENTAL PERFORMANCE

Environmental monitoring is a key component of Drayton's operation. Monitoring undertaken includes air quality, surface and ground water quality, blasting, noise and meteorology. All monitoring is conducted in accordance with the appropriate Australian Standard, with collection of samples by site personnel or contractors and the analysis of water and dust samples performed by an independent laboratory that is NATA accredited.

Drayton's Safety, Health and Environment Management System (SHE MS) is certified to both ISO 14001 for its environmental management practices and ASOHS 18001, AS/NZ4801 for health and safety. This system is aimed at ensuring continual improvement in SHEC performance as required by Anglo American.

The following section reports on the environmental performance associated with Drayton Mine during the reporting period.

6.1 Meteorological Monitoring

6.1.1 Introduction

Real-time meteorological monitoring is a component of Drayton's environmental monitoring system. Meteorological data including wind speed, wind direction, temperature, rainfall, solar radiation and humidity are monitored using an on-site automatic weather station located at the CHP.

The data is collected at five minute intervals and transferred directly into a log file located on Drayton's electronic database. The data allows Drayton employees to assess the prevailing weather conditions and modify the operation where necessary to suit the current conditions. It also plays a vital role in planning blasting events for appropriate weather conditions.

Prevailing winds at Drayton historically depict winds from the south-east in summer months and the north-west during winter months which influences the potential impacts that operations at Drayton Mine have on air quality results.

6.1.2 Results

Rainfall

Total annual rainfall for 2016 was 759.6 mm falling over 110 rain days, a decrease from the previous reporting period (781.6 mm) though above the long term average of 675.2 mm. January recorded the wettest month during 2016 with 132.2 mm of rain. January was followed by the driest recorded month since 1981 being February where only 7.2 mm of rain was recorded (see **Figure 4**). **Figure 4** contains the monthly averages for the entirety of 2016 and compares this with historical rainfall data.

The total monthly rainfall and the total number of rain days during the 2016 reporting period are shown in **Table 8**. There was an increase in the total number of rain days experienced in 2016 for a total of 110 compared to 96 in 2015.

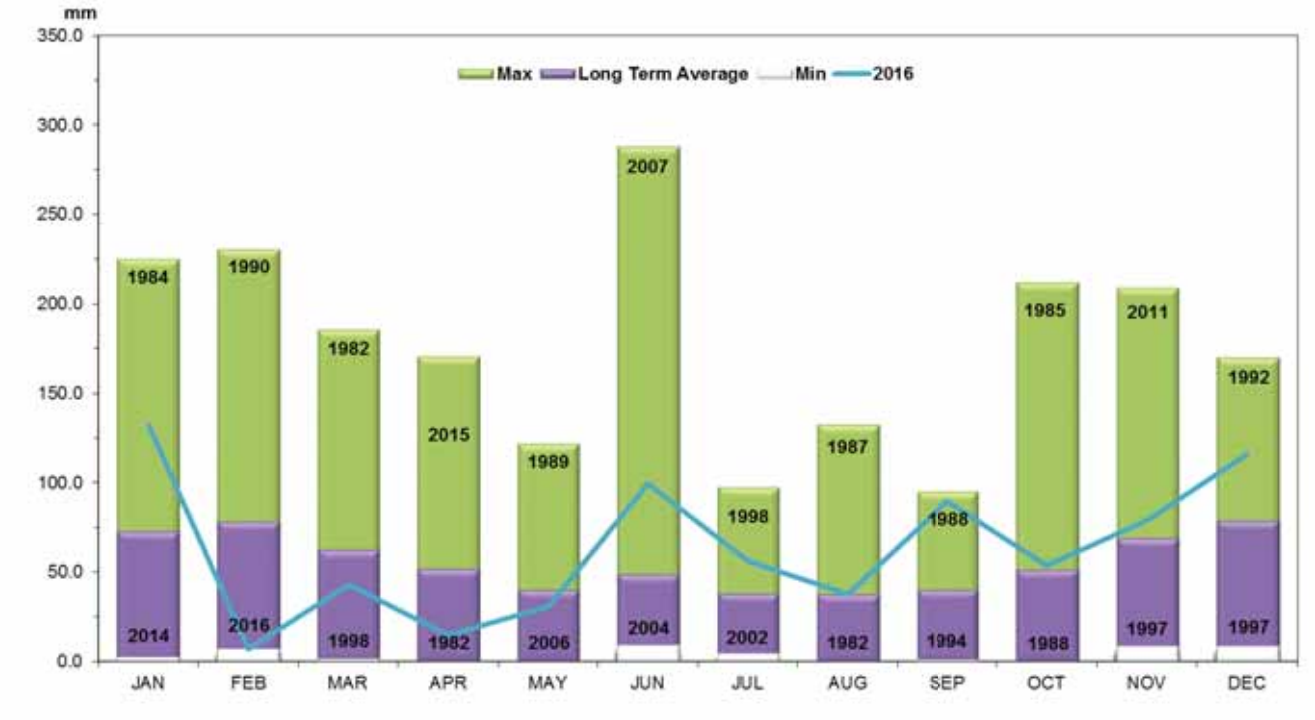


Figure 4: Rainfall history 1981 to 2016

Table 8: Total Monthly Rainfall for 2016

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Rainfall (mm)	132	7.2	43.2	14.8	30.6	99.4	56	37.8	89.6	53.8	79.2	116	**759.6**
No. of rain days	11	3	8	8	7	12	8	11	13	10	7	12	**110**

Note: A rain day is a day in which 0.2 mm or greater of water is recorded by the on-site meteorological station

Temperature

Ambient temperature was monitored at the Drayton CHP meteorological station. The maximum temperature recorded during the year was 40.4°C on the 25th of February 2016 and the minimum was -0.3°C on 30th of June 2016. Temperatures in 2016 followed a similar trend to 2015 however 2016 experienced in general warmer temperatures than 2015. The temperature range per month throughout 2016 and a comparison of the 2015 and 2016 average temperatures is shown in **Table 9** below.

Table 9: 2016 Monthly Temperature Range and Average Daily Temperature

Month	Monthly Temp Range 2015 (°C)	Average Daily Temp 2016 (°C)	Average Daily Temp 2015 (°C)
January	12.4 - 39.1	23.4	23.6
February	14.2 - 40.4	24.6	22.7
March	12.1 – 36.2	23.1	21.7
April	10.3 - 34.6	20.9	17.3
May	2.0 - 27.7	16.1	14.1
June	-0.3 – 20.21	12.3	10.9
July	0.2 – 23.4	11.9	9.8
August	2.8 - 23.8	12.4	11.9
September	4.7 - 24.4	15.0	14.2
October	4.8 - 31.8	17.1	20.1
November	6.2 – 35.4	22.1	21.6
December	13.5 – 40.0	25.5	22.6

Wind Speed and Direction

Similar to previous years, the prominent wind directions at Drayton during 2016 were north westerly and south easterly. The 2016 summer season (January, February and December) was dominated by south easterly (SE) winds from the Lake Liddell direction. The late autumn and early winter months (May to July) were dominated by north westerly (NW) winds from the direction of between Muswellbrook and Denman. Autumn (March to May) and spring months (September to November) experienced a change in dominant wind direction from SE to NW during autumn, while the dominant winds fluctuated between NW and SE during spring.

6.2 Air Quality

6.2.1 Introduction

Dust management is an integral component of Drayton's operations. Specific requirements and criteria relating to air quality monitoring are detailed in PA 06_0202 and EPL 1323. The Drayton air quality monitoring program assesses possible impacts against required parameters including Depositional Dust, Total Suspended Particulates (TSP) and particulate matter less than 10 µm in diameter (PM_{10}).

A component of the air quality monitoring network includes the dust management system where upwind and downwind real time monitors provide feedback to a software package that assesses Drayton's dust contribution. This system provides alerts when Drayton's dust emissions are elevated which triggers actions for employees. This has been outlined in Drayton's Air Quality Management and Monitoring Plan.

6.2.2 Monitoring System

Throughout the 2016 reporting period air quality monitoring continued to be based on the existing network of monitoring locations. A combination of dust fallout gauges, high volumes air samplers and real time monitoring stations currently monitor dust levels in areas surrounding the Drayton operation. Air quality monitoring currently focuses on the northern areas of Drayton as these are the nearest privately owned lands not used for heavy industry. On the western side of Drayton is the Mt Arthur open cut coal mine and to the east and south are AGL Macquarie's Liddell and Bayswater power stations.

Using the results from the monitoring program, Drayton is able to determine compliance with applicable licence conditions. The results from the Drayton air quality monitoring program are published monthly via the Anglo American website and reported annually in this AEMR.

Drayton also considers regional air quality via the Upper Hunter Air Quality Monitoring Network (UHAQMN) monitoring network for PM_{10} and $PM_{2.5}$. SMS notification is provided to site environment personnel when elevated dust levels are recorded and predicted dust risk is provided daily via email notification.

6.2.3 Monitoring Results

Deposited Dust

Dust depositional gauges have been in operation for the life of the mine. The eight depositional gauges used for compliance are situated to the north of the lease boundary, and in the vicinity of the residential areas around the mine (see **Figure 5**).

Figure 5: Depositional Dust Monitoring Sites

The dust gauges and measurement conform to *AS3580.10.1 - 2003 - Methods 10.1 - Determination of Particulates - Deposited matter - Gravimetric Method*. Samples are collected, in accordance with AS 2724.5(1987) each calendar month. The samples are analysed by a NATA certified laboratory for total solids, insoluble solids, ash residue and combustible matter. A field observation is made during collection as to possible contamination of samples. To determine compliance the depositional dust results are compared to impact assessment criteria identified in PA 06_0202 and outlined in **Table 10**.

There were no exceedances of the depositional dust impact assessment criteria recorded during the reporting period.

The Drayton Mine Extension Environmental Assessment 2007 estimated emissions to air for years one, five and ten, and modelled the dispersion and deposition of emissions in these years. The 2016 reporting period coincides with year nine of the EA therefore the 2016 results have been compared to the closest year's prediction (Year 10).

The 2007 EA predicted that no privately owned residences would experience dust deposition levels above the assessment criteria during year 10. The 2016 dust deposition levels displayed slightly higher than modelling predictions however all results remain well below the 4 g/m^2/month annual average as identified in PA 06_0202 and outlined in **Table 10**. Monitoring results compared to those predicted in the EA can be found in **Table 11**.

Table 12 and **Figure 6** summarise the year's results of insoluble solids, ash and combustible matter recorded during 2016.

Dust gauges 2157, 2208, 2230, 2235 and 2247 were equal to or fell below the long term averages and gauges while 2130, 2175 and 2197 were slightly above the long term averages (see **Table 12**). In 2016 the overall average level of insoluble solids across all eight gauges from all sources was 2.1 g/m²/month. This was a decrease of 0.3 g/m²/month compared to the 2015 average insoluble solids level of 2.4 g/m²/month. Details relating to each individual gauge on a monthly basis are outlined in **Appendix C**.

Gauge 2197 had the highest average result levels; however, this gauge experienced a decrease from an average of 3.8 g/m^2/month in 2015 to an average of 2.9 g/m^2/month in 2016. This dust gauge is in an exposed location, being adjacent to farmland that overlooks Mt Arthur Mine.

The depositional dust gauges have shown generally a minor decrease in results during 2016 when compared to 2015 which may be attributable to an above average annual rainfall and reduced production rates.

Due to the nature of deposition dust gauges, contamination of samples by bird droppings, insects and vegetation does occur from time to time. Contamination may cause dust results to appear higher than they actually are.

Table 10: Long Term Impact Assessment Criteria for Deposited Dust

Pollutant	Averaging Period	Maximum Increase in Deposited Dust Levels	Maximum Total Deposited Dust Level
Deposited Dust	Annual	2 g/m²/month	4 g/m²/month

Table 11: 2016 Dust Deposition Results Compared with EA Predictions

Residence ID	Representative Dust Gauge	2016 Average Insoluble Solids (g/m^2/month)	EA Prediction Year 10 Average Insoluble Solids (g/m^2/month)
16	2235	2.0	1.5
61	2247	1.8	1.4
27	2230	2.2	1.3
71	2175	2.0	1.3

Table 12: 2016 Average Dust Deposition Gauge Results

Site Number	Ash (g/m²/month)	Combustible Matter (g/m²/month)	Insoluble Solids (g/m²/month)	No of Samples 2016	Limit (Insoluble Solids)	Long Term Average (Insoluble Solids)	
					g/m²/month	g/m²/month	Period
2130	1.4	0.8	2.2	11*	4.0	2.0	May99 – Dec16
2157	1.3	0.8	2.1	12	4.0	2.1	Oct82 – Dec16
2175	1.38	0.6	2.0	12	4.0	1.8	Dec86 – Dec16
2197	1.78	1.15	2.9	12	4.0	2.8	Dec86 – Dec16
2208	1.1	0.4	1.5	12	4.0	2.3	Dec86 – Dec16
2230	1.25	0.7	2.0	12	4.0	2.4	Dec87 – Dec16
2235	1.3	0.7	2.0	12	4.0	2.0	Jan85 – Dec16
2247	1.2	0.6	1.8	12	4.0	1.8	Oct82 – Dec16

Note: Deposited dust is assessed as insoluble solids as defined by 'AS/NZS 3580.10.1.2003: Methods for Sampling and Analysis of Ambient Air – Determination of Particulate Matter – Deposited Matter – Gravimetric Method'.

**Broken bottle in August 2016*

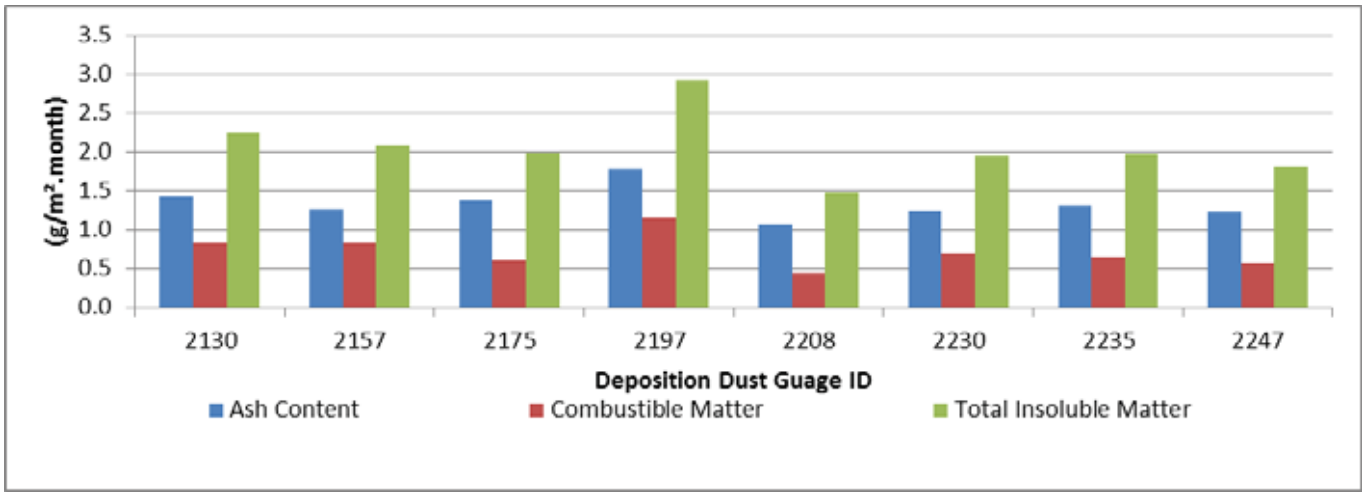


Figure 6: Average Depositional Dust Gauge Results 2016

Total Suspended Particulates

Drayton operates two high volume air samplers (HVAS) at locations indicated in **Figure 7** below. The Met Station monitor is located on site in the CHP area and is used to indicate TSP levels on site. The Lot 22 monitor is located offsite, within the Antiene rural sub division close to residential premises, and is used for compliance purposes. Both monitors were calibrated every two months throughout the 2016 reporting period.

Drayton's TSP sampling program follows the OEH guidelines of a six-day rotational cycle. The HVAS and measurement also conform to '*AS 2724.3 – 1984: Particulate Matter – Determination of Total Suspended Particulates (TSP), High Volume Sampler Gravimetric Method*'. Compliance is determined by comparing the results from the HVAS sampling to the impact assessment criteria identified in PA 06_0202 and outlined in **Table 13**.

There were no exceedances of the TSP impact assessment criteria recorded during the reporting period.

Figure 8 presents the Antiene station Lot 22 TSP results for the entirety of the 2016 reporting period. The 2016 annual average TSP for this location was 49.3 µg/m³, well below the annual average limit of 90 µg/m³ (see **Figure 9**). The annual mean results are summarised in **Table 14** with the complete results for the 2016 reporting period presented in **Appendix C**.

The 2007 EA prediction for the annual TSP concentrations due to emissions from Drayton and other sources for year 10 for representative residence 14 was 70.2 µg/m³. The 2016 annual concentration of 49.3 µg/m³ and the long-term average of 52.5 µg/m³ (see **Table 14**) are below the EA prediction and required limits.

Table 13: Long term impact assessment criteria for TSP

Pollutant	Averaging period	Criterion
Total suspended particulate (TSP) matter	Annual	90 µg/m³

Figure 7: Real-time Dust Monitoring Equipment

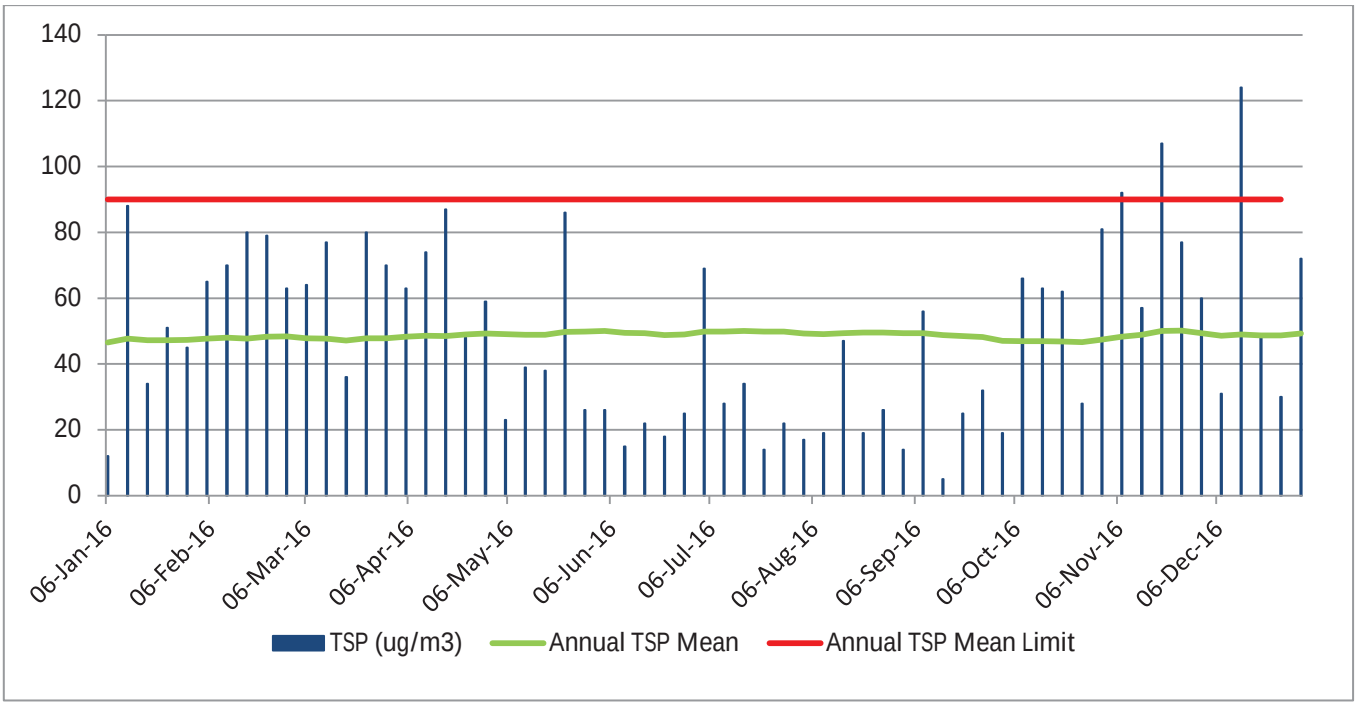


Figure 8: TSP from Lot 22 HVAS 2016

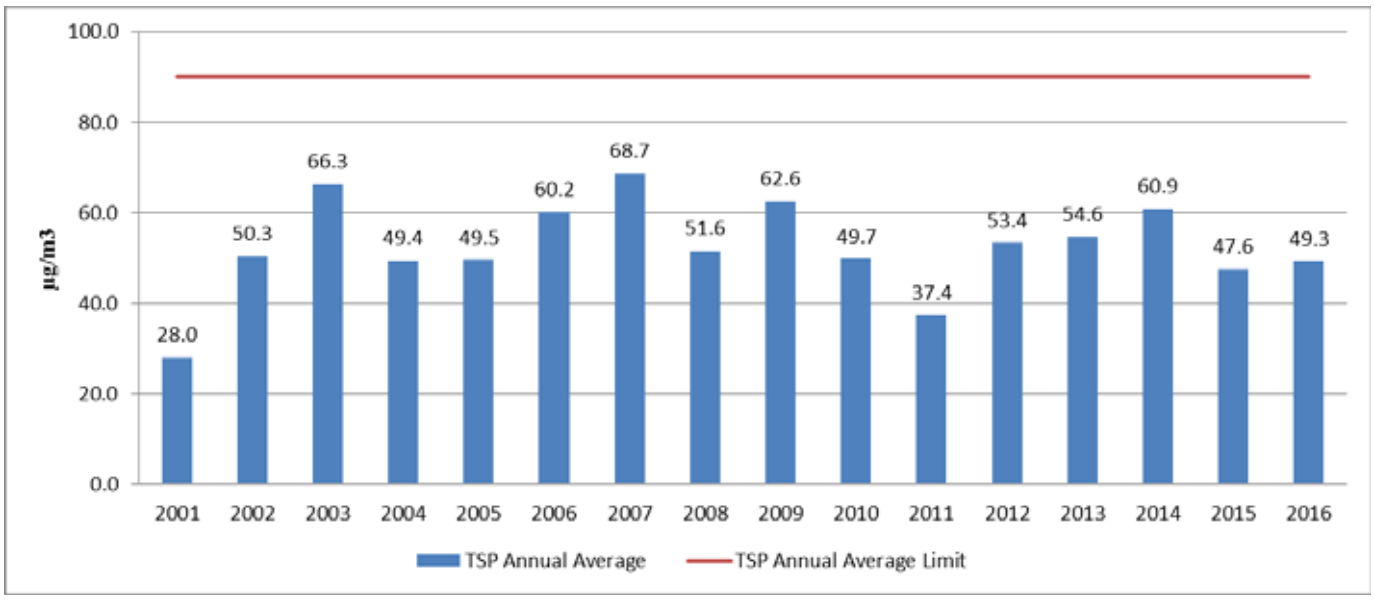


Figure 9: Long Term Annual Average TSP from Lot 22 HVAS

Table 14: Total Suspended Particulates 2016

Location	Yearly Average (µg/m3)	Range (µg/m^3)	No. Samples	Long Term Average µg/m³	EA Prediction Residence 14 Year 10
Lot 22 Antiene	49.3	5.0 – 124.0	61	52.5 (2001 – 2016)	70.4

PM_{10}

Drayton's Tapered Element Oscillating Microbalance (TEOM) continuously monitors PM_{10} at a location between Drayton's mining operations and the near neighbours' boundaries (Lot 9 TEOM) (refer to **Figure 7**). It is used to indicate real time dust levels between the operation and nearby residents. The TEOM was calibrated in March, June, August and December 2016 in accordance with AS3580.9.8-2008 and the TEOM Service Manual. It is required that dust levels at neighbouring residences fall below the impact assessment criteria identified in PA 06_0202 and outlined in **Table 15** in order to be compliant with licence conditions.

There were no exceedances of the PM_{10} impact assessment criteria during the reporting period.

Table 15: Short and long term impact assessment criteria for PM10

Pollutant	Averaging period	Criterion
Particulate matter <10µm (PM10)	24 hour	50 µg/m³*
Particulate matter <10µm (PM10)	Annual	30 µg/m³

**Incremental increase in PM_{10} concentrations due to the mine site alone*

The 2007 EA prediction of the annual PM_{10} concentrations due to emissions from Drayton and other sources for year 10 predicted that the annual average PM_{10} concentrations from all sources for representative residence 72 (Lot 9 Antiene) would be 21.4 µg/m³. The 2016 annual average concentration of PM_{10} at the Lot 9 TEOM was 14.4 µg/m³ and is below the EA's predicted level.

The real time dust monitoring results show that the annual average PM_{10} criterion of 30 $\mu g/m^3$ was not exceeded in 2016 (see **Figure 10**). Throughout the 2016 reporting period the 24-hour average PM_{10} results did not exceeded the 50 $\mu g/m^3$ criterion.

Figure 10 also indicates that PM_{10} results from the Muswellbrook UHAQMN monitor also remained below the 24-hour average 50 $\mu g/m^3$ criterion.

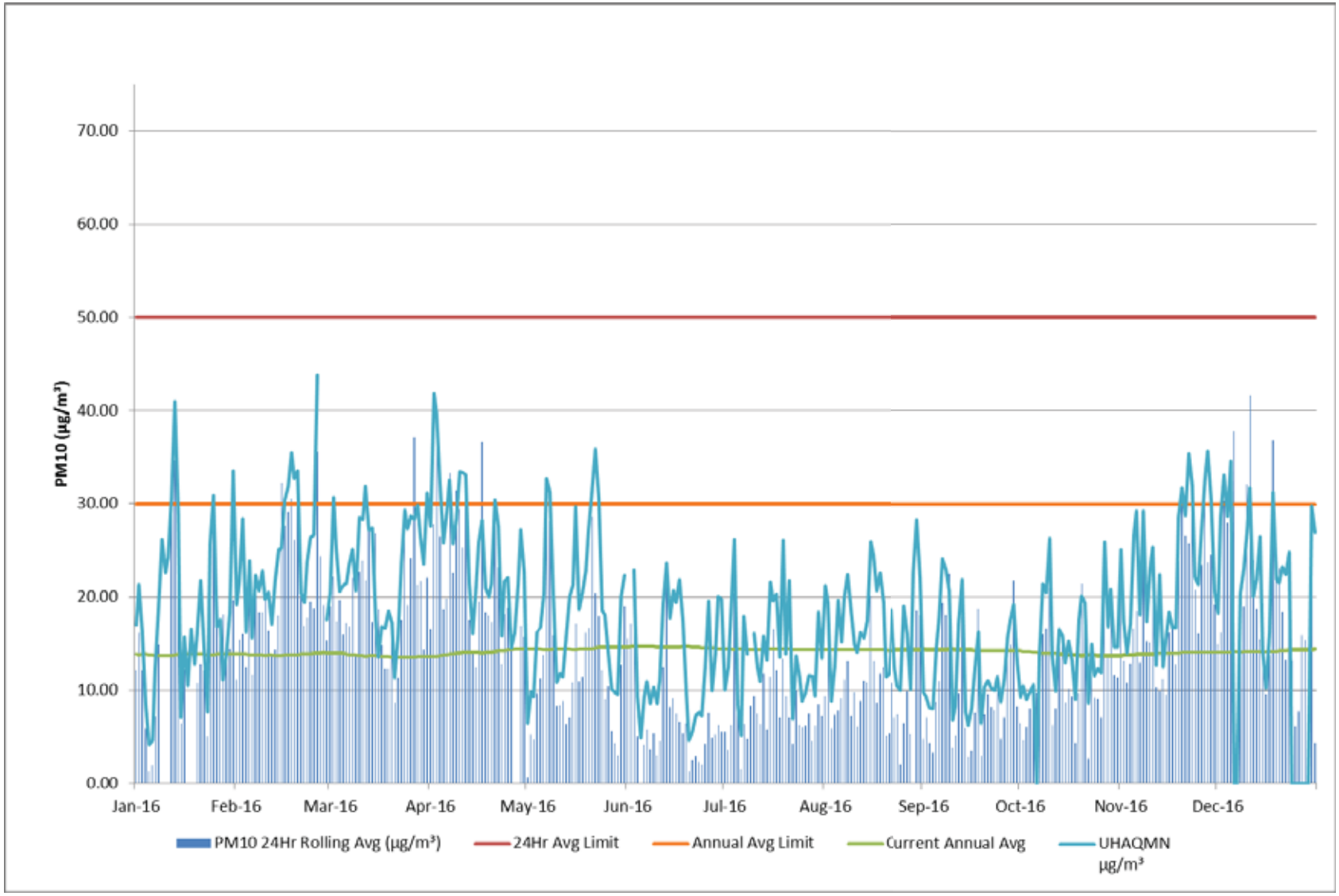


Figure 10: PM_{10} Data (2016)

E-Sampler Network

Throughout the reporting period, Drayton operated 4 E-Samplers monitoring continuous PM_{10} levels (see **Figure 7**). These units are positioned to capture particulate matter concentrations both upwind and downwind of operations.

As discussed in **Section 6.1** the dominant wind directions at Drayton are south-easterlies in the summer months and north-westerlies in the winter months. E-Samplers 1 and 2 are located north and south of the operation respectively whilst E-Samplers 3 and 4 are located to the east and west respectively.

The E-Samplers are used to continuously monitor real time trends in PM_{10} concentrations as well as for investigating elevated PM_{10} levels or air quality complaints. Site personnel have the ability to access E-Sampler levels in real time to identify potential sources of PM_{10} and make operational decisions based on this real time data.

Predictive weather modelling provides daily reports to site personnel and was used throughout 2016 to provide a forecast for dust enhancing weather and to trigger preparatory actions prior to dust enhancing conditions. Operations can be subsequently tailored as required in consideration of potential impacts as outlined in the Air Quality Management Plan.

6.2.4 Greenhouse Gas and Energy Efficiencies

Drayton continued to focus on reducing greenhouse gases and improving energy efficiencies. During the 2015/2016 financial year Drayton reported to the Clean Energy Regulator a total of 45,956 t CO2-e in scope 1 emissions and 25,382 t CO2-e in scope 2 emissions. Also during this financial year, Drayton consumed 726,631 gigajoules of energy and produced 52,666,470 gigajoules of energy in the form of coal mined. These results represented a decrease scope 1 and scope 2 emissions and a decrease in the amount of energy consumed and produced.

Drayton had an energy optimisation assessment report compiled by SMEC Australia Pty Ltd in 2014 and opportunities identified through that assessment have continued to be implemented on site through the 2016 reporting period. BanLaw, a fuel management system, tracks the diesel issued from fuel farms and service trucks to end use equipment such as heavy mine equipment, stationary equipment (e.g. pumps, lighting plants) and light and medium vehicles. This system has improved fuel security and accounting rigour (e.g. data accuracy, completeness and transparency) relating to diesel management and consumption on site.

6.3 Erosion and Sediment

During the 2016 reporting period, erosion and sediment control at Drayton was managed in accordance with the site Water Management Plan and the *Managing Urban Stormwater: Soils and Construction* guidelines. The control measures in place throughout the year included:

- Sediment traps and catch drains in the runoff zones from industrial areas;
- Collection of surface runoff in established dams downstream of disturbed areas;
- Progressive rehabilitation of disturbed areas as soon as practicable; and
- Contour banks on rehabilitated land designed at 0.5% - 1% grade and spaced to minimise down slope flows.

Water from washdown bays is collected in a series of sumps that are desilted on a regular basis. Any overflow from these sumps goes into the oil pollution control dam.

The rail loop dam, which collects runoff from the CHP area, has been designed so runoff water travels through a series of sediment ponds prior to entering the dam. Drayton does not possess a licence to discharge water off site so water and sediment is retained on site.

Periodic checks of rehabilitated areas are conducted to identify any erosion concerns and implement remediation measures.

On 20 December 2016 Drayton was subject to a Dam Management Audit which was led by the EPA. The audit focused on the effective management and compliance of onsite dams against relevant approval conditions. Other regulatory authorities from DRE, DP&E and the DSC also assisted with the audit. Recommendations arising from this audit will be discussed in the next AEMR.

6.4 Contaminated Land

Drayton maintains a register of locations on site that are known or potential locations of land contamination. Throughout the reporting period there were no new areas of contaminated land added to the land contamination register.

The areas that Drayton classifies as contaminated did not change from those described in the 2015 AEMR. Potentially contaminated sites includes all areas around the workshop, stores areas, west fuel bay, main diesel facility, East Pit, Industrial Dam, Savoy Dam, Oil Pollution Control Dam, Access Road Dam and its upstream catchment. Refer to **Section 6.15** for further information on hydrocarbon contamination.

Associated with mine closure will be the preparation of a phase 1 contaminated land assessment which is scheduled to be conducted in 2017. Results from the contaminated land assessment will be reported on in next AEMR.

6.5 Threatened Flora and Fauna

Drayton Environmental Management Plans relating to threatened flora and fauna include:

- Offset Strategy;
- Rehabilitation and Offset Management Plan; and
- Flora and Fauna Management Plan.

In accordance with the above documentation monitoring of threatened flora and fauna within the biodiversity offset and rehabilitation areas is completed annually. A Flora and Fauna Monitoring Report was completed by Eco Logical Australia (ELA) for the 2016 reporting period. Flora monitoring was undertaken between 7 and 11 November 2016. Fauna monitoring was undertaken from 31 October to 1 November and 8–9 November 2016. The surveys were undertaken by ELA Ecologists.

A representative network of 29 rehabilitation and offset monitoring sites were included in the 2016 monitoring program. Consistent with past assessments, eight of the 29 monitoring sites were surveyed for fauna and all sites were surveyed via floristic and biometric sampling methods.

A discussion as to the results from the monitoring program is provided below.

6.5.1 Flora Monitoring Results

Flora monitoring was undertaken during the reporting period in rehabilitation and offset areas. No additional threatened flora species or communities were identified in the reporting period. The EEC, Hunter Lowland Redgum Forest (HLRF) as listed under the *Threatened Species Conservation Act 1995* (TSC Act), has been previously identified. Also during a focussed investigation program conducted in 2015 a population of Pine Donkey Orchid (*Diuris tricolor*) was identified in the Drayton Wildlife Refuge and confirmed by specialist botanical ecologists. The species is listed as vulnerable under the TSC Act.

The 2016 Flora and Fauna Monitoring Report also reviewed the biodiversity offset and rehabilitation areas against key performance objectives and completion criteria as identified in the following management plans:

- Offset Strategy;
- Rehabilitation and Offset Management Plan; and
- Flora and Fauna Management Plan.

The report found that natural vegetation sites generally met performance criteria targets in 2016, other than one site which slightly exceeded the target for noxious weed cover.

Most woodland rehabilitation monitoring sites were found to be meeting the performance criteria target for bare ground, percentage of target woodland species present on site, native species diversity and native grass cover; however, several are still underperforming for these measures. The majority of the woodland rehabilitation sites are underperforming for canopy cover, shrub cover and native groundcover. Most sites had seedlings of target canopy species present; several also had seedlings of target mid-storey species. Establishment of perennial tree species via planting of tubestock has not met rehabilitation objectives and the methodology for establishment of woodland species will be reviewed in 2017.

The majority of pasture rehabilitation monitoring sites are meeting the performance criteria target for effective cover of pasture species, although one has a very low pasture species cover. Mixed results were observed for target pasture species, diversity and weeds.

6.5.2 Fauna Monitoring Results

A total of 90 fauna species were recorded during the 2016 fauna monitoring surveys, including three vertebrate pest species. The Drayton Wildlife Refuge was the most diverse, with the highest number of native species while the Great North Tip rehabilitation area was the least diverse.

A total of eighteen threatened fauna species and three migratory species have been recorded at Drayton during EA and subsequent fauna monitoring surveys. Threatened species occurring at Drayton are listed in the Flora and Fauna Management Plan. Management and preservation of existing habitat forms the basis of protection of these threatened species. Known habitat occurs mainly in remnant and regenerating areas of woodland in the Drayton Wildlife Refuge, Northern Offset and Southern Offset.

Two threatened arboreal mammal species were recorded in the 2016: *Petaurus norfolcensis* (Squirrel Glider; listed as vulnerable under the TSC Act) was detected and *Phascogale tapoatafa* (Brush-tailed Phascogale, also listed as vulnerable under the NSW *Threatened Species Conservation Act 1995* (TSC Act), was recorded. The former has been recorded during all previous monitoring events; however, the latter is a new threatened species record for Drayton.

Fauna monitoring undertaken during the previous 2015 monitoring program revealed for the first time the Spotted-tail Quoll (*Dasyurus maculatus*) is listed as vulnerable under the *Threatened Species Conservation Act 1995* (TSC Act) and endangered under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). During the 2016 fauna monitoring the Spotted-tail Quoll was not sighted during remote camera / hairtube or spotlighting surveys however scats were present within the creekline at the northern end of the southern offsets, suggesting their continued presence on site.

Two threatened bird species were recorded in 2016: *Chthonicola sagittata* (Speckled Warbler) and *Pomatostomus temporalis* (Grey-crowned Babler), both listed as vulnerable under the TSC Act. The Grey-crowned Babbler is a new species for the Drayton monitoring area.

Four threatened bat species were recorded during the 2016 monitoring. The Eastern False Pipistrelle (*Falsistrellus tasmaniensis*), Eastern Bentwing Bat (*Miniopterus schreibersii oceanensis*), Eastern Freetail-bat (*Mormopterus norfolkensi*) and Greater Broad-nosed Bat (*Scoteanax rueppellii*) all listed as vulnerable under the TSC Act. All four species have been previously recorded at Drayton.

6.5.3 Drayton Wildlife Refuge

In 1987 the Drayton Wildlife Refuge (see **Figure 2**) was gazetted. It allows for planned land use of all areas of the Drayton land holding, whilst still respecting wildlife values. In the Drayton EA it was predicted that the 'Natural Zone' of the Drayton Wildlife Refuge would not be impacted by the Project and that the management of this area will compensate for the impacts of the project on flora and fauna. Besides providing a buffer zone between residents and the mine, the Drayton Wildlife Refuge continues to provide remnant woodland for natural ecosystems and threatened species.

6.5.4 Feral Animal Control

Feral animals, such as cats, wild dogs, rabbits and foxes, have been identified at Drayton. Control strategies undertaken include the use of poison baits to control these animal populations. Drayton implements a coordinated feral animal control program with neighbouring property holders. This integrated approach is designed to maximise effectiveness of control for target species across a broad area.

In June 2016 a 1080 Wild Dog baiting program was conducted in coordination with local land owners within the Mt Arthur Wild Dog Association area. The baiting was a success with over 50% of baits being taken. Baits were laid across operational and non-operational areas of the site with a focus on areas where dogs have been sighted previously. The 2016 fauna monitoring, conducted in November 2015, did not identify dogs at any of the monitoring locations.

Cats, foxes and rabbits were recorded during the 2016 fauna monitoring. Numbers recorded were generally consistent with those recorded in previous years monitoring though there was a reduction in sites where feral species were identified compared to 2015.

All feral animal control needs to be carefully planned and relevant guidelines adhered to, however the Southern Offset is particularly sensitive due to the presence of Spotted-tail Quoll which was recorded for the second year running in 2016. Due to the potential vulnerability of the species to 1080 (sodium fluoroacetate), fox, cat and rabbit baiting should not be undertaken within an exclusion zone around the creekline habitat in the Southern Offset, and any baiting in the surrounding areas should use precautions including burying meat baits to a depth of at least 10 cm and avoidance, where possible, of baiting during the peak breeding season of the species (July to September).

6.5.5 Pest Animal Control

Kangaroo species, especially the Eastern Grey Kangaroo (*Macropus giganteus*), have reached high numbers in the areas to the south and south west of the mine. In March 2016, a licenced commercial harvester was used to cull 30 male kangaroos. Excessive kangaroo numbers have resulted on impacts to the establishment and ongoing success of rehabilitated areas, especially on the survival rate of young trees.

6.6 Weeds

Weeds are targeted for control based on priority. High priority weeds include noxious weeds, weeds establishing on new rehabilitation areas and environmental weeds spreading to previously unaffected areas. Weed control is ongoing with control scheduled opportunistically throughout the year depending on weather conditions and life stage of the species being targeted. Treatment occurs during flowering, where possible, to assist with identification and ensure weeds are treated prior to seeding. Weeds are mapped and data collected regarding extent and density of infestations. The weed control program is ongoing and focuses on rehabilitation and offset areas where weeds threaten targets for long-term outcomes.

6.7 Blasting

6.7.1 Management System

Blasting is permitted under Drayton's Project Approval between the hours of 0900 and 1700 Monday to Saturday (EST) and between 0900 and 1800 Monday to Saturday (DST). Drayton's Mining Lease, PA 06_0202 and EPL 1323 include requirements for the monitoring and control of blasting impacts (see **Table 16**) at any residence on privately-owned land. A maximum of two blasts per day can be carried out with a limit of eight blasts per week averaged over a 12 month period.

Table 16: Blasting and Vibration Criteria

Airblast Overpressure Level	
(dB(L)in Peak)	**Allowable Exceedance**
115	5% of the total number of blasts over a period of 12 months
120	0%
Peak Particle Velocity (Ground Vibration)	
mm/sec	**Allowable Exceedance**
5	5% of the total number of blasts over a period of 12 months
10	0%

Procedures have been implemented to ensure Drayton minimises the impact of blasting on near neighbours and operates within licence and project approval conditions. They include the following:

- Loading blasts according to Drill and Blast Engineer's design with attention given to factors such as:
    - charge weight per delay;
    - loading pattern of holes;
    - stemming used;
    - firing sequence and direction;
    - maximum instantaneous charge; and
    - type of blast.
- Accountability for blasting compliance lies primarily with the Mining Operations Department;
- Meteorological conditions are considered when firing shots;
- Waveforms of both air blast and vibration are available for all blasts;
- Implementing an NN Strategy for blasting in the north pit;
- Implementing a road closure process for closing Thomas Mitchell Drive during blasting in the north pit (within 500m of the road);
- Implementing electronic detonation on most blasts in the NN area; and
- Designing blasts to remain below internal limits and well below regulatory limits.

Drayton is also involved in a continuing research project, funded by the Australian Coal Association Research Program (ACARP), to identify the specific weather conditions relating to blasting activity. This is a joint research project involving a number of Upper Hunter mining companies. This project is referred to as the SODAR project.

Throughout 2016, the use of a weather forecasting tool (implemented through 2014) was continued. The weather forecasting tool allows modelling of conditions at the proposed time of each blast and prediction of the blast dust or potential fume pathway. Inputs to this modelling system also allow prediction of actual fume levels expected for each blast. Multiple blast times can be modelled to ensure minimal impact to personnel and neighbouring residences. This system allows more accurate forecasting and prediction of potential impacts from blasting to assist in planning for optimal results.

6.7.2 Monitoring System

Drayton uses an internet based blast monitoring system which gives access to immediate blasting information for all blasts. The blast monitoring units also allow additional monitoring to be undertaken in specific locations as required. The units operate between approved blasting hours and automatically trigger once a vibration or overpressure event is recorded. There are three community based blast monitors at locations in the Antiene area and two monitors at the Ash Dam, one on the toe, and one on the crest of the wall. The locations of the five blast monitoring units are shown in **Figure 11**.

6.7.3 Results

A total of 49 blasts were fired at Drayton during the 2016 reporting period. Due to the cessation of coal extraction in October 2016 the final Drayton blast occurred within the ENO2 pit on the 19th September 2016. The monitoring results of these blasts are summarised in **Table 17** and displayed in **Appendix E**.

During 2016, all monitoring results were below the maximum limit for ground vibration (10 mm/s) and the airblast/overpressure criteria (120 decibels (linear)).

Throughout 2016 a total of 3 blasting related enquiries or complaints were received. Two of these were in regards to blast vibration felt at the complainants' residences, and one was related to a blast cloud. Follow up actions concluded that no blasting had occurred at Drayton on any of the days where a complaint was made. Details of the complaints or enquiries received during 2016 are contained in **Section 9.2**.

Table 17: Blast Monitoring Summary

Location	Antiene	DeBoer	Sharman
Avg Air blast dB(L)	94.4	94.2	93.0
Range dB(L)	73.8 - 109.8	76.5 - 108.9	80.9 - 106.9
Avg Vibration mm/sec	0.5	0.3	0.1
Range mm/sec	0.01 - 2.87	0.01 - 1.13	0.01 - 0.4

Figure 11: Blast Monitoring Sites

6.8 Operational Noise

6.8.1 Management System

Drayton has implemented a number of noise management controls including mine planning, operational and engineering measures, and a real-time monitoring system. The mitigation measures outlined below were applied during the 2016 reporting period and revised as appropriate:

- North and East pit trucks dump in shielded locations during evening and night;
- North pit pre-strip haul roads are shielded by pit walls or a berm in the direction of residences, during evening and night;
- Loading units within the North Pit are located in a shielded area below natural ground surface during the evening and night;
- The haul road from the South Pit has been realigned to the lowest possible elevation, with minimal long straight sections of road directly in line with a residence and effective shielding with earth berms along the sides of the road where possible;
- Mine planning schedules are developed to ensure no active dumping occurs at exposed locations during adverse weather conditions;
- Training of relevant personnel has being undertaken to ensure they are familiar with the complaints response process;
- All trucks and the L1400 loader are fitted with noise attenuation mufflers to further reduce noise emissions for these units;
- Alternative reversing beepers including Broadband (Quacker) Reverse Alarms have been implemented on trucks, to further reduce noise emissions from these units across site; and
- Drayton has a second real-time noise monitor, which is located at the end of Balmoral Road.

6.8.2 Monitoring System

Drayton undertakes a combination of independent monitoring and real-time monitoring in order to assess mine noise criteria stipulated in EPL 1323 and PA 06_0202 (see **Table 18**).

Table 18: Noise Impact Assessment Criteria

Land ID Number	Day	Evening	Night	
	L_{Aeq}(15min)	L_{Aeq}(15min)	L_{Aeq}(15min)	L_{A1}(1min)
34	35	35	36	45
29	35	35	36	47
31	35	35	37	47
33, 86	35	35	38	45
32	35	35	40	47

Land ID Number	Day	Evening	Night	
71, 75	35	35	41	47
70	35	36	41	47
76	35	36	42	47
28	35	37	40	47
69	35	37	41	47
13	36	36	35	45
12	36	36	36	47
25	36	37	37	47
26	36	37	38	47
27	36	37	39	47
72	36	37	42	47
17	37	38	36	47
21, 22	38	38	38	45
18	38	39	38	47
20, 61	39	40	39	45
14	40	39	38	47
19	40	40	39	47
16	41	41	39	47
23	35	35	35	47
All other privately-owned land	35	35	35	45

Independent Monitoring

Independent noise monitoring is undertaken to quantify the overall noise levels at the nearby residences and determine compliance with noise criteria by Drayton's operations. The monitoring is carried out on a monthly basis by an acoustic engineer who incorporates attended monitoring data into a site model to provide a compliance report. This monitoring also fulfils the requirement of EPL 1323 Condition M8.1 that noise must be monitored every six months from the premises to determine compliance with the noise limits. Drayton has continued to undertake independent attended noise monitoring on a monthly basis throughout 2016 to determine compliance against noise criteria. Monitoring has continued beyond the cessation of monitoring in order to further assist in determining baseline noise levels.

Drayton's Project Approval details noise impact assessment criteria for 28 specific residential locations (see **Table 18** above). For logistical reasons it is not reasonable to carry out attended noise monitoring at all of the listed locations during the one monitoring survey. As such, the approach taken is to monitor the noise at eight representative residential locations and determine, by noise modelling, the noise level at all of the other locations required in PA 06_0202. Noise measurement locations for the attended noise survey are listed below and depicted in **Figure 12**:

- Doherty
- Kerr
- Wilson*
- Smith*
- Skinner
- Robertson
- Sharman
- Horder

** Additional locations contained in EPL 1323 but not in PA 06_0202.*

Three sets of measurements are made over the "circuit", one during the day time period (quarterly) (before 6 pm), one during the evening period (from 6 pm – 10 pm) and one at night (after 10 pm).

Real Time Monitoring

Real-time noise monitoring involves the use of two BarnOwl® noise monitoring systems. Multiple microphones allow the BarnOwl® to distinguish the direction of noise sources. This is particularly important when assessing and managing cumulative noise impacts.

The BarnOwl® system facilitates production of graphical and numerical data as well as recording and maintaining noise emission files on a five minute basis. One BarnOwl® has been installed at Lot 9 Antiene, approximately 150 m from the Drayton rail spur, and in close proximity to the mine's near neighbours (see **Figure 12**). This station enables proactive management to minimise noise emissions from the site should elevated results be recorded or complaint received. No noise complaints were received during the 2016 reporting period.

A second BarnOwl® was installed at the end of Balmoral Road in the Antiene area. This monitor is operated in conjunction with Mt Arthur Coal and monitors noise levels representative of Balmoral Road residences. This monitor will send alerts to Drayton personnel in the event of elevated noise levels.

Figure 12: Noise Monitoring Locations

6.8.3 Results

Independent Attended Monitoring

Independent noise monitoring was undertaken monthly during 2016 to quantify the overall noise levels at the nearby residences and determine compliance with noise criteria by Drayton's operations. In 2016 a noise compliance assessment report was submitted to the EPA with the Annual Return as set out in Condition R1 of EPL 1323.

Predicted noise levels in the 2007 EA were reported for years 1, 5 and 10 of the project. 2016 is equivalent to year 9 for the project and as a result year 10 predictions have been used below to compare actual monitoring results to predicted noise levels. All of the results of the attended noise monitoring were below that of predicted noise levels in the 2007 EA for year 10 of the project

Table 19 to **Table 22** below present the results for day, evening and night monitoring together with the EA prediction for comparison. No exceedance of operational noise criteria was detected during the 2016 reporting period with full reports provided in **Appendix D.**

Table 19: Noise Results Day LAeq (15 min)

Daytime* Measured Noise Results – Drayton Contribution dB(A) $L_{eq\ (15\ min)}$													
Location (Criterion)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	EA Prediction (Yr 10)
Doherty (41)			<20			<20			<20			<20	40
Kerr (36)			<20			<20			<20			<20	34
Skinner (39)			<20			<20			<20			<20	37
Robertson (36)			<20			26			<20			<20	34
Sharman (35)			<20			<20			<20			<20	32
Horder (35)			<20			29			<20			<20	33
Wilson (35)			<20			<20			<20			<20	<30
Smith (35)			<20			<20			<20			<20	<30

** Day period results only collected on a quarterly basis*

Table 20: Noise Results Evening LAeq (15 min)

Evening Measured Noise Results – Drayton Contribution dB(A) $L_{eq\ (15\ min)}$													
Location (Criterion)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	EA Prediction (Yr 10)
Doherty (41)	31	<20	27	27	31	29	<20	34	25	<20	<20	<20	41
Kerr (37)	30	<20	35	<20	25	<20	<20	29	<20	<20	<20	<20	35
Skinner (40)	33	<20	35	37	33	<20	32	37	<20	<20	26	<20	39
Robertson (37)	30	<20	<20	<20	25	28	28	36	33	36	29	<20	36
Sharman (35)	27	<20	<20	<20	<20	27	28	31	28	30	25	<20	34
Horder (36)	28	<20	<20	<20	23	28	31	35	30	32	27	<20	35
Wilson (35)	<20	<20	<20	<20	<20	<20	<20	25	<20	<20	<20	<20	30
Smith (35)	26	<20	<20	<20	<20	<20	<20	26	<20	<20	<20	<20	<30

Table 21: Noise Results Night LAeq (15 min)

Night Measured Noise Results – Drayton Contribution dB(A) $L_{eq\ (15\ min)}$													
Location (Criterion)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	EA Prediction (Yr 10)
Doherty (39)	31	26	34	36	33	26	<20	37	26	<20	<20	<20	39
Kerr (37)	26	28	31	<20	33	29	30	32	< 20	20	<20	<20	35
Skinner (39)	32	31	37	32	34	33	34	37	34	30	<20	<20	39
Robertson (42)	34	23	28	36	34	32	32	38	37	42	<20	<20	42
Sharman (41)	28	<20	<20	26	27	26	31	30	29	33	<20	<20	40
Horder (42)	35	22	27	31	33	30	33	37	35	40	<20	<20	42
Wilson (35)	<20	<20	<20	<20	<20	24	<20	26	24	<20	<20	<20	34
Smith (35)	<20	<20	<20	<20	<20	<20	<20	25	<20	<20	<20	<20	31

Table 22: Noise Results Night LA1 (1 min)

Night Measured Noise Results – Drayton Contribution dB(A) $L_{1\ (1\ min)}$*													
Location (Criterion)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	EA Prediction (Yr 10)
Doherty (47)	35	29	39	37	38	29	<20	41	30	IA	N/A	N/A	n/a
Kerr (47)	29	33	35	<20	37	33	34	35	IA	IA	N/A	N/A	n/a
Skinner (45)	35	35	42	36	38	37	38	42	38	35	N/A	N/A	n/a
Robertson (47)	38	25	31	40	39	36	36	43	41	46	N/A	N/A	n/a
Sharman (47)	30	<20	IA	29	30	30	34	35	32	39	N/A	N/A	n/a
Horder (47)	39	25	30	37	37	34	37	42	40	45	N/A	N/A	n/a
Wilson (45)	< 20	<20	IA	<20	<20	26	<20	28	26	IA	N/A	N/A	n/a
Smith (45)	< 20	<20	IA	<20	<20	IA	<20	27	IA	IA	N/A	N/A	n/a

** $L_{1\ (1\ min)}$ night period required for EPL 1323, IA= Inaudible, NA=Drayton Operations not active in this period*

6.9 Visual Aesthetics and Lighting

As predicted in the EA assessments, Drayton's operations have a low visual impact as a result of judicious clearing during initial construction. Remnants of the initial woodland have been retained around and throughout the site by careful layout of infrastructure and clearing of the minimum area required. Mature trees provide effective screening of areas such as the CHP, Rail Loadout facilities and general administration area.

Tree planting continues to be a component of rehabilitation programmes. These plantings will provide additional screening of mining activities as well as a corridor for wildlife movement between refuge and offset areas. During 2007, some 2,060 native tree seedlings were planted along Thomas Mitchell Drive to act as visual barrier for future mining developments. The seedlings were successfully established and now provide a screened barrier for travellers along Thomas Mitchell Drive. Further tree plantings occurred throughout 2012, 2014 and 2015. Trees were planted in areas that are visible to both the New England Highway and Thomas Mitchell Drive to provide future relief from linear rehabilitated contours.

Mobile lighting was actively managed during 2016 to prevent impacts on both Thomas Mitchell Drive and the New England Highway. These lights, essential for night-time operations, are carefully positioned to prevent glare from impacting drivers.

6.10 Aboriginal Heritage

Drayton maintains an Aboriginal Cultural Heritage Management Plan (ACHMP) in accordance with PA 06_0202. The ACHMP provides a set of operational procedures that guides Drayton in the management of Aboriginal cultural heritage issues within the mine development context.

The EA predicted that 29 of the 39 Aboriginal sites identified would likely be impacted by the project. The Aboriginal heritage sites consisted of isolated artefacts and areas where transient communities may have travelled. Of the 39 sites located, 13 sites were conserved as part of the Drayton Mine Extension area development. In 2009 the remaining 26 sites were subject to various mitigation salvage procedures prior to impact from mining development. The majority of these sites are considered to be of low scientific significance, however Ramrod Creek R3 was considered to be of medium-high scientific significance following salvage works on a local level.

The 13 conservation sites all remain in situ, with fencing in place to demarcate the heritage sites. New signage and fencing (where required) is scheduled to be completed in 2017. The artefacts salvaged in 2009 have continued to be stored by the Safety, Health and Environment department for safe keeping.

Throughout the 2016 reporting period, there was no trigger for consultation with cultural heritage groups relating to the mining activities at Drayton.

6.11 Natural Heritage

No natural heritage sites have been identified on the mine site or on land under the control of Drayton.

6.11.1 Non-Aboriginal Heritage

The EA field survey identified five non-Aboriginal heritage sites within the EA boundary, none of which were statutory listed. One of these sites was determined to be of high local significance. It was predicted in the EA that this site would not be impacted by mining activities however a physical barrier was installed around the site to prevent accidental damage and maintain its heritage value.

6.12 Spontaneous Combustion

Drayton, along with other open cut coal mines mining the Greta Coal Measures, experiences spontaneous combustion within spoil, coal stockpiles and coal seams. As a result, a Spontaneous Combustion Management Plan is followed on site in order to meet both statutory and company requirements. This plan indicates the causes of spontaneous combustion, determines accountabilities for its management, lists remediation work to prevent recurrences, and specifies monitoring and reporting requirements. The pit is inspected on a daily basis by an Open Cut Examiner (OCE). Remedial works such as capping or sheeting with inert material are initiated where outbreaks of spontaneous combustion are identified. Drayton also completes six monthly reports to the EPA regarding spontaneous combustion management.

Throughout the 2016 production period, which ceased in October, mining activities were concentrated within the South Pit West, North Pit and East Pit North. The spontaneous combustion activity during this period has occurred in both the northern and southern pits. Carbonaceous material from the South Pit was selectively dumped on the lower faces of the expanding Great North Tip area and then buried with inert material to reduce exposure time. This work has been occurring for several years and is controlling outbreaks of spontaneous combustion.

Table 23: Area affected by spontaneous combustion (1998 – 2016)

Year	Area Affected (m^2)	Year	Area Affected (m^2)
1998	82,837	**2008**	1,870
1999	57,854	**2009**	1,020
2000	26,251	**2010**	1,170
2001	6,745	**2011**	1,070
2002	1,870	**2012**	1,160
2003	3,140	**2013**	1,180
2004	3,940	**2014**	810
2005	3,370	**2015**	870
2006	3,480	**2016**	810*
2007	3,720		

** As at 2016 Apr-Sep 6-monthly report to EPA on 5th Jan 2017*

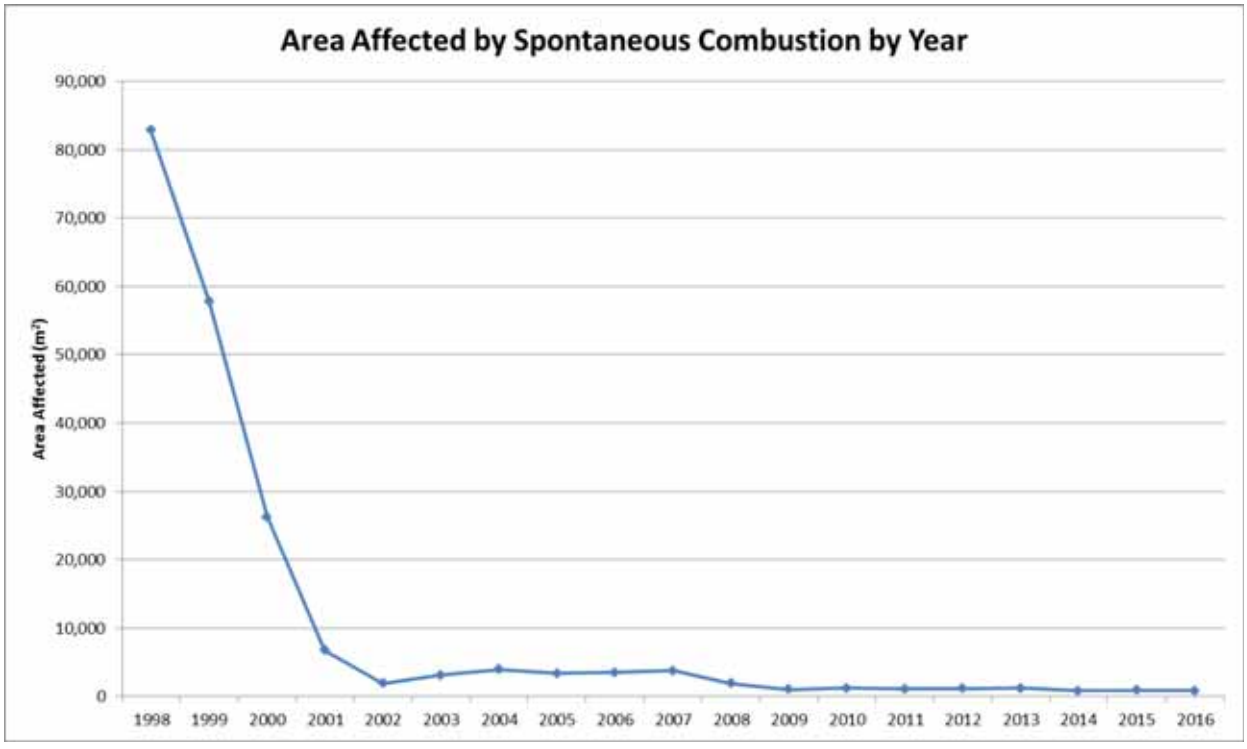


Figure 13: Area affected by spontaneous combustion by year

Table 23 and **Figure 13** outline the areas that have been affected by spontaneous combustion since 1998. This demonstrates that spontaneous combustion reduced substantially from the late 1990's. At the end of the reporting period, it was assessed that approximately 810 m^2 of surface area was visibly affected by spontaneous combustion. The areas are currently being managed through a process of active dumping with inert material and/or clay capping.

The potential use broad scale thermal imaging from an unmanned aerial vehicle (UAV) platform is currently being investigated further to assist with the process of identifying, tracking and management of spontaneous combustion. Should this technology be adopted it will be discussed in the next AEMR.

6.13 Bushfire

During the 2016 reporting period, bushfire mitigation works were carried out in accordance with the Bushfire Management Plan. As part of the management plan, mine equipment such as water carts, graders and dozers were available for suppression of any on-site fires. The risk of on-site bushfires was managed through a system of peripheral roads that act as firebreaks. Additionally, weeds and grasses growing around electrical substations, explosives magazine and fuel storages were kept to a minimum. An inspection was carried out to assess the status of the Drayton property boundary and neighbouring properties regarding the potential for bushfires. The southern boundary fence line was slashed in November to ensure access in the event of a bushfire.

6.14 Mine Subsidence

Subsidence is not an issue at Drayton as it is an open cut coal mine with no underground workings or highwall mining.

6.15 Hydrocarbon Contamination

Drayton has various hydrocarbon storage locations. The primary diesel tank, with a capacity of 860,000 litres, is located near the workshop. Additionally, there is an in pit fuel facility, consisting of above ground diesel storage tanks with a total 220,000 litre capacity.

All bulk storage tanks and containers of hydrocarbons are stored within appropriate bunding and kept in a neat and tidy condition. Contamination is kept at a minimum, with any moderate spillages (20 L or greater) being reported internally through Drayton's incident reporting system. Tanks and storage areas are located such that any incidents will not lead to offsite discharge and impacts. Concrete and earthen bunds were inspected throughout the reporting period for structural integrity and cleanliness. After rainfall events, rainwater is removed from bunds to ensure sufficient storage capacity in the bund in the event of a spill.

In addition to the permanent bunded areas, portable bunds are used for temporary storage or transportation of oils and fuels around the site. Various spill kits and/or bins containing oil absorbent material are located around the site in areas where there is highest potential for a spill to occur. Site personnel are made aware of the locations of these spills kits and absorbent material bins in their work area. The contents of the spill kits and the oil absorbent material bins are checked on a weekly basis by the site's waste contractor. Materials contaminated by hydrocarbons are put into oily rag bins that are located next to all spill kits and throughout the workshop areas.

Drayton has an area dedicated to bio-remediating hydrocarbon contaminated soil which is located to the south of the workshop area. Remediated material is periodically removed from the cells and disposed of in pit once soil testing confirms that the material meets specifications as outlined in the approved Bioremediation Management Plan. Inspections of the facility are conducted and sediment samples taken and analysed for the presence of contaminants on an ongoing basis.

Drayton continued the operation of its oil pollution control dam throughout 2016. This dam is located below the main workshop, vehicle wash down bays and lube facilities. Any runoff from the industrial area reports to this dam via an oil separator that removes hydrocarbons from the water. From the Oil Pollution Control Dam, water passes through a second oil separator before flowing into the Industrial Dam for reuse on site. Hydrocarbons are collected in storage tanks which are serviced by a waste contractor on a regular basis and removed from site.

6.16 Waste Management

Drayton has existing waste management systems which, where appropriate, incorporate waste reuse and recycling and address issues relevant to the management of waste.

The volumes of different waste streams generated during 2016 are outlined in **Table 24**.

Table 24: Waste stream volumes generated in 2016

Waste Stream	Treatment and Disposal	Volume	Unit
Metal	Recycled off-site	545.0	tonne
General Waste	Off-site landfill	105.2	tonne
Confidential document bins	Off-site document destruction	4.0	tonne
Batteries	Recycled off-site	6.7	tonne
Empty 205L gallon drums	Recycled off-site	4	each
Empty 20L drums	Recycled off-site	98	each
Oil Filters	Recycled / disposed of off-site	3,967	each
Oil	Recycled / disposed of off-site	164,600	litres
Mixed Regulated Waste	Off-site disposal at licensed regulated waste facility	7.1	tonne
Sewage	On-site treatment and disposal	280,000	litres
Sewage	Off-site treatment and disposal at licensed sewerage treatment facility	20,000	litres

6.16.1 General Waste

To assist in the separation of waste at source, designated waste storage areas, such as labelled bins or bunded areas, are in place across the site. Hazardous wastes are contained within bunds which drain into Drayton's pollution control system.

Remondis is currently contracted to dispose of all waste materials generated on site. Domestic rubbish generated on site is deposited in the Muswellbrook Waste Management Facility.

Monthly inventories and reports ensure all waste movements are documented. Management strategies are in place for each of the major waste streams relevant to key work areas.

6.16.2 Recycling Initiatives

Drayton recycles or reuses specific waste streams to minimise the environmental effects of the product. Where possible, waste items are recycled by original equipment manufacturers or certified contractors. Machine batteries; mobile phone and radio batteries; waste oil; grease; empty drums; aluminium cans; and scrap metal are removed from site and recycled by Remondis. Used printer cartridges are returned to the manufacturer for recycling.

6.16.3 Sewerage Treatment / Disposal

There has been a reduction in demand for waste services as the number of employees during the reporting period has decreased significantly when compared to previous years.

All on-site effluent is treated in Drayton's sewage treatment plant, which is licenced under the EPL. The treated effluent is then distributed into two settlement ponds, and overflow from these ponds is pumped to an area of rehabilitation on the East Tip.

There are several septic tanks on site (e.g. at the CHP and crib huts) which are not connected to the on-site sewerage treatment plant. During the 2016 reporting period, Drayton's waste provider transported 280 kL of effluent from these tanks and pumped it into the on-site STP for treatment. EPL 1323 allows 140 kL/day to be discharged to the utilisation area. Visual inspections of the area have not identified any ponding or run-off. During January 2016, a total of 20 kL of effluent was transported off site to a licensed sewerage treatment facility while maintenance was carried out on Drayton's on-site treatment station.

6.17 Public Safety

Public and workplace safety is a major consideration in achieving the Anglo American corporate goal of zero harm. Drayton offers no public access to any mine working areas. Signage around the mining lease boundary fences has been erected notifying the public not to enter the mine site. This signage was updated and increased during 2012. Boundary gates are kept locked and following cessation of mining in October 2016 an automated security gate was installed on Drayton land off Thomas Mitchell Drive. No public access is available to Drayton outside operating hours of 7am – 5pm weekdays. Security personnel are present outside operating times to ensure safety and to provide a contact person in the event of an emergency.

When required Thomas Mitchell Drive is closed with licenced traffic controllers stationed at appropriate locations for all blasts within 500m of the road. There were no incidents of public safety concerns during 2016.

7 WATER MANAGEMENT

7.1.1 Water Licences

Drayton operates a closed water system and does not draw water from surface water sources (such as the Hunter River), or discharge water to the environment. Drayton does not currently hold any Water Access Licences (WALs) for the extraction of water from the Hunter River or any credits to discharge water in accordance with the Hunter River Salinity Trading Scheme (HRSTS). Accordingly, no water was either extracted from the Hunter River or discharged from Drayton during the 2016 reporting period.

All mine water is contained within the existing operations storages and mining voids for use in coal processing or dust suppression. Water is generally lost through evaporation or entrainment in tailings, rejects or product coal railed from site, and is recharged from rainfall run off and minimal groundwater interception. There are no significant clean water catchments located on site and therefore no clean water storages are required.

Section 112 of the *Water Act 1912* provides that a licence is required for the sinking of a bore, or the enlargement, deepening or alteration of a bore. The definition of a bore under section 105 includes *'any bore of well or any excavation or other work connected with sources of sub-surface water'*. Based on this broad definition, open cut mining is considered a bore. Therefore groundwater inflows to mining areas are required to be authorised by a bore licence under section 112 of the *Water Act 1912*.

Drayton currently has several Water Licences issued by the NSW Office of Water associated with mining operations (see **Table 25**). Of these, two groundwater licences are for extraction purposes of up to 985 ML per annum, and 402 ML per annum (1,387 ML combined). These are shown in **Table 26** below.

Table 25: Summary of Drayton Groundwater Licences

Consents, Leases and Licences	Type	Date of Issue	Date of Expiry	Approval Authority
Bore Licence 20BL111869	Production Bore	24/04/2010	23/04/2015*	NSW Office of Water
Bore Licence 20BL171958	Production Bore	23/02/2015	22/02/2020	NSW Office of Water
Bore Licence 20BL171956	Test Bore	27/08/2008	Perpetuity	NSW Office of Water
Bore Licence 20BL171957	Test Bore	27/08/2008	Perpetuity	NSW Office of Water
Bore Licence 20BL171955	Test Bore	27/08/2008	Perpetuity	NSW Office of Water
Bore Licence 20BL171954	Test Bore	27/08/2008	Perpetuity	NSW Office of Water
Bore Licence 20BL171953	Test Bore	27/08/2008	Perpetuity	NSW Office of Water
Hunter River Salinity Trading Scheme (Credit purchase arrangement)	N/A	Nov 1998	No current credits	NSW EPA

** Groundwater license renewal submitted to NSW Office of Water 21/04/2015, license renewal pending.*

Table 26: Groundwater Licences (Extraction)

Consents, Leases and Licences	Type	Entitlement (ML)
Bore Licence 20BL111869	Production Bore	402
Bore Licence 20BL171958	Production Bore	985
Total		**1,387**

7.1.2 Water Management System

No changes were made to the mine water management system in the reporting period. The Drayton water management system is a closed system which sources all of its process water internally from within the existing mining operational area with no extraction from the Hunter River. Potable water is supplied by pipeline from Muswellbrook. During 2016 the Drayton water management system consists of a series of on-site dams and in-pit water storage areas as shown on **Figure 14**.

The total storage capacity of the water management system was 16,270 ML at the end of the 2016 reporting period. This consisted of 1,553 ML capacity in major mine water storage dams and 14,717 ML in the voids. Water volumes in major storages are given in **Table 27** below.

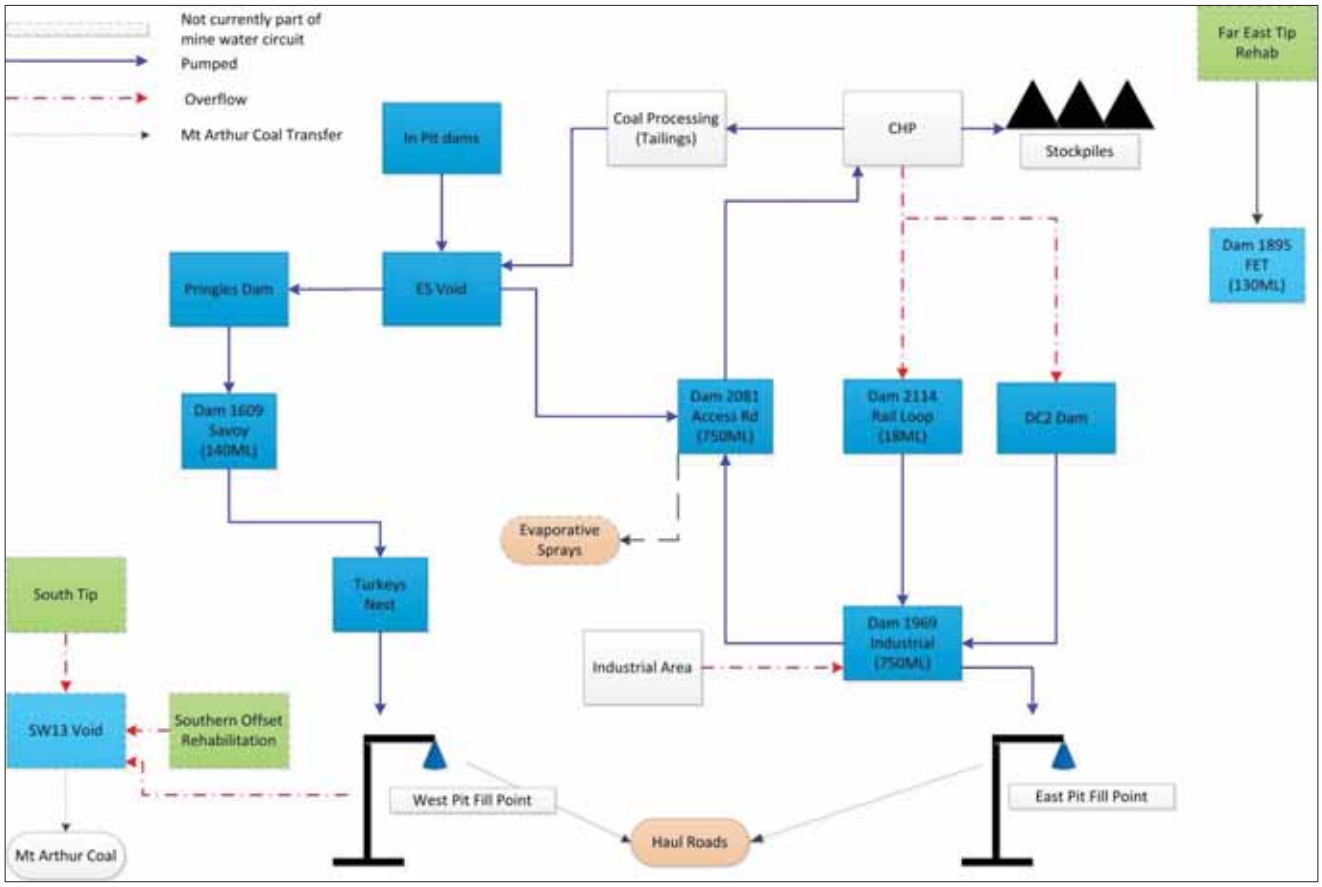


Figure 14: Water Management Flow Diagram

Table 27: Stored Water – December 2016

		Volumes held (ML)		
		Start of Reporting Period	End of Reporting Period	Storage Capacity
Clean Water		0.05	0.05	0.05
Mine Water:	**Savoy (1609) Dam**	74.8	49.3	145
	Industrial (1969) Dam	416.5	375.4	750
	Access Road (2081) Dam	469.5	295.9	615
	Rail Loop (2114) Dam	5	5	18
	Other Surface Dams (transfer dams)	25	25	25
SW13 Void*		590	590	1,000
NN Pit		31	31	40
ES Void		2,878.2	3,223.2	5,537
SPE Void		917.4	1,806.7	8,140
Controlled discharge water (salinity trading scheme)		Nil	Nil	Nil
Contaminated Water		Nil	Nil	Nil

The Far East Tip Dam (Dam 1895) has a capacity of approximately 130 ML however it has no connection with mining activities. This dam exists principally to control runoff (clean water) from the Far East Tip, a rehabilitated out of pit overburden dump.

The Rail Loop Dam (Dam 2114) controls runoff from the CHP area. Water from the Rail Loop Dam is recycled back to the mine water system via the Industrial Dam. The 18 ML capacity of the Rail Loop Dam is maintained as close to zero as possible to prevent potential for offsite discharge of mine water.

Clean water is imported to site for drinking and bathing. Clean water is stored in a holding tank of 0.05 ML capacity. The tank is maintained at capacity for use as needed.

Historically, Drayton's water balance has remained in surplus. Throughout drought periods, water storage levels have dropped however water storage supplies remained sufficient for normal mining operations to occur without adverse impacts on operations. At the end of each month, water storage levels in dams and voids are surveyed. At the end of 2016, approximately 750 ML was being stored in established dams and 5,650 ML in pit voids. This equates to approximately 48% of available dam storage capacity and approximately 38% of available void storage capacity.

Throughout 2016 Drayton had a water sharing arrangement with Mt Arthur Coal Mine which allows both companies to store water in SW13 Void, located near a shared boundary. This agreement expired in December 2016 and as a result no water is currently placed in the SW13 Void.

Drayton also utilises evaporation sprays which allow evaporation of excess water.

7.1.3 Water Sources

Drayton is situated in the headwaters of three creek catchments, namely Ramrod Creek, Bayswater Creek and Saddlers Creek. There is no major stream flowing through the mine that requires diversion.

All runoff from disturbed areas is intercepted by dams or by the respective pits. All final tips have associated catchment dams that allow runoff to be collected and suspended solids to settle. During the 2016 reporting period approximately 1,991 ML of runoff from rainfall was captured on site. Any potentially contaminated rainfall runoff from the workshop area is diverted to the Oil Pollution Control (OPC) Dam. The OPC Dam has an oil / water separator in place which removes oil residue from the water runoff prior to it being transferred into the Industrial Dam.

Pit water extracted from Drayton's operation is a combination of both ground water inflows and surface runoff from the areas within the pit during periods of rainfall.

Table 28 below outlines the main water storages, the source of their water supply and where the water is consumed.

Table 28: Mine water storage dams – Water source and usage

Reference No.	Dam Names	Supply Source	Water Use
1969	Industrial Dam	Runoff from rehabilitated area, industrial areas and East Pit	Haul road dust suppression, industrial wash down water and supply to Access Road Dam
2081	Access Road Dam	Runoff from undisturbed and rehabilitated land and pumping in from Industrial Dam and ES Void	Industrial areas, CHP and fire system
2114	Rail Loop Dam	Runoff from CHP, coal stockpile area and fine rejects settling ponds, and direct pumping from Access Road Dam	Transfer to Industrial Dam
1609	Savoy Dam	Runoff from undisturbed and rehabilitated land, SW Void and ES Void transfer point	Mine water storage or transfer to tanker fill stations
ES Void	East Pit South Void	Tailings and water storage	Water extracted and transferred to Access Road Dam or Savoy Dam
SW13 Void	West Pit Void	Runoff from Southern Offset and excess water during wet weather.	Key storage for Drayton and Mt Arthur Coal. This location will be available for both Drayton and Mt Arthur Coal to extract water from during the life of the mine.
SPE Void	South Pit East Void	Final void water storage, water pumped from ES Void.	Mine water storage

7.1.4 Water Consumption

During 2016, total mine water consumption was approximately 867.1 ML. Of this, 322.2 ML consisted of industrial usage mainly through wash-down in the workshop and truck wash bays and approximately 355 ML was sprayed onto haul roads for dust suppression purposes. Approximately 189 ML was used by the CHP to process coal through the Coal Treatment Unit (CTU), for wash-down and in the CHP dust suppression systems. Some of the CHP water consumed was pumped to the ES void in tailings slurry from the CTU. As the tailings settles, a proportion of this water is recovered from the ES void and recycled back into the mine water system via the Access Road Dam.

During the 2016 reporting period Drayton used 7.70 ML of potable water for drinking, showering and toilets within the mining operation areas.

7.2 Surface Water Monitoring

7.2.1 Management System

Drayton maintains a Water Management Plan, which addresses surface water management and monitoring. As part of water management on site the site water balance is calculated each month using the surveyed storage levels, meter readings and rainfall volumes recorded by the on-site meteorological station.

7.2.2 Monitoring System

As part of the surface water monitoring plan, monthly surface water monitoring is undertaken at eleven locations. These monitoring locations are illustrated in **Figure 15**. Most of these dams are mine water dams except for dam 2221, which is located in the Antiene Rural Estate area.

Analysis undertaken on the samples collected from the main drainage basins and on-site dams include:

- pH
- Electrical Conductivity (EC)
- Total Dissolved Solids (TDS)
- Suspended Solids (SS)
- Bicarbonates
- Soluble Ions (Sodium, Magnesium, Chloride, Sulphate, Calcium and Potassium)

Figure 15: Surface water monitoring sites

7.2.3 Results

During the reporting period Drayton received 759.6 mm of rainfall. Water levels in the main dams remained stable throughout 2016 and water quality monitoring continued as in previous years. The Drayton Mine Extension EA 2007 notes that site water quality is typical of other mines in the area and is moderately saline.

A summary of the results for each surface water monitoring point are discussed below and presented in **Table 29**. Complete results for each monitoring location are provided in **Appendix B**.

Table 29: Average Results of Water Quality Monitoring Locations (2016)

Dam	EC µS/cm	pH	TDS mg/L	Magnesium mg/L	Chloride mg/L	Sulphate mg/L	Sodium mg/L	No. Samples
2081	6506	8.07	5488	462	688	2885	620	11
1895	6438	8.77	4449	370	816	816	1022	11
1609	7645	8.25	6437	609	773	3727	645	11
1969	6262	8.07	5221	417	662	2651	610	11
2109	3469	7.35	2400	127	517	909	498	11
2114	5739	7.88	4795	373	593	2405	541	11
2221	1618	8.01	976	51	254	265	231	11
SW13	7012	8.04	5756	516	641	3344	618	11
ES Void	7330	7.93	5670	553	719	3550	593	2
OPC Dam	6139	7.89	4947	394	668	2497	652	11
V Notch Weir	9989	7.97	7972	403	1306	3519	1525	11

Far East Tip Dam (1895)

Dam 1895 collects runoff from rehabilitated land and undisturbed areas. Ongoing monitoring of the Far East Tip Dam (1895) has revealed that the water quality in this dam is alkaline. The pH levels have remained reasonably consistent fluctuating between 8.5 and 9.3 throughout the year.

Access Road Dam (2081)

The Access Road Dam (2081) receives water from the ES Void tailings storage and the Industrial Dam. The Access Road Dam has a high turnover of water which was pumped to the CHP prior to cessation of operations. During the reporting period the EC and TDS in the Access Road Dam remained stable.

In accordance with EPL 1232 Drayton continued monitoring downstream of the Access Road Dam. An electric pump and real time flow monitor have been installed at a downstream weir to pump any seepage water and water from the adjoining clean catchment into the Access Road Dam as well as monitor flow, if any, at the weir. Results to date have indicated that water flow data collected at the weir corresponds to rainfall intensity and volume.

Antiene Dam

The Antiene Dam (2221) is located off site in the Antiene rural sub division area. This dam has no connection to mining activities and is monitored for background purposes only. The Antiene Dam was originally a small farm dam and its purpose now is to supply water to native animals. During the reporting period the Antiene Dam showed generally lower EC, pH, TDS and metal concentrations in comparison to the mine water dams.

Other Dams

Dam 2114, located within the Drayton rail loop, collects surface runoff from the CHP and returns water to the internal water management system. Water quality in this dam fluctuated throughout 2016 in response to rainfall events. All other results are consistent with previous years monitoring results. The complete data for all surface water monitoring locations dams is provided in **Appendix B**.

7.3 Ground Water

7.3.1 Management System

Drayton maintains a Water Management Plan, which addresses groundwater management and monitoring. Groundwater at Drayton is extracted only through infiltration to mine voids. As part of water management on site the volume of inflow groundwater is calculated as part of the site water balance. The 2007 EA predicted that the Permian coal seam aquifer would be impacted by Drayton's operations. As a result piezometers were established during the exploration drilling program, and subsequently throughout the mining process as further exploration drilling was carried out.

Of the original 33 piezometers used in the EA predictions, all but two have been mined out at the end of 2015. These two piezometers (F1167 and F1168) have continued to be monitored on a monthly basis. The Groundwater Impact Statement undertaken as part of the 2007 EA predicted a drop of 25 – 50 m for piezometer F1168 and 10 – 25 m for F1167, from their original levels of approximately 194.40 RL and 190.54 RL respectively. The predicted depth for F1168 by year 10 was between 169 RL and 144 RL, and the average RL during 2016 was 159.55. The predicted depth for F1167 by year 10 was between 180 RL and 169 RL, and the average RL during 2016 was 163.77.

7.3.2 Monitoring System

Drayton monitors a network of 8 piezometers on and off site. Standing water levels and water quality are monitored on a monthly basis when access is possible, with full water quality analysis being completed six monthly for selected bores. Some piezometers cannot be sampled due to insufficient water.

The locations of the piezometers are shown in **Figure 16**.

Figure 16: Groundwater Monitoring Sites

7.3.3 Results

A summary of the 2016 and long-term piezometer groundwater levels is presented in **Table 30**. The complete results from the 2016 groundwater monitoring program are shown in **Appendix B**.

Piezometer levels from monitoring locations to the south of the mine were generally steady throughout the reporting period. Piezometer R4241 remains in close proximity to the limit of mining in the south. With the completion of mining in the South Pit East, the adjusted relative level of this piezometer has remained steady.

Piezometer W1102 and F1163 are located to the south-west of the mining lease but are not in close proximity to current operations. W1102 is located near Saddlers Creek and was closest to mining in the south west pit (now SW13 Void), while F1163 is located further to the south of Saddlers Creek. Both of these piezometers have exhibited little change in groundwater levels since monitoring at these locations began in the early 1980s.

Piezometers located in the northern areas of the mining lease generally display a gradual decline in level. Piezometer F1024 was dry throughout 2016, only collecting minor amounts of rainwater runoff and not providing a suitable volume to sample. The water levels in F1162 and F1164, located close to the NN Pit, were too deep to sample during the reporting period. Piezometer F1168, located to the north of the coal stockpiles, displayed a similar level to the previous reporting period.

Piezometer F1167, located in the Antiene area further to the north of the mine, showed a minor decline throughout the reporting period.

Table 30: Summary of Groundwater Levels (2016)

Location	Average Depth 2016 (RL)	No. Of Water Levels Monitored	Long Term Average Depth (RL)	Years of Available Data
F1024^	178.97	10	200.11	1982 – 2016
F1162*	-	10	152.16	1983 – 2016
F1163	177.52	10	177.60	1984 – 2016
F1164*	-	10	160.92	1985 – 2016
F1167	163.77	10	182.98	1986 – 2016
F1168	159.55	10	186.67	1987 – 2016
W1102	178.51	10	178.19	1988 – 2016
R4241	173.58	10	182.10	2005 – 2016

Note: All measurements adjusted with Relative Levels.

*^ Bore dry, no water to sample, *Water levels checked every month (>100m, too deep for equipment to get a standing water level)*

7.3.4 Water Accounting Framework

The Minerals Council of Australia (MCA) has recognised the vital role of water in mining both as an asset that produces value and as a shared natural resource that requires responsible stewardship. To assist its members in managing both of these roles the MCA has, in conjunction with the Sustainable Minerals Institute of the University of Queensland, developed a water accounting framework. Drayton has used this framework.

For the 2016 reporting period, Drayton mine has committed to reporting the *Input-Output Statement* listing flows for all input and output categories for the reporting period, along with the change in the total storage from start-end of the reporting period. **Table 31** details the *Input-Output Statement* for Drayton mine for the reporting period spanning 1st January 2016 to 31st December 2016.

The water balance uses the difference in measured volumes in the dams at the beginning and end of each period (site inventory) and compares it against the difference between the known inputs and outputs for the site (net changes). Inputs and outputs include measured pump meter numbers, simulated rainfall and runoff volumes from mine water storage catchments, evaporation from the water storages, and measured moisture contents for raw and product coal, rejects and tailings transfers. As Drayton mine does not possess a release license, it is considered a closed system and therefore the difference in inventory should equal the net changes. If the numbers are not equal, the difference is considered to be due to groundwater.

During the reporting period, it was calculated that a total of 240 ML of groundwater was intercepted by the north, south and east pits. The majority of groundwater is pumped out of the mine workings for safe mining operations to take place, and stored in the ES Void. The calculated groundwater interception falls well below the groundwater extraction limit authorised by the 20BL111869 and 20BL171958 water licenses held by Drayton (see **Section 7.1.1**).

The 2007 EA predicted rate of groundwater inflow at Year 10 (2018) is 2.7 ML/day (~981 ML/yr) across the operation. Therefore aquifer interception during 2016 was lower than predicted.

As Drayton is a non-discharge site no groundwater is pumped offsite. The majority of groundwater intercepted on site is stored in the ES void for usages including dust suppression and washing of coal.

Table 31: Drayton Water Accounting Framework Input-Output Statement

INPUT - OUTPUT STATEMENT DATA ENTRY										
	Site Details:	Drayton								
	Reporting Period Det	**Date (dd/mm/yyyy)**	**Storage (ML)**							
	Start	1/01/2016	4490.1							
	Finish	31/12/2016	5762.0							
INPUTS-OUTPUTS										
Input-Output	**Element (Source/Destination)**	**Sub-element (Inputs/Outputs)**	**Water Quality**			**Sub-element**	**Accuracy (high, medium, low)**			**Notes (1,2...)**
			Category 1 (ML)	**Category 2 (ML)**	**Category 3 (ML)**		**Measured**	**Estimated**	**Simulated**	
Inputs	Surface Water	*Precipitation and Runoff*		1,716.8		1,716.8			Medium	
		Rivers and Creeks								
		External Surface Water Storage								
	Groundwater	*Aquifer Interception*			240.0	240.0		Low		
		Bore Fields								
		Entrainment			94.7	94.7	Measured			
	Seawater	*Estuary*								
		Sea/Ocean								
	Third Party Water	*Contract*								
		Waste Water								
		Other (potable, misc)	7.7			7.7	High			
	TOTAL INPUTS		**7.7**	**1,716.8**	**334.7**	**2,059.2**				
Outputs	Surface Water	*Discharge*								
		Environmental Flows								
	Groundwater	*Seepage*								
		Reinjection								
	Seawater	*Discharge to Estuary*								
		Discharge to Sea/Ocean								
	Supply to Third Party									
	Other	*Evaporation*	980.1			980.1			Medium	
		Entrainment			189.4	189.4			Medium	
		Other (potable, misc)	7.71			7.7	High			
	TOTAL OUTPUTS		**987.8**		**189.4**	**1,177.2**				
DIVERSIONS										
Inputs	Surface Water	*Precipitation and Runoff*								
		Rivers & Creeks								
	Groundwater	*Aquifer Interception*								
	TOTAL DIVERSION INPUTS									
Outputs	Surface Water	*Discharge*								
	Groundwater	*Reinjection*								
	TOTAL DIVERSION OUTPUTS									

8 REHABILITATION

Drayton has conducted rehabilitation activities since 1983 with a focus on achieving a safe, sustainable and non-polluting landform. The foremost objective of mine rehabilitation at Drayton is to create a landform which is compatible with the surrounding land use practices, is stable in the long term and is capable of a productive post mining land use. Rehabilitation is designed to align with the conservation objectives of the Drayton offset areas as well as those of neighbouring land holders. The objectives of local strategies including the Muswellbrook Shire Council Mining Rehabilitation Policy have been incorporated where possible and the general principles of DRE's 'Synoptic Plan of Integrated Landscapes' have been accounted for in the plan with respect to the creation of wildlife habitat corridors.

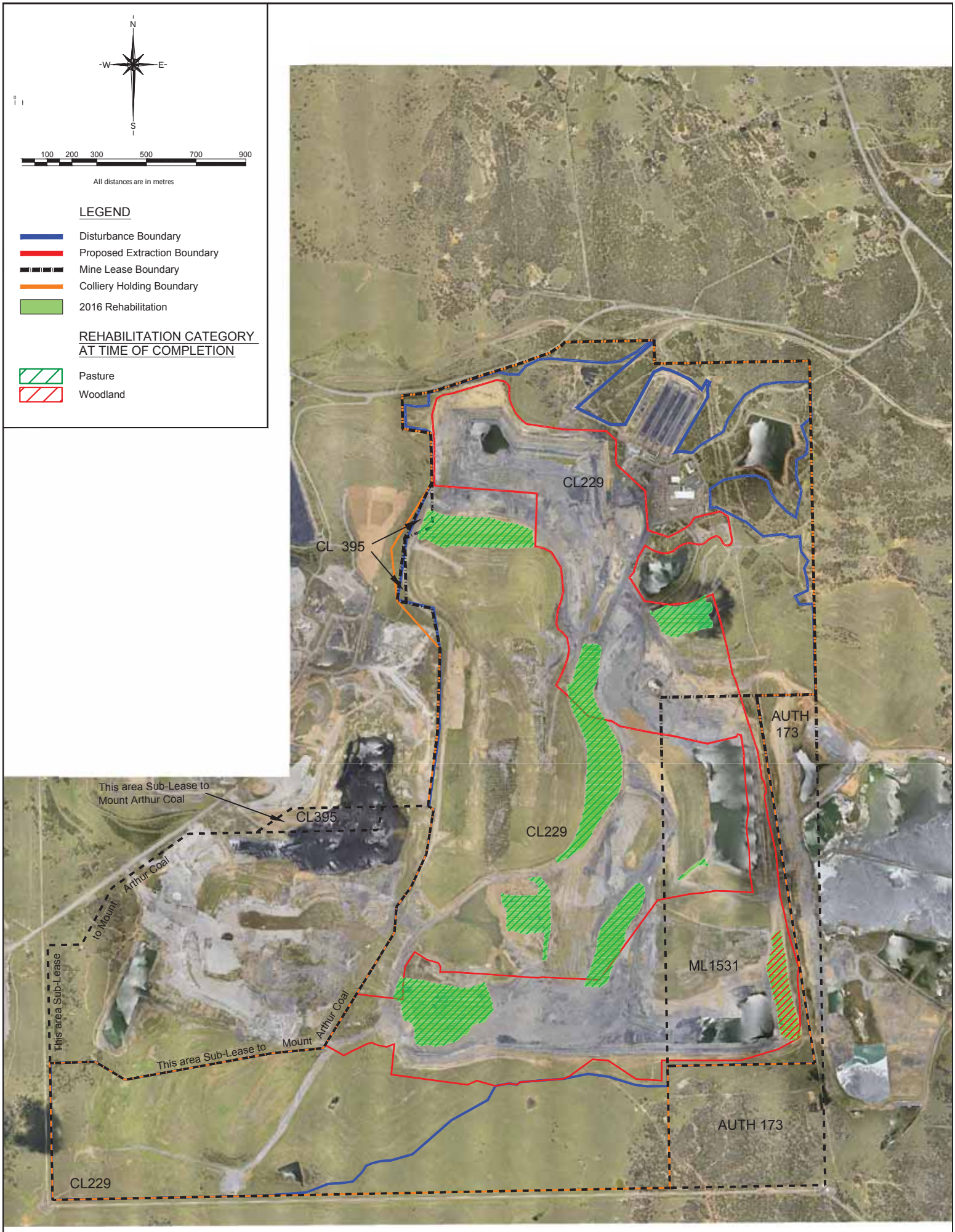
The Drayton area was traditionally used for beef cattle grazing, so maintaining grazing capacity in pasture areas is a key objective. Another key objective is to maintain ecosystems and biodiversity through the establishment of trees native to the region. Attainment of both goals will result in land that has good grazing potential and high wildlife amenity.

8.1 Rehabilitation of Disturbed Land

Drayton achieved the area proposed in the MOP of 86 ha of rehabilitation in 2016 (see **Table 32**). The areas that were rehabilitated in 2016 were in North Pit (NN), South Pit East (SPE), South Pit West (SPW) and the East Pit (ES and EN). These areas are presented on **Figure 17**.

The areas that were rehabilitated in 2016 varied slightly compared to Plan 3A in the Drayton MOP. According to the plan, two small areas adjoining the 2016 rehabilitation located on the western and southern side of the NN rehab and adjacent to the rehabilitation completed north of the south pit were decided to be postponed to 2017 to provide access to these areas for an additional year. An additional area scheduled for completion in 2017 was brought forward to ensure target hectares (86 ha) were achieved in accordance with the MOP. All other remaining areas were rehabilitated as planned.

Areas rehabilitated during the reporting period were bulk shaped and, where necessary, capped with inert material at a minimum depth of two metres to minimise the risk of spontaneous combustion. Contour banks designed with a 0.5% gradient were constructed as required across all rehabilitated areas, with all runoff being collected in the mine water system. Contour drains were constructed using a D6 dozer and an excavator. Areas were spread with Organic Growth Medium (OGM), using a tractor drawn spreader at a rate of approximately 100t/ha. The OGM originates from a green waste recycling plant in Sydney and provides additional organic material to the soil to promote plant growth.



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Annual Environmental Management Report
Figure 17 - Rehabilitation 2016

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Table 32: Rehabilitation Summary

Mine Area Type	Previous Reporting Period (end 2015) (ha)	This Reporting Period (end 2016) (ha)	Next Reporting Period (forecast end 2017) (ha)
Total Mine Footprint*	1318.2	1318.2	1318.2
Total Active Disturbance**	698.5	612.5	506.5
Land Being Prepared for Rehabilitation	86	106	241
Land Under Active Rehabilitation	619.7	705.7	811.7
Completed Rehabilitation^	0	0	0

**2007 EA Approved Disturbance Boundary. Actual disturbance may be less than stated.*
***Includes Approved Disturbance Boundary less Land Under Active Rehabilitation.*
^No land yet formally signed off by DRE or relinquished.

During 2016 a trail using hydro-mulching on a highwall was completed on an approximate 6 ha area on the eastern side of the SPE Void. The area was applied with hydro-mulch which included a woodland species seed mix, sugar cane mulch, fertiliser, water, green dye and a binding agent (see **Plate 1**). The hydromulch was applied using a truck mounted water cannon capable of providing even coverage over steeper areas with otherwise limited access. Results from the hydro-mulching trial will be included in the next AEMR.

In addition to the areas of rehabilitation, the construction of a rock drain drop down structure approximately 400 m in length into the ES Void and approximately 500 m of rock drain contour banks.

Plate 1
Hydro-mulching SPW Highwall

Post mining land use for the site is low intensity grazing with biodiversity values being protected via the establishment of a habitat corridor. Of the 86 ha completed in 2016, approximately 80 ha were seeded to pasture. The pasture seed mix used is detailed in **Appendix I**, and the mix was applied with fertiliser at a rate of 100-250 kg/ha, which also acted as a bulking agent to ensure even spread of the seed. The mix used was varied between winter and summer sown areas.

The proposed land capability classifications for the pasture areas ranges from Class IV to Class VI. Class IV and V lands are suitable for well managed grazing, and Class VI and VII lands are not suitable for grazing, but can be used for native woodlands. Post mining rural land capability classification has not yet been assessed for these areas. Pasture areas continue to exhibit high groundcover establishment levels. Completion criteria based on palatable species establishment, diversity of grazing species and soil characteristics have been developed. Future monitoring will include assessment of these parameters against the completion criteria. Rural land capability classification assessment will be completed for areas where grazing has been identified as the final land use, prior to seeking lease relinquishment completion. **Section 8.5** discusses a trial currently underway grazing horses on rehabilitated pasture.

Approximately 6 ha of the rehabilitation completed during the reporting period was seeded to native woodland to expand and enhance the habitat connectivity being established across site. The native woodland species and seed mix used are outlined in **Appendix I**. All seeding mixtures included millet (summer) or oats (winter) as a cover crop to aid soil stabilisation. All native seed was sourced from within NSW with seed sourced within the Hunter Valley where possible. Some species seeding rates were varied depending on availability and price of local provenance seed at the time of seeding.

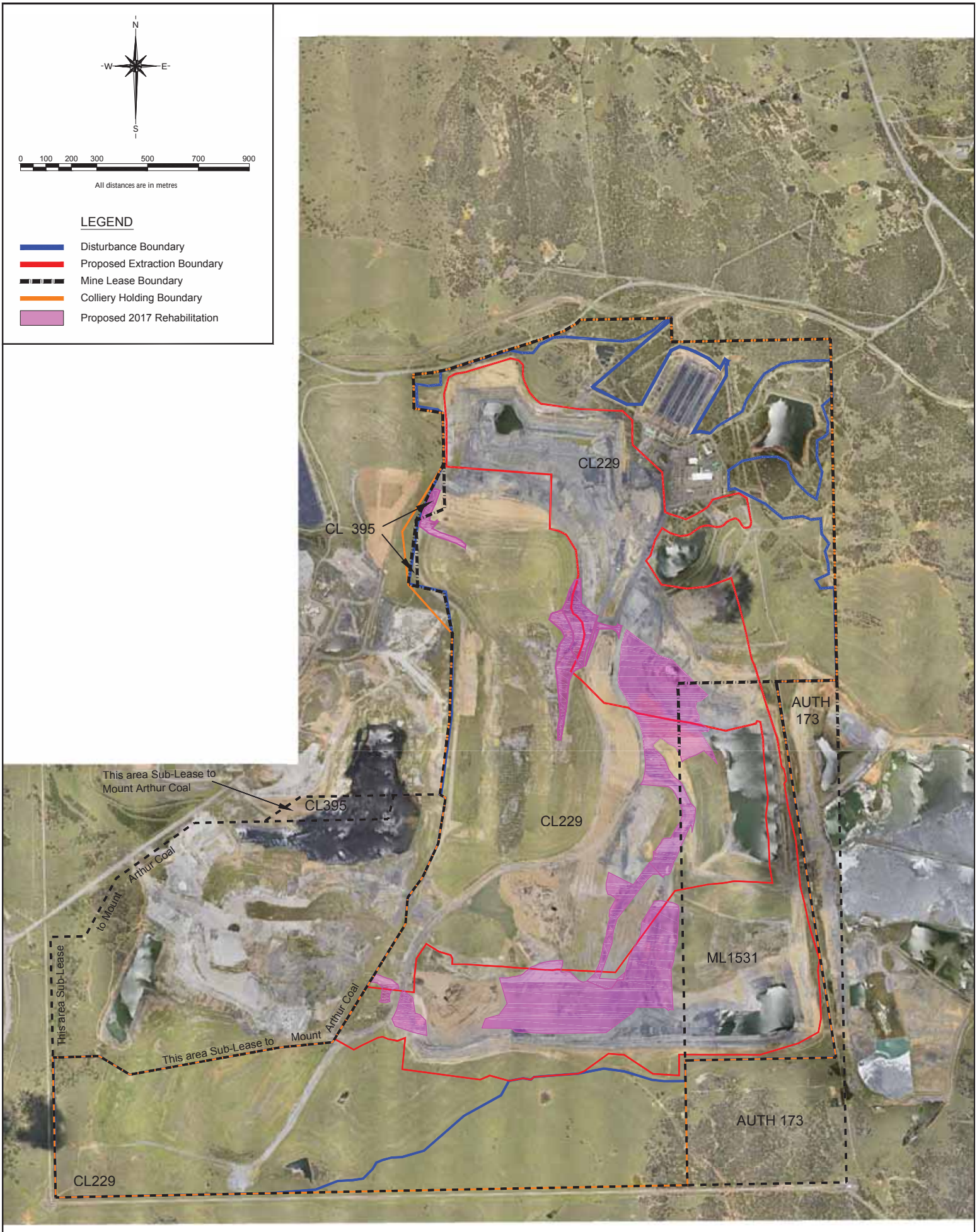
Figure 18 identifies the areas proposed for rehabilitation in 2017 and is generally consistent with the current MOP with the exception of the minor changes as discussed earlier in this chapter. 2017 rehabilitation will target total of 106 ha consisting primarily of pasture.

8.2 Tree Plantings

During 2015 and 2016 an extensive tubestock planting program occurred across rehabilitation and offset areas onsite in an attempt to increase connectivity of woodland areas in the wildlife corridor thereby enhancing habitat value of rehabilitated areas for fauna. As trees mature, it is anticipated that they will provide an important link between remnant woodland areas in the Southern Offset and intact woodland areas of the Northern Offset and Wildlife Refuge.

Since 2015 a significant number of native woodland species have been planted out from tubestock across the Drayton site. To date tubestock losses have greatly exceeded expected field mortality rates at all sites subject to planting. The reasons behind the low survival rate are still being investigated; however, most likely causes may include prolonged dry conditions and grazing/damage from wildlife, and other factors may include soil compaction and condition, or competition with grass species.

Whilst Drayton is committed to establishing woodland communities and corridors in line with the MOP, no further tubestock tree plantings will be undertaken until such time as reasons for past losses are known and quantified. Monitoring of remaining tubestock plantings will continue as part of the annual soils and flora and fauna monitoring report.



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Annual Environmental Management Report
Figure 18 - Rehabilitation 2017

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During 2017 the recently appointed Environment Superintendent will be completing a review of all previous rehabilitation methodology and objectives in relation to the success criteria identified in the MOP. It is anticipated that the results from the annual soils and flora and fauna monitoring reports will also assist in providing data that can be used to develop a program of rehabilitation to ensure long term success criteria are achieved. One outcome from the review may be to adopt direct seeding in lieu of planting to improve establishment rates and achieve a more resilient vegetation community.

8.3 Buildings

No buildings are scheduled for removal during the 2015 - 2020 MOP period; however, some buildings may require removal if Drayton mine is closed at the end of the MOP term. All buildings undergo routine inspections and maintenance. No buildings were renovated or removed at Drayton during the 2016 reporting period.

Prior to removal Drayton will develop a detailed Decommissioning Plan in consultation with the relevant authorities.

8.4 Other Infrastructure

No other infrastructure was subject to decommissioning or rehabilitation during the period.

8.5 Rehabilitation Trials and Research

Drayton has conducted various trials on site over the life of the mine, and been involved in a number of in-house and industry sponsored research projects. In August 2014, Drayton introduced horses into a 40 acre area on the Far East Tip of primarily pasture rehabilitation with a small area of virgin land (see **Plate 2**). The number of horses in the trial area has varied over time. At the end of the reporting period there were three horses in this area. The area has been fenced to safely contain the horses and a watering point installed for their wellbeing. There are a number of treed areas to provide shade and cover. During the 2017 reporting period, Drayton will continue to monitor the pasture response to grazing and adjust stocking rates as required.

8.6 Further Development of the Final Rehabilitation Plan

Rehabilitation inspections during 2016 assessed risk to rehabilitation areas including competition from weeds, erosion, spontaneous combustion and predation by animals.

The 2016 rehabilitation areas were assessed for spontaneous combustion using thermal imaging techniques. This monitoring is currently being investigated for further applications during 2017 to ensure any outbreaks in rehabilitation areas are identified and appropriately managed.

Assessments of tree growth in woodland rehab areas from seed or tubestock will be conducted during 2017. Remediation will be conducted as required to achieve the target woodland communities at densities approaching that of the reference sites (see **Section 8.2**).

Plate 2
Horse Grazing Trial

Flora and fauna on rehabilitation areas were monitored during 2016 by Eco Logical Australia (ELA). This AEMR has incorporated findings from this assessment.

Organic waste compost product was used as growth medium establishment on all suitable areas in 2016 rehabilitation and restoration. Monitoring will continue in 2017 to determine the success of plant establishment using this product.

Drayton's MOP incorporates the Mine Closure Plan and was approved in 2015 (and amendment approved in February 2017) and was developed assuming that the Drayton South Project approval would not be obtained and mining/processing at Drayton would cease in 2016. The Mine Closure Plan identifies areas of rehabilitation through to 2019. The rehabilitation targets for the following years are detailed below and include the completed rehab areas for each reporting period (see **Table 33**).

The rehabilitation targets outlined in the Mine Closure Plan show target annual hectares beyond 2017 when Drayton's development approval expires. To achieve the objectives of the Mine Closure Plan, rehabilitation activities may continue for several years beyond the cessation of mining at Drayton.

Table 33: Rehabilitation Plan Target and Actual Completed

Year	Rehabilitation Target (ha)	Rehabilitation Completed (ha)
2014	40	41.2
2015	108	108
2016	86	86
2017	106	
2018	241	
2019	143	

9 COMMUNITY

Drayton is bounded to the north by Thomas Mitchell Drive, to the south-east by the Liddell and Bayswater power stations and to the west by Mt Arthur Coal. The privately owned, rural-residential land holdings to the north-east of Thomas Mitchell Drive (Antiene Estate) represent Drayton's immediate local community.

Drayton falls entirely within the Muswellbrook Local Government Area (LGA), which represents Drayton's wider local community. The Singleton LGA adjoins the Muswellbrook LGA immediately to the south of Drayton mine.

The ongoing uncertainty associated with Drayton South has resulted in the lack of continuity between existing and proposed operations. As a result active mining operations ceased in October 2016 with the loss of approximately 400 jobs, with only a small project team remaining to oversee the rehabilitation of Drayton. Up until this point Drayton employed approximately 400 permanent employees and engaged contractors to assist in some areas of the operation with over half residing in the local Muswellbrook and Upper Hunter LGSs.

9.1 Social / Economic Contributions and Achievements

Drayton supports a diverse range of projects benefiting the communities of Muswellbrook, Singleton and Upper Hunter LGAs. During the operations phase of the mine contributions were made regularly through application rounds which were advertised in the local papers. Community members belonging to schools and organisations requiring funding for projects, equipment or events were encouraged to complete the application form (available on the Anglo American website) for consideration.

Prior to cessation of coal extraction Drayton was able to support numerous local community projects relating to education and training, health and welfare, sport, arts, culture and heritage, and environment.

Projects Drayton participates in through sponsorship and donations demonstrate Anglo American's commitment to improving social infrastructure for the ongoing benefit of our local communities. 'Giving back' to the local community in which we live and operate is our commitment.

Drayton commenced production in 1983, some key economic information associated with operations include:

- 128mt coal mined, processed and delivered to local power stations and export market;
- Up to 530 personnel on site (including 90% from local region);
- $409M in direct wages over 5 years (2009 –2013 prior to downsizing in 2014);
- $146M in Royalties over 5 years (2009 –2013 prior to downsizing in 2014); and
- $1,490M total cash costs over 5 years (2009 –2013 prior to downsizing in 2014).

9.2 Environmental Complaints

At any time, the community and other stakeholders can find information on Drayton's environmental management and performance by visiting the Anglo Coal website. The Drayton Environment web page features details of Drayton's approvals, proposed blasting times and environmental management plans. Drayton publishes a monthly update of environmental monitoring data to the web page and this AEMR can also be found there for download.

Drayton maintains a 24 hour hotline (1800 814 195) for complaints and enquiries as well as a complaints form on its web page (http://www.angloamerican.com.au/~/media/Files/A/Anglo-American-Australia-V2/Attachments/content/Community%20complaints%20form%20-%20Drayton.pdf). The hotline allows the community to request and provide feedback about operational activities and lodge complaints on any aspect of the Drayton operations. The hotline number has been advertised in the local newspapers throughout the reporting period and is available on the Drayton Website (http://australia.angloamerican.com/our-operations/operating-sites-subpage/drayton-environment).

An initial call back is provided for all calls to the hotline within 24 hours of the call being received. All complaints are investigated and the details, including any follow-up actions required, are recorded in Enablon, Anglo's internal reporting system. The community member is notified of the response and/or outcome of the complaint once the investigation has been completed. Complaint information is also discussed at Drayton's Community Consultative Committee meetings (see **Section 9.3**).

Over the past several years, the number of complaints receive has decreased (see **Figure 19**). A total of 5 complaints were received during the 2016 reporting period. Of these, three were related to blasting and one each related to fire safety and odour.

The odour related complaint was unlikely to be related to Drayton operations; however, it was logged as a complaint due to the source of the odour being unknown. All of odour related complaints in recent years were received from the same complainant, a resident of Scone, located approximately 30km from Drayton.

Of the three blasting related complaints, two of these were in regards to blast vibration felt at the complainants' residences, and one was related to a blast cloud. Follow up actions concluded that no blasting had occurred at Drayton on any of the days where a complaint was made.

Further information on community complaints can be found in **Appendix F**.

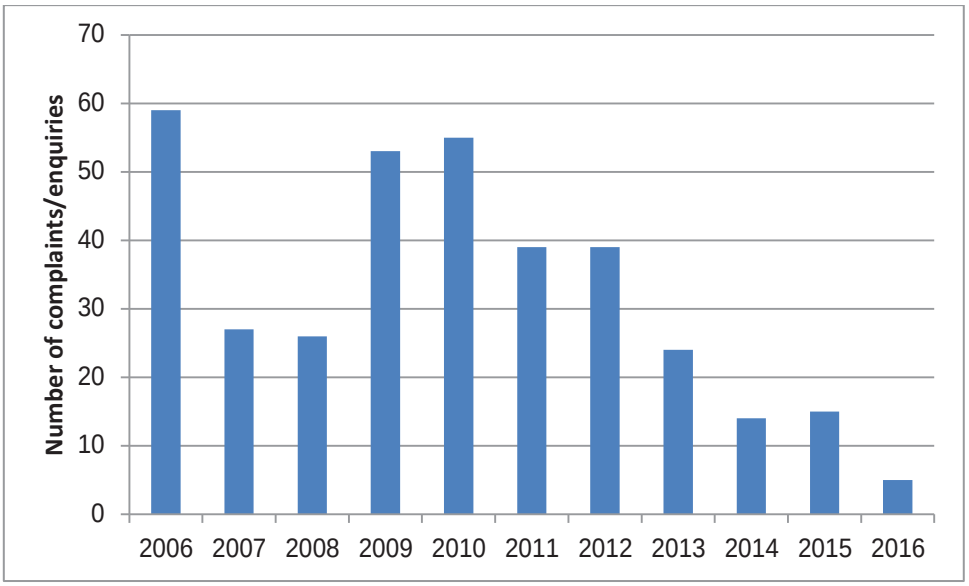

Figure 19: Community Complaints/Enquiries Associated with Drayton (2006 – 2016)

9.3 Drayton Community Consultative Committee

Drayton's Community Consultative Committee (CCC) meets quarterly to discuss environmental performance and community issues. Members of this committee consist of local council representatives and near neighbours in addition to the General Manager, SHE Manager and the Environmental Coordinator. Drayton also operates, in conjunction with Mt Arthur Coal, a joint CCC where discussions are held regarding the shared Antiene Rail Spur. Members of the joint CCC meet on a six monthly basis. The joint CCC consists of the members of both operations' individual CCCs.

Key aspects discussed at the CCC meetings include environmental complaints and enquiries, air quality, blasting and vibration, waste management, rehabilitation, project updates and new developments. Throughout the 2016 reporting period, four Drayton CCC meetings were held during the months of March, June, September and December, while two additional joint CCC meetings were held in conjunction with Mt Arthur Coal in June and December.

During the 2016 reporting period Jennifer Lecky was elected and endorsed by DP&E as the new Chairperson of the Drayton CCC. The Drayton CCC thanks Ray Butchard for his time and contribution over the years in the role prior to Jennifer's election.

The minutes from the Drayton CCC meetings are published on the Drayton web page.

10 INDEPENDENT AUDIT

Environmental risks associated with the Drayton Operations are recorded in an Environmental Aspects and Impacts Register. The Environmental Aspects and Impacts Register is reviewed on an annual basis and is the basis of the Environmental Improvement Plan (EIP). The current version of the Aspects and Impacts Register and the EIP are available to all site personnel through the document control system, Drayton SHEC MS Explorer. **Table 34** shows the primary aspects of mining rated against the Anglo American Risk Matrix (**Appendix G**).

Condition 6, Schedule 5 of the PA 06_0202 (as modified), and Condition 7.1 of Development Application 106-04-00 requires that every three years an Independent Environmental Audit (IEA) be prepared. Accordingly in late 2015, AECOM Australia Pty Ltd (AECOM) completed the *Independent Environmental Audit Drayton Coal Mine* (2016).

The IEA covered the period between October 2012 and November 2015, and included:

- Conditions of PA 06_0202 (as modified),DA 106-04-00, EPL 1323, CL 229, CL 395, ML 1531 and supporting documents such as environmental management plans;
- An assessment of Anglo Coal's environmental management and performance and the adequacy of relevant environmental management plans at Drayton Coal Mine; and
- A list of recommendations flowing from the findings of this audit.

This audit was conducted by AECOM and included specialists in the fields of air quality, spontaneous combustion, noise and rehabilitation.

The IEA audited over 1,800 conditions associated with the Project Approval, the Environmental Assessments and the relevant management plans. **Table 35** presents a list of the recommendations arising from the IEA and includes a response to how Drayton has addressed each as required.

In accordance with PA 06_0202 (as modified) the next Independent audit will be conducted in 2018.

Table 34: Environmental Risk Review

Aspect	Normal Operations		Abnormal Operations		Shut Down		Emergency	
	Env	Rep	Env	Rep	Env	Rep	Env	Rep
Spontaneous Combustion	18S	8M			18S	13S	8M	
Decommissioning of Mine					18S	9M		
Water Management	8M	8M	8M	8M			9M	9M
Availability of Inert Material	9M		9M		9M		9M	
Management of Topsoil	12M		5L				5L	
Final Void	8M	13S			8M	13S		
Waste Management	4L	2L	2L	2L			2L	
Equipment Noise	8M	4L	8M	5L			3L	
Vibration/Noise from Blasting	12M	12M		8M				

Aspect	Normal Operations		Abnormal Operations		Shut Down		Emergency	
	Env	Rep	Env	Rep	Env	Rep	Env	Rep
Air Quality - Dust	12M	17S	13S					
Groundwater	12M	5L	5L		5L		9M	9M
Sewerage Treatment Plant	5L	5L						
Erosion and Sediment Control	12M	8M			13S	13S	9M	13S
Rehabilitation	12M	8M			17S	13S		
Contaminated Land	4L		7M		7M		4L	
Hydrocarbon Spills	14S	9M	5L		17S	5L	6M	6M
Cultural Heritage	9M	9M	9M	14S	9M	9M	10M	
Light emissions	4L	4L	4L	5L			4L	5L
Greenhouse Gases	11M	5L						
Fauna management	8M	5L	5L	5L			6M	
Flora management	9M	14S					6M	
Uncapped exploration holes	4L				4L			
Coal transport – rail		7M		4L			2L	
Radiation devices	1L							
Weed Infestation	12M	8M			12M	13S		
Feral Animals	8M	8M			8M	8M		

Table 35
2015 Independent Audit Recommendations & Response

Audit Recommendation	Drayton Response
Noise Management Plan	
The methodology of monthly noise reporting should be clarified. *Context: It was considered by the auditor that "The monthly noise monitoring does not appear to be undertaken in accordance with the approved methodology. Noise levels are arbitrarily separated into contributions from different sources, do not appear to be specific to the operations undertaken onsite at the time of measurements, and is not calibrated against measurements taken. Specifically, noise monitoring undertaken by external consultants does not appear to adequately isolate background noise levels from the source noises which are required to be monitored".*	Drayton passed the finding on to the external noise consultant responsible for monthly noise monitoring. The response from the external noise consultant was that the methodology was "developed in coordination with the EPA" and "is the most robust in terms of determining mine noise contribution." The external noise consultant engaged by Drayton is a noise specialist with decades of experience conducting noise monitoring and auditing noise monitoring methodologies. Drayton considers that no further action is required.
Future AEMRs should: • Report the overall noise measurements undertaken by Anglo staff rather than breaking these down based on arbitrarily defined noise contribution sources; and • Reference an annual validation of the noise model.	Drayton accepts the finding in regards to the methodology for supplementary noise monitoring conducted by Drayton staff. As this monitoring is not required for compliance to any consent, lease or licence, and is not required to be reported in the AEMR, future AEMR's will omit data collected during supplementary noise monitoring. Results of compliance monitoring conducted by specialist noise consultants will continue to be reported. An annual validation of the noise model against finding in the 2007 EA will be included in the AEMR (see **Section 6.8.3)**.
Blasting Management and Monitoring Plan	
As some of the responsibilities outlined in the Blasting Management and Monitoring Plan are actually being carried out by different personnel than those nominated in the Plan, it is recommended that the Plan be updated to reflect this.	The Blasting Management and Monitoring Plan is currently under review to incorporate this recommendation.
Improved record keeping of blast rescheduling, blast results and internal blast-level investigations. *Context: The auditor found that explosives quantity does not appear to be recorded as per Engineering Fume Checklist, Pre-blast Checklist and Post-blast Checklist, as well as summary of blast monitoring. Based on the summary of blast monitoring provided to the auditors, there were at least six instances during the audit period (2014 and 2015) where blasts did not have a corresponding pre-shot checklist completed.*	Blast rescheduling happens for various reasons and is not required to be recorded. All blasts are recorded with the date and time they are fired, not when they were scheduled to be fired. Explosive quantity is recorded electronically and in the shot-firer's record books, but has been omitted from blasting checklists. A summary of blast monitoring results is kept electronically in duplicate and reported, both in the monthly monitoring reports available on the website, and in the AEMR's. Internal blast-level investigations are recorded in Enablon (Drayton's incident reporting and investigation system) where appropriate. These investigations do not relate to exceedances. Exceedances are always recorded in Enablon. Drayton concludes that current blasting record keeping practices are adequate. The checklists will be reviewed to determine if the explosives quantity

	and blast monitoring results omitted are required to be further duplicated in the checklists, if so, the staff responsible will be trained in completion of the checklists.
Spontaneous Combustion Management Plan	
The Plan should be updated to reference the recent issues the site has had with rehabilitation and the relevant works order from the regulators	The Spontaneous Combustion Management Plan is currently under review to incorporate this recommendation.
Air Quality Management and Monitoring Plan	
It is recommended that the Air Quality Management Plan be updated to reflect the current practice of E-Sampler trigger levels being used on a one hour average basis rather than a half hour. The Air Quality Management Plan should be updated with the calibrated Trigger Action Response Plan.	The Air Quality Management and Monitoring Plan is currently under review to incorporate these recommendations.
Water Management Plan	
Incident response procedures within the WMP are to be updated to refer to the immediate reporting requirements under the *Protection of the Environment Operations Act 1997*, and staff are to be made aware of these requirements. Erosion and sediment control be reviewed to confirm compliance with the Managing Urban Stormwater: Soils and Construction Manual (Landcom 2004, or its latest version). The Water Management Plan should be updated so that it refers to the current network of surface and groundwater monitoring locations.	The Water Management Plan is currently under review to incorporate these recommendations.
It is recommended that the system of post rainfall inspections be reviewed to include rehabilitation areas, sediment and erosion control measures, and the potential for offsite discharge.	The system of post rainfall inspections needs to be reviewed to include a trigger for conducting inspections and a methodology for recording inspections that are completed. The system will then be reviewed to include newly established rehabilitation areas (where vegetation is absent or not well established), sediment and erosion control structures (which may have impaired function after rainfall), and dams with the potential to discharge offsite. These are all inspected regularly but post rainfall inspections are not consistently recorded.
The current water level gauge used at the Access Road Dam should be reviewed to confirm whether the current reading times (once per half hour) are adequate for the site to be able to sufficiently comprehend when a sudden overflow event has occurred.	The water level gauge reading times have been updated to 15-minute intervals.
There is an electrical conductivity result of 22,100 from 21 September 2015, but not indication that this was followed through as it appears to indicate non-compliance with	The result is not a non-compliance. The groundwater monitoring result came from an onsite monitoring location with a baseline high in electrical conductivity.

the site's criteria. However, as this commitment itself is not entirely clear when read in conjunction with the original Groundwater Impact Assessment prepared in 2006, it is recommended that the site confirm what this requirement relates to.	This monitoring location has been installed since the last review of the Water Management Plan. The Water Management Plan is currently under review to incorporate these recommendations.
It is also recommended that future AEMRs include: • Volume (if any) of water supplied to Mt Arthur during the reporting period; • A review against the groundwater model predictions and water usage predictions contained in the environmental assessment; and • A comparison of standing water levels to the steady state calibration results as detailed in the environmental assessment	It should be noted that Drayton does not supply water to Mt Arthur mine. The two mines have an agreement, which expires December 2016, allowing both to store water in a void located near a shared boundary. As at December 2016 no water from Drayton was being placed in the SW13 Void (see **Section 7.3**).
Rehabilitation and Offset Management Plan	
It is recommended that future AEMRs include the following: • Clarification of when rehabilitation works have been undertaken • More details on rehabilitation activities in general including: topsoil application; and annual flora, fauna and spontaneous combustion monitoring, including tracking of any trends identified and survival rates of rehabilitation.	See **Section 8**.
Aboriginal Cultural Heritage Management Plan	
The Aboriginal Cultural Heritage Management Plan (Anglo Coal, October 2008) should be updated to refer to the current status of Aboriginal cultural heritage items that have been preserved offsite or salvaged.	The Aboriginal Cultural Heritage Management Plan is currently under review to incorporate this recommendation.
It is recommended that the site implement an inspection regime to confirm the condition of Aboriginal cultural heritage items remaining in-situ.	An annual inspection regime will be implemented and outlined in the updated Aboriginal Cultural Heritage Management Plan.
Furthermore it is recommended that future AEMRs: • Clarify whether or not Aboriginal community stakeholder consultation was required during the reporting period, and if not required, specify why; and • Make some comment on the status of any in situ or salvaged Aboriginal cultural heritage items.	See **Section 6.10**.
Environmental Management Strategy	
Incident response procedures are to be updated to refer to the immediate reporting requirements under the *Protection of the Environment Operations Act 1997*, and staff are to be made aware of these requirements. The roles and responsibilities outlined in the Appendices to the Environmental Management Strategy should be reviewed for currency	The Environmental Management Strategy is currently under review to include these recommendations. The site induction has been updated to include the incident response procedures.

The site should continue to manage its website to ensure that, in future, all current versions of management plans, AEMRs, previous audit reports and project approvals are available online (it is noted that the 2012 AEMR, several management plans, audit reports, and the DA 106-04-00 was not available at the time of conducting the audit.	The website has been reviewed and updated. The document control system has been updated so that documents that are required to be published on the website are noted.
Environmental Monitoring Program	
The Environmental Monitoring Program should be updated so that refers to the current network of surface and groundwater monitoring locations. The site should reconcile the Environmental Monitoring Program with updates to management plans as and when those updates occur.	The Environmental Monitoring Program is currently under review to include these recommendations.
Previous IEA 2012	
It is recommended that the Site update its document control process to ensure that when new and revised document are finalised, these are uploaded on the website.	The document control system has been updated so that documents that are required to be published on the website are noted. These documents will be updated when they are finalised.
It is recommended that the site consider including a short statement in noise monitoring reports (in addition to the tabulated monitoring findings) confirming whether any exceedances were or were not detected during the reporting period.	This recommendation has been passed on to the noise specialist responsible for undertaking monthly monitoring and providing these reports.
General Recommendations	
It is recommended that onsite staff, particularly those in operational and maintenance management roles, be familiarised with the regulatory requirements to notify potential material environmental harm incidents immediately upon becoming aware of them. Furthermore, the site's PIRMP should be updated to reflect the current regulatory requirements of immediate notification to the EPA and other relevant authorities, as the current PIRMP references the old requirement to notify as soon as practicable/within 24 hours.	The Incident Reporting, Notification and Initial Investigation Procedure and the site's PIRMP (available on the website) are being revised in response to this recommendation. When the review is complete, the changes will be communicated to relevant supervisors via a toolbox talk. Training currently references the need to report all environmental incidents to the environment department and staff are generally aware of this requirement.
Certain aspects of the site's environmental management are delegated to other areas of mine management. While the delegation of these matters of environmental management may be appropriate to meet operational needs, it is recommended that there is regular communication between environmental staff and the staff responsible for the day-to-day management of these environmental matters	All staff are responsible for management of day-to-day environmental matters. Environmental staff regularly speak to staff responsible for rehabilitation; water management; dust control; plant maintenance; and various other aspects of environmental management. Apart from daily pre shift briefings and weekly meetings, these discussions are informal and not documented to the satisfaction of the auditors.
It is recommended that the site implement an inspection regime for fences.	There are currently several processes for fence inspections occurring onsite prioritised for site security and stock control. Drayton will introduce an documentation regime.

11 INCIDENTS AND NON-COMPLIANCES DURING THE REPORTING PERIOD

11.1 Environmental Incidents

There were no reportable environmental incidents during the 2016 reporting period.

11.2 Environmental Non-Compliances

As part of the SHECMS, internal audits are undertaken to assess compliance against environmental licences and approvals including the development consents, EPL 1323 and Mining Lease conditions. The internal audits completed did not identify any non-conformances with the exception of the following administrative non-compliance.

DA 106-04-00 Condition 6.1(e) requires that the Applicant shall submit a statement every six (6) months regarding the number of daily train movements, quantities and destination of product hauled on the Drayton rail loop and Anitiene Rail Spur in that period to the Director-General, commencing from the date of commencement of the consent.

During 2016 the mid-year six monthly report was not provided to DP&E and as a result is considered a minor administrative non-compliance. It is noted that no exceedance of rail limits had occurred in this period. A summary report for compliance purposes of all rail movements and tonnages is provided for the entire 2016 reporting period and is contained within **Appendix H.**

11.3 Regulatory Enquiries / Correspondence

In correspondence dated 2nd and 10th August 2016 the EPA provided Drayton with a show cause notice (EPA Ref 1543068) associated with a possible incident of excessive dust generation from a drill rig.

Drayton provided a response on 26th August 2016 stating that it was believed that the drilling activity was being carried out in a competent manner and the equipment was operated properly and efficiently, having regard for the drilling ground conditions at the time and the relevant operational factors described in the EPA's "Interim Dust Assessment Handbook". There was no environmental harm or potential for environmental harm from the drilling activity.

Subsequently the EPA concurred that no offence had occurred and that conditions pertaining to EPL 1323 had not been breached. No further actions were required.

No official cautions, warning letters, penalty notices or prosecution proceedings were provided or occurred within the 2016 reporting period.

12 ACTIVITIES TO BE COMPLETED IN THE NEXT REPORTING PERIOD

12.1 Activities in 2017

Drayton is committed to continuously improve the environmental and community performance of operations. Operations during 2017 will provide consideration of changes to the nature and scale of operations being conducted on site, lessons learnt, evolving technologies, government and community feedback and available best practice that may be feasible to the operation. In this regard Drayton's environmental targets for the 2017 reporting period include:

- Maintaining full compliance with environmental legislation including air quality, noise and blast requirements including improvement of the documentation associated with the Environmental Management System. As identified in **Section 10** several management plans are currently in the process of being updated and will be submitted during 2017;
- Nil offsite discharge of mine water including a review of findings (yet to be provided) from the Dams Management Audit completed in 2016;
- Continued reduction in spontaneous combustion emissions by ongoing improvement in application of the spontaneous combustion management plan;
- Continuation of public involvement and project notifications via the CCC meetings;
- Implementation of the approved Mine Closure Plan including 106 ha of rehabilitation; and
- Preparation of a decommissioning plan in consultation with DRE and DP&E. This plan will outline the key stages and management actions in the decommissioning of Drayton infrastructure remaining on site following mine closure. If additional options for a beneficial end use of site infrastructure arise (either internally or in consultation with any third party) then these will be investigated in consultation with the relevant authorities and stakeholder.

12.1.1 Review of Rehabilitation Performance and Management Actions

As discussed in **Section 8.2**, during 2017 the recently appointed Environment Superintendent will be completing a review of all previous rehabilitation methodology and objectives in relation to the success criteria identified in the MOP. It is anticipated that the results from the annual soils and flora and fauna monitoring reports will also assist in providing data that can be used to develop a program of rehabilitation and remedial actions for existing rehabilitation areas to ensure long term success criteria are achieved.

13 ADDITIONAL INFORMATION

13.1 Dams Safety Committee Requirements

13.1.1 Liddell Ash Dam

The Liddell Ash Dam Levee (ADL) was constructed to retain ash produced by the Liddell Power Station. The DSC issued Drayton with requirements for monitoring and reporting regarding the ADL.

In 2016 Drayton complied with the DSC requirements by:

- Carrying out an annual independent Type 2 engineering assessment;
- Having tri-weekly inspections conducted by a competent person;
- Completing an annual review of the Ash Dam Management Plan;
- Having an appointed a DSC Liaison Officer;
- Inspecting the ADL after each blast in the notification area;
- Reporting significant changes in seepage to DSC immediately;
- Reporting blast vibrations in excess of 50 mm/s to DSC immediately; and
- Providing monthly reports on:
    - Seepage and pumping rates;
    - ash deposition status;
    - blast monitoring results within the notification area;
    - mining face positions; and
    - compliance statement.

Deposition of ash against the levee in the southern most section of the ADL commenced in mid-March 2015. As predicted, seepage increased significantly when the ash was first deposited. An ash beach is maintained against the wall to seal it and contain the ash but the wall allows seepage of water to assist consolidation of the contained ash. An inspection regime is in place to monitor seepage changes during this period and monthly reports to the DSC continued to inform them of the status of the ADL during 2016.

The vibration limit at the ADL for blasting, set by the DSC, is 50 mm/s with all blast results over the limit to be reported immediately to the DSC. Vibration is monitored using two fixed blast monitors located at the crest and toe of the ADL in accordance with DSC requirements. During 2016, one blast located approximately 150m of the Ash Dam Levee on 29th April exceeded the 50 mm/s limit recording 63.46 mm/s on both the Ash Dam Crest and Ash Dam Toe monitors. The DSC were notified of the exceedance and noted the exceedance. No further actions were requested.

Vibration results from all blasts within the notification area were reported to the DSC in the monthly reports.

An updated Dam Safety Emergency Plan for the ADL was approved by the DSC 16th November 2015.

A Type 2 surveillance inspection is conducted annually and results are reported to the DSC. A geotechnical engineer inspected the dam on 27th July 2016. A Type 2 surveillance report for this dam was subsequently prepared and submitted to the DSC. Several technical recommendations were made with actions associated with these recommendations tracked in the monthly reports to the DSC.

13.1.2 Access Road Dam

Drayton's main process water storage facility is called the Access Road Dam (2081). This dam is a 13 metre high, significant consequence category, DSC prescribed dam. A Type 3 surveillance inspection is conducted every five years and results are reported to the DSC. A geotechnical engineer inspected the dam on 11th August 2015. A Type 3 surveillance report for this dam was prepared and has since been submitted to the DSC. The report concluded that "the dam and storage together appears to perform as intended. No obvious concerns for the safety of the dam or major operational requirements were noted during this inspection." The report recommended removal of saplings from the bank and spillway which was undertaken during the reporting period. The next report is due in August 2020.

The Access Road Dam is inspected weekly and no stability issues were found during the reporting period. The dam is operated and maintained with adequate freeboard to prevent discharge via the spillway.

APPENDICES

Appendix A: Consents, Leases and Licenses

Table 36: Drayton's Consents, Leases and Licenses

Consents, Leases and Licences	Date of Issue	Date of Expiry	Approval Authority
Licence / Approval Title			
DUAP Conditions re Antiene Rail Spur Development	02/11/2000	02/11/2025	Minister for Planning
PA – Drayton Mine Extension (06_0202)	01/02/2008		Minister for Planning
Modification to Drayton Mine Extension	16/10/2009		Minister for Planning
Modification 2 to Drayton Mine Extension	17/02/2012		Minister for Planning
Lease Conditions			
Exchange of Parts of Coal Lease 229 & Coal Lease 744	25/06/1992		Minister for Mineral Resources and Energy
Coal Lease 395	08/03/2007	Jan 2029	Minister for Mineral Resources and Energy
Renewal of Authorisation 173	12/05/2014		Minister for Mineral Resources and Energy
Mining Operation Plan	01/07/2015	30/06/2020	Division of Resources and Energy (DRE)
Mining Operation Plan - Amendment A (Approved 7th February 2017)	01/07/2015	30/06/2020	Division of Resources and Energy (DRE)
Coal Lease 229	28/05/2003	May 2024	Minister for Mineral Resources and Energy
Mining Lease ML 1531	26/02/2003	Feb 2024	Minister for Mineral Resources and Energy
Ministerial Approval of an Emplacement Area	22/09/2004		Minister for Mineral Resources and Energy
Anglo Sub Lease	29/01/2008		Minister for Mineral Resources and Energy
Ministerial Approval of an Emplacement Area	28/10/2011		Minister for Mineral Resources and Energy
Current Licence Conditions			
Environmental Protection Licence 1323	28/08/2015		NSW Environmental Protection Authority
Bore Licence 20BL111869	24/04/2010	23/04/2015*	NSW Office of Water
Bore Licence 20BL171958	23/02/2015	22/02/2020	NSW Office of Water
Bore Licence 20BL171956	27/08/2008	Perpetuity	NSW Office of Water
Bore Licence 20BL171957	27/08/2008	Perpetuity	NSW Office of Water
Bore Licence 20BL171955	27/08/2008	Perpetuity	NSW Office of Water
Bore Licence 20BL171954	27/08/2008	Perpetuity	NSW Office of Water
Bore Licence 20BL171953	27/08/2008	Perpetuity	NSW Office of Water

Consents, Leases and Licences	Date of Issue	Date of Expiry	Approval Authority
Licence to Store Explosives (XSTR100017)	22/11/2011	08/05/2016	Work Cover NSW
Acknowledgement of Notification of Dangerous Goods on Premesis (NDG019387)	04/03/2014	Perpetuity	Work Cover NSW
Hunter River Salinity Trading Scheme (Credit purchase arrangement)	Nov 1998	No current credits	Department Environment & Climate Change (EPA)
Other Agreements			
NPWS Wildlife Refuge	1987		National Parks and Wildlife
Bayswater/Drayton Boundary Licence No 5	02/02/1999		
Licence Agreement for Liddell – Macquarie Generation Water Bores	14/10/1986		Electricity Commission NSW
Agreement to Access & Occupy Property (Water Bores)	04/06/2001		AGL - Macquarie
Agreement to Access & Occupy Property (Far East Tip)	04/06/2001		AGL - Macquarie
Licence Agreement with Muswellbrook Pistol Club	Aug 2001		Drayton Coal Pty Ltd

** Groundwater license renewal submitted to NSW Office of Water 21/04/2015, license renewal pending.*

*** Radiation sources removed from site in 2016.*

Appendix B: 2016 Water Sampling Results

Table 37: 2016 Surface Water Results

Site	Date	Electrical Conductivity	pH	TDS	TSS	Calcium	Magnesium	Chloride	Sulphate	Bicarbonate	Sodium	Potassium
		µS/cm		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
1609	Jan						*No Sample Taken*					
	Feb	7480	8.36	5750	< 5	502	555	795	4080	100	607	80
	Mar	7440	8.36	5860	< 5	511	599	797	3470	99	629	85
	Apr	8560	8.1	7150	< 5	507	577	718	4530	124	613	82
	May	7760	8.17	7300	< 5	536	615	784	3400	136	650	85
	Jun	7680	8.12	7030	< 5	554	627	764	3690	145	685	85
	Jul	7590	8.28	5780	< 5	549	600	787	3190	138	644	87
	Aug	7760	8.08	5730	< 5	514	582	735	3900	140	612	80
	Sep	7120	8.34	4050	10	517	640	753	3600	106	615	76
	Oct	7700	8.33	7280	< 5	524	618	788	3400	97	676	84
	Nov	7360	8.5	7410	9	538	645	822	3590	71	703	92
	Dec	7640	8.16	7470	23	534	644	756	4150	77	664	85
	Average	**7645**	**8.25**	**6437**	**14**	**526**	**609**	**773**	**3727**	**112**	**645**	**84**
1969	Jan						*No Sample Taken*					
	Feb	5750	8.28	4950	16	300	383	634	2710	120	577	41
	Mar	6070	8.13	4870	8	312	427	695	2520	183	620	47
	Apr	7150	7.91	5410	6	364	418	636	2590	233	604	47
	May	6570	8.08	5640	8	405	450	689	2610	282	638	48
	Jun	6400	8.21	5360	9	414	410	639	2700	292	646	47
	Jul	6190	8.07	4750	24	418	423	674	2390	173	602	49
	Aug	6520	7.9	5470	8	435	397	663	3120	297	620	47
	Sep	5970	8.13	5460	18	434	437	658	2610	255	596	42

Site	Date	Electrical Conductivity	pH	TDS	TSS	Calcium	Magnesium	Chloride	Sulphate	Bicarbonate	Sodium	Potassium
		µS/cm		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
	Oct	6380	7.82	4890	20	399	408	672	2580	204	607	45
	Nov	5940	8.15	5380	< 5	408	443	698	2470	148	653	50
	Dec	5940	8.06	5250	< 5	354	393	624	2860	135	549	42
	Average	**6262**	**8.07**	**5221**	**13**	**386**	**417**	**662**	**2651**	**211**	**610**	**46**
2109	Jan						*No Sample Taken*					
	Feb	1870	7.32	1220	8	52	62	299	463	42	239	5
	Mar	4190	7.56	3140	< 5	105	162	655	1150	140	624	8
	Apr	5750	7.68	3610	5	134	190	706	1340	165	742	11
	May	5050	7.63	3510	5	130	193	766	1350	136	748	11
	Jun	3000	7.11	2060	6	98	112	437	837	49	428	7
	Jul	1850	7.62	1180	150	50	65	286	378	30	245	5
	Aug	3520	6.88	2340	< 5	88	118	510	1010	67	489	6
	Sep	2580	7.26	1890	8	70	101	409	675	41	370	5
	Oct	3940	7.13	2710	8	110	154	600	883	62	580	8
	Nov	4780	7.76	3650	9	136	190	777	1510	108	794	10
	Dec	1630	6.89	1090	12	48	53	246	408	25	221	5
	Average	**3469**	**7.35**	**2400**	**23**	**93**	**127**	**517**	**909**	**79**	**498**	**7**
2114	Jan						*No Sample Taken*					
	Feb	6480	8.02	5600	13	362	420	701	3040	356	615	45
	Mar	6580	7.99	5980	20	390	462	721	2630	396	633	47
	Apr	7590	8.03	5710	6	415	461	672	2800	275	631	51
	May	7150	7.94	6440	27	488	520	702	2910	425	664	51
	Jun	6740	7.95	5650	32	482	401	714	2710	466	632	46
	Jul	6530	7.98	5280	44	529	444	705	2620	230	635	53
	Aug	6770	7.75	5650	12	492	387	673	3200	450	617	48
	Sep	6280	8.07	5010	19	478	460	676	2760	301	622	45

Site	Date	Electrical Conductivity	pH	TDS	TSS	Calcium	Magnesium	Chloride	Sulphate	Bicarbonate	Sodium	Potassium
		µS/cm		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
	Oct	3590	7.81	2850	6	223	205	363	1340	90	338	21
	Nov	4000	7.79	3480	< 5	259	269	472	1950	110	444	29
	Dec	1420	7.34	1100	< 5	101	72	121	493	43	119	9
	Average	**5739**	**7.88**	**4795**	**20**	**384**	**373**	**593**	**2405**	**286**	**541**	**40**
2221	Jan						*No Sample Taken*					
	Feb	1520	8.06	908	< 5	43	48	242	266	149	206	8
	Mar	1640	7.76	1130	24	48	58	287	275	224	247	8
	Apr	2060	7.9	1100	6	54	59	283	273	268	255	9
	May	1950	8.2	1170	6	57	64	301	264	242	271	10
	Jun	1720	8.4	1040	23	53	53	246	282	194	243	10
	Jul	1620	8.33	903	< 5	50	53	247	242	166	226	11
	Aug	1630	7.46	987	38	42	48	287	294	188	210	10
	Sep	1360	7.91	754	5	22	41	214	234	97	206	8
	Oct	1440	8.61	878	10	14	46	220	252	67	225	6
	Nov	1500	7.96	962	18	31	51	259	276	134	254	6
	Dec	1360	7.57	909	6	41	43	209	254	128	197	9
	Average	**1618**	**8.01**	**976**	**15**	**41**	**51**	**254**	**265**	**169**	**231**	**9**
1895	Jan						*No Sample Taken*					
	Feb	5860	8.78	4110	< 5	46	326	773	773	402	918	22
	Mar	6150	8.75	4500	< 5	41	357	821	821	467	970	19
	Apr	7240	8.58	4620	9	46	357	767	767	572	976	24
	May	6710	8.52	4890	< 5	54	387	850	850	634	1060	25
	Jun	6550	8.5	4500	< 5	59	351	808	808	594	1060	23
	Jul	6360	8.82	3700	< 5	64	371	833	833	444	1000	25
	Aug	6550	8.51	4710	< 5	67	369	811	811	618	1010	24
	Sep	5990	8.72	4700	5	63	383	785	785	459	977	21

Site	Date	Electrical Conductivity	pH	TDS	TSS	Calcium	Magnesium	Chloride	Sulphate	Bicarbonate	Sodium	Potassium
		µS/cm		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
	Oct	6550	8.83	4220	< 5	48	367	837	837	400	1040	22
	Nov	6280	9.18	4020	< 5	31	403	873	873	229	1150	23
	Dec	6580	9.29	4970	14	24	402	814	814	196	1080	22
	Average	**6438**	**8.77**	**4449**	**9**	**49**	**370**	**816**	**816**	**456**	**1022**	**23**
2081	**Jan**						*No Sample Taken*					
	Feb	5970	8.04	5220	28	305	400	678	2990	67	569	46
	Mar	6270	8.12	4780	5	331	450	714	2750	116	603	55
	Apr	7360	7.83	5800	6	390	443	648	2660	164	575	57
	May	6670	7.92	5820	8	416	474	700	2680	184	620	57
	Jun	6590	8.15	5690	< 5	410	440	662	2920	207	634	54
	Jul	6440	8.3	5400	12	419	461	709	2620	178	621	56
	Aug	6540	7.95	5610	14	392	444	664	3270	198	605	50
	Sep	6100	8.17	4400	8	390	485	672	2700	161	624	49
	Oct	6630	7.85	5500	12	388	455	698	2680	135	632	51
	Nov	6380	8.17	6090	< 5	415	512	747	3110	115	696	61
	Dec	6620	8.23	6060	< 5	414	516	679	3360	92	644	59
	Average	**6506**	**8.07**	**5488**	**12**	**388**	**462**	**688**	**2885**	**147**	**620**	**54**
SW 13	**Jan**						*No Sample Taken*					
	Feb	6730	8.21	5430	< 5	467	456	645	3520	204	576	51
	Mar	6810	8.11	5990	< 5	557	510	656	3090	237	612	54
	Apr	7870	7.95	6380	< 5	505	508	596	3200	241	604	54
	May	7080	8.02	6510	< 5	514	520	647	3090	244	619	52
	Jun	7110	7.83	6430	< 5	524	497	634	3550	260	644	51
	Jul	7050	8.24	5320	< 5	540	536	658	3100	207	626	55
	Aug	7190	7.83	5680	< 5	503	508	615	3780	273	582	50
	Sep	6620	8.06	3400	6	520	550	636	3280	230	607	48

Site	Date	Electrical Conductivity	pH	TDS	TSS	Calcium	Magnesium	Chloride	Sulphate	Bicarbonate	Sodium	Potassium
		µS/cm		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
	Oct	7140	7.96	5580	6	529	548	662	3210	233	670	52
	Nov	6800	8.16	6600	< 5	554	566	687	3340	231	696	56
	Dec	6730	8.08	6000	18	471	476	612	3620	210	557	46
	Average	**7012**	**8.04**	**5756**	**10**	**517**	**516**	**641**	**3344**	**234**	**618**	**52**
Oil Pollution Control Dam	**Jan**						*No Sample Taken*					
	Feb	5800	9.12	5030	87	322	359	653	2740	47	580	42
	Mar	7040	7.48	5670	58	338	461	733	2790	123	659	57
	Apr	7450	7.74	5790	21	394	464	661	2740	212	643	58
	May	6710	7.53	5980	760	410	472	708	2720	250	662	56
	Jun	5060	7.47	4080	59	317	311	495	1820	175	499	37
	Jul	8830	8.41	7120	< 5	413	365	1210	2820	255	1400	17
	Aug	5800	7.36	4440	93	346	344	594	2470	213	542	41
	Sep	5940	7.9	4160	74	394	456	653	2650	187	620	45
	Oct	5740	7.53	4090	41	358	412	597	2260	165	608	45
	Nov	6260	8.39	5820	21	407	507	756	3200	194	719	57
	Dec	2900	7.81	2240	< 5	176	180	285	1260	122	240	20
	Average	**6139**	**7.89**	**4947**	**135**	**352**	**394**	**668**	**2497**	**177**	**652**	**43**
ES Void	**Jan**						*Samples required quarterly*					
	Feb						*Samples required quarterly*					
	Mar	7130	7.98	5900	< 5	589	544	737	3270	227	582	81
	Apr						*Samples required quarterly*					
	May						*Samples required quarterly*					
	Jun						*Restricted Access*					

Site	Date	Electrical Conductivity µS/cm	pH	TDS mg/L	TSS mg/L	Calcium mg/L	Magnesium mg/L	Chloride mg/L	Sulphate mg/L	Bicarbonate mg/L	Sodium mg/L	Potassium mg/L
	Jul						*Samples required quarterly*					
	Aug	7530	7.87	5440	< 5	549	562	701	3830	237	604	78
	Sep						Samples required quarterly					
	Oct						*Samples required quarterly*					
	Nov						*Restricted Access*					
	Dec						Samples required quarterly					
	Average	**7330**	**7.93**	**5670**	**< 5**	**569**	**553**	**719**	**3550**	**232**	**593**	**80**

Table 38: 2016 V-Notch Weir Water Results

Site	Date	Electrical Conductivity µS/cm	pH	TDS mg/L	TSS mg/L	Calcium mg/L	Magnesium mg/L	Chloride mg/L	Sulphate mg/L	Bicarbonate mg/L	Sodium mg/L	Potassium mg/L
V Notch	Jan						*No Sample Taken*					
	Feb	10200	7.98	8280	< 5	413	373	1370	3790	371	1530	18
	Mar	11900	7.99	10400	< 5	578	476	1660	4010	419	1900	18
	Apr	12800	8.07	9490	< 5	529	449	1380	3930	382	1780	20
	May	10800	8.05	8880	< 5	520	432	1390	4070	380	1660	21
	Jun	9280	7.91	7140	< 5	356	341	1210	3090	249	1440	14
	Jul	6060	8.34	5250	40	402	421	661	2450	189	595	47
	Aug	9590	7.88	7360	< 5	390	330	1150	3670	336	1350	15
	Sep	8570	8.02	5740	< 5	396	377	1230	3110	316	1360	14
	Oct	9240	7.71	7600	6	376	344	1190	2960	298	1440	14
	Nov	11900	7.93	10100	7	456	542	1870	4210	462	2300	17
	Dec	9540	7.78	7450	24	319	352	1250	3420	330	1420	14
	Average	**9989**	**7.97**	**7972**	**19**	**430**	**403**	**1306**	**3519**	**339**	**1525**	**19**

Table 39: 2016 Piezometer Results

Drill Number	Date	Water Level (m)	pH	Electrical Conductivity (µS/cm)	Salinity (ppm)	Total Dissolved Solids (mg/L)
F1024	January	178.62	*Bore dry – unable to sample*			
	February	178.61	*Bore dry – unable to sample*			
	March	178.64	*Bore dry – unable to sample*			
	April		*Bore dry – unable to sample*			
	May	179.12	*Bore dry – unable to sample*			
	June	179.12	*Bore dry – unable to sample*			
	July	179.12	*Bore dry – unable to sample*			
	August	179.12	*Bore dry – unable to sample*			
	September	179.12	*Bore dry – unable to sample*			
	October		*Bore dry – unable to sample*			
	November	179.12	*Bore dry – unable to sample*			
	December	179.12	*Bore dry – unable to sample*			
	Average	178.97	*Bore dry – unable to sample*			
F1162	January – December	*Too deep – unable to sample*				
	Average	>100.00				
F1163	January	177.48	7.46	942	558	394
	February	177.49	7.06	1104	560	765
	March	177.5	7.06	1097	563	759
	April	-	-	-	-	-
	May	177.45	6.5	920	451	640
	June	177.49	-	-	-	-
	July	177.52	6.62	755	384	539
	August	177.54	-	-	-	-
	September	177.39	-	-	-	-
	October	-	-	-	-	-
	November	177.61	-	-	-	-
	December	177.76	-	-	-	-
	Average	177.52	6.94	964	503	619

Drill Number	Date	Water Level (m)	pH	Electrical Conductivity (µS/cm)	Salinity (ppm)	Total Dissolved Solids (mg/L)
F1164	January – December			*Too deep – unable to sample*		
	Average	>100.00				
F1167	January	163.85		*Insufficient Water to Sample*		
	February	163.86		*Insufficient Water to Sample*		
	March	DNS		*Insufficient Water to Sample*		
	April	195.5		*Insufficient Water to Sample*		
	May	163.74		*Insufficient Water to Sample*		
	June	163.74		*Insufficient Water to Sample*		
	July	163.74		*Insufficient Water to Sample*		
	August	163.74		*Insufficient Water to Sample*		
	September	163.74		*Insufficient Water to Sample*		
	October	195.5		*Insufficient Water to Sample*		
	November	163.74		*Insufficient Water to Sample*		
	December	163.74		*Insufficient Water to Sample*		
	Average	163.77				
F1168	January	158.54	-	-	-	-
	February	158.57	7.08	5050	2520	3440
	March	158.55	7.14	5110	2540	3500
	April	-	-	-	-	-
	May	163.95	6.8	5170	2580	3610
	June	161.9	-	-	-	-
	July	158.7	6.83	5110	2530	3.66
	August	158.8	-	-	-	-
	September	158.6	-	-	-	-
	October	-	-	-	-	-
	November	159.06	-	-	-	-
	December	158.8	-	-	-	-
	Average	159.55	6.96	5110	2543	2638

Drill Number	Date	Water Level (m)	pH	Electrical Conductivity (µS/cm)	Salinity (ppm)	Total Dissolved Solids (mg/L)
R4241	January	173.96	-	-	-	-
	February	173.95	7.08	5050	2520	3440
	March	173.95	7.14	5110	2540	3500
	April	-	-	-	-	-
	May	172.98	6.8	5170	2580	3610
	June	173.23	-	-	-	-
	July	173.41	6.83	5110	2530	3.66
	August	173.54	-	-	-	-
	September	173.32	-	-	-	-
	October	-	-	-	-	-
	November	173.57	-	-	-	-
	December	173.88	-	-	-	-
	Average	173.58	6.96	5110	2543	2638
W1102	January	178.56	7.28	7520	3770	5180
	February	178.55	7.29	7500	3760	5190
	March	178.54	7.31	7560	3800	5170
	April	-				
	May	178.08	7.14	7270	3620	5100
	June	178.27	7.13	7410	3700	5200
	July	178.5	7.11	7540	3750	5270
	August	178.43				
	September	178.44				
	October	-				
	November	178.74				
	December	179.02				
	Average	178.51	7.21	7467	3733	5185

Appendix C: 2016 Dust Sampling Results

Table 40: 2016 Depositional Dust Gauge Results

Site Number	Period	Ash Content (g/m².month)	Combustible Matter (g/m².month)	Total Insoluble Matter (g/m².month)	Total Solids (g/m².month)	Field Note Comments
2130	January	1.4	0.7	2.1	2.2	Insects, dust
	February	0.7	0.2	0.9	1	Dust, insects
	March	3.1	0.7	3.8	4.3	Insects, dust
	April	1.5	1.1	2.6	3	Insects
	May	1.3	0.7	2	2.9	Insects, dust
	June	0.8	0.5	1.3	1.9	Insects, dust
	July	0.4	0.2	0.6	2.7	Insects, dust
	August	N/A	N/A	N/A	N/A	None
	September	0.8	0.5	1.3	1.6	Insects, dust
	October	1.6	1.2	2.8	5.2	Insects
	November	2.1	2.3	4.4	6.4	Insects, vegetation
	December	1.9	1	2.9	4.6	Insects, dust
	Average	**1.42**	**0.83**	**2.25**	**3.25**	
2157	January	1.1	0.4	1.5	1.7	Insects, dust
	February	1.1	1.4	2.5	3	Dust, insects, spider
	March	1.9	0.6	2.5	2.8	Dust, insects
	April	2.2	2	4.2	4.2	Spider
	May	1.9	0.9	2.8	3.5	Dust, insects
	June	0.8	0.6	1.4	2.1	Insects, dust, vegetation

Site Number	Period	Ash Content (g/m².month)	Combustible Matter (g/m².month)	Total Insoluble Matter (g/m².month)	Total Solids (g/m².month)	Field Note Comments
	July	0.5	0.3	0.8	1.7	Insects, dust, vegetation
	August	0.6	0.4	1	2.1	Twigs
	September	0.8	0.4	1.2	2.4	Insects, dust
	October	0.8	0.4	1.2	1.2	Beetles, insects, dust
	November	1.6	1.3	2.9	4.6	Spider, fly, vegetation
	December	1.8	1.3	3.1	3.4	Organics, insects
	Average	**1.26**	**0.83**	**2.09**	**2.73**	
2175	January	0.8	0.3	1.1	1.9	Cricket, vegetation
	February	0.7	0.3	1	1.2	Dust, insects
	March	4.3	1	5.3	6	Insects, dust, algae
	April	1.4	0.8	2.2	2.5	None
	May	1.5	0.7	2.2	3.1	Spider
	June	0.8	0.4	1.2	1.2	Insects, dust, vegetation
	July	0.7	0.4	1.1	1.6	Insects, dust
	August	0.8	0.4	1.2	2.5	Vegetation
	September	0.8	0.1	0.9	1	Insects, dust
	October	1	0.2	1.2	2	Insects
	November	2	1.6	3.6	5.1	Cricket, vegetation
	December	1.8	1	2.8	2.8	Organics, insects, dust
	Average	**1.38**	**0.60**	**1.98**	**2.58**	
2197	January	2.3	2.9	5.2	6.5	Insects, dust
	February	0.4	0.4	0.8	3	Dust, leaves, bird poo

Site Number	Period	Ash Content (g/m².month)	Combustible Matter (g/m².month)	Total Insoluble Matter (g/m².month)	Total Solids (g/m².month)	Field Note Comments
	March	4.8	2.2	7	7.5	Insects, dust, spider
	April	2.4	2.4	4.8	5.3	Spider, vegetation
	May	1.9	0.8	2.7	3.5	Insects
	June	1.2	1	2.2	2.7	Insects, dust
	July	1.3	0.4	1.7	2.6	Vegetation, insects, dust
	August	1.2	0.6	1.8	2.4	None
	September	1.3	0.6	1.9	4.3	Insects, dust
	October	1.2	0.5	1.7	4	Bugs
	November	1.4	0.8	2.2	3.3	Insects
	December	1.9	1.2	3.1	3.2	Bee, insects, dust
	Average	**1.78**	**1.15**	**2.93**	**4.03**	

2208	January	0.8	< 0.1	0.8	0.9	Cricket, vegetation, dust
	February	0.6	0.1	0.7	0.9	Insects, dust, spider web
	March	1.9	0.5	2.4	2.9	Insects, dust
	April	1.3	0.7	2	4.6	Insects, dust
	May	1.6	0.4	2	2.7	Spider
	June	0.7	0.4	1.1	1.8	Insects, dust
	July	0.6	0.2	0.8	1.2	Insects, dust
	August	0.8	0.4	1.2	1.2	None
	September	0.7	0.3	1	3.8	Insects, dust
	October	1	0.6	1.6	3.8	Large spider, dust
	November	1.3	0.6	1.9	2.7	Ants, spiders, vegetation
	December	1.6	0.6	2.2	2.7	Insects, dust

Site Number	Period	Ash Content (g/m².month)	Combustible Matter (g/m².month)	Total Insoluble Matter (g/m².month)	Total Solids (g/m².month)	Field Note Comments
	Average	**1.08**	**0.44**	**1.48**	**2.43**	
2230	January	1.1	0.7	1.8	1.8	Insects, dust
	February	1.4	1.3	2.7	3.4	Insects, algae, bird poo
	March	1.2	0.3	1.5	1.8	Spider, web in funnel, dust
	April	1.7	1.1	2.8	3	None
	May	1.3	0.7	2	3	Insects
	June	0.7	0.3	1	1.4	Spider
	July	1.1	0.4	1.5	2.8	Insects, dust
	August	0.8	0.3	1.1	2	None
	September	0.7	0.5	1.2	4.2	Insects, dust
	October	1.2	0.6	1.8	2.2	Insects, dust
	November	1.9	0.9	2.8	4.3	Insects, algae, dust
	December	1.9	1.4	3.3	5.4	Insects
	Average	**1.25**	**0.71**	**1.96**	**2.94**	
2235	January	1.3	1.2	2.5	4.6	Insects, dust
	February	0.8	0.4	1.2	1.8	Dust, insects, leaves
	March	2.7	0.6	3.3	3.7	Insects, dust, vegetation
	April	1.4	0.8	2.2	2.8	None
	May	1.5	0.4	1.9	2.9	None
	June	1	0.6	1.6	1.7	Insects, dust
	July	0.8	0.2	1	1.4	Insects, dust
	August	0.8	0.5	1.3	2.5	None

Site Number	Period	Ash Content (g/m².month)	Combustible Matter (g/m².month)	Total Insoluble Matter (g/m².month)	Total Solids (g/m².month)	Field Note Comments
	September	0.8	0.3	1.1	2.7	Insects, dust
	October	1.3	0.4	1.7	2.8	Bird poo, algae
	November	1.4	1.6	3	7.1	Ants, spiders
	December	1.9	0.9	2.8	4.1	Organics, insects, dust
	Average	**1.31**	**0.66**	**1.97**	**3.18**	
2247	January	0.9	0.3	1.2	2.6	Insects, dust
	February	0.7	0.4	1.1	1.5	Insects, dust, spider web
	March	2.1	0.9	3	3.4	Insects, dust
	April	1.2	0.8	2	2	None
	May	1.8	0.3	2.1	2.7	Spider, insects
	June	0.7	0.4	1.1	1.2	Insects, dust
	July	0.9	0.2	1.1	1.2	Insects, dust
	August	1	0.5	1.5	1.5	None
	September	0.9	0.3	1.2	3	Insects, dust
	October	1.1	0.5	1.6	2.2	Insects, algae
	November	2	1.6	3.6	5.2	Insects
	December	1.5	0.7	2.2	4	Organics, insects, dust
	Average	**1.23**	**0.58**	**1.81**	**2.54**	

Table 41: 2016 TEOM PM_{10} Monitoring Results

TEOM (µg/m³)					
Date	PM10 24Hr Av	Date	PM10 24Hr Av	Date	PM10 24Hr Av
1/01/2016	12.17	1/02/2016	11.11	1/03/2016	19.05
2/01/2016	16.21	2/02/2016	15.43	2/03/2016	22.15
3/01/2016	12.09	3/02/2016	16.12	3/03/2016	17.4
4/01/2016	5.87	4/02/2016	12.504	4/03/2016	19.7
5/01/2016	1.25	5/02/2016	20.4	5/03/2016	16
6/01/2016	1.92	6/02/2016	11.67	6/03/2016	17.2
7/01/2016	7.206	7/02/2016	20.24	7/03/2016	16.8
8/01/2016	14.902	8/02/2016	18.38	8/03/2016	22.1
9/01/2016	0*	9/02/2016	18.41	9/03/2016	13.9
10/01/2016	0*	10/02/2016	20.34	10/03/2016	22.7
11/01/2016	0*	11/02/2016	16.36	11/03/2016	23.9
12/01/2016	32.04	12/02/2016	13.62	12/03/2016	21.8
13/01/2016	34.69	13/02/2016	14.31	13/03/2016	27.1
14/01/2016	25.39	14/02/2016	18.02	14/03/2016	17.27
15/01/2016	6.41	15/02/2016	32.29	15/03/2016	26.825
16/01/2016	12.18	16/02/2016	27.67	16/03/2016	18.7
17/01/2016	0*	17/02/2016	29.14	17/03/2016	14.8
18/01/2016	0*	18/02/2016	30.48	18/03/2016	12.3
19/01/2016	0*	19/02/2016	26.13	19/03/2016	12.3
20/01/2016	10.77	20/02/2016	30.05	20/03/2016	16.2
21/01/2016	12.77	21/02/2016	22.92	21/03/2016	8.68
22/01/2016	12.15	22/02/2016	16.94	22/03/2016	11.3
23/01/2016	5.08	23/02/2016	17.71	23/03/2016	17.6
24/01/2016	21.42	24/02/2016	19.51	24/03/2016	26.2
25/01/2016	28.66	25/02/2016	18.72	25/03/2016	19.1
26/01/2016	18.5	26/02/2016	35.56	26/03/2016	24.2
27/01/2016	17.339	27/02/2016	24.37	27/03/2016	37.1
28/01/2016	18.109	28/02/2016	19.11	28/03/2016	21.3
29/01/2016	14.72	29/02/2016	15.38	29/03/2016	21.7
30/01/2016	14.41			30/03/2016	14.3
31/01/2016	19.64			31/03/2016	22.1

**Intermittent power issues resulting in either unreliable data or no result*

TEOM (µg/m³)					
Date	PM10 24Hr Av	Date	PM10 24Hr Av	Date	PM10 24Hr Av
1/04/2016	16.5	1/05/2016	0.6	1/06/2016	15.5
2/04/2016	27.9	2/05/2016	5.21	2/06/2016	17.1
3/04/2016	37.4	3/05/2016	4.66	3/06/2016	19.9
4/04/2016	26.5	4/05/2016	9.65	4/06/2016	5.01
5/04/2016	18.7	5/05/2016	11.2	5/06/2016	0*
6/04/2016	19.9	6/05/2016	13.8	6/06/2016	4.1
7/04/2016	33.3	7/05/2016	29.8	7/06/2016	5.77
8/04/2016	22.6	8/05/2016	28.1	8/06/2016	3.67
9/04/2016	31.4	9/05/2016	15.9	9/06/2016	5.34
10/04/2016	29.4	10/05/2016	8.25	10/06/2016	3.01
11/04/2016	25.3	11/05/2016	8.36	11/06/2016	4.54
12/04/2016	32	12/05/2016	8.82	12/06/2016	12.5
13/04/2016	17.6	13/05/2016	6.31	13/06/2016	23.1
14/04/2016	13.9	14/05/2016	7.04	14/06/2016	8.2
15/04/2016	12.5	15/05/2016	10.8	15/06/2016	9.12
16/04/2016	19.5	16/05/2016	17.1	16/06/2016	7.4
17/04/2016	36.7	17/05/2016	10.9	17/06/2016	6.65
18/04/2016	18.4	18/05/2016	11.4	18/06/2016	5.34
19/04/2016	18	19/05/2016	16.2	19/06/2016	6.44
20/04/2016	17.3	20/05/2016	16.6	20/06/2016	1.32
21/04/2016	27.7	21/05/2016	28.6	21/06/2016	2.47
22/04/2016	23.2	22/05/2016	20.4	22/06/2016	2.89
23/04/2016	12.8	23/05/2016	17.9	23/06/2016	2.3
24/04/2016	18.2	24/05/2016	12.1	24/06/2016	2.06
25/04/2016	18.8	25/05/2016	8.98	25/06/2016	4.2
26/04/2016	14.7	26/05/2016	10.4	26/06/2016	7.54
27/04/2016	0*	27/05/2016	5.59	27/06/2016	4.83
28/04/2016	0*	28/05/2016	4.36	28/06/2016	5.25
29/04/2016	16.9	29/05/2016	3.06	29/06/2016	6.23
30/04/2016	15.7	30/05/2016	12.7	30/06/2016	5.53
		31/05/2016	19		

**Intermittent power issues resulting in either unreliable data or no result*

TEOM (µg/m³)					
Date	PM10 24Hr Av	Date	PM10 24Hr Av	Date	PM10 24Hr Av
1/07/2016	5.49	1/08/2016	9.41	1/09/2016	4.81
2/07/2016	3.62	2/08/2016	14.02	2/09/2016	7.08
3/07/2016	6.27	3/08/2016	5.88	3/09/2016	4.33
4/07/2016	20.4	4/08/2016	7.38	4/09/2016	3.29
5/07/2016	10.6	5/08/2016	7.83	5/09/2016	8.72
6/07/2016	1.55	6/08/2016	9.13	6/09/2016	10.95
7/07/2016	6.35	7/08/2016	11.08	7/09/2016	19.37
8/07/2016	4.8	8/08/2016	13.16	8/09/2016	18.14
9/07/2016	8.27	9/08/2016	7.25	9/09/2016	22.49
10/07/2016	9.37	10/08/2016	9.76	10/09/2016	3.82
11/07/2016	7.47	11/08/2016	6.03	11/09/2016	5.13
12/07/2016	6.32	12/08/2016	8.81	12/09/2016	9.67
13/07/2016	11.72	13/08/2016	11.03	13/09/2016	17.87
14/07/2016	5.77	14/08/2016	10.83	14/09/2016	5.96
15/07/2016	11.4	15/08/2016	20.09	15/09/2016	2.86
16/07/2016	16.56	16/08/2016	13.18	16/09/2016	3.53
17/07/2016	12.12	17/08/2016	8.66	17/09/2016	7.63
18/07/2016	7.05	18/08/2016	11.72	18/09/2016	18.77
19/07/2016	13.31	19/08/2016	12.53	19/09/2016	2.97
20/07/2016	9.38	20/08/2016	5.13	20/09/2016	7.44
21/07/2016	7.06	21/08/2016	5.32	21/09/2016	9.56
22/07/2016	4.26	22/08/2016	10.76	22/09/2016	8.22
23/07/2016	9.95	23/08/2016	7.05	23/09/2016	7.78
24/07/2016	6.26	24/08/2016	7.44	24/09/2016	11.71
25/07/2016	5.96	25/08/2016	2.01	25/09/2016	4.75
26/07/2016	6.11	26/08/2016	6.42	26/09/2016	7.11
27/07/2016	7.47	27/08/2016	9.89	27/09/2016	13.33
28/07/2016	4.47	28/08/2016	5.29	28/09/2016	14.88
29/07/2016	6.15	29/08/2016	0*	29/09/2016	21.81
30/07/2016	8.46	30/08/2016	18.58	30/09/2016	8.25
31/07/2016	7.29	31/08/2016	18.13		

**No result due to TEOM maintenance and change out of filter*

TEOM (µg/m³)					
Date	PM10 24Hr Av	Date	PM10 24Hr Av	Date	PM10 24Hr Av
1/10/2016	6.43	1/11/2016	22.45	1/12/2016	14.94
2/10/2016	4.65	2/11/2016	13.14	2/12/2016	16.21
3/10/2016	6.03	3/11/2016	10.78	3/12/2016	30.32
4/10/2016	7.98	4/11/2016	12.88	4/12/2016	27.91
5/10/2016	10.02	5/11/2016	16.65	5/12/2016	30.35
6/10/2016	9.75	6/11/2016	18.45	6/12/2016	37.77
7/10/2016	9.71	7/11/2016	12.98	7/12/2016	8.02
8/10/2016	15.97	8/11/2016	24.75	8/12/2016	16.98
9/10/2016	16.68	9/11/2016	15.22	9/12/2016	18.93
10/10/2016	20.97	10/11/2016	15.17	10/12/2016	32.08
11/10/2016	6.23	11/11/2016	23.35	11/12/2016	41.64
12/10/2016	7.96	12/11/2016	10.31	12/12/2016	23.95
13/10/2016	14.56	13/11/2016	9.93	13/12/2016	18.72
14/10/2016	15.61	14/11/2016	11.25	14/12/2016	15.48
15/10/2016	8.65	15/11/2016	9.48	15/12/2016	19.33
16/10/2016	10.12	16/11/2016	16.17	16/12/2016	9.58
17/10/2016	9.31	17/11/2016	16.56	17/12/2016	13.79
18/10/2016	4.34	18/11/2016	12.75	18/12/2016	36.77
19/10/2016	9.69	19/11/2016	23.87	19/12/2016	26.89
20/10/2016	21.45	20/11/2016	30.34	20/12/2016	23.04
21/10/2016	16.85	21/11/2016	26.57	21/12/2016	18.38
22/10/2016	2.63	22/11/2016	25.7	22/12/2016	13.26
23/10/2016	11.97	23/11/2016	29.06	23/12/2016	20.42
24/10/2016	9.18	24/11/2016	20.78	24/12/2016	13.16
25/10/2016	9.12	25/11/2016	16.09	25/12/2016	6.19
26/10/2016	7.09	26/11/2016	23.42	26/12/2016	7.73
27/10/2016	19.91	27/11/2016	31.91	27/12/2016	15.87
28/10/2016	13.75	28/11/2016	23.75	28/12/2016	15.37
29/10/2016	19.2	29/11/2016	24.52	29/12/2016	13.9
30/10/2016	11.57	30/11/2016	19.23	30/12/2016	23.18
31/10/2016	11.42			31/12/2016	4.29

Table 42: 2016 High Volume Air Sampler Results

LOT 22 HI-VOL AIR SAMPLER (TSP)		
Run Date	Particulate Mass (mg)	TSP ug/m3
6/01/2016	18.4	12
12/01/2016	134.6	88
18/01/2016	53.4	34
24/01/2016	79	51
30/01/2016	68.8	45
5/02/2016	100.7	65
11/02/2016	108.7	70
17/02/2016	123.4	80
23/02/2016	122.7	79
29/02/2016	99.1	63
6/03/2016	100.4	64
12/03/2016	119.5	77
18/03/2016	54.8	36
24/03/2016	125.5	80
30/03/2016	108.5	70
5/04/2016	97.9	63
11/04/2016	116.2	74
17/04/2016	138.4	87
23/04/2016	75.4	48
29/04/2016	93.7	59
5/05/2016	36.7	23
11/05/2016	61.3	39
17/05/2016	59.3	38
23/05/2016	135.7	86
29/05/2016	41.8	26
4/06/2016	41.2	26
10/06/2016	23.3	15
16/06/2016	35.6	22
22/06/2016	28.3	18
28/06/2016	40.3	25
4/07/2016	114.5	69
10/07/2016	45.2	28
16/07/2016	56.5	34
22/07/2016	22.4	14
28/07/2016	36.5	22
3/08/2016	28.1	17
9/08/2016	30.8	19
15/08/2016	77.5	47
21/08/2016	30.9	19
27/08/2016	41.6	26

LOT 22 HI-VOL AIR SAMPLER (TSP)		
Run Date	Particulate Mass (mg)	TSP ug/m3
2/09/2016	21.4	14
8/09/2016	90.6	56
14/09/2016	7.7	5
20/09/2016	39.8	25
26/09/2016	50.5	32
2/10/2016	30.2	19
8/10/2016	204.6	66
14/10/2016	204.6	63
20/10/2016	99.6	62
26/10/2016	44.2	28
1/11/2016	128.5	81
7/11/2016	144.4	92
13/11/2016	87.6	57
19/11/2016	167.4	107
25/11/2016	120.4	77
1/12/2016	92.4	60
7/12/2016	48.3	31
13/12/2016	189.4	124
19/12/2016	74.9	48
25/12/2016	46.4	30
31/12/2016	113.5	72

Appendix D: 2016 Attended Noise Monitoring Results – 2016 Monthly Reports

29 January 2016

Ref: 03012/6299

James Benson
Anglo Coal (Drayton Management) Pty Limited
PMB 9
Muswellbrook NSW 2333

RE: JANUARY 2016 NOISE MONITORING RESULTS

This letter report presents the results of noise compliance monitoring conducted for the Drayton Coal Mine (DCM) on Wednesday 27th January, 2016. The purpose of the measurements was to quantify the overall noise levels at the nearby residences and determine the contribution from DCM operations.

Schedule 3 of the DCM Project Approval details noise impact assessment criteria for 28 specific residential locations. For logistic reasons it is not reasonable to carry out attended noise monitoring at all of the listed locations during the one monitoring survey. As such, the approach taken was to monitor the noise at eight representative residential locations and determine, by noise modelling, the noise level at all of the other locations required in the Project Approval. Noise measurement locations for the attended noise survey are listed below (as shown in **Figure 1**):

Location R16: Doherty
Location R25: Kerr
Location R35: Wilson*
Location R42: Smith*
Location R61: Skinner
Location R72: Robertson
Location R75: Sharman
Location R76: Horder

* Additional locations contained in EPL 1323 but not in the Project Approval.

Two sets of measurements were made over the "circuit", one during the evening period (from 6 pm – 10 pm) and one at night (after 10 pm). DCM activities were audible at certain monitoring locations throughout the evening and night time periods.

Meteorological data used in this report was supplied by the mine from their automatic weather station. Wind speeds (in m/s) and direction have been determined as the arithmetic average of the measurements over the monitoring period. The mine operated weather station does not record temperature inversion data.

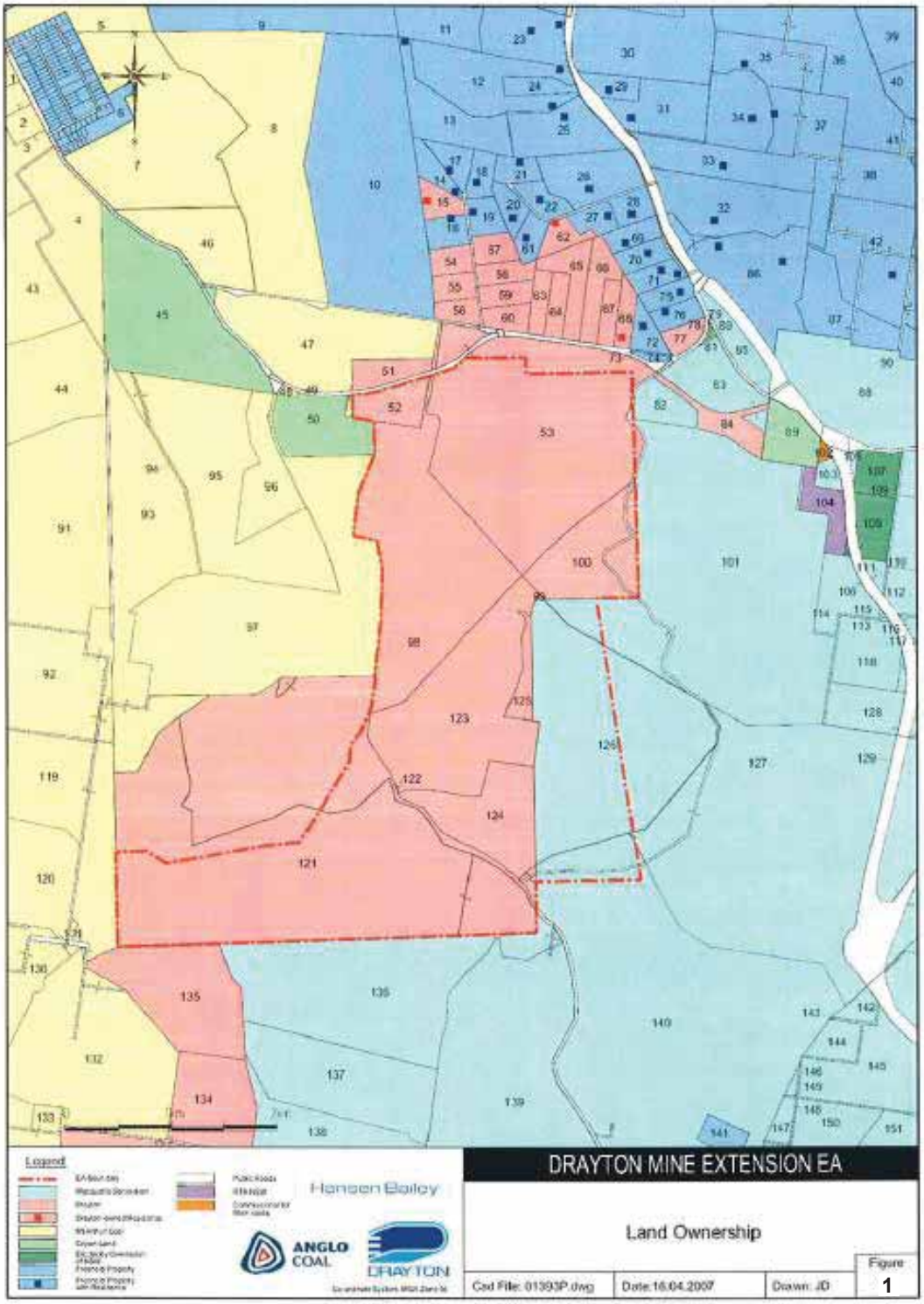
DRAYTON MINE EXTENSION EA
Land Ownership
Hansen Bailey
ANGLO COAL
DRAYTON
Legend
Cad File: 01393P.dwg
Date:16.04.2007
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Figure
1

Details of the DCM Project Approval with respect to noise emissions are shown as **Appendix A** to this report.

Attended noise monitoring was conducted with a Brüel & Kjær Type 2250 Precision Sound Analyser. This instrument has Type 1 characteristics as defined in AS1259-1982 "Sound Level Meters" and has current NATA calibration. Field calibration is carried out at the start and end of each monitoring period.

Measured noise levels for each monitoring circuit are summarised in the following tables. The total measured L_{eq} is shown in **Tables 1-2** and night time $L_{1\ (1minute)}$ – approximated as measured L_{max} – in **Table 3**. Table 3 shows the overall $L_{1\ (1minute)}$ and the contributing source as well as the $L_{1\ (1minute)}$ from DCM, where this was measurable.

Data were analysed with the Bruel & Kjaer "*Evaluator*" software to quantify the contributions of the various noise source(s) to the overall. The noise sources are listed in the comments column with the contribution of each shown in brackets. The noise goal for mining operations at DCM is variable depending upon the location (as per the table from Schedule 3 shown in Appendix A). The contribution of mine noise from DCM is shown in bold. Any exceedances of the EPL and project approval noise criteria are shaded grey.

Table 1
DCM Noise Monitoring Results – 27 January 2016 (evening)

Location (Criterion)	Time	dB(A), $L_{eq(15min)}$	Wind speed/ direction	Identified Noise Sources
Doherty (41)	8:35 pm	51	2.5/135	Frogs & insects (51), traffic (39), DCM (31)
Kerr (37)	8:56 pm	43	3.3/142	Traffic (41), frogs & insects (38), DCM (30)
Skinner (40)	8:32 pm	41	2.4/139	Traffic (39), frogs & insects (35), DCM (33)
Robertson (37)	8:58 pm	45	3.2/143	Frogs & insects (45), traffic (31), DCM (30)
Sharman (35)	9:40 pm	46	2.5/133	Traffic (45), frogs & insects (40), DCM (27)
Horder (36)	9:20 pm	46	2.8/131	Frogs & Insects (46), traffic (33), DCM (28)
Wilson (35)	9:20 pm	41	2.8/131	Traffic (39), frogs & insects (36), DCM (<20)
Smith (35)	9:42 pm	39	2.5/133	Frogs & insects (38), traffic (29), DCM (26)

Table 2
DCM Noise Monitoring Results – 27 January 2016 (night)

Location (Criterion)	Time	dB(A), $L_{eq(15min)}$	Wind speed/ direction	Identified Noise Sources
Doherty (39)	10:03 pm	44	2.9/140	Frogs & insects (43), traffic (37), DCM (31)
Kerr (37)	10:32 pm	46	3.4/143	Traffic (44), frogs & insects (41), DCM (26)
Skinner (39)	10:08 pm	42	3.0/136	Frogs & insects (39), traffic (38), DCM (32)
Robertson (42)	10:25 pm	41	3.3/140	Traffic (38), frogs & insects (35), DCM (34)
Sharman (41)	10:44 pm	43	2.9/144	Traffic (42), frogs & insects (36), DCM (28)
Horder (42)	11:05 pm	46	3.1/146	Frogs & insects (45), traffic (38), DCM (35)
Wilson (36)	10:58 pm	41	2.8/145	Frogs & insects (39), traffic (36), DCM (<20)
Smith (36)	11:26 pm	37	3.5/142	Frogs & insects (34), train (32), traffic (29), DCM (<20)

Table 3 DCM Noise Monitoring Results – 27 January 2016 (night)					
Location (Criterion)	Time	dB(A), $L_{1\ (1min)}$	Wind speed/ direction	$L_{1\ (1\ min)}$ source	Identified Mine Sources ($L_{1\ (1\ min)}$)
Doherty (47)	10:03 pm	47	2.9/140	Highway	Hum (35)
Kerr (47)	10:32 pm	53	3.4/143	Highway	Hum (29)
Skinner (47)	10:08 pm	46	3.0/136	Highway	Hum (35)
Robertson (47)	10:25 pm	49	3.3/140	Highway	Hum (38)
Sharman (47)	10:44 pm	54	2.9/144	Highway	Hum (30)
Horder (47)	11:05 pm	50	3.1/146	Frogs	Hum (39)
Wilson (47)	10:58 pm	44	2.8/145	Highway	(<20)
Smith (47)	11:26 pm	45	3.5/142	Train	(<20)

The results in Tables 1 and 2 shows that the noise criterion was not exceeded at any location.

Data from those times where DCM operations were audible were analysed using the *"Evaluator"* software. This analysis showed the noise did not contain any tonal, impulsive or low frequency components as per definitions in the NSW Industrial Noise Policy.

The results in Table 3 show that the noise sleep disturbance criterion ($L_{1\ (1minute)}$) was not exceeded at any monitoring location during the night time period.

The operational noise levels at other receivers listed in the DCM Project Approval were determined using the ENM noise model in point calculation mode. The noise model was set up with a series of point noise sources representing the DCM operations and then calibrated to be consistent with the measured noise levels from the attended survey under similar atmospheric conditions to those at the time of the monitoring. Point calculations were then performed for each of the listed residential locations with results shown in **Appendix B**.

As the $L_{1\ (1minute)}$ levels were well below the sleep disturbance criterion at the attended monitoring locations, no modelling of $L_{1\ (1minute)}$ levels was conducted for other receiver locations, as these are all at greater distance from the DCM.

We trust this report fulfils your requirements at this time, however, should you require additional information or assistance please contact the undersigned on 4954 2276.

Yours faithfully,
SPECTRUM ACOUSTICS PTY LIMITED

Author:

Neil Pennington
Acoustical Consultant

Review:

Ross Hodge
Acoustical Consultant

SCHEDULE 3
SPECIFIC ENVIRONMENTAL CONDITIONS

NOISE

Noise Impact Assessment Criteria

1. The Proponent shall ensure that the noise generated by the project does not exceed the noise impact assessment criteria in Table 1 at any residence on privately-owned land, or on more than 25 percent of any privately-owned land.

Table 1: Noise impact assessment criteria dB(A)

Land Number	Day	Evening	Night	
	$L_{Aeq(15\ min)}$	$L_{Aeq(15\ min)}$	$L_{Aeq(15\ min)}$	$L_{A1(1\ min)}$
34	35	35	36	45
29	35	35	36	47
31	35	35	37	47
33, 86	35	35	38	45
32	35	35	40	47
71, 75	35	35	41	47
70	35	36	41	47
76	35	36	42	47
28	35	37	40	47
69	35	37	41	47
13	36	36	35	45
12	36	36	36	47
25	36	37	37	47
26	36	37	38	47
27	36	37	39	47
72	36	37	42	47
17	37	38	36	47
21, 22	38	38	38	45
18	38	39	38	47
20, 61	39	40	39	45
14	40	39	38	47
19	40	40	39	47
16	41	41	39	47
23	35	35	35	47
All other privately-owned land	35	35	35	45

However, if the Proponent has a written negotiated noise agreement with any landowner of the land listed in Table 1, and a copy of this agreement has been forwarded to the Department and DECC, then the Proponent may exceed the noise limits in Table 1 in accordance with the negotiated noise agreement.

Notes:

- *For information on the numbering and identification of properties used in this approval, see Appendix 5.*
- *To determine compliance with the $L_{Aeq(15\ minute)}$ noise limits, noise from the project is to be measured at the most affected point within the residential boundary, or at the most affected point within 30 metres of a dwelling (rural situations) where the dwelling is more than 30 metres from the boundary. Where it can be demonstrated that direct measurement of noise from the project is impractical, the DECC may accept alternative means of determining compliance (see Chapter 11 of the NSW Industrial Noise Policy). The modification factors in Section 4 of the NSW Industrial Noise Policy shall also be applied to the measured noise levels where applicable.*
- *To determine compliance with the $L_{A1(1\ minute)}$ noise limits, noise from the project is to be measured at 1 metre from the dwelling façade. Where it can be demonstrated that direct measurement of noise from the project is impractical, the DECC may accept alternative means of determining compliance (see Chapter 11 of the NSW Industrial Noise Policy).*

- *The noise emission limits identified in the above table apply under meteorological conditions of:*
  - *wind speeds of up to 3 m/s at 10 metres above ground level; or*
  - *temperature inversion conditions of up to 3°C/100m, and wind speeds of up to 2 m/s at 10 metres above ground level.*

Land Acquisition Criteria

2. If the noise generated by the project exceeds the criteria in Table 2 at any residence on privately-owned land or on more than 25 percent of any privately-owned land, the Proponent shall, upon receiving a written request for acquisition from the landowner, acquire the land in accordance with the procedures in conditions 8-10 of Schedule 4.

Table 2: Land acquisition criteria dB(A)

Land Number	***Day/Evening/Night*** $L_{Aeq(15min)}$
12, 14, 16, 17, 18, 19, 23, 25, 26, 27, 28, 29, 31, 32, 69, 70, 71, 72, 75, 76	42
All other private land owners not listed in Table 1, or on more than 25 percent of, any privately owned land.	40

Note: Noise generated by the project is to be measured in accordance with the notes to Table 1.

Cumulative Noise Criteria

3. The Proponent shall take all reasonable and feasible measures to ensure that the noise generated by the project combined with the noise generated by other mines does not exceed the following amenity criteria at any residence on privately-owned land or on more than 25 percent of any privately owned land:
   - $L_{Aeq(11\ hour)}$ *50 dB(A) – Day;*
   - $L_{Aeq(4\ hour)}$ *45 dB(A) – Evening;*
   - $L_{Aeq(9\ hour)}$ *40 dB(A) – Night.*

4. If the noise generated by the project combined with the noise generated by other mines exceeds the following amenity criteria at any residence on privately owned-land or on more than 25 percent of any privately owned land, then upon receiving a written request from the landowner, the Proponent shall acquire the land on as equitable basis as possible with the relevant mines in accordance with the procedures in conditions 8-10 of Schedule 4:
   - $L_{Aeq(11\ hour)}$ *53 dB(A) – Day;*
   - $L_{Aeq(4\ hour)}$ *48 dB(A) – Evening;*
   - $L_{Aeq(9\ hour)}$ *43 dB(A) – Night.*

Notes: The cumulative noise generated by the project combined with the noise generated by other mines is to be measured in accordance with the relevant procedures in the NSW Industrial Noise Policy.

APPENDIX B MODELLED NOISE LEVELS as Leq (15 min)				
Location	Evening		Night	
	Noise Level	Noise Goal	Noise Level	Noise Goal
34	<30	35	<30	39
29	<30	35	<30	36
31	<30	35	<30	37
33	<30	35	<30	38
86	<30	35	<30	38
32	<30	35	<30	40
71	31	35	<30	41
75*	27	35	28	41
70	30	36	33	41
76*	28	36	35	42
28	32	37	<30	40
69	30	37	30	41
13	<30	36	<30	35
12	<30	36	<30	36
25*	30	37	26	37
26	<30	37	<30	38
27	32	37	<30	39
72*	30	37	34	42
17	30	38	30	36
21	30	38	30	38
22	31	38	31	38
18	30	39	30	38
20	31	40	31	39
61*	33	40	32	39
14	30	39	30	39
19	31	40	31	39
16*	31	41	31	39
23	<30	35	<30	35
35*	<20	35	<20	35
42*	26	35	<20	35
37	<30	35	<30	35

* Measurement location

12 February 2016

Ref: 03012/6333

James Benson
Anglo Coal (Drayton Management) Pty Limited
PMB 9
Muswellbrook NSW 2333

RE: FEBRUARY 2016 NOISE MONITORING RESULTS

This letter report presents the results of noise compliance monitoring conducted for the Drayton Coal Mine (DCM) on Wednesday 10th February, 2016. The purpose of the measurements was to quantify the overall noise levels at the nearby residences and determine the contribution from DCM operations.

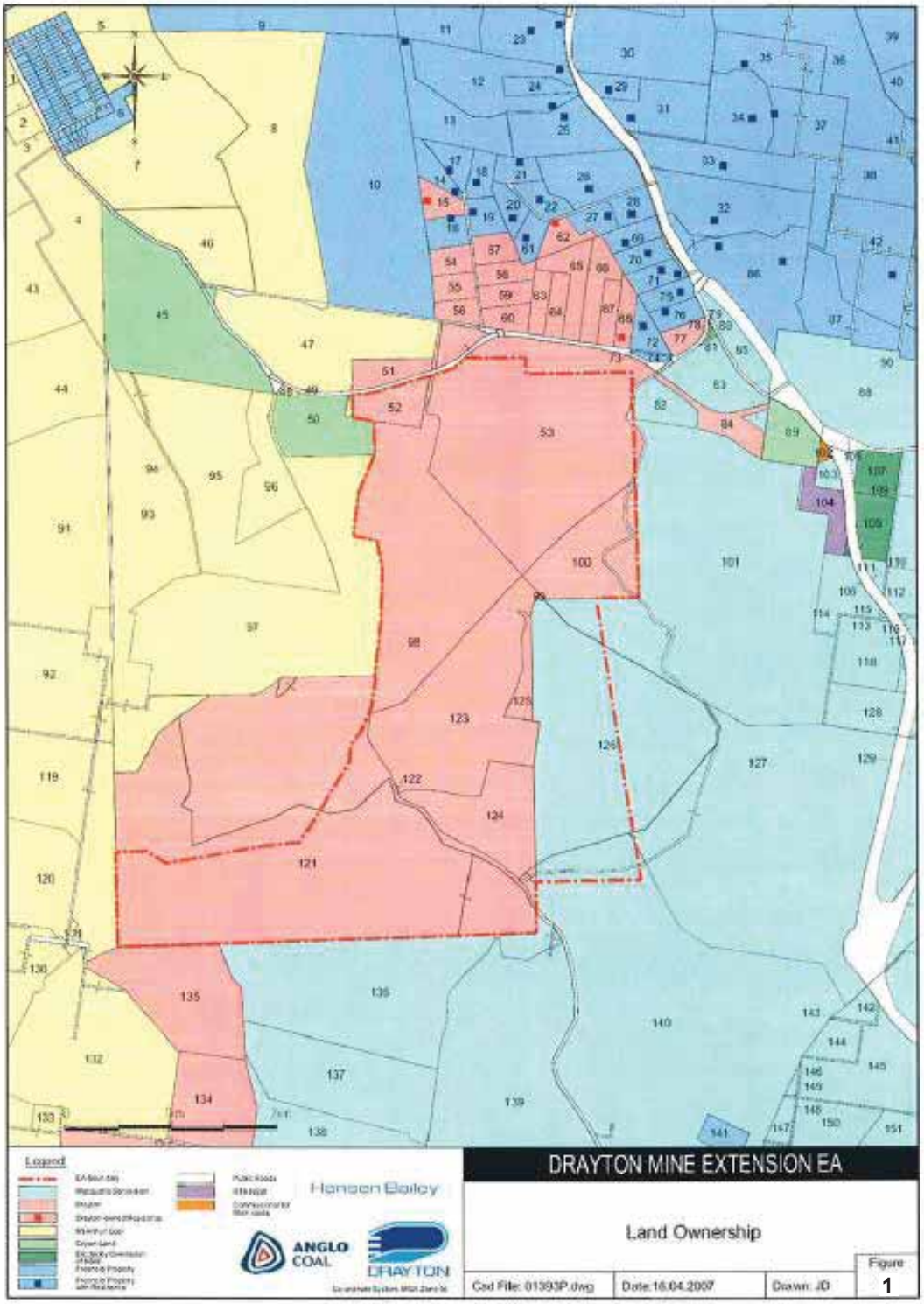
Schedule 3 of the DCM Project Approval details noise impact assessment criteria for 28 specific residential locations. For logistic reasons it is not reasonable to carry out attended noise monitoring at all of the listed locations during the one monitoring survey. As such, the approach taken was to monitor the noise at eight representative residential locations and determine, by noise modelling, the noise level at all of the other locations required in the Project Approval. Noise measurement locations for the attended noise survey are listed below (as shown in **Figure 1**):

Location R16: Doherty
Location R25: Kerr
Location R35: Wilson*
Location R42: Smith*
Location R61: Skinner
Location R72: Robertson
Location R75: Sharman
Location R76: Horder

* Additional locations contained in EPL 1323 but not in the Project Approval.

Two sets of measurements were made over the "circuit", one during the evening period (from 6 pm – 10 pm) and one at night (after 10 pm). DCM activities were audible at certain monitoring locations throughout the evening and night time periods.

Meteorological data used in this report was supplied by the mine from their automatic weather station. Wind speeds (in m/s) and direction have been determined as the arithmetic average of the measurements over the monitoring period. The mine operated weather station does not record temperature inversion data.


DRAYTON MINE EXTENSION EA
Land Ownership
Hansen Bailey
ANGLO COAL
DRAYTON
Cad File: 01393P.dwg
Date:16.04.2007
Drawn: JD
Figure
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Details of the DCM Project Approval with respect to noise emissions are shown as **Appendix A** to this report.

Attended noise monitoring was conducted with a Brüel & Kjær Type 2250 Precision Sound Analyser. This instrument has Type 1 characteristics as defined in AS1259-1982 "Sound Level Meters" and has current NATA calibration. Field calibration is carried out at the start and end of each monitoring period.

Measured noise levels for each monitoring circuit are summarised in the following tables. The total measured L_{eq} is shown in **Tables 1-2** and night time $L_{1\ (1minute)}$ – approximated as measured L_{max} – in **Table 3**. Table 3 shows the overall $L_{1\ (1minute)}$ and the contributing source as well as the $L_{1\ (1minute)}$ from DCM, where this was measurable.

Data were analysed with the Bruel & Kjaer "*Evaluator*" software to quantify the contributions of the various noise source(s) to the overall. The noise sources are listed in the comments column with the contribution of each shown in brackets. The noise goal for mining operations at DCM is variable depending upon the location (as per the table from Schedule 3 shown in Appendix A). The contribution of mine noise from DCM is shown in bold. Any exceedances of the EPL and project approval noise criteria are shaded grey.

Table 1
DCM Noise Monitoring Results – 10 February 2016 (evening)

Location (Criterion)	Time	dB(A), $L_{eq(15min)}$	Wind speed/ direction	Identified Noise Sources
Doherty (41)	6:46 pm	37	2.3/130	Traffic (35), birds (32), DCM (<20)
Kerr (37)	8:35 pm	47	2.0/150	Traffic (45), birds & insects (42), DCM (<20)
Skinner (40)	8:12 pm	39	1.6/146	Birds & insects (37), traffic (35), DCM (<20)
Robertson (37)	7:09 pm	44	1.9/138	Birds & insects (43), traffic (37), DCM (<20)
Sharman (35)	7:50 pm	45	1.9/149	Traffic (44), birds & insects (39), roadworks (29), DCM (<20)
Horder (36)	7:30 pm	43	2.1/155	Birds & Insects (41), traffic (39), DCM (<20)
Wilson (35)	9:05 pm	41	2.8/135	Insects (40), roadworks (32), traffic (28), DCM (<20)
Smith (35)	9:34 pm	42	3.1/142	Insects (41), traffic (34), DCM (<20)

Table 2
DCM Noise Monitoring Results – 10/11 February 2016 (night)

Location (Criterion)	Time	dB(A), $L_{eq(15min)}$	Wind speed/ direction	Identified Noise Sources
Doherty (39)	10:29 pm	38	4.8/148	Traffic (36), insects (33), DCM (26)
Kerr (37)	12:29 pm	44	2.0/152	Traffic (42), insects (40), DCM (28), roadworks (27)
Skinner (39)	12:04 pm	38	1.8/146	Traffic (36), insects (31), DCM (31)
Robertson (42)	10:55 pm	42	3.9/134	Insects (39), traffic (39), DCM (23)
Sharman (41)	11:41 pm	44	3.5/137	Traffic (43), insects (38), DCM (<20)
Horder (42)	11:18 pm	39	3.8/138	Traffic (37), insects (35), DCM (22)
Wilson (36)	12:54 pm	39	2.0/143	Traffic (38), insects (33), DCM (<20)
Smith (36)	10:00 pm	43	3.6/155	Insects (42), traffic (35), DCM (<20)

Table 3 DCM Noise Monitoring Results – 10/11 February 2016 (night)					
Location (Criterion)	Time	dB(A), $L_{1\ (1min)}$	Wind speed/ direction	$L_{1\ (1\ min)}$ source	Identified Mine Sources ($L_{1\ (1\ min)}$)
Doherty (47)	10:29 pm	45	4.8/148	Highway	Hum (29)
Kerr (47)	12:29 pm	51	2.0/152	Highway	Hum (33)
Skinner (47)	12:04 pm	41	1.8/146	Highway	Hum (35)
Robertson (47)	10:55 pm	46	3.9/134	Highway	Hum (25)
Sharman (47)	11:41 pm	55	3.5/137	Highway	(<20)
Horder (47)	11:18 pm	47	3.8/138	Highway	Hum (25)
Wilson (47)	12:54 pm	44	2.0/143	Highway	(<20)
Smith (47)	10:00 pm	46	3.6/155	Insects	(<20)

The results in Tables 1 and 2 shows that the noise criterion was not exceeded at any location.

Data from those times where DCM operations were audible were analysed using the *"Evaluator"* software. This analysis showed the noise did not contain any tonal, impulsive or low frequency components as per definitions in the NSW Industrial Noise Policy.

The results in Table 3 show that the noise sleep disturbance criterion ($L_{1\ (1minute)}$) was not exceeded at any monitoring location during the night time period.

The operational noise levels at other receivers listed in the DCM Project Approval were determined using the ENM noise model in point calculation mode. The noise model was set up with a series of point noise sources representing the DCM operations and then calibrated to be consistent with the measured noise levels from the attended survey under similar atmospheric conditions to those at the time of the monitoring. Point calculations were then performed for each of the listed residential locations with results shown in **Appendix B**.

As the $L_{1\ (1minute)}$ levels were well below the sleep disturbance criterion at the attended monitoring locations, no modelling of $L_{1\ (1minute)}$ levels was conducted for other receiver locations, as these are all at greater distance from the DCM.

We trust this report fulfils your requirements at this time, however, should you require additional information or assistance please contact the undersigned on 4954 2276.

Yours faithfully,
SPECTRUM ACOUSTICS PTY LIMITED

Author:

Neil Pennington
Acoustical Consultant

Review:

Ross Hodge
Acoustical Consultant

SCHEDULE 3
SPECIFIC ENVIRONMENTAL CONDITIONS

NOISE

Noise Impact Assessment Criteria

1. The Proponent shall ensure that the noise generated by the project does not exceed the noise impact assessment criteria in Table 1 at any residence on privately-owned land, or on more than 25 percent of any privately-owned land.

Table 1: Noise impact assessment criteria dB(A)

Land Number	Day	Evening	Night	
	$L_{Aeq(15\ min)}$	$L_{Aeq(15\ min)}$	$L_{Aeq(15\ min)}$	$L_{A1(1\ min)}$
34	35	35	36	45
29	35	35	36	47
31	35	35	37	47
33, 86	35	35	38	45
32	35	35	40	47
71, 75	35	35	41	47
70	35	36	41	47
76	35	36	42	47
28	35	37	40	47
69	35	37	41	47
13	36	36	35	45
12	36	36	36	47
25	36	37	37	47
26	36	37	38	47
27	36	37	39	47
72	36	37	42	47
17	37	38	36	47
21, 22	38	38	38	45
18	38	39	38	47
20, 61	39	40	39	45
14	40	39	38	47
19	40	40	39	47
16	41	41	39	47
23	35	35	35	47
All other privately-owned land	35	35	35	45

However, if the Proponent has a written negotiated noise agreement with any landowner of the land listed in Table 1, and a copy of this agreement has been forwarded to the Department and DECC, then the Proponent may exceed the noise limits in Table 1 in accordance with the negotiated noise agreement.

Notes:

- *For information on the numbering and identification of properties used in this approval, see Appendix 5.*
- *To determine compliance with the $L_{Aeq(15\ minute)}$ noise limits, noise from the project is to be measured at the most affected point within the residential boundary, or at the most affected point within 30 metres of a dwelling (rural situations) where the dwelling is more than 30 metres from the boundary. Where it can be demonstrated that direct measurement of noise from the project is impractical, the DECC may accept alternative means of determining compliance (see Chapter 11 of the NSW Industrial Noise Policy). The modification factors in Section 4 of the NSW Industrial Noise Policy shall also be applied to the measured noise levels where applicable.*
- *To determine compliance with the $L_{A1(1\ minute)}$ noise limits, noise from the project is to be measured at 1 metre from the dwelling façade. Where it can be demonstrated that direct measurement of noise from the project is impractical, the DECC may accept alternative means of determining compliance (see Chapter 11 of the NSW Industrial Noise Policy).*

- *The noise emission limits identified in the above table apply under meteorological conditions of:*
  - *wind speeds of up to 3 m/s at 10 metres above ground level; or*
  - *temperature inversion conditions of up to 3°C/100m, and wind speeds of up to 2 m/s at 10 metres above ground level.*

Land Acquisition Criteria

2. If the noise generated by the project exceeds the criteria in Table 2 at any residence on privately-owned land or on more than 25 percent of any privately-owned land, the Proponent shall, upon receiving a written request for acquisition from the landowner, acquire the land in accordance with the procedures in conditions 8-10 of Schedule 4.

Table 2: Land acquisition criteria dB(A)

Land Number	***Day/Evening/Night*** $L_{Aeq(15min)}$
12, 14, 16, 17, 18, 19, 23, 25, 26, 27, 28, 29, 31, 32, 69, 70, 71, 72, 75, 76	42
All other private land owners not listed in Table 1, or on more than 25 percent of, any privately owned land.	40

Note: Noise generated by the project is to be measured in accordance with the notes to Table 1.

Cumulative Noise Criteria

3. The Proponent shall take all reasonable and feasible measures to ensure that the noise generated by the project combined with the noise generated by other mines does not exceed the following amenity criteria at any residence on privately-owned land or on more than 25 percent of any privately owned land:
   - $L_{Aeq(11\ hour)}$ *50 dB(A) – Day;*
   - $L_{Aeq(4\ hour)}$ *45 dB(A) – Evening;*
   - $L_{Aeq(9\ hour)}$ *40 dB(A) – Night.*

4. If the noise generated by the project combined with the noise generated by other mines exceeds the following amenity criteria at any residence on privately owned-land or on more than 25 percent of any privately owned land, then upon receiving a written request from the landowner, the Proponent shall acquire the land on as equitable basis as possible with the relevant mines in accordance with the procedures in conditions 8-10 of Schedule 4:
   - $L_{Aeq(11\ hour)}$ *53 dB(A) – Day;*
   - $L_{Aeq(4\ hour)}$ *48 dB(A) – Evening;*
   - $L_{Aeq(9\ hour)}$ *43 dB(A) – Night.*

Notes: The cumulative noise generated by the project combined with the noise generated by other mines is to be measured in accordance with the relevant procedures in the NSW Industrial Noise Policy.

APPENDIX B MODELLED NOISE LEVELS as Leq (15 min)				
Location	Evening		Night	
	Noise Level	Noise Goal	Noise Level	Noise Goal
34	<30	35	<30	39
29	<30	35	<30	36
31	<30	35	<30	37
33	<30	35	<30	38
86	<30	35	<30	38
32	<30	35	<30	40
71	31	35	<30	41
75*	<20	35	<20	41
70	30	36	22	41
76*	<20	36	35	42
28	32	37	<30	40
69	30	37	<30	41
13	<30	36	<30	35
12	<30	36	<30	36
25*	<20	37	28	37
26	<30	37	<30	38
27	32	37	<30	39
72*	<20	37	23	42
17	30	38	<30	36
21	30	38	<30	38
22	31	38	30	38
18	30	39	30	38
20	31	40	30	39
61*	<20	40	31	39
14	30	39	<30	39
19	31	40	<30	39
16*	<20	41	26	39
23	<30	35	<30	35
35*	<20	35	<20	35
42*	<20	35	<20	35
37	<30	35	<30	35

* Measurement location

21 March 2016

Ref: 03012/6392

James Benson
Anglo Coal (Drayton Management) Pty Limited
PMB 9
Muswellbrook NSW 2333

RE: MARCH 2016 NOISE MONITORING RESULTS

This letter report presents the results of noise compliance monitoring conducted for the Drayton Coal Mine (DCM) on Wednesday 9th March 2016. The purpose of the measurements was to quantify the overall noise levels at the nearby residences and determine the contribution from DCM operations.

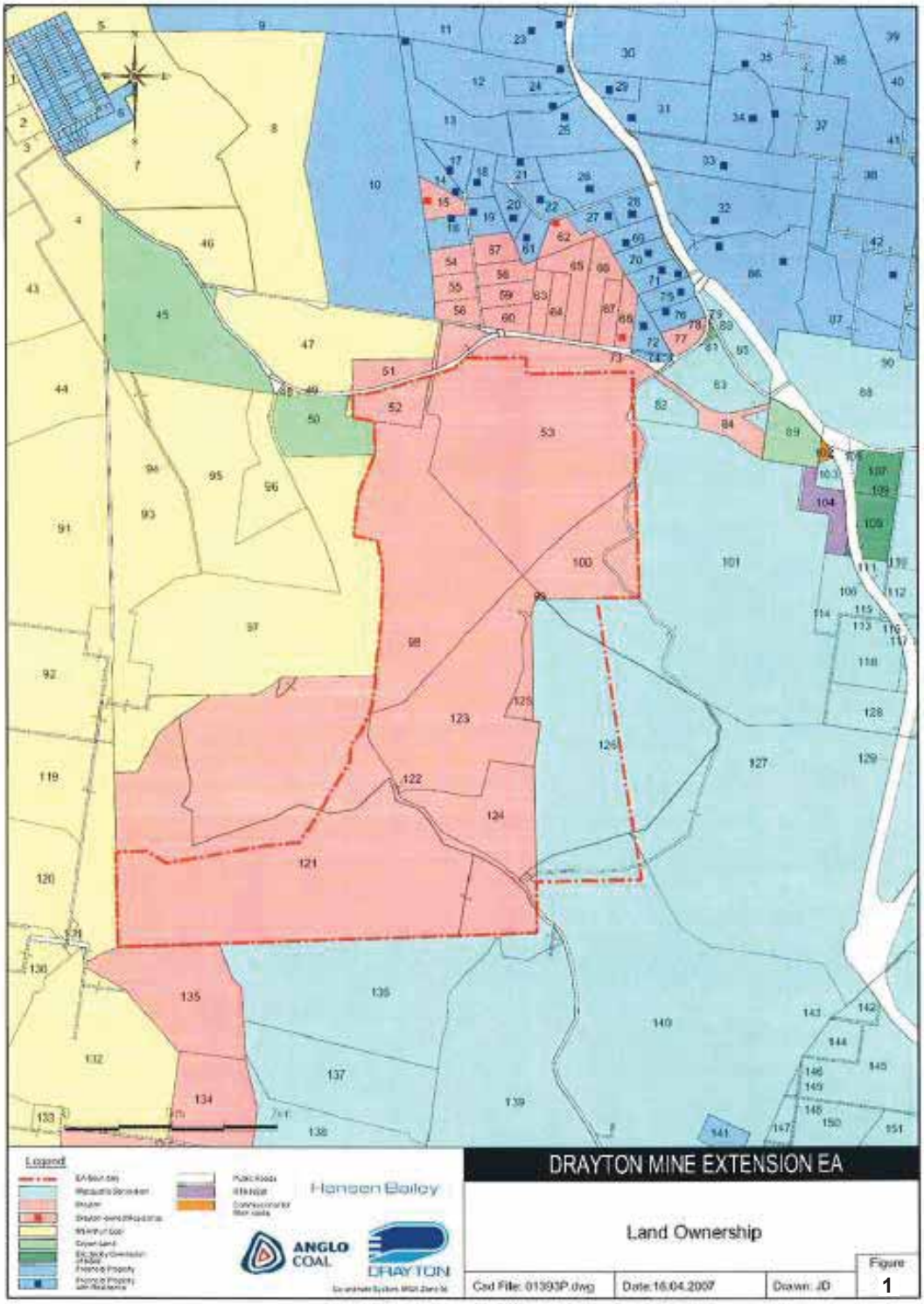
Schedule 3 of the DCM Project Approval details noise impact assessment criteria for 28 specific residential locations. For logistic reasons it is not reasonable to carry out attended noise monitoring at all of the listed locations during the one monitoring survey. As such, the approach taken was to monitor the noise at eight representative residential locations and determine, by noise modelling, the noise level at all of the other locations required in the Project Approval. Noise measurement locations for the attended noise survey are listed below (as shown in **Figure 1**):

Location R16: Doherty
Location R25: Kerr
Location R35: Wilson*
Location R42: Smith*
Location R61: Skinner
Location R72: Robertson
Location R75: Sharman
Location R76: Horder

* Additional locations contained in EPL 1323 but not in the Project Approval.

Three sets of measurements were made over the "circuit", one during the day time period (before 6 pm), one during the evening period (from 6 pm – 10 pm) and one at night (after 10 pm). DCM activities were audible at many monitoring locations throughout the survey.

Meteorological data used in this report was supplied by the mine from their automatic weather station. Wind speeds (in m/s) and direction have been determined as the arithmetic average of the measurements over the monitoring period. The mine operated weather station does not record temperature inversion data.


DRAYTON MINE EXTENSION EA
Land Ownership
Hansen Bailey
ANGLO COAL
DRAYTON
Legend
Cad File: 01393P.dwg
Date:16.04.2007
Drawn: JD
Figure
1

Details of the DCM Project Approval with respect to noise emissions are shown as **Appendix A** to this report.

Noise emission levels were measured with Brüel & Kjær Type 2250 Precision Sound Analysers. These instruments have Type 1 characteristics as defined in AS1259-1982 "Sound Level Meters". Calibration of the instruments was confirmed with a Brüel & Kjær Type 4231 Sound Level Calibrator prior to and at the completion of measurements.

Measured noise levels for each monitoring circuit are summarised in the following tables. The total measured L_{eq} is shown in **Tables 1-3** and night time $L_{1(1minute)}$ – approximated as measured L_{max} – in **Table 4**. Table 3 shows the overall $L_{1(1minute)}$ and the contributing source as well as the $L_{1(1minute)}$ from DCM, where this was measurable.

Data were analysed with the Bruel & Kjaer "*Evaluator*" software to quantify the contributions of the various noise source(s) to the overall. The noise sources are listed in the comments column with the contribution of each shown in brackets. The noise goal (criterion) for mining operations at DCM is variable depending upon the location (as per the table from Schedule 3 shown in Appendix A). The relevant criterion is shown in brackets in the "Location" column in the tables. The contribution of mine noise from DCM is shown in bold. Any exceedances of the EPL and project approval noise criteria are shaded grey.

Table 1
DCM Noise Monitoring Results – 9 March 2016 (Day)

Location (Criterion)	Time	dB(A), $L_{eq(15min)}$	Wind speed/ direction	Identified Noise Sources
Doherty (41)	4:26 pm	39	0.9/144	Traffic (37), birds & insects (35), DCM (<20)
Kerr (36)	4:25 pm	42	0.9/144	Traffic (42), birds (27), DCM (<20)
Skinner (39)	4:47 pm	45	1.4/229	Birds (44), traffic (38), DCM (<20)
Robertson (36)	4:49 pm	48	1.4/229	Traffic (47), birds & insects (42), DCM (<20)
Sharman (35)	5:32 pm	51	2.2/178	Traffic (51), birds (28), DCM (<20)
Horder (35)	5:10 pm	49	1.4/272	Birds (48), traffic (41), DCM (<20)
Wilson (35)	5:11 pm	47	1.4/272	Birds (47), traffic (28), DCM (<20)
Smith (35)	5:40 pm	32	1.7/134	Traffic (30), birds & insects (27), DCM (<20)

Table 2
DCM Noise Monitoring Results – 9 March 2016 (Evening)

Location (Criterion)	Time	dB(A), $L_{eq(15min)}$	Wind speed/ direction	Identified Noise Sources
Doherty (41)	8:25 pm	43	1.6/119	Insects (42), traffic (37), DCM (27)
Kerr (37)	8:43 pm	46	2.0/135	Traffic (44), insects (39), DCM (35)
Skinner (40)	8:20 pm	39	1.7/121	Insects (35), DCM (35), traffic (31)
Robertson (37)	8:49 pm	37	2.1/135	Traffic (35), insects (31), DCM (<20)
Sharman (35)	9:28 pm	45	2.8/145	Traffic (45), insects (35), DCM (<20)
Horder (36)	9:10 pm	38	2.4/152	Insects (35), traffic (35), DCM (<20)
Wilson (35)	9:06 pm	37	2.4/148	Traffic (34), insects (34), DCM (<20)
Smith (35)	9:32 pm	46	2.8/145	Insects (46), traffic (29), DCM (<20)

Table 3 DCM Noise Monitoring Results – 9 March 2016 (Night)				
Location (Criterion)	Time	dB(A), $L_{eq(15min)}$	Wind speed/ direction	Identified Noise Sources
Doherty (39)	10:00 pm	43	1.1/134	Insects (41), traffic (36), DCM (34)
Kerr (37)	10:37 pm	47	1.6/150	Traffic (46), insects (39), DCM (31)
Skinner (39)	10:10 pm	39	1.4/162	DCM (37), traffic (33), insects (31)
Robertson (42)	10:23 pm	38	1.4/152	Traffic (36), insects (31), DCM (28)
Sharman (41)	10:44 pm	50	1.6/135	Traffic (49), insects (41), DCM (<20)
Horder (42)	11:04 pm	39	2.1/140	Insects (36), traffic (35), DCM (27)
Wilson (36)	11:02 pm	40	1.9/134	Traffic (38), insects (35), DCM (<20)
Smith (36)	11:33 pm	34	1.6/149	Insects (33), traffic (28), DCM (<20)

Table 4 DCM Noise Monitoring Results – 9 March 2016 (Night)					
Location (Criterion)	Time	dB(A), $L_{1(1minute)}$	Wind speed/ direction	L_{A1} source	Identified Mine Sources ($L_{1\ (1\ min)}$)
Doherty (47)	10:00 pm	47	1.1/134	Highway	Truck revs (39)
Kerr (47)	10:37 pm	56	1.6/150	Highway	Truck revs (35)
Skinner (47)	10:10 pm	42	1.4/162	Mine	Truck revs (42)
Robertson (47)	10:23 pm	43	1.4/152	Highway	Hum (31)
Sharman (47)	10:44 pm	55	1.6/135	Highway	n/a
Horder (47)	11:04 pm	42	2.1/140	Highway	Hum (30)
Wilson (47)	11:02 pm	45	1.9/134	Highway	n/a
Smith (47)	11:33 pm	39	1.6/149	Insects	n/a

The results in Tables 1 to 3 show that the applicable operational noise criteria were not exceeded at any location or at any time throughout the monitoring survey. The audible noise sources from DCM included truck revs and general mine hum and there no trains loaded during the entire monitoring period.

Data from those times where DCM operations were audible were analysed using the *"Evaluator"* software. This analysis showed the noise did not contain any tonal, impulsive or low frequency components as per definitions in the NSW Industrial Noise Policy.

The results in Table 4 show that the sleep disturbance criteria ($L_{1(1minute)}$) was not exceeded at any monitoring location during the night time period.

The operational noise levels at other receivers listed in the DCM Project Approval were determined using the ENM noise model in point calculation mode. The noise model was set up with a series of point noise sources representing the DCM operations and then calibrated to be consistent with the measured noise levels from the attended survey under similar atmospheric conditions to those at the time of the monitoring. Point calculations were then performed for each of the listed residential locations with results shown in **Appendix B**.

As the $L_{1(1minute)}$ levels were well below the sleep disturbance criterion at the attended monitoring locations, no modelling of $L_{1(1minute)}$ levels was conducted for other receiver locations, as these are all at greater distance from the DCM.

We trust this report fulfils your requirements at this time, however, should you require additional information or assistance please contact the undersigned on 4954 2276.

Yours faithfully,
SPECTRUM ACOUSTICS PTY LIMITED

Author:

Neil Pennington
Acoustical Consultant

Review:

Ross Hodge
Acoustical Consultant

SCHEDULE 3
SPECIFIC ENVIRONMENTAL CONDITIONS

NOISE

Noise Impact Assessment Criteria

1. The Proponent shall ensure that the noise generated by the project does not exceed the noise impact assessment criteria in Table 1 at any residence on privately-owned land, or on more than 25 percent of any privately-owned land.

Table 1: Noise impact assessment criteria dB(A)

Land Number	Day	Evening	Night	
	$L_{Aeq(15\ min)}$	$L_{Aeq(15\ min)}$	$L_{Aeq(15\ min)}$	$L_{A1(1\ min)}$
34	35	35	36	45
29	35	35	36	47
31	35	35	37	47
33, 86	35	35	38	45
32	35	35	40	47
71, 75	35	35	41	47
70	35	36	41	47
76	35	36	42	47
28	35	37	40	47
69	35	37	41	47
13	36	36	35	45
12	36	36	36	47
25	36	37	37	47
26	36	37	38	47
27	36	37	39	47
72	36	37	42	47
17	37	38	36	47
21, 22	38	38	38	45
18	38	39	38	47
20, 61	39	40	39	45
14	40	39	38	47
19	40	40	39	47
16	41	41	39	47
23	35	35	35	47
All other privately-owned land	35	35	35	45

However, if the Proponent has a written negotiated noise agreement with any landowner of the land listed in Table 1, and a copy of this agreement has been forwarded to the Department and DECC, then the Proponent may exceed the noise limits in Table 1 in accordance with the negotiated noise agreement.

Notes:

- *For information on the numbering and identification of properties used in this approval, see Appendix 5.*
- *To determine compliance with the $L_{Aeq(15\ minute)}$ noise limits, noise from the project is to be measured at the most affected point within the residential boundary, or at the most affected point within 30 metres of a dwelling (rural situations) where the dwelling is more than 30 metres from the boundary. Where it can be demonstrated that direct measurement of noise from the project is impractical, the DECC may accept alternative means of determining compliance (see Chapter 11 of the NSW Industrial Noise Policy). The modification factors in Section 4 of the NSW Industrial Noise Policy shall also be applied to the measured noise levels where applicable.*
- *To determine compliance with the $L_{A1(1\ minute)}$ noise limits, noise from the project is to be measured at 1 metre from the dwelling façade. Where it can be demonstrated that direct measurement of noise from the project is impractical, the DECC may accept alternative means of determining compliance (see Chapter 11 of the NSW Industrial Noise Policy).*

- *The noise emission limits identified in the above table apply under meteorological conditions of:*
  - *wind speeds of up to 3 m/s at 10 metres above ground level; or*
  - *temperature inversion conditions of up to 3°C/100m, and wind speeds of up to 2 m/s at 10 metres above ground level.*

Land Acquisition Criteria

2. If the noise generated by the project exceeds the criteria in Table 2 at any residence on privately-owned land or on more than 25 percent of any privately-owned land, the Proponent shall, upon receiving a written request for acquisition from the landowner, acquire the land in accordance with the procedures in conditions 8-10 of Schedule 4.

Table 2: Land acquisition criteria dB(A)

Land Number	***Day/Evening/Night*** $L_{Aeq(15min)}$
12, 14, 16, 17, 18, 19, 23, 25, 26, 27, 28, 29, 31, 32, 69, 70, 71, 72, 75, 76	42
All other private land owners not listed in Table 1, or on more than 25 percent of, any privately owned land.	40

Note: Noise generated by the project is to be measured in accordance with the notes to Table 1.

Cumulative Noise Criteria

3. The Proponent shall take all reasonable and feasible measures to ensure that the noise generated by the project combined with the noise generated by other mines does not exceed the following amenity criteria at any residence on privately-owned land or on more than 25 percent of any privately owned land:
   - $L_{Aeq(11\ hour)}$ *50 dB(A) – Day;*
   - $L_{Aeq(4\ hour)}$ *45 dB(A) – Evening;*
   - $L_{Aeq(9\ hour)}$ *40 dB(A) – Night.*

4. If the noise generated by the project combined with the noise generated by other mines exceeds the following amenity criteria at any residence on privately owned-land or on more than 25 percent of any privately owned land, then upon receiving a written request from the landowner, the Proponent shall acquire the land on as equitable basis as possible with the relevant mines in accordance with the procedures in conditions 8-10 of Schedule 4:
   - $L_{Aeq(11\ hour)}$ *53 dB(A) – Day;*
   - $L_{Aeq(4\ hour)}$ *48 dB(A) – Evening;*
   - $L_{Aeq(9\ hour)}$ *43 dB(A) – Night.*

Notes: The cumulative noise generated by the project combined with the noise generated by other mines is to be measured in accordance with the relevant procedures in the NSW Industrial Noise Policy.

APPENDIX B MODELLED NOISE LEVELS as Leq (15 min)						
Location	Day		Evening		Night	
	Noise Level	Noise Goal	Noise Level	Noise Goal	Noise Level	Noise Goal
34	<30	35	<30	35	<30	39
29	<30	35	<30	35	<30	36
31	<30	35	<30	35	<30	37
33	<30	35	<30	35	<30	38
86	<30	35	<30	35	<30	38
32	<30	35	<30	35	<30	40
71	<30	35	<30	35	<30	41
75*	<30	35	<30	35	<30	41
70	<30	35	<30	36	<30	41
76*	<30	35	<30	36	<30	42
28	<30	35	<30	37	<30	40
69	<30	35	<30	37	<30	41
13	<30	36	<30	36	<30	35
12	<30	36	<30	36	<30	36
25*	<30	36	35	37	31	37
26	<30	36	<30	37	<30	38
27	<30	36	<30	37	<30	39
72*	<30	36	<30	37	<30	42
17	<30	37	<30	38	<30	36
21	<30	38	<30	38	<30	38
22	<30	38	<30	38	<30	38
18	<30	38	<30	39	<30	38
20	<30	39	<30	40	<30	39
61*	<30	39	<30	40	<30	39
14	<30	40	<30	39	<30	39
19	<30	40	<30	40	<30	39
16*	<30	41	<30	41	34	39
23	<30	35	<30	35	<30	35
35*	<30	35	35	35	37	35
42*	<30	35	<30	35	<30	35
37	<30	35	<30	35	<30	35

* Measurement location

27 April 2016

Ref: 03012/6441

James Benson
Anglo Coal (Drayton Management) Pty Limited
PMB 9
Muswellbrook NSW 2333

RE: APRIL 2016 NOISE MONITORING RESULTS

This letter report presents the results of noise compliance monitoring conducted for the Drayton Coal Mine (DCM) on Thursday 21st April, 2016. The purpose of the measurements was to quantify the overall noise levels at the nearby residences and determine the contribution from DCM operations.

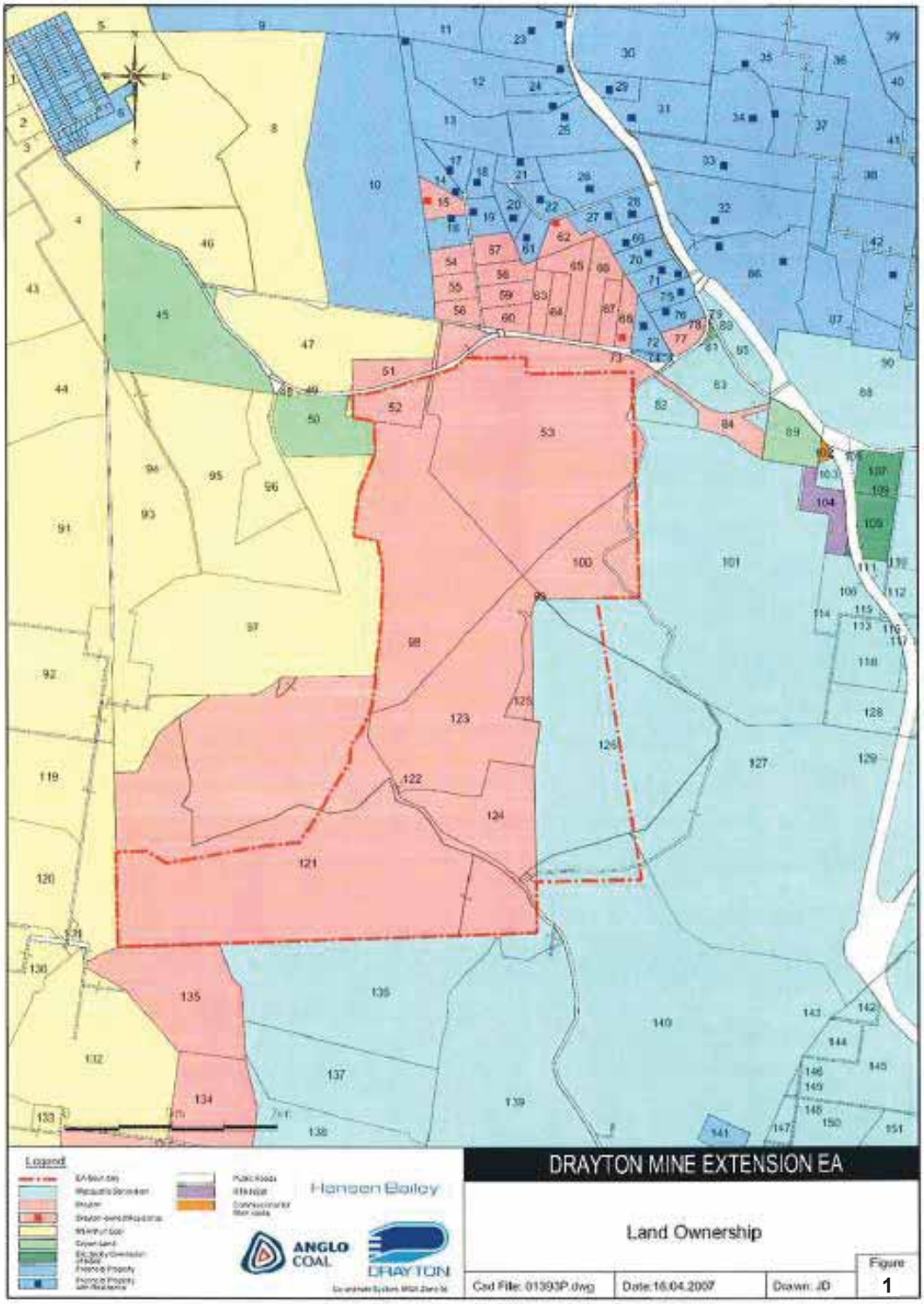
Schedule 3 of the DCM Project Approval details noise impact assessment criteria for 28 specific residential locations. For logistic reasons it is not reasonable to carry out attended noise monitoring at all of the listed locations during the one monitoring survey. As such, the approach taken was to monitor the noise at eight representative residential locations and determine, by noise modelling, the noise level at all of the other locations required in the Project Approval. Noise measurement locations for the attended noise survey are listed below (as shown in **Figure 1**):

Location R16: Doherty
Location R25: Kerr
Location R35: Wilson*
Location R42: Smith*
Location R61: Skinner
Location R72: Robertson
Location R75: Sharman
Location R76: Horder

* Additional locations contained in EPL 1323 but not in the Project Approval.

Two sets of measurements were made over the "circuit", one during the evening period (from 6 pm – 10 pm) and one at night (after 10 pm). DCM activities were audible at certain monitoring locations throughout the evening and night time periods.

Meteorological data used in this report was supplied by the mine from their automatic weather station. Wind speeds (in m/s) and direction have been determined as the arithmetic average of the measurements over the monitoring period. The mine operated weather station does not record temperature inversion data.


DRAYTON MINE EXTENSION EA
Land Ownership
Hansen Bailey
ANGLO COAL
DRAYTON
Cad File: 01393P.dwg
Date:16.04.2007
Drawn: JD
Figure
1

Details of the DCM Project Approval with respect to noise emissions are shown as **Appendix A** to this report.

Attended noise monitoring was conducted with a Brüel & Kjær Type 2250 Precision Sound Analyser. This instrument has Type 1 characteristics as defined in AS1259-1982 "Sound Level Meters" and has current NATA calibration. Field calibration is carried out at the start and end of each monitoring period.

Measured noise levels for each monitoring circuit are summarised in the following tables. The total measured L_{eq} is shown in **Tables 1-2** and night time $L_{1\ (1minute)}$ – approximated as measured L_{max} – in **Table 3**. Table 3 shows the overall $L_{1\ (1minute)}$ and the contributing source as well as the $L_{1\ (1minute)}$ from DCM, where this was measurable.

Data were analysed with the Bruel & Kjaer "*Evaluator*" software to quantify the contributions of the various noise source(s) to the overall. The noise sources are listed in the comments column with the contribution of each shown in brackets. The noise goal for mining operations at DCM is variable depending upon the location (as per the table from Schedule 3 shown in Appendix A). The contribution of mine noise from DCM is shown in bold. Any exceedances of the EPL and project approval noise criteria are shaded grey.

Table 1
DCM Noise Monitoring Results – 21 April 2016 (evening)

Location (Criterion)	Time	dB(A), $L_{eq(15min)}$	Wind speed/ direction	Identified Noise Sources
Doherty (41)	6:33 pm	41	1.6/147	Traffic (39), insects (36), DCM (27)
Kerr (37)	8:26 pm	46	1.2/166	Traffic (46), insects (26), DCM (<20)
Skinner (40)	8:03 pm	40	1.3/163	Traffic (37), DCM (37)[1]
Robertson (37)	6:57 pm	40	1.0/135	Traffic (40), insects (25), DCM (<20)
Sharman (35)	7:38 pm	46	0.9/150	Traffic (46), insects (24), DCM (<20)
Horder (36)	7:18 pm	40	1.2/138	Traffic (39), frogs & insects (33), DCM (<20)
Wilson (35)	8:52 pm	37	1.1/152	Traffic (37), insects (23), DCM (<20)
Smith (35)	9:20 pm	39	1.2/154	Insects (37), traffic (33), other mine (29), DCM (<20)

1. DCM train noise

Table 2
DCM Noise Monitoring Results – 21/22 April 2016 (night)

Location (Criterion)	Time	dB(A), $L_{eq(15min)}$	Wind speed/ direction	Identified Noise Sources
Doherty (39)	10:00 pm	43	0.3/278	Traffic (42), DCM (36), insects (24)
Kerr (37)	11:48 pm	46	1.8/290	Traffic (46), DCM (<20)
Skinner (39)	11:26 pm	38	1.8/295	Traffic (36), DCM (32), insects (24)
Robertson (42)	10:23 pm	43	0.8/320	Traffic (42), DCM (36), insects (24)
Sharman (41)	11:04 pm	47	1.4/296	Traffic (47), DCM (26), insects (24)
Horder (42)	10:43 pm	43	0.8/310	Traffic (42), train (32), DCM (31), insects (26)
Wilson (36)	12:12 pm	37	2.1/291	Traffic (37), DCM (<20)
Smith (36)	12:36 pm	36	2.3/299	Traffic (36), insects (22), DCM (<20)

Table 3 DCM Noise Monitoring Results – 21/22 April 2016 (night)					
Location (Criterion)	Time	dB(A), $L_{1\ (1min)}$	Wind speed/ direction	$L_{1\ (1\ min)}$ source	Identified Mine Sources ($L_{1\ (1\ min)}$)
Doherty (47)	10:00 pm	47	0.3/278	Highway	Hum (37)
Kerr (47)	11:48 pm	54	1.8/290	Highway	(<20)
Skinner (47)	11:26 pm	44	1.8/295	Highway	Hum (36)
Robertson (47)	10:23 pm	51	0.8/320	Highway	Hum (40)
Sharman (47)	11:04 pm	59	1.4/296	Highway	Hum (29)
Horder (47)	10:43 pm	51	0.8/310	Highway	Hum (37)
Wilson (47)	12:12 pm	45	2.1/291	Highway	(<20)
Smith (47)	12:36 pm	43	2.3/299	Highway	(<20)

The results in Tables 1 and 2 shows that the noise criterion was not exceeded at any location and DCM was therefore in compliance throughout the whole monitoring period.

Data from those times where DCM operations were audible were analysed using the *"Evaluator"* software. This analysis showed the noise did not contain any tonal, impulsive or low frequency components as per definitions in the NSW Industrial Noise Policy.

The results in Table 3 show that the noise sleep disturbance criterion ($L_{1\ (1minute)}$) was not exceeded at any monitoring location during the night time period.

The operational noise levels at other receivers listed in the DCM Project Approval were determined using the ENM noise model in point calculation mode. The noise model was set up with a series of point noise sources representing the DCM operations and then calibrated to be consistent with the measured noise levels from the attended survey under similar atmospheric conditions to those at the time of the monitoring. Point calculations were then performed for each of the listed residential locations with results shown in **Appendix B**.

As the $L_{1\ (1minute)}$ levels were well below the sleep disturbance criterion at the attended monitoring locations, no modelling of $L_{1\ (1minute)}$ levels was conducted for other receiver locations, as these are all at greater distance from the DCM.

We trust this report fulfils your requirements at this time, however, should you require additional information or assistance please contact the undersigned on 4954 2276.

Yours faithfully,
SPECTRUM ACOUSTICS PTY LIMITED

Author:

Neil Pennington
Acoustical Consultant

Review:

Ross Hodge
Acoustical Consultant

SCHEDULE 3
SPECIFIC ENVIRONMENTAL CONDITIONS

NOISE

Noise Impact Assessment Criteria

1. The Proponent shall ensure that the noise generated by the project does not exceed the noise impact assessment criteria in Table 1 at any residence on privately-owned land, or on more than 25 percent of any privately-owned land.

Table 1: Noise impact assessment criteria dB(A)

Land Number	Day	Evening	Night	
	$L_{Aeq(15\ min)}$	$L_{Aeq(15\ min)}$	$L_{Aeq(15\ min)}$	$L_{A1(1\ min)}$
34	35	35	36	45
29	35	35	36	47
31	35	35	37	47
33, 86	35	35	38	45
32	35	35	40	47
71, 75	35	35	41	47
70	35	36	41	47
76	35	36	42	47
28	35	37	40	47
69	35	37	41	47
13	36	36	35	45
12	36	36	36	47
25	36	37	37	47
26	36	37	38	47
27	36	37	39	47
72	36	37	42	47
17	37	38	36	47
21, 22	38	38	38	45
18	38	39	38	47
20, 61	39	40	39	45
14	40	39	38	47
19	40	40	39	47
16	41	41	39	47
23	35	35	35	47
All other privately-owned land	35	35	35	45

However, if the Proponent has a written negotiated noise agreement with any landowner of the land listed in Table 1, and a copy of this agreement has been forwarded to the Department and DECC, then the Proponent may exceed the noise limits in Table 1 in accordance with the negotiated noise agreement.

Notes:

- *For information on the numbering and identification of properties used in this approval, see Appendix 5.*
- *To determine compliance with the $L_{Aeq(15\ minute)}$ noise limits, noise from the project is to be measured at the most affected point within the residential boundary, or at the most affected point within 30 metres of a dwelling (rural situations) where the dwelling is more than 30 metres from the boundary. Where it can be demonstrated that direct measurement of noise from the project is impractical, the DECC may accept alternative means of determining compliance (see Chapter 11 of the NSW Industrial Noise Policy). The modification factors in Section 4 of the NSW Industrial Noise Policy shall also be applied to the measured noise levels where applicable.*
- *To determine compliance with the $L_{A1(1\ minute)}$ noise limits, noise from the project is to be measured at 1 metre from the dwelling façade. Where it can be demonstrated that direct measurement of noise from the project is impractical, the DECC may accept alternative means of determining compliance (see Chapter 11 of the NSW Industrial Noise Policy).*

- *The noise emission limits identified in the above table apply under meteorological conditions of:*
  - *wind speeds of up to 3 m/s at 10 metres above ground level; or*
  - *temperature inversion conditions of up to 3°C/100m, and wind speeds of up to 2 m/s at 10 metres above ground level.*

Land Acquisition Criteria

2. If the noise generated by the project exceeds the criteria in Table 2 at any residence on privately-owned land or on more than 25 percent of any privately-owned land, the Proponent shall, upon receiving a written request for acquisition from the landowner, acquire the land in accordance with the procedures in conditions 8-10 of Schedule 4.

Table 2: Land acquisition criteria dB(A)

Land Number	***Day/Evening/Night*** $L_{Aeq(15min)}$
12, 14, 16, 17, 18, 19, 23, 25, 26, 27, 28, 29, 31, 32, 69, 70, 71, 72, 75, 76	42
All other private land owners not listed in Table 1, or on more than 25 percent of, any privately owned land.	40

Note: Noise generated by the project is to be measured in accordance with the notes to Table 1.

Cumulative Noise Criteria

3. The Proponent shall take all reasonable and feasible measures to ensure that the noise generated by the project combined with the noise generated by other mines does not exceed the following amenity criteria at any residence on privately-owned land or on more than 25 percent of any privately owned land:
   - $L_{Aeq(11\ hour)}$ *50 dB(A) – Day;*
   - $L_{Aeq(4\ hour)}$ *45 dB(A) – Evening;*
   - $L_{Aeq(9\ hour)}$ *40 dB(A) – Night.*

4. If the noise generated by the project combined with the noise generated by other mines exceeds the following amenity criteria at any residence on privately owned-land or on more than 25 percent of any privately owned land, then upon receiving a written request from the landowner, the Proponent shall acquire the land on as equitable basis as possible with the relevant mines in accordance with the procedures in conditions 8-10 of Schedule 4:
   - $L_{Aeq(11\ hour)}$ *53 dB(A) – Day;*
   - $L_{Aeq(4\ hour)}$ *48 dB(A) – Evening;*
   - $L_{Aeq(9\ hour)}$ *43 dB(A) – Night.*

Notes: The cumulative noise generated by the project combined with the noise generated by other mines is to be measured in accordance with the relevant procedures in the NSW Industrial Noise Policy.

APPENDIX B MODELLED NOISE LEVELS as Leq (15 min)				
Location	Evening		Night	
	Noise Level	Noise Goal	Noise Level	Noise Goal
34	<30	35	<30	39
29	<30	35	<30	36
31	<30	35	<30	37
33	<30	35	<30	38
86	<30	35	<30	38
32	<30	35	<30	40
71	31	35	<30	41
75*	<20	35	<30	41
70	30	36	22	41
76*	<20	36	31	42
28	32	37	<30	40
69	30	37	<30	41
13	<30	36	<30	35
12	<30	36	<30	36
25*	<20	37	<20	37
26	<30	37	<30	38
27	32	37	<30	39
72*	<20	37	36	42
17	30	38	<30	36
21	30	38	<30	38
22	31	38	30	38
18	30	39	30	38
20	31	40	30	39
61*	37	40	32	39
14	30	39	<30	39
19	31	40	<30	39
16*	<30	41	36	39
23	<30	35	<30	35
35*	<20	35	<20	35
42*	<20	35	<20	35
37	<30	35	<30	35

* Measurement location

2 June 2016

Ref: 03012/6526

James Benson
Anglo Coal (Drayton Management) Pty Limited
PMB 9
Muswellbrook NSW 2333

RE: MAY 2016 NOISE MONITORING RESULTS

This letter report presents the results of noise compliance monitoring conducted for the Drayton Coal Mine (DCM) on Monday 23rd May, 2016. The purpose of the measurements was to quantify the overall noise levels at the nearby residences and determine the contribution from DCM operations.

Schedule 3 of the DCM Project Approval details noise impact assessment criteria for 28 specific residential locations. For logistic reasons it is not reasonable to carry out attended noise monitoring at all of the listed locations during the one monitoring survey. As such, the approach taken was to monitor the noise at eight representative residential locations and determine, by noise modelling, the noise level at all of the other locations required in the Project Approval. Noise measurement locations for the attended noise survey are listed below (as shown in **Figure 1**):

Location R16: Doherty
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Location R61: Skinner
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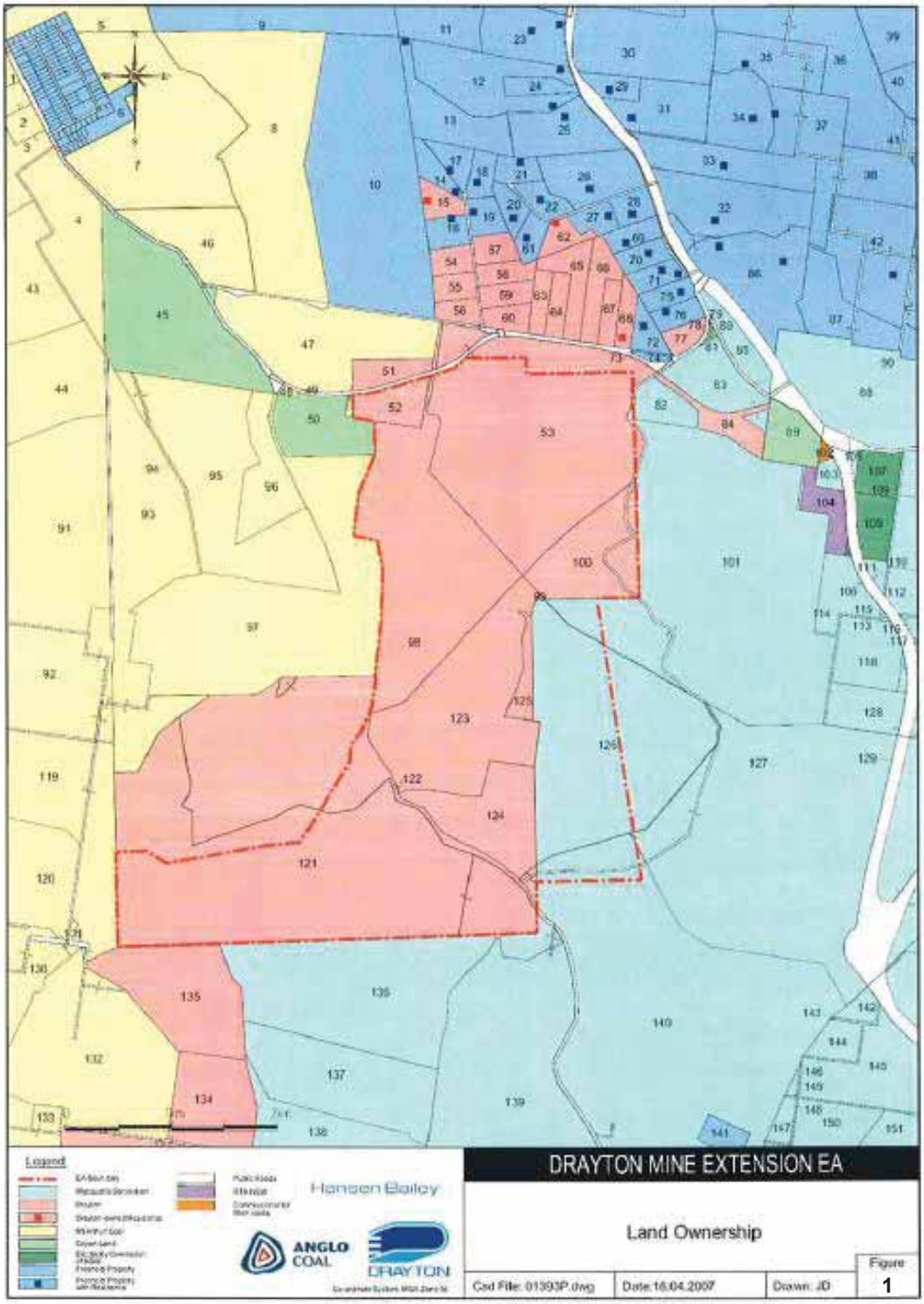
Location R76: Horder

* Additional locations contained in EPL 1323 but not in the Project Approval.

Two sets of measurements were made over the "circuit", one during the evening period (from 6 pm – 10 pm) and one at night (after 10 pm). DCM activities were audible at certain monitoring locations throughout the evening and night time periods.

Meteorological data used in this report was supplied by the mine from their automatic weather station. Wind speeds (in m/s) and direction have been determined as the arithmetic average of the measurements over the monitoring period. The mine operated weather station does not record temperature inversion data.


DRAYTON MINE EXTENSION EA
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ANGLO COAL
DRAYTON
Cad File: 01393P.dwg
Date:16.04.2007
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Figure
1

Details of the DCM Project Approval with respect to noise emissions are shown as **Appendix A** to this report.

Attended noise monitoring was conducted with a Brüel & Kjær Type 2250 Precision Sound Analyser. This instrument has Type 1 characteristics as defined in AS1259-1982 "Sound Level Meters" and has current NATA calibration. Field calibration is carried out at the start and end of each monitoring period.

Measured noise levels for each monitoring circuit are summarised in the following tables. The total measured L_{eq} is shown in **Tables 1-2** and night time $L_{1\ (1minute)}$ – approximated as measured L_{max} – in **Table 3**. Table 3 shows the overall $L_{1\ (1minute)}$ and the contributing source as well as the $L_{1\ (1minute)}$ from DCM, where this was measurable.

Data were analysed with the Bruel & Kjaer "*Evaluator*" software to quantify the contributions of the various noise source(s) to the overall. The noise sources are listed in the comments column with the contribution of each shown in brackets. The noise goal for mining operations at DCM is variable depending upon the location (as per the table from Schedule 3 shown in Appendix A). The contribution of mine noise from DCM is shown in bold. Any exceedances of the EPL and project approval noise criteria are shaded grey.

Table 1
DCM Noise Monitoring Results – 23 May 2016 (evening)

Location (Criterion)	Time	dB(A), $L_{eq(15min)}$	Wind speed/ direction	Identified Noise Sources
Doherty (41)	6:38 pm	34	1.7/318	Traffic (31), DCM (31)
Kerr (37)	8:31 pm	39	2.9/286	Traffic (39), DCM (25), other mine (22)
Skinner (40)	8:08 pm	34	1.6/302	DCM (33), traffic (27)
Robertson (37)	7:02 pm	40	2.2/297	Traffic (40), DCM (25)
Sharman (35)	7:43 pm	46	0.9/309	Traffic (46), DCM (<20)
Horder (36)	7:23 pm	41	1.3/322	Traffic (41), DCM (23)
Wilson (35)	8:58 pm	40	1.3/287	Traffic (40), DCM (<20)
Smith (35)	9:27 pm	41	1.2/320	Traffic (41), DCM (<20)

Table 2
DCM Noise Monitoring Results – 23/24 May 2016 (night)

Location (Criterion)	Time	dB(A), $L_{eq(15min)}$	Wind speed/ direction	Identified Noise Sources
Doherty (39)	10:05 pm	34	1.5/281	DCM (33), traffic (27)
Kerr (37)	11:53 pm	38	1.6/332	Traffic (36), DCM (33), other mine (25)
Skinner (39)	11:31 pm	35	1.8/322	DCM (34), traffic (27)
Robertson (42)	10:28 pm	41	1.9/303	Traffic (40), DCM (34)
Sharman (41)	11:09 pm	48	2.1/299	Traffic (48), DCM (27)
Horder (42)	10:49 pm	40	1.7/317	Traffic (39), DCM (33)
Wilson (36)	12:18 am	30	1.9/307	Traffic (30), DCM (<20)
Smith (36)	12:42 am	32	2.0/297	Traffic (32), DCM (<20)

Table 3 DCM Noise Monitoring Results – 23/24 May 2016 (night)					
Location (Criterion)	Time	dB(A), $L_{1\ (1min)}$	Wind speed/ direction	$L_{1\ (1\ min)}$ source	Identified Mine Sources ($L_{1\ (1\ min)}$)
Doherty (47)	10:05 pm	40	1.5/281	Highway	Dozer tracks (38)
Kerr (47)	11:53 pm	45	1.6/332	Highway	Hum (37)
Skinner (47)	11:31 pm	38	1.8/322	Mine	Dozer tracks (38)
Robertson (47)	10:28 pm	51	1.9/303	Highway	Dozer tracks (39)
Sharman (47)	11:09 pm	58	2.1/299	Highway	Hum (30)
Horder (47)	10:49 pm	48	1.7/317	Highway	Dozer tracks (37)
Wilson (47)	12:18 am	38	1.9/307	Highway	(<20)
Smith (47)	12:42 am	39	2.0/297	Highway	(<20)

The results in Tables 1 and 2 shows that the noise criterion was not exceeded at any location and DCM was therefore in compliance throughout the whole monitoring period.

Data from those times where DCM operations were audible were analysed using the *"Evaluator"* software. This analysis showed the noise did not contain any tonal, impulsive or low frequency components as per definitions in the NSW Industrial Noise Policy.

The results in Table 3 show that the noise sleep disturbance criterion ($L_{1\ (1minute)}$) was not exceeded at any monitoring location during the night time period.

The operational noise levels at other receivers listed in the DCM Project Approval were determined using the ENM noise model in point calculation mode. The noise model was set up with a series of point noise sources representing the DCM operations and then calibrated to be consistent with the measured noise levels from the attended survey under similar atmospheric conditions to those at the time of the monitoring. Point calculations were then performed for each of the listed residential locations with results shown in **Appendix B**.

As the $L_{1\ (1minute)}$ levels were well below the sleep disturbance criterion at the attended monitoring locations, no modelling of $L_{1\ (1minute)}$ levels was conducted for other receiver locations, as these are all at greater distance from the DCM.

We trust this report fulfils your requirements at this time, however, should you require additional information or assistance please contact the undersigned on 4954 2276.

Yours faithfully,
SPECTRUM ACOUSTICS PTY LIMITED

Author:

Neil Pennington
Acoustical Consultant

Review:

Ross Hodge
Acoustical Consultant

SCHEDULE 3
SPECIFIC ENVIRONMENTAL CONDITIONS

NOISE

Noise Impact Assessment Criteria

1. The Proponent shall ensure that the noise generated by the project does not exceed the noise impact assessment criteria in Table 1 at any residence on privately-owned land, or on more than 25 percent of any privately-owned land.

Table 1: Noise impact assessment criteria dB(A)

Land Number	Day	Evening	Night	
	$L_{Aeq(15\ min)}$	$L_{Aeq(15\ min)}$	$L_{Aeq(15\ min)}$	$L_{A1(1\ min)}$
34	35	35	36	45
29	35	35	36	47
31	35	35	37	47
33, 86	35	35	38	45
32	35	35	40	47
71, 75	35	35	41	47
70	35	36	41	47
76	35	36	42	47
28	35	37	40	47
69	35	37	41	47
13	36	36	35	45
12	36	36	36	47
25	36	37	37	47
26	36	37	38	47
27	36	37	39	47
72	36	37	42	47
17	37	38	36	47
21, 22	38	38	38	45
18	38	39	38	47
20, 61	39	40	39	45
14	40	39	38	47
19	40	40	39	47
16	41	41	39	47
23	35	35	35	47
All other privately-owned land	35	35	35	45

However, if the Proponent has a written negotiated noise agreement with any landowner of the land listed in Table 1, and a copy of this agreement has been forwarded to the Department and DECC, then the Proponent may exceed the noise limits in Table 1 in accordance with the negotiated noise agreement.

Notes:

- *For information on the numbering and identification of properties used in this approval, see Appendix 5.*
- *To determine compliance with the $L_{Aeq(15\ minute)}$ noise limits, noise from the project is to be measured at the most affected point within the residential boundary, or at the most affected point within 30 metres of a dwelling (rural situations) where the dwelling is more than 30 metres from the boundary. Where it can be demonstrated that direct measurement of noise from the project is impractical, the DECC may accept alternative means of determining compliance (see Chapter 11 of the NSW Industrial Noise Policy). The modification factors in Section 4 of the NSW Industrial Noise Policy shall also be applied to the measured noise levels where applicable.*
- *To determine compliance with the $L_{A1(1\ minute)}$ noise limits, noise from the project is to be measured at 1 metre from the dwelling façade. Where it can be demonstrated that direct measurement of noise from the project is impractical, the DECC may accept alternative means of determining compliance (see Chapter 11 of the NSW Industrial Noise Policy).*

- *The noise emission limits identified in the above table apply under meteorological conditions of:*
  - *wind speeds of up to 3 m/s at 10 metres above ground level; or*
  - *temperature inversion conditions of up to 3°C/100m, and wind speeds of up to 2 m/s at 10 metres above ground level.*

Land Acquisition Criteria

2. If the noise generated by the project exceeds the criteria in Table 2 at any residence on privately-owned land or on more than 25 percent of any privately-owned land, the Proponent shall, upon receiving a written request for acquisition from the landowner, acquire the land in accordance with the procedures in conditions 8-10 of Schedule 4.

Table 2: Land acquisition criteria dB(A)

Land Number	***Day/Evening/Night*** $L_{Aeq(15min)}$
12, 14, 16, 17, 18, 19, 23, 25, 26, 27, 28, 29, 31, 32, 69, 70, 71, 72, 75, 76	42
All other private land owners not listed in Table 1, or on more than 25 percent of, any privately owned land.	40

Note: Noise generated by the project is to be measured in accordance with the notes to Table 1.

Cumulative Noise Criteria

3. The Proponent shall take all reasonable and feasible measures to ensure that the noise generated by the project combined with the noise generated by other mines does not exceed the following amenity criteria at any residence on privately-owned land or on more than 25 percent of any privately owned land:
   - $L_{Aeq(11\ hour)}$ *50 dB(A) – Day;*
   - $L_{Aeq(4\ hour)}$ *45 dB(A) – Evening;*
   - $L_{Aeq(9\ hour)}$ *40 dB(A) – Night.*

4. If the noise generated by the project combined with the noise generated by other mines exceeds the following amenity criteria at any residence on privately owned-land or on more than 25 percent of any privately owned land, then upon receiving a written request from the landowner, the Proponent shall acquire the land on as equitable basis as possible with the relevant mines in accordance with the procedures in conditions 8-10 of Schedule 4:
   - $L_{Aeq(11\ hour)}$ *53 dB(A) – Day;*
   - $L_{Aeq(4\ hour)}$ *48 dB(A) – Evening;*
   - $L_{Aeq(9\ hour)}$ *43 dB(A) – Night.*

Notes: The cumulative noise generated by the project combined with the noise generated by other mines is to be measured in accordance with the relevant procedures in the NSW Industrial Noise Policy.

APPENDIX B MODELLED NOISE LEVELS as Leq (15 min)				
Location	Evening		Night	
	Noise Level	Noise Goal	Noise Level	Noise Goal
34	<30	35	<30	39
29	<30	35	<30	36
31	<30	35	<30	37
33	<30	35	<30	38
86	<30	35	<30	38
32	<30	35	<30	40
71	31	35	<30	41
75*	<20	35	27	41
70	30	36	22	41
76*	23	36	33	42
28	32	37	<30	40
69	30	37	<30	41
13	<30	36	<30	35
12	<30	36	<30	36
25*	25	37	33	37
26	<30	37	<30	38
27	32	37	<30	39
72*	25	37	34	42
17	30	38	<30	36
21	30	38	<30	38
22	31	38	30	38
18	30	39	30	38
20	31	40	30	39
61*	33	40	34	39
14	30	39	<30	39
19	31	40	<30	39
16*	31	41	33	39
23	<30	35	<30	35
35*	<20	35	<20	35
42*	<20	35	<20	35
37	<30	35	<30	35

* Measurement location

21 June 2016

Ref: 03012/6579

James Benson
Anglo Coal (Drayton Management) Pty Limited
PMB 9
Muswellbrook NSW 2333

RE: JUNE 2016 NOISE MONITORING RESULTS

This letter report presents the results of noise compliance monitoring conducted for the Drayton Coal Mine (DCM) on Monday 27th June 2016. The purpose of the measurements was to quantify the overall noise levels at the nearby residences and determine the contribution from DCM operations.

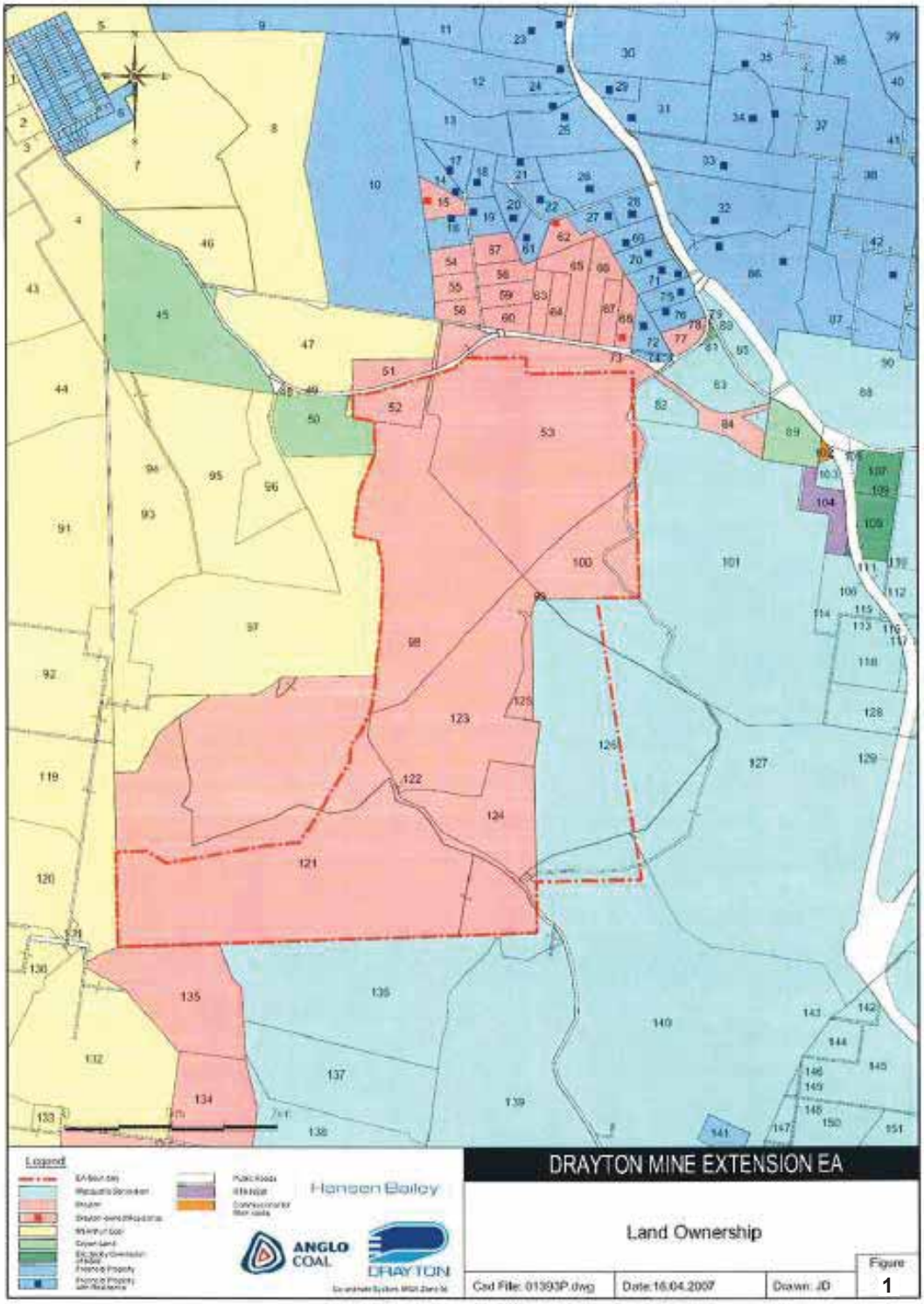
Schedule 3 of the DCM Project Approval details noise impact assessment criteria for 28 specific residential locations. For logistic reasons it is not reasonable to carry out attended noise monitoring at all of the listed locations during the one monitoring survey. As such, the approach taken was to monitor the noise at eight representative residential locations and determine, by noise modelling, the noise level at all of the other locations required in the Project Approval. Noise measurement locations for the attended noise survey are listed below (as shown in **Figure 1**):

Location R16: Doherty
Location R25: Kerr
Location R35: Wilson*
Location R42: Smith*
Location R61: Skinner
Location R72: Robertson**
Location R75: Sharman
Location R76: Horder

* Additional locations contained in EPL 1323 but not in the Project Approval.
** Monitoring conducted at front gate of property at Landowners request.

Three sets of measurements were made over the "circuit", one during the day time period (before 6 pm), one during the evening period (from 6 pm – 10 pm) and one at night (after 10 pm). DCM activities were audible at many monitoring locations throughout the survey.

Meteorological data used in this report was supplied by the mine from their automatic weather station. Wind speeds (in m/s) and direction have been determined as the arithmetic average of the measurements over the monitoring period. The mine operated weather station does not record temperature inversion data.


DRAYTON MINE EXTENSION EA
Land Ownership
Hansen Bailey
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1

Details of the DCM Project Approval with respect to noise emissions are shown as **Appendix A** to this report.

Noise emission levels were measured with Brüel & Kjær Type 2250 Precision Sound Analysers. These instruments have Type 1 characteristics as defined in AS1259-1982 "Sound Level Meters". Calibration of the instruments was confirmed with a Brüel & Kjær Type 4231 Sound Level Calibrator prior to and at the completion of measurements.

Measured noise levels for each monitoring circuit are summarised in the following tables. The total measured L_{eq} is shown in **Tables 1-3** and night time $L_{1(1minute)}$ – approximated as measured L_{max} – in **Table 4**. Table 3 shows the overall $L_{1(1minute)}$ and the contributing source as well as the $L_{1(1minute)}$ from DCM, where this was measurable.

Data were analysed with the Bruel & Kjaer "*Evaluator*" software to quantify the contributions of the various noise source(s) to the overall. The noise sources are listed in the comments column with the contribution of each shown in brackets. The noise goal (criterion) for mining operations at DCM is variable depending upon the location (as per the table from Schedule 3 shown in Appendix A). The relevant criterion is shown in brackets in the "Location" column in the tables. The contribution of mine noise from DCM is shown in bold. Any exceedances of the EPL and project approval noise criteria are shaded grey.

Table 1
DCM Noise Monitoring Results – 27 June 2016 (Day)

Location (Criterion)	Time	dB(A), $L_{eq(15min)}$	Wind speed/ direction	Identified Noise Sources
Doherty (41)	2:50 pm	42	4.0/303	Wind (40), birds (36), traffic (27), other mine (26), DCM (<20)
Kerr (36)	4:38 pm	46	3.2/298	Traffic (46), wind (31), other mine (26), DCM (<20)
Skinner (39)	4:16 pm	39	3.0/299	Birds (36), wind (35), traffic (28), other mine (24), DCM (<20)
Robertson (36)	3:13 pm	57	3.8/294	Traffic (57), wind (33), birds (28), DCM (26)
Sharman (35)	3:53 pm	54	3.6/300	Traffic (54), birds (40), wind (33), DCM (<20)
Horder (35)	3:32 pm	50	3.5/296	Wind (46), traffic (45), birds (37), DCM (29)
Wilson (35)	5:03 pm	41	2.8/310	Traffic (41), DCM (<20)
Smith (35)	5:29 pm	42	2.5/311	Traffic (42), DCM (<20)

Table 2
DCM Noise Monitoring Results – 27 June 2016 (Evening)

Location (Criterion)	Time	dB(A), $L_{eq(15min)}$	Wind speed/ direction	Identified Noise Sources
Doherty (41)	6:28 pm	38	2.6/3.5	Other mine (35), traffic (30), DCM (29), frogs (29)
Kerr (37)	8:21 pm	43	2.5/3.5	Traffic (43), other mine (31), DCM (<20)
Skinner (40)	7:59 pm	38	3.2/292	Other mine (34), traffic (32), wind (32), frogs (28), DCM (<20)
Robertson (37)	6:51 pm	46	2.6/301	Traffic (46), wind (32), DCM (28)
Sharman (35)	7:33 pm	48	3.3/300	Traffic (48), frogs (31), DCM (27), wind (27)
Horder (36)	7:13 pm	45	3.3/296	Wind (43), traffic (40), DCM (28)
Wilson (35)	8:48 pm	42	3.3/307	Traffic (42), frogs (27), DCM (<20)
Smith (35)	9:18 pm	40	2.6/309	Traffic (39), wind (31), DCM (<20)

Table 3 DCM Noise Monitoring Results – 27/28 June 2016 (Night)				
Location (Criterion)	Time	dB(A), $L_{eq(15min)}$	Wind speed/ direction	Identified Noise Sources
Doherty (39)	10:00 pm	38	2.9/301	Other mine (36), traffic (29), frogs (28), DCM (26)
Kerr (37)	11:49 pm	43	2.5/317	Traffic (43), DCM (29), other mine (25)
Skinner (39)	11:26 pm	37	2.4/318	Other mine (33), DCM (33), traffic (27), frogs (26)
Robertson (42)	10:21 pm	42	2.0/308	Traffic (41), DCM (32), wind (29)
Sharman (41)	11:03 pm	45	2.3/299	Traffic (45), frogs (27), DCM (26)
Horder (42)	10:42 pm	41	2.5/308	Traffic (41), DCM (30)
Wilson (36)	12:13 pm	39	2.9/306	Traffic (38), frogs (35), DCM (24)
Smith (36)	12:38 pm	41	2.7/312	Traffic (39), wind (36), DCM (<20)

Table 4 DCM Noise Monitoring Results – 27/28 June 2016 (Night)					
Location (Criterion)	Time	dB(A), $L_{1(1minute)}$	Wind speed/ direction	L_{A1} source	Identified Mine Sources ($L_{1\ (1\ min)}$)
Doherty (47)	10:00 pm	40	2.9/301	Other mine	Hum (29)
Kerr (47)	11:49 pm	51	2.5/317	Highway	Truck revs (33)
Skinner (47)	11:26 pm	37	2.4/318	Other mine	Truck revs (37)
Robertson (47)	10:21 pm	50	2.0/308	Traffic	Truck revs (36)
Sharman (47)	11:03 pm	54	2.3/299	Highway	Hum (30)
Horder (47)	10:42 pm	48	2.5/308	Highway	Hum (34)
Wilson (47)	12:13 pm	43	2.9/306	Highway	Hum (26)
Smith (47)	12:38 pm	45	2.7/312	Highway	n/a

The results in Tables 1 to 3 show that the applicable operational noise criteria were not exceeded at any location or at any time throughout the monitoring survey. The audible noise sources from DCM included truck revs and general mine hum and there were no trains loaded during the entire monitoring period.

Data from those times where DCM operations were audible were analysed using the *"Evaluator"* software. This analysis showed the noise did not contain any tonal, impulsive or low frequency components as per definitions in the NSW Industrial Noise Policy.

The results in Table 4 show that the sleep disturbance criteria ($L_{1(1minute)}$) was not exceeded at any monitoring location during the night time period.

The operational noise levels at other receivers listed in the DCM Project Approval were determined using the ENM noise model in point calculation mode. The noise model was set up with a series of point noise sources representing the DCM operations and then calibrated to be consistent with the measured noise levels from the attended survey under similar atmospheric conditions to those at the time of the monitoring. Point calculations were then performed for each of the listed residential locations with results shown in **Appendix B**.

As the $L_{1(1minute)}$ levels were well below the sleep disturbance criterion at the attended monitoring locations, no modelling of $L_{1(1minute)}$ levels was conducted for other receiver locations, as these are all at greater distance from the DCM.

We trust this report fulfils your requirements at this time, however, should you require additional information or assistance please contact the undersigned on 4954 2276.

Yours faithfully,
SPECTRUM ACOUSTICS PTY LIMITED

Author:

Neil Pennington
Acoustical Consultant

Review:

Ross Hodge
Acoustical Consultant

SCHEDULE 3
SPECIFIC ENVIRONMENTAL CONDITIONS

NOISE

Noise Impact Assessment Criteria

1. The Proponent shall ensure that the noise generated by the project does not exceed the noise impact assessment criteria in Table 1 at any residence on privately-owned land, or on more than 25 percent of any privately-owned land.

Table 1: Noise impact assessment criteria dB(A)

Land Number	Day	Evening	Night	
	$L_{Aeq(15\ min)}$	$L_{Aeq(15\ min)}$	$L_{Aeq(15\ min)}$	$L_{A1(1\ min)}$
34	35	35	36	45
29	35	35	36	47
31	35	35	37	47
33, 86	35	35	38	45
32	35	35	40	47
71, 75	35	35	41	47
70	35	36	41	47
76	35	36	42	47
28	35	37	40	47
69	35	37	41	47
13	36	36	35	45
12	36	36	36	47
25	36	37	37	47
26	36	37	38	47
27	36	37	39	47
72	36	37	42	47
17	37	38	36	47
21, 22	38	38	38	45
18	38	39	38	47
20, 61	39	40	39	45
14	40	39	38	47
19	40	40	39	47
16	41	41	39	47
23	35	35	35	47
All other privately-owned land	35	35	35	45

However, if the Proponent has a written negotiated noise agreement with any landowner of the land listed in Table 1, and a copy of this agreement has been forwarded to the Department and DECC, then the Proponent may exceed the noise limits in Table 1 in accordance with the negotiated noise agreement.

Notes:

- *For information on the numbering and identification of properties used in this approval, see Appendix 5.*
- *To determine compliance with the $L_{Aeq(15\ minute)}$ noise limits, noise from the project is to be measured at the most affected point within the residential boundary, or at the most affected point within 30 metres of a dwelling (rural situations) where the dwelling is more than 30 metres from the boundary. Where it can be demonstrated that direct measurement of noise from the project is impractical, the DECC may accept alternative means of determining compliance (see Chapter 11 of the NSW Industrial Noise Policy). The modification factors in Section 4 of the NSW Industrial Noise Policy shall also be applied to the measured noise levels where applicable.*
- *To determine compliance with the $L_{A1(1\ minute)}$ noise limits, noise from the project is to be measured at 1 metre from the dwelling façade. Where it can be demonstrated that direct measurement of noise from the project is impractical, the DECC may accept alternative means of determining compliance (see Chapter 11 of the NSW Industrial Noise Policy).*

- *The noise emission limits identified in the above table apply under meteorological conditions of:*
  - *wind speeds of up to 3 m/s at 10 metres above ground level; or*
  - *temperature inversion conditions of up to 3°C/100m, and wind speeds of up to 2 m/s at 10 metres above ground level.*

Land Acquisition Criteria

2. If the noise generated by the project exceeds the criteria in Table 2 at any residence on privately-owned land or on more than 25 percent of any privately-owned land, the Proponent shall, upon receiving a written request for acquisition from the landowner, acquire the land in accordance with the procedures in conditions 8-10 of Schedule 4.

Table 2: Land acquisition criteria dB(A)

Land Number	***Day/Evening/Night*** $L_{Aeq(15min)}$
12, 14, 16, 17, 18, 19, 23, 25, 26, 27, 28, 29, 31, 32, 69, 70, 71, 72, 75, 76	42
All other private land owners not listed in Table 1, or on more than 25 percent of, any privately owned land.	40

Note: Noise generated by the project is to be measured in accordance with the notes to Table 1.

Cumulative Noise Criteria

3. The Proponent shall take all reasonable and feasible measures to ensure that the noise generated by the project combined with the noise generated by other mines does not exceed the following amenity criteria at any residence on privately-owned land or on more than 25 percent of any privately owned land:
   - $L_{Aeq(11\ hour)}$ *50 dB(A) – Day;*
   - $L_{Aeq(4\ hour)}$ *45 dB(A) – Evening;*
   - $L_{Aeq(9\ hour)}$ *40 dB(A) – Night.*

4. If the noise generated by the project combined with the noise generated by other mines exceeds the following amenity criteria at any residence on privately owned-land or on more than 25 percent of any privately owned land, then upon receiving a written request from the landowner, the Proponent shall acquire the land on as equitable basis as possible with the relevant mines in accordance with the procedures in conditions 8-10 of Schedule 4:
   - $L_{Aeq(11\ hour)}$ *53 dB(A) – Day;*
   - $L_{Aeq(4\ hour)}$ *48 dB(A) – Evening;*
   - $L_{Aeq(9\ hour)}$ *43 dB(A) – Night.*

Notes: The cumulative noise generated by the project combined with the noise generated by other mines is to be measured in accordance with the relevant procedures in the NSW Industrial Noise Policy.

APPENDIX B MODELLED NOISE LEVELS as Leq (15 min)						
Location	Day		Evening		Night	
	Noise Level	Noise Goal	Noise Level	Noise Goal	Noise Level	Noise Goal
34	<30	35	<30	35	<30	39
29	<30	35	<30	35	<30	36
31	<30	35	<30	35	<30	37
33	<30	35	<30	35	<30	38
86	<30	35	<30	35	<30	38
32	<30	35	<30	35	<30	40
71	<30	35	<30	35	<30	41
75*	<30	35	<30	35	<30	41
70	<30	35	<30	36	<30	41
76*	<30	35	<30	36	30	42
28	<30	35	<30	37	<30	40
69	<30	35	<30	37	<30	41
13	<30	36	<30	36	<30	35
12	<30	36	<30	36	<30	36
25*	<30	36	<30	37	<30	37
26	<30	36	<30	37	<30	38
27	<30	36	<30	37	<30	39
72*	<30	36	<30	37	32	42
17	<30	37	<30	38	<30	36
21	<30	38	<30	38	<30	38
22	<30	38	<30	38	<30	38
18	<30	38	<30	39	<30	38
20	<30	39	<30	40	<30	39
61*	<30	39	<30	40	33	39
14	<30	40	<30	39	<30	39
19	<30	40	<30	40	<30	39
16*	<30	41	<30	41	<30	39
23	<30	35	<30	35	<30	35
35*	<30	35	<30	35	<30	35
42*	<30	35	<30	35	<30	35
37	<30	35	<30	35	<30	35

* Measurement location

25 July 2016

Ref: 03012/6611

James Benson
Anglo Coal (Drayton Management) Pty Limited
PMB 9
Muswellbrook NSW 2333

RE: JULY 2016 NOISE MONITORING RESULTS

This letter report presents the results of noise compliance monitoring conducted for the Drayton Coal Mine (DCM) on Thursday 14th July, 2016. The purpose of the measurements was to quantify the overall noise levels at the nearby residences and determine the contribution from DCM operations.

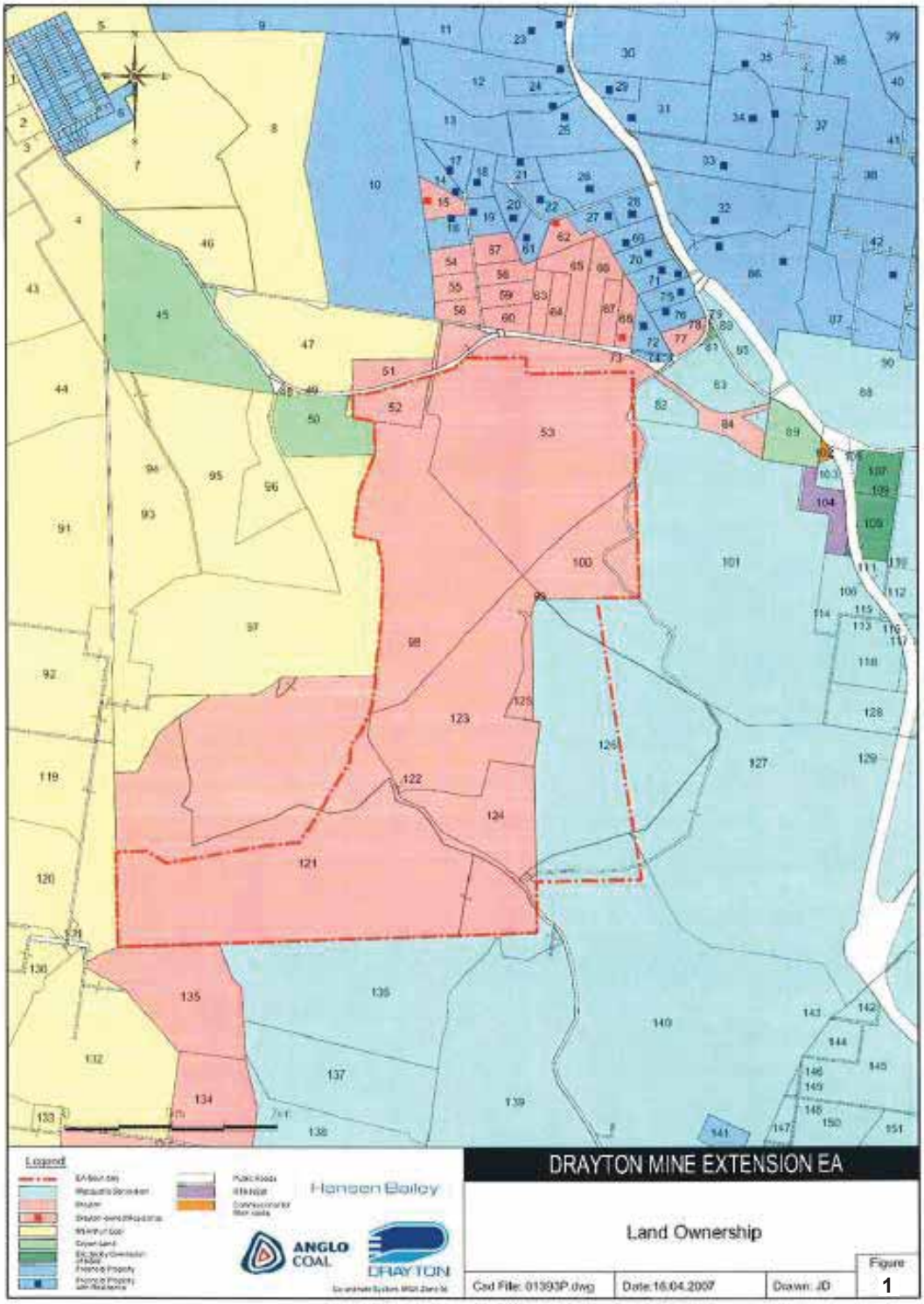
Schedule 3 of the DCM Project Approval details noise impact assessment criteria for 28 specific residential locations. For logistic reasons it is not reasonable to carry out attended noise monitoring at all of the listed locations during the one monitoring survey. As such, the approach taken was to monitor the noise at eight representative residential locations and determine, by noise modelling, the noise level at all of the other locations required in the Project Approval. Noise measurement locations for the attended noise survey are listed below (as shown in **Figure 1**):

Location R16: Doherty
Location R25: Kerr
Location R35: Wilson*
Location R42: Smith*
Location R61: Skinner
Location R72: Robertson**
Location R75: Sharman
Location R76: Horder

* Additional locations contained in EPL 1323 but not in the Project Approval.
** Monitoring conducted at front gate of property at Landowners request.

Two sets of measurements were made over the "circuit", one during the evening period (from 6 pm – 10 pm) and one at night (after 10 pm). DCM activities were audible at certain monitoring locations throughout the evening and night time periods.

Meteorological data used in this report was supplied by the mine from their automatic weather station. Wind speeds (in m/s) and direction have been determined as the arithmetic average of the measurements over the monitoring period. The mine operated weather station does not record temperature inversion data.


DRAYTON MINE EXTENSION EA
Land Ownership
Hansen Bailey
ANGLO COAL
DRAYTON
Cad File: 01393P.dwg
Date:16.04.2007
Drawn: JD
Figure
1

Details of the DCM Project Approval with respect to noise emissions are shown as **Appendix A** to this report.

Attended noise monitoring was conducted with a Brüel & Kjær Type 2250 Precision Sound Analyser. This instrument has Type 1 characteristics as defined in AS1259-1982 "Sound Level Meters" and has current NATA calibration. Field calibration is carried out at the start and end of each monitoring period.

Measured noise levels for each monitoring circuit are summarised in the following tables. The total measured L_{eq} is shown in **Tables 1-2** and night time $L_{1\ (1minute)}$ – approximated as measured L_{max} – in **Table 3**. Table 3 shows the overall $L_{1\ (1minute)}$ and the contributing source as well as the $L_{1\ (1minute)}$ from DCM, where this was measurable.

Data were analysed with the Bruel & Kjaer "*Evaluator*" software to quantify the contributions of the various noise source(s) to the overall. The noise sources are listed in the comments column with the contribution of each shown in brackets. The noise goal for mining operations at DCM is variable depending upon the location (as per the table from Schedule 3 shown in Appendix A). The contribution of mine noise from DCM is shown in bold. Any exceedances of the EPL and project approval noise criteria are shaded grey.

Table 1
DCM Noise Monitoring Results – 14 July 2016 (evening)

Location (Criterion)	Time	dB(A), $L_{eq(15min)}$	Wind speed/ direction	Identified Noise Sources
Doherty (41)	8:07 pm	43	2.7/312	Traffic (40), other mine (40), frogs (26), DCM (<20)
Kerr (37)	8:02 pm	48	2.7/313	Traffic (48), other mine (29), DCM (<20)
Skinner (40)	8:48 pm	43	2.7/311	Traffic (43), other mine (35), DCM (32), frogs (29)
Robertson (37)	8:29 pm	48	2.4/296	Traffic (48), DCM (28)
Sharman (35)	9:14 pm	51	2.8/316	Traffic (51), DCM (28)
Horder (36)	8:55 pm	47	2.7/316	Traffic (46), frogs (40), DCM (31)
Wilson (35)	8:25 pm	44	2.4/301	Traffic (44), frogs (33), DCM (<20)
Smith (35)	9:12 pm	43	2.9/315	Traffic (43), wind (31), DCM (<20)

Table 2
DCM Noise Monitoring Results – 14 July 2016 (night)

Location (Criterion)	Time	dB(A), $L_{eq(15min)}$	Wind speed/ direction	Identified Noise Sources
Doherty (39)	10:00 pm	43	2.5/314	Other mine (41), traffic (39), DCM (<20)
Kerr (37)	10:00 pm	47	2.5/314	Traffic (47), DCM (30), other mine (30)
Skinner (39)	10:52 pm	40	2.9/310	Traffic (38), DCM (34), other mine (30), frogs (27)
Robertson (42)	10:22 pm	47	2.2/209	Traffic (47), DCM (32)
Sharman (41)	11:01 pm	47	2.7/307	Traffic (47), DCM (31)
Horder (42)	10:41 pm	45	2.7/313	Traffic (43), frogs (39), DCM (33)
Wilson (36)	10:27 pm	41	2.4/312	Traffic (41), DCM (<20)
Smith (36)	11:15 pm	40	2.9/313	Traffic (37), wind (37), DCM (<20)

Table 3 DCM Noise Monitoring Results – 14 July 2016 (night)					
Location (Criterion)	Time	dB(A), $L_{1\ (1min)}$	Wind speed/ direction	$L_{1\ (1\ min)}$ source	Identified Mine Sources ($L_{1\ (1\ min)}$)
Doherty (47)	10:00 pm	46	2.5/314	Highway traffic	(<20)
Kerr (47)	10:00 pm	55	2.5/314	Highway traffic	Hum (34)
Skinner (47)	10:52 pm	43	2.9/310	Highway traffic	Engine revs (38)
Robertson (47)	10:22 pm	53	2.2/209	Traffic	Engine revs (36)
Sharman (47)	11:01 pm	57	2.7/307	Traffic	Engine revs (34)
Horder (47)	10:41 pm	53	2.7/313	Highway traffic	Engine revs (37)
Wilson (47)	10:27 pm	48	2.4/312	Highway traffic	(<20)
Smith (47)	11:15 pm	42	2.9/313	Highway traffic	(<20)

The results in Tables 1 and 2 shows that the noise criterion was not exceeded at any location and DCM was therefore in compliance throughout the whole monitoring period.

The loading of a train at DCM commenced at 10:59 pm which may have impacted noise levels at the Skinner and Sharman monitoring locations which took place during or after this time.

Data from those times where DCM operations were audible were analysed using the *"Evaluator"* software. This analysis showed the noise did not contain any tonal, impulsive or low frequency components as per definitions in the NSW Industrial Noise Policy.

The results in Table 3 show that the noise sleep disturbance criterion ($L_{1\ (1minute)}$) was not exceeded at any monitoring location during the night time period.

The operational noise levels at other receivers listed in the DCM Project Approval were determined using the ENM noise model in point calculation mode. The noise model was set up with a series of point noise sources representing the DCM operations and then calibrated to be consistent with the measured noise levels from the attended survey under similar atmospheric conditions to those at the time of the monitoring. Point calculations were then performed for each of the listed residential locations with results shown in **Appendix B**.

As the $L_{1\ (1minute)}$ levels were well below the sleep disturbance criterion at the attended monitoring locations, no modelling of $L_{1\ (1minute)}$ levels was conducted for other receiver locations, as these are all at greater distance from the DCM.

We trust this report fulfils your requirements at this time, however, should you require additional information or assistance please contact the undersigned on 4954 2276.

Yours faithfully,

SPECTRUM ACOUSTICS PTY LIMITED

Author:

Neil Pennington

Acoustical Consultant

Review:

Ross Hodge

Acoustical Consultant

SCHEDULE 3
SPECIFIC ENVIRONMENTAL CONDITIONS

NOISE

Noise Impact Assessment Criteria

1. The Proponent shall ensure that the noise generated by the project does not exceed the noise impact assessment criteria in Table 1 at any residence on privately-owned land, or on more than 25 percent of any privately-owned land.

Table 1: Noise impact assessment criteria dB(A)

Land Number	Day	Evening	Night	
	$L_{Aeq(15\ min)}$	$L_{Aeq(15\ min)}$	$L_{Aeq(15\ min)}$	$L_{A1(1\ min)}$
34	35	35	36	45
29	35	35	36	47
31	35	35	37	47
33, 86	35	35	38	45
32	35	35	40	47
71, 75	35	35	41	47
70	35	36	41	47
76	35	36	42	47
28	35	37	40	47
69	35	37	41	47
13	36	36	35	45
12	36	36	36	47
25	36	37	37	47
26	36	37	38	47
27	36	37	39	47
72	36	37	42	47
17	37	38	36	47
21, 22	38	38	38	45
18	38	39	38	47
20, 61	39	40	39	45
14	40	39	38	47
19	40	40	39	47
16	41	41	39	47
23	35	35	35	47
All other privately-owned land	35	35	35	45

However, if the Proponent has a written negotiated noise agreement with any landowner of the land listed in Table 1, and a copy of this agreement has been forwarded to the Department and DECC, then the Proponent may exceed the noise limits in Table 1 in accordance with the negotiated noise agreement.

Notes:

- *For information on the numbering and identification of properties used in this approval, see Appendix 5.*
- *To determine compliance with the $L_{Aeq(15\ minute)}$ noise limits, noise from the project is to be measured at the most affected point within the residential boundary, or at the most affected point within 30 metres of a dwelling (rural situations) where the dwelling is more than 30 metres from the boundary. Where it can be demonstrated that direct measurement of noise from the project is impractical, the DECC may accept alternative means of determining compliance (see Chapter 11 of the NSW Industrial Noise Policy). The modification factors in Section 4 of the NSW Industrial Noise Policy shall also be applied to the measured noise levels where applicable.*
- *To determine compliance with the $L_{A1(1\ minute)}$ noise limits, noise from the project is to be measured at 1 metre from the dwelling façade. Where it can be demonstrated that direct measurement of noise from the project is impractical, the DECC may accept alternative means of determining compliance (see Chapter 11 of the NSW Industrial Noise Policy).*

- *The noise emission limits identified in the above table apply under meteorological conditions of:*
  - *wind speeds of up to 3 m/s at 10 metres above ground level; or*
  - *temperature inversion conditions of up to 3°C/100m, and wind speeds of up to 2 m/s at 10 metres above ground level.*

Land Acquisition Criteria

2. If the noise generated by the project exceeds the criteria in Table 2 at any residence on privately-owned land or on more than 25 percent of any privately-owned land, the Proponent shall, upon receiving a written request for acquisition from the landowner, acquire the land in accordance with the procedures in conditions 8-10 of Schedule 4.

Table 2: Land acquisition criteria dB(A)

Land Number	***Day/Evening/Night*** $L_{Aeq(15min)}$
12, 14, 16, 17, 18, 19, 23, 25, 26, 27, 28, 29, 31, 32, 69, 70, 71, 72, 75, 76	42
All other private land owners not listed in Table 1, or on more than 25 percent of, any privately owned land.	40

Note: Noise generated by the project is to be measured in accordance with the notes to Table 1.

Cumulative Noise Criteria

3. The Proponent shall take all reasonable and feasible measures to ensure that the noise generated by the project combined with the noise generated by other mines does not exceed the following amenity criteria at any residence on privately-owned land or on more than 25 percent of any privately owned land:
   - $L_{Aeq(11\ hour)}$ *50 dB(A) – Day;*
   - $L_{Aeq(4\ hour)}$ *45 dB(A) – Evening;*
   - $L_{Aeq(9\ hour)}$ *40 dB(A) – Night.*

4. If the noise generated by the project combined with the noise generated by other mines exceeds the following amenity criteria at any residence on privately owned-land or on more than 25 percent of any privately owned land, then upon receiving a written request from the landowner, the Proponent shall acquire the land on as equitable basis as possible with the relevant mines in accordance with the procedures in conditions 8-10 of Schedule 4:
   - $L_{Aeq(11\ hour)}$ *53 dB(A) – Day;*
   - $L_{Aeq(4\ hour)}$ *48 dB(A) – Evening;*
   - $L_{Aeq(9\ hour)}$ *43 dB(A) – Night.*

Notes: The cumulative noise generated by the project combined with the noise generated by other mines is to be measured in accordance with the relevant procedures in the NSW Industrial Noise Policy.

APPENDIX B MODELLED NOISE LEVELS as Leq (15 min)				
Location	Evening		Night	
	Noise Level	Noise Goal	Noise Level	Noise Goal
34	<30	35	<30	39
29	<30	35	<30	36
31	<30	35	<30	37
33	<30	35	<30	38
86	<30	35	<30	38
32	<30	35	<30	40
71	31	35	<30	41
75*	28	35	31	41
70	30	36	22	41
76*	31	36	33	42
28	32	37	<30	40
69	30	37	<30	41
13	<30	36	<30	35
12	<30	36	<30	36
25*	<20	37	30	37
26	<30	37	<30	38
27	32	37	<30	39
72*	28	37	32	42
17	30	38	<30	36
21	30	38	<30	38
22	31	38	30	38
18	30	39	30	38
20	31	40	30	39
61*	32	40	34	39
14	30	39	<30	39
19	31	40	<30	39
16*	<20	41	<20	39
23	<30	35	<30	35
35*	<20	35	<20	35
42*	<20	35	<20	35
37	<30	35	<30	35

* Measurement location

10 August 2016

Ref: 03012/6642

James Benson
Anglo Coal (Drayton Management) Pty Limited
PMB 9
Muswellbrook NSW 2333

RE: AUGUST 2016 NOISE MONITORING RESULTS

This letter report presents the results of noise compliance monitoring conducted for the Drayton Coal Mine (DCM) on Thursday 4th August, 2016. The purpose of the measurements was to quantify the overall noise levels at the nearby residences and determine the contribution from DCM operations.

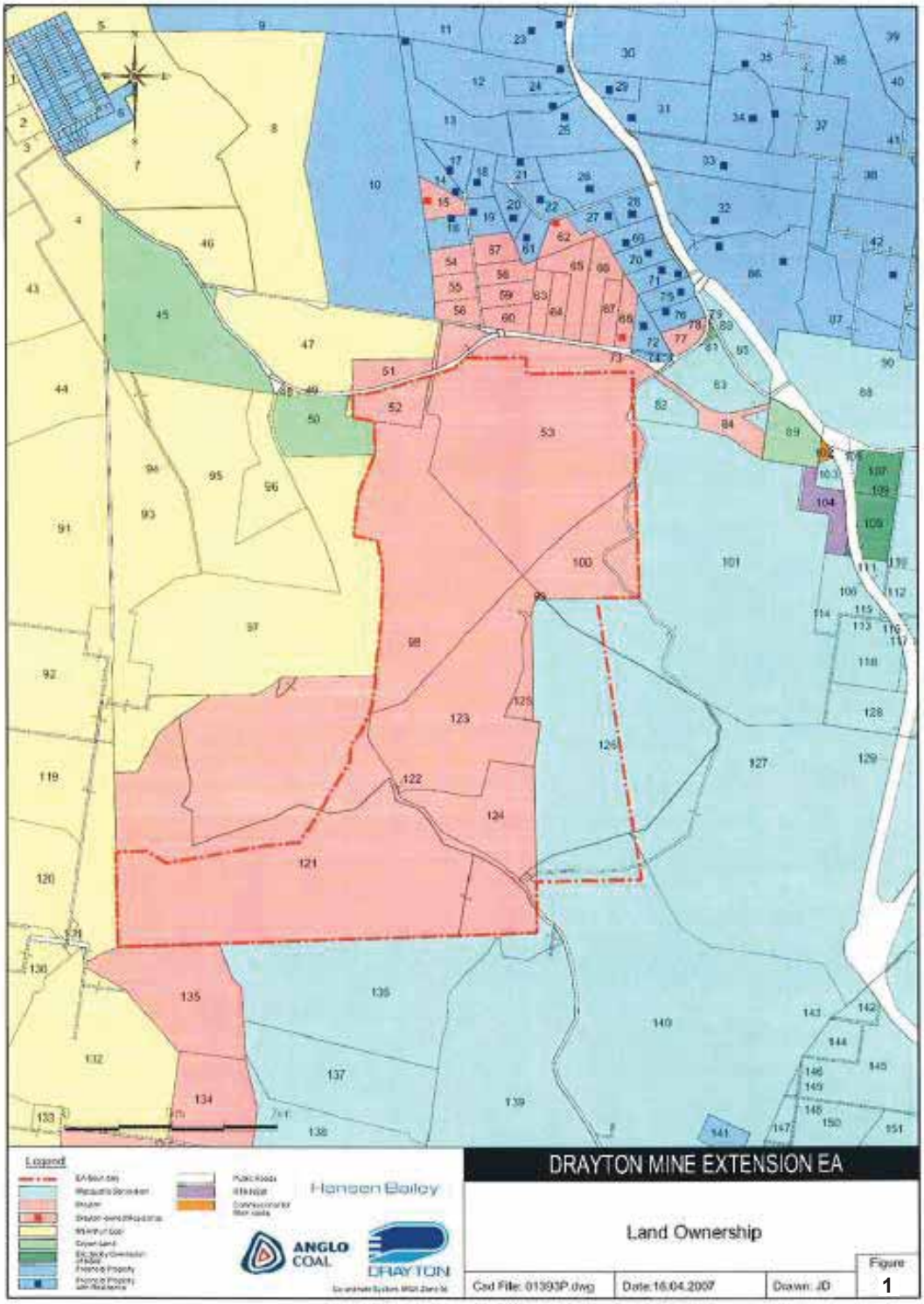
Schedule 3 of the DCM Project Approval details noise impact assessment criteria for 28 specific residential locations. For logistic reasons it is not reasonable to carry out attended noise monitoring at all of the listed locations during the one monitoring survey. As such, the approach taken was to monitor the noise at eight representative residential locations and determine, by noise modelling, the noise level at all of the other locations required in the Project Approval. Noise measurement locations for the attended noise survey are listed below (as shown in **Figure 1**):

Location R16: Doherty
Location R25: Kerr
Location R35: Wilson*
Location R42: Smith*
Location R61: Skinner
Location R72: Robertson**
Location R75: Sharman
Location R76: Horder

* Additional locations contained in EPL 1323 but not in the Project Approval.
** Monitoring conducted at front gate of property at Landowners request.

Two sets of measurements were made over the "circuit", one during the evening period (from 6 pm – 10 pm) and one at night (after 10 pm). DCM activities were audible at all monitoring locations throughout the evening and night time periods.

Meteorological data used in this report were supplied by the mine from their automatic weather station. Wind speeds (in m/s) and direction have been determined as the arithmetic average of the measurements over the monitoring period. The mine operated weather station does not record temperature inversion data.


DRAYTON MINE EXTENSION EA
Land Ownership
Hansen Bailey
ANGLO COAL
DRAYTON
Legend
Cad File: 01393P.dwg
Date:16.04.2007
Drawn: JD
Figure
1

Details of the DCM Project Approval with respect to noise emissions are shown as **Appendix A** to this report.

Attended noise monitoring was conducted with a Brüel & Kjær Type 2250 Precision Sound Analyser. This instrument has Type 1 characteristics as defined in AS1259-1982 "Sound Level Meters" and has current NATA calibration. Field calibration is carried out at the start and end of each monitoring period.

Measured noise levels for each monitoring circuit are summarised in the following tables. The total measured L_{eq} is shown in **Tables 1-2** and night time $L_{1\ (1minute)}$ – approximated as measured L_{max} – in **Table 3**. Table 3 shows the overall $L_{1\ (1minute)}$ and the contributing source as well as the $L_{1\ (1minute)}$ from DCM, where this was measurable.

Data were analysed with the Bruel & Kjaer "*Evaluator*" software to quantify the contributions of the various noise source(s) to the overall. The noise sources are listed in the comments column with the contribution of each shown in brackets. The noise goal for mining operations at DCM is variable depending upon the location (as per the table from Schedule 3 shown in Appendix A). The contribution of mine noise from DCM is shown in bold. Any exceedances of the EPL and project approval noise criteria are shaded grey.

Table 1
DCM Noise Monitoring Results – 4 August 2016 (evening)

Location (Criterion)	Time	dB(A), $L_{eq(15min)}$	Wind speed/ direction	Identified Noise Sources
Doherty (41)	8:56 pm	44	2.0/163	Traffic (41), frogs (40), DCM (34)
Kerr (37)	8:54 pm	50	2.0/163	Traffic (49), frogs (41), DCM (29)
Skinner (40)	8:31 pm	46	1.3/171	Frogs (45), DCM (37), traffic (34)
Robertson (37)	9:18 pm	48	2.4/142	Traffic (48), DCM (36), frogs (31)
Sharman (35)	8:33 pm	49	1.3/171	Traffic (48), frogs (41), DCM (31)
Horder (36)	9:38 pm	48	3.0/140	Frogs (46), traffic (43), DCM (35)
Wilson (35)	9:17 pm	40	2.4/142	Traffic (38), frogs (35), DCM (25)
Smith (35)	9:42 pm	39	3.0/140	Traffic (38), frogs (27), power plant (27), DCM (26)

Table 2
DCM Noise Monitoring Results – 4 August 2016 (night)

Location (Criterion)	Time	dB(A), $L_{eq(15min)}$	Wind speed/ direction	Identified Noise Sources
Doherty (39)	10:01 pm	45	3.6/141	Frogs (42), traffic (40), DCM (37)
Kerr (37)	10:27 pm	44	2.4/184	Traffic (43), frogs (34), DCM (32)
Skinner (39)	10:04 pm	42	3.6/143	Frogs (38), DCM (37), traffic (35)
Robertson (42)	10:22 pm	45	2.7/142	Traffic (43), DCM (38), wind (36), frogs (31)
Sharman (41)	11:01 pm	48	2.4/150	Traffic (46), frogs (42), DCM (30), power plant (27)
Horder (42)	10:42 pm	49	2.6/143	Frogs (49), DCM (37), traffic (33)
Wilson (36)	10:50 pm	40	2.7/154	Traffic (38), frogs (33), power plant (30), DCM (26)
Smith (36)	11:12 pm	39	2.0/153	Traffic (36), power plant (34), frogs (32), DCM (25)

Table 3 DCM Noise Monitoring Results – 4 August 2016 (night)					
Location (Criterion)	Time	dB(A), $L_{1\ (1min)}$	Wind speed/ direction	$L_{1\ (1\ min)}$ source	Identified Mine Sources ($L_{1\ (1\ min)}$)
Doherty (47)	10:01 pm	49	3.6/141	Frogs	Engine revs (41)
Kerr (47)	10:27 pm	51	2.4/184	Highway traffic	Hum (35)
Skinner (47)	10:04 pm	45	3.6/143	Frogs	Engine revs (42)
Robertson (47)	10:22 pm	52	2.7/142	Traffic	Engine revs (43)
Sharman (47)	11:01 pm	55	2.4/150	Traffic	Engine revs (35)
Horder (47)	10:42 pm	54	2.6/143	Frogs	Engine revs (42)
Wilson (47)	10:50 pm	44	2.7/154	Highway traffic	Hum (28)
Smith (47)	11:12 pm	43	2.0/153	Highway traffic	Hum (27)

The results in Tables 1 and 2 shows that the noise criterion was not exceeded at any location and DCM was therefore in compliance throughout the whole monitoring period.

Data from those times where DCM operations were audible were analysed using the *"Evaluator"* software. This analysis showed the noise did not contain any tonal, impulsive or low frequency components as per definitions in the NSW Industrial Noise Policy.

The results in Table 3 show that the noise sleep disturbance criterion ($L_{1\ (1minute)}$) was not exceeded at any monitoring location during the night time period.

The operational noise levels at other receivers listed in the DCM Project Approval were determined using the ENM noise model in point calculation mode. The noise model was set up with a series of point noise sources representing the DCM operations and then calibrated to be consistent with the measured noise levels from the attended survey under similar atmospheric conditions to those at the time of the monitoring. Point calculations were then performed for each of the listed residential locations with results shown in **Appendix B**.

As the $L_{1\ (1minute)}$ levels were well below the sleep disturbance criterion at the attended monitoring locations, no modelling of $L_{1\ (1minute)}$ levels was conducted for other receiver locations, as these are all at greater distance from the DCM.

We trust this report fulfils your requirements at this time, however, should you require additional information or assistance please contact the undersigned on 4954 2276.

Yours faithfully,
SPECTRUM ACOUSTICS PTY LIMITED

Author:

Neil Pennington
Acoustical Consultant

Review:

Ross Hodge
Acoustical Consultant

SCHEDULE 3
SPECIFIC ENVIRONMENTAL CONDITIONS

NOISE

Noise Impact Assessment Criteria

1. The Proponent shall ensure that the noise generated by the project does not exceed the noise impact assessment criteria in Table 1 at any residence on privately-owned land, or on more than 25 percent of any privately-owned land.

Table 1: Noise impact assessment criteria dB(A)

Land Number	Day	Evening	Night	
	$L_{Aeq(15\ min)}$	$L_{Aeq(15\ min)}$	$L_{Aeq(15\ min)}$	$L_{A1(1\ min)}$
34	35	35	36	45
29	35	35	36	47
31	35	35	37	47
33, 86	35	35	38	45
32	35	35	40	47
71, 75	35	35	41	47
70	35	36	41	47
76	35	36	42	47
28	35	37	40	47
69	35	37	41	47
13	36	36	35	45
12	36	36	36	47
25	36	37	37	47
26	36	37	38	47
27	36	37	39	47
72	36	37	42	47
17	37	38	36	47
21, 22	38	38	38	45
18	38	39	38	47
20, 61	39	40	39	45
14	40	39	38	47
19	40	40	39	47
16	41	41	39	47
23	35	35	35	47
All other privately-owned land	35	35	35	45

However, if the Proponent has a written negotiated noise agreement with any landowner of the land listed in Table 1, and a copy of this agreement has been forwarded to the Department and DECC, then the Proponent may exceed the noise limits in Table 1 in accordance with the negotiated noise agreement.

Notes:

- *For information on the numbering and identification of properties used in this approval, see Appendix 5.*
- *To determine compliance with the $L_{Aeq(15\ minute)}$ noise limits, noise from the project is to be measured at the most affected point within the residential boundary, or at the most affected point within 30 metres of a dwelling (rural situations) where the dwelling is more than 30 metres from the boundary. Where it can be demonstrated that direct measurement of noise from the project is impractical, the DECC may accept alternative means of determining compliance (see Chapter 11 of the NSW Industrial Noise Policy). The modification factors in Section 4 of the NSW Industrial Noise Policy shall also be applied to the measured noise levels where applicable.*
- *To determine compliance with the $L_{A1(1\ minute)}$ noise limits, noise from the project is to be measured at 1 metre from the dwelling façade. Where it can be demonstrated that direct measurement of noise from the project is impractical, the DECC may accept alternative means of determining compliance (see Chapter 11 of the NSW Industrial Noise Policy).*

- *The noise emission limits identified in the above table apply under meteorological conditions of:*
  - *wind speeds of up to 3 m/s at 10 metres above ground level; or*
  - *temperature inversion conditions of up to 3°C/100m, and wind speeds of up to 2 m/s at 10 metres above ground level.*

Land Acquisition Criteria

2. If the noise generated by the project exceeds the criteria in Table 2 at any residence on privately-owned land or on more than 25 percent of any privately-owned land, the Proponent shall, upon receiving a written request for acquisition from the landowner, acquire the land in accordance with the procedures in conditions 8-10 of Schedule 4.

Table 2: Land acquisition criteria dB(A)

Land Number	***Day/Evening/Night*** $L_{Aeq(15min)}$
12, 14, 16, 17, 18, 19, 23, 25, 26, 27, 28, 29, 31, 32, 69, 70, 71, 72, 75, 76	42
All other private land owners not listed in Table 1, or on more than 25 percent of, any privately owned land.	40

Note: Noise generated by the project is to be measured in accordance with the notes to Table 1.

Cumulative Noise Criteria

3. The Proponent shall take all reasonable and feasible measures to ensure that the noise generated by the project combined with the noise generated by other mines does not exceed the following amenity criteria at any residence on privately-owned land or on more than 25 percent of any privately owned land:
   - $L_{Aeq(11\ hour)}$ *50 dB(A) – Day;*
   - $L_{Aeq(4\ hour)}$ *45 dB(A) – Evening;*
   - $L_{Aeq(9\ hour)}$ *40 dB(A) – Night.*

4. If the noise generated by the project combined with the noise generated by other mines exceeds the following amenity criteria at any residence on privately owned-land or on more than 25 percent of any privately owned land, then upon receiving a written request from the landowner, the Proponent shall acquire the land on as equitable basis as possible with the relevant mines in accordance with the procedures in conditions 8-10 of Schedule 4:
   - $L_{Aeq(11\ hour)}$ *53 dB(A) – Day;*
   - $L_{Aeq(4\ hour)}$ *48 dB(A) – Evening;*
   - $L_{Aeq(9\ hour)}$ *43 dB(A) – Night.*

Notes: The cumulative noise generated by the project combined with the noise generated by other mines is to be measured in accordance with the relevant procedures in the NSW Industrial Noise Policy.

APPENDIX B MODELLED NOISE LEVELS as Leq (15 min)				
Location	Evening		Night	
	Noise Level	Noise Goal	Noise Level	Noise Goal
34	<30	35	<30	39
29	<30	35	<30	36
31	<30	35	<30	37
33	<30	35	30	38
86	<30	35	<30	38
32	<30	35	31	40
71	30	35	<30	41
75*	31	35	30	41
70	30	36	<30	41
76*	35	36	37	42
28	32	37	31	40
69	33	37	34	41
13	<30	36	<30	35
12	<30	36	<30	36
25*	29	37	32	37
26	32	37	33	38
27	32	37	32	39
72*	36	37	38	42
17	32	38	34	36
21	32	38	33	38
22	35	38	35	38
18	32	39	34	38
20	35	40	36	39
61*	37	40	37	39
14	34	39	36	39
19	34	40	36	39
16*	34	41	37	39
23	<30	35	<30	35
35*	25	35	26	35
42*	26	35	25	35
37	<30	35	<30	35

* Measurement location

6 October 2016

Ref: 03012/6752

James Benson
Anglo Coal (Drayton Management) Pty Limited
PMB 9
Muswellbrook NSW 2333

RE: SEPTEMBER 2016 NOISE MONITORING RESULTS

This letter report presents the results of noise compliance monitoring conducted for the Drayton Coal Mine (DCM) on Monday 19th September 2016. The purpose of the measurements was to quantify the overall noise levels at the nearby residences and determine the contribution from DCM operations.

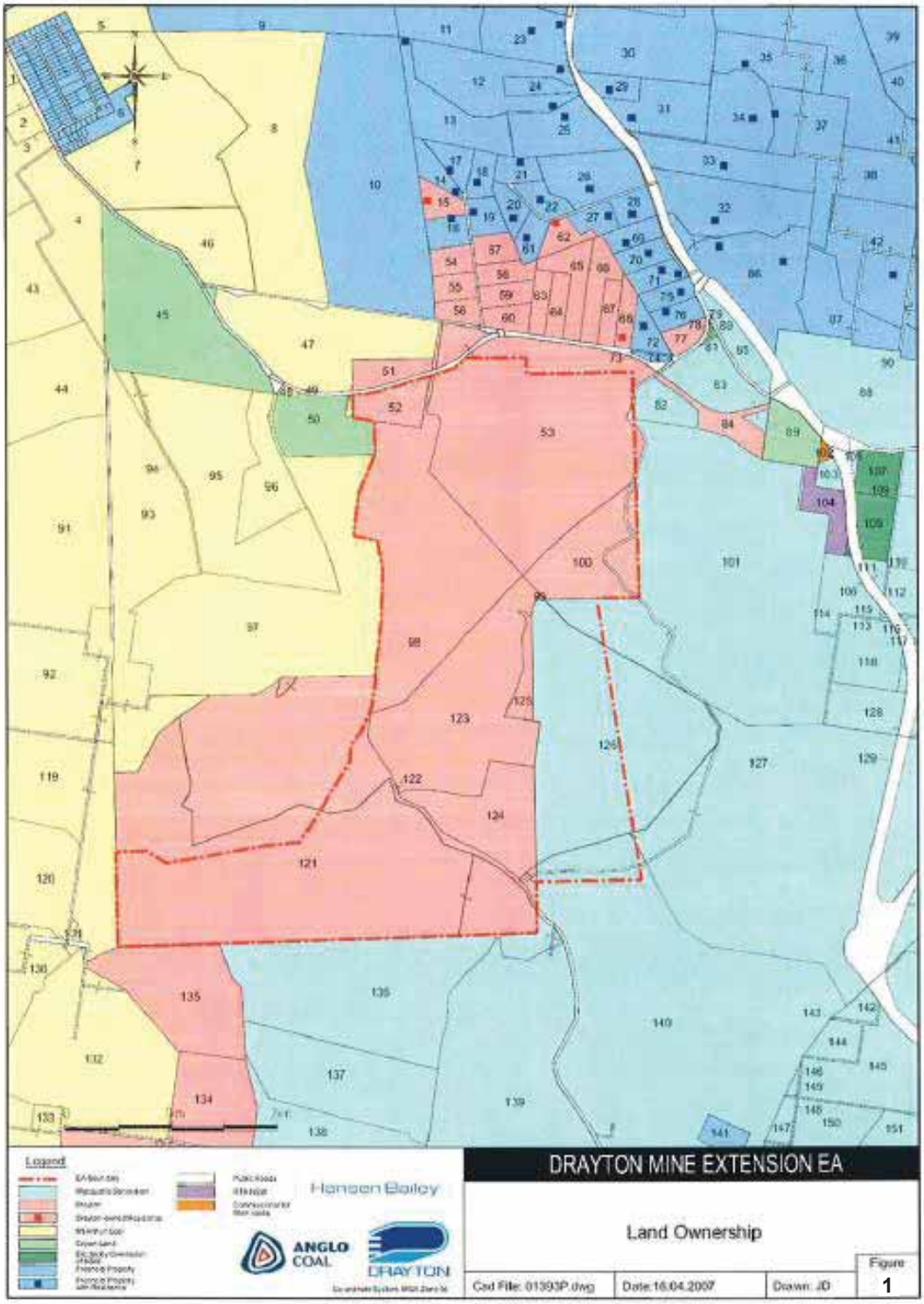
Schedule 3 of the DCM Project Approval details noise impact assessment criteria for 28 specific residential locations. For logistic reasons it is not reasonable to carry out attended noise monitoring at all of the listed locations during the one monitoring survey. As such, the approach taken was to monitor the noise at eight representative residential locations and determine, by noise modelling, the noise level at all of the other locations required in the Project Approval. Noise measurement locations for the attended noise survey are listed below (as shown in **Figure 1**):

Location R16: Doherty
Location R25: Kerr
Location R35: Wilson*
Location R42: Smith*
Location R61: Skinner
Location R72: Robertson**
Location R75: Sharman**
Location R76: Horder

* Additional locations contained in EPL 1323 but not in the Project Approval.
** Monitoring conducted at front gate of property at Landowners request.

Three sets of measurements were made over the "circuit", one during the day time period (before 6 pm), one during the evening period (from 6 pm – 10 pm) and one at night (after 10 pm). DCM activities were audible at many monitoring locations throughout the survey.

Meteorological data used in this report was supplied by the mine from their automatic weather station. Wind speeds (in m/s) and direction have been determined as the arithmetic average of the measurements over the monitoring period. The mine operated weather station does not record temperature inversion data.


DRAYTON MINE EXTENSION EA
Land Ownership
Hansen Bailey
ANGLO COAL
DRAYTON
Legend
Cad File: 01393P.dwg
Date:16.04.2007
Drawn: JD
Figure
1

Details of the DCM Project Approval with respect to noise emissions are shown as **Appendix A** to this report.

Noise emission levels were measured with Brüel & Kjær Type 2250 Precision Sound Analysers. These instruments have Type 1 characteristics as defined in AS1259-1982 "Sound Level Meters". Calibration of the instruments was confirmed with a Brüel & Kjær Type 4231 Sound Level Calibrator prior to and at the completion of measurements.

Measured noise levels for each monitoring circuit are summarised in the following tables. The total measured L_{eq} is shown in **Tables 1-3** and night time $L_{1(1minute)}$ – approximated as measured L_{max} – in **Table 4**. Table 3 shows the overall $L_{1(1minute)}$ and the contributing source as well as the $L_{1(1minute)}$ from DCM, where this was measurable.

Data were analysed with the Bruel & Kjaer "*Evaluator*" software to quantify the contributions of the various noise source(s) to the overall. The noise sources are listed in the comments column with the contribution of each shown in brackets. The noise goal (criterion) for mining operations at DCM is variable depending upon the location (as per the table from Schedule 3 shown in Appendix A). The relevant criterion is shown in brackets in the "Location" column in the tables. The contribution of mine noise from DCM is shown in bold. Any exceedances of the EPL and project approval noise criteria are shaded grey.

Table 1
DCM Noise Monitoring Results – 19 September 2016 (Day)

Location (Criterion)	Time	dB(A), $L_{eq(15min)}$	Wind speed/ direction	Identified Noise Sources
Doherty (41)	4:28 pm	42	3.6/295	Birds (41), wind (32), traffic (28), DCM (<20)
Kerr (36)	3:17 pm	47	4.8/307	Traffic (46), wind (38), birds (32), DCM (<20)
Skinner (39)	2:55 pm	48	3.6/311	Wind (48), birds (31), traffic (24), DCM (<20)
Robertson (36)	4:51 pm	56	3.9/302	Traffic (56), wind (41), birds (33), DCM (<20)
Sharman (35)	5:35 pm	59	3.8/291	Traffic (59), birds (32), DCM (<20)
Horder (35)	5:13 pm	47	3.3/299	Traffic (45), wind (41), birds (38), DCM (<20)
Wilson (35)	3:40 pm	44	3.9/312	Wind (42), traffic (39), birds (31), DCM (<20)
Smith (35)	4:03 pm	43	4.2/285	Wind (42), traffic (36), birds (29), DCM (<20)

Table 2
DCM Noise Monitoring Results – 19 September 2016 (Evening)

Location (Criterion)	Time	dB(A), $L_{eq(15min)}$	Wind speed/ direction	Identified Noise Sources
Doherty (41)	8:16 pm	41	3.6/291	Frogs (40), other mine (32), traffic (29), DCM (25)
Kerr (37)	6:38 pm	47	3.3/301	Traffic (47), frogs (31), DCM (<20)
Skinner (40)	7:23 pm	43	3.4/294	Frogs (43), traffic (30), DCM (<20)
Robertson (37)	8:44 pm	58	3.8/293	Traffic (58), DCM (33), wind (30), frogs (26)
Sharman (35)	9:26 pm	53	2.7/309	Traffic (53), frogs (29), DCM (28)
Horder (36)	9:06 pm	45	3.8/299	Traffic (43), frogs (40), DCM (30)
Wilson (35)	7:00 pm	46	3.4/298	Traffic (45), frogs (39), DCM (<20)
Smith (35)	7:51 pm	44	3.2/294	Traffic (43), frogs (37), DCM (<20)

Table 3 DCM Noise Monitoring Results – 19 September 2016 (Night)				
Location (Criterion)	Time	dB(A), $L_{eq(15min)}$	Wind speed/ direction	Identified Noise Sources
Doherty (39)	10:00 pm	42	1.6/299	Frogs (41), other mine (34), traffic (27), DCM (26)
Kerr (37)	10:02 pm	44	1.6/299	Traffic (44), frogs (29), other mine (24), DCM (<20)
Skinner (39)	10:56 pm	41	1.6/313	Frogs (39), DCM (34), traffic (33)
Robertson (42)	10:23 pm	52	1.9/304	Traffic (52), DCM (37), frogs (25)
Sharman (41)	11:04 pm	52	1.8/321	Traffic (52), frogs (34), DCM (29)
Horder (42)	10:43 pm	48	1.5/324	Frogs (47), traffic (40), DCM (35)
Wilson (36)	10:29 pm	41	1.8/313	Traffic (41), frogs (29), DCM (24)
Smith (36)	11:23 pm	38	2.4/309	Traffic (38), frogs (26), DCM (<20)

Table 4 DCM Noise Monitoring Results – 19 September 2016 (Night)					
Location (Criterion)	Time	dB(A), $L_{1(1minute)}$	Wind speed/ direction	L_{A1} source	Identified Mine Sources ($L_{1\,(1\,min)}$)
Doherty (47)	10:00 pm	45	1.6/299	Frogs	Hum (30)
Kerr (47)	10:02 pm	52	1.6/299	Highway	n/a
Skinner (47)	10:56 pm	45	1.6/313	Frogs	Truck revs (38)
Robertson (47)	10:23 pm	61	1.9/304	Traffic	Truck revs (41)
Sharman (47)	11:04 pm	64	1.8/321	Highway	Hum (32)
Horder (47)	10:43 pm	53	1.5/324	Frogs	Truck revs (40)
Wilson (47)	10:29 pm	47	1.8/313	Highway	Hum (26)
Smith (47)	11:23 pm	44	2.4/309	Highway	n/a

The results in Tables 1 to 3 show that the applicable operational noise criteria were not exceeded at any location or at any time throughout the monitoring survey. The audible noise sources from DCM included truck revs and general mine hum and there were no trains loaded during the entire monitoring period.

Data from those times where DCM operations were audible were analysed using the *"Evaluator"* software. This analysis showed the noise did not contain any tonal, impulsive or low frequency components as per definitions in the NSW Industrial Noise Policy.

The results in Table 4 show that the sleep disturbance criteria ($L_{1(1minute)}$) was not exceeded at any monitoring location during the night time period.

The operational noise levels at other receivers listed in the DCM Project Approval were determined using the ENM noise model in point calculation mode. The noise model was set up with a series of point noise sources representing the DCM operations and then calibrated to be consistent with the measured noise levels from the attended survey under similar atmospheric conditions to those at the time of the monitoring. Point calculations were then performed for each of the listed residential locations with results shown in **Appendix B**.

As the $L_{1(1minute)}$ levels were well below the sleep disturbance criterion at the attended monitoring locations, no modelling of $L_{1(1minute)}$ levels was conducted for other receiver locations, as these are all at greater distance from the DCM.

We trust this report fulfils your requirements at this time, however, should you require additional information or assistance please contact the undersigned on 4954 2276.

Yours faithfully,
SPECTRUM ACOUSTICS PTY LIMITED

Author:

Neil Pennington
Acoustical Consultant

Review:

Ross Hodge
Acoustical Consultant

SCHEDULE 3
SPECIFIC ENVIRONMENTAL CONDITIONS

NOISE

Noise Impact Assessment Criteria

1. The Proponent shall ensure that the noise generated by the project does not exceed the noise impact assessment criteria in Table 1 at any residence on privately-owned land, or on more than 25 percent of any privately-owned land.

Table 1: Noise impact assessment criteria dB(A)

Land Number	Day	Evening	Night	
	$L_{Aeq(15\ min)}$	$L_{Aeq(15\ min)}$	$L_{Aeq(15\ min)}$	$L_{A1(1\ min)}$
34	35	35	36	45
29	35	35	36	47
31	35	35	37	47
33, 86	35	35	38	45
32	35	35	40	47
71, 75	35	35	41	47
70	35	36	41	47
76	35	36	42	47
28	35	37	40	47
69	35	37	41	47
13	36	36	35	45
12	36	36	36	47
25	36	37	37	47
26	36	37	38	47
27	36	37	39	47
72	36	37	42	47
17	37	38	36	47
21, 22	38	38	38	45
18	38	39	38	47
20, 61	39	40	39	45
14	40	39	38	47
19	40	40	39	47
16	41	41	39	47
23	35	35	35	47
All other privately-owned land	35	35	35	45

However, if the Proponent has a written negotiated noise agreement with any landowner of the land listed in Table 1, and a copy of this agreement has been forwarded to the Department and DECC, then the Proponent may exceed the noise limits in Table 1 in accordance with the negotiated noise agreement.

Notes:

- *For information on the numbering and identification of properties used in this approval, see Appendix 5.*
- *To determine compliance with the $L_{Aeq(15\ minute)}$ noise limits, noise from the project is to be measured at the most affected point within the residential boundary, or at the most affected point within 30 metres of a dwelling (rural situations) where the dwelling is more than 30 metres from the boundary. Where it can be demonstrated that direct measurement of noise from the project is impractical, the DECC may accept alternative means of determining compliance (see Chapter 11 of the NSW Industrial Noise Policy). The modification factors in Section 4 of the NSW Industrial Noise Policy shall also be applied to the measured noise levels where applicable.*
- *To determine compliance with the $L_{A1(1\ minute)}$ noise limits, noise from the project is to be measured at 1 metre from the dwelling façade. Where it can be demonstrated that direct measurement of noise from the project is impractical, the DECC may accept alternative means of determining compliance (see Chapter 11 of the NSW Industrial Noise Policy).*

- *The noise emission limits identified in the above table apply under meteorological conditions of:*
  - *wind speeds of up to 3 m/s at 10 metres above ground level; or*
  - *temperature inversion conditions of up to 3°C/100m, and wind speeds of up to 2 m/s at 10 metres above ground level.*

Land Acquisition Criteria

2. If the noise generated by the project exceeds the criteria in Table 2 at any residence on privately-owned land or on more than 25 percent of any privately-owned land, the Proponent shall, upon receiving a written request for acquisition from the landowner, acquire the land in accordance with the procedures in conditions 8-10 of Schedule 4.

Table 2: Land acquisition criteria dB(A)

Land Number	***Day/Evening/Night*** $L_{Aeq(15min)}$
12, 14, 16, 17, 18, 19, 23, 25, 26, 27, 28, 29, 31, 32, 69, 70, 71, 72, 75, 76	42
All other private land owners not listed in Table 1, or on more than 25 percent of, any privately owned land.	40

Note: Noise generated by the project is to be measured in accordance with the notes to Table 1.

Cumulative Noise Criteria

3. The Proponent shall take all reasonable and feasible measures to ensure that the noise generated by the project combined with the noise generated by other mines does not exceed the following amenity criteria at any residence on privately-owned land or on more than 25 percent of any privately owned land:
   - $L_{Aeq(11\ hour)}$ *50 dB(A) – Day;*
   - $L_{Aeq(4\ hour)}$ *45 dB(A) – Evening;*
   - $L_{Aeq(9\ hour)}$ *40 dB(A) – Night.*

4. If the noise generated by the project combined with the noise generated by other mines exceeds the following amenity criteria at any residence on privately owned-land or on more than 25 percent of any privately owned land, then upon receiving a written request from the landowner, the Proponent shall acquire the land on as equitable basis as possible with the relevant mines in accordance with the procedures in conditions 8-10 of Schedule 4:
   - $L_{Aeq(11\ hour)}$ *53 dB(A) – Day;*
   - $L_{Aeq(4\ hour)}$ *48 dB(A) – Evening;*
   - $L_{Aeq(9\ hour)}$ *43 dB(A) – Night.*

Notes: The cumulative noise generated by the project combined with the noise generated by other mines is to be measured in accordance with the relevant procedures in the NSW Industrial Noise Policy.

APPENDIX B MODELLED NOISE LEVELS as Leq (15 min)						
Location	Day		Evening		Night	
	Noise Level	Noise Goal	Noise Level	Noise Goal	Noise Level	Noise Goal
34	<30	35	<30	35	<30	39
29	<30	35	<30	35	<30	36
31	<30	35	<30	35	<30	37
33	<30	35	<30	35	<30	38
86	<30	35	<30	35	<30	38
32	<30	35	<30	35	<30	40
71	<30	35	<30	35	<30	41
75*	<30	35	<30	35	<30	41
70	<30	35	<30	36	<30	41
76*	<30	35	30	36	35	42
28	<30	35	<30	37	<30	40
69	<30	35	<30	37	<30	41
13	<30	36	<30	36	<30	35
12	<30	36	<30	36	<30	36
25*	<30	36	<30	37	<30	37
26	<30	36	<30	37	<30	38
27	<30	36	<30	37	<30	39
72*	<30	36	33	37	37	42
17	<30	37	<30	38	<30	36
21	<30	38	<30	38	<30	38
22	<30	38	<30	38	<30	38
18	<30	38	<30	39	<30	38
20	<30	39	<30	40	<30	39
61*	<30	39	<30	40	34	39
14	<30	40	<30	39	<30	39
19	<30	40	<30	40	<30	39
16*	<30	41	<30	41	<30	39
23	<30	35	<30	35	<30	35
35*	<30	35	<30	35	<30	35
42*	<30	35	<30	35	<30	35
37	<30	35	<30	35	<30	35

* Measurement location

19 October 2016

Ref: 03012/6774

James Benson
Anglo Coal (Drayton Management) Pty Limited
PMB 9
Muswellbrook NSW 2333

RE: OCTOBER 2016 NOISE MONITORING RESULTS

This letter report presents the results of noise compliance monitoring conducted for the Drayton Coal Mine (DCM) on Wednesday 12th October 2016. The purpose of the measurements was to quantify the overall noise levels at the nearby residences and determine the contribution from DCM operations.

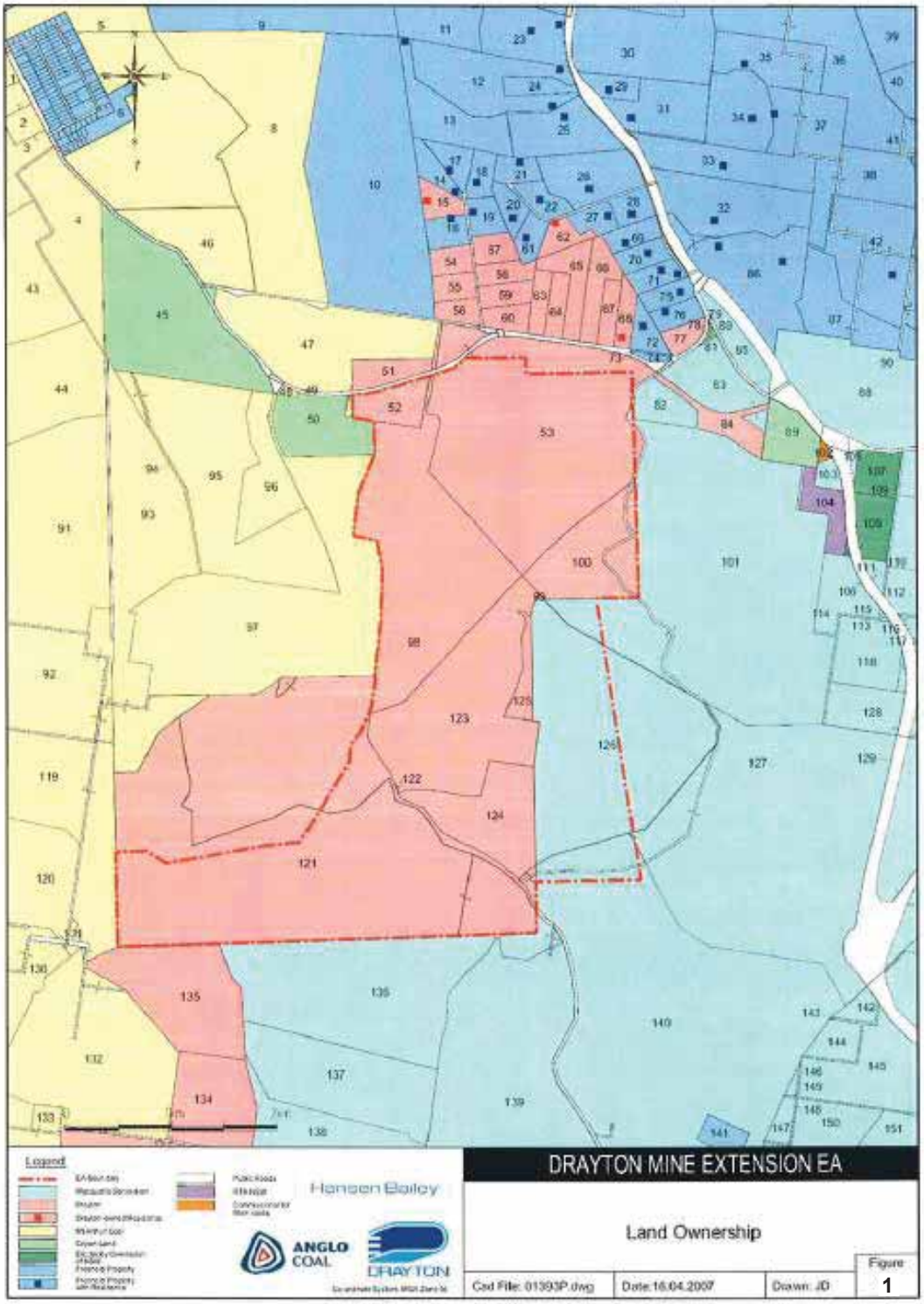
Schedule 3 of the DCM Project Approval details noise impact assessment criteria for 28 specific residential locations. For logistic reasons it is not reasonable to carry out attended noise monitoring at all of the listed locations during the one monitoring survey. As such, the approach taken was to monitor the noise at eight representative residential locations and determine, by noise modelling, the noise level at all of the other locations required in the Project Approval. Noise measurement locations for the attended noise survey are listed below (as shown in **Figure 1**):

Location R16: Doherty
Location R25: Kerr
Location R35: Wilson*
Location R42: Smith*
Location R61: Skinner
Location R72: Robertson**
Location R75: Sharman**
Location R76: Horder

* Additional locations contained in EPL 1323 but not in the Project Approval.
** Monitoring conducted at front gate of property at Landowners request.

Two sets of measurements were made over the "circuit", one during the evening period (from 6 pm – 10 pm) and one at night (after 10 pm). DCM activities were audible at several of the monitoring locations throughout the evening and night time periods.

Meteorological data used in this report was supplied by the mine from their automatic weather station. Wind speeds (in m/s) and direction have been determined as the arithmetic average of the measurements over the monitoring period. The mine operated weather station does not record temperature inversion data.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Details of the DCM Project Approval with respect to noise emissions are shown as **Appendix A** to this report.

Noise emission levels were measured with Brüel & Kjær Type 2250 Precision Sound Analysers. These instruments have Type 1 characteristics as defined in AS1259-1982 "Sound Level Meters". Calibration of the instruments was confirmed with a Brüel & Kjær Type 4231 Sound Level Calibrator prior to and at the completion of measurements.

Measured noise levels for each monitoring circuit are summarised in the following tables. The total measured L_{eq} is shown in **Tables 1-3** and night time $L_{1(1minute)}$ – approximated as measured L_{max} – in **Table 4**. Table 3 shows the overall $L_{1(1minute)}$ and the contributing source as well as the $L_{1(1minute)}$ from DCM, where this was measurable.

Data were analysed with the Bruel & Kjaer "*Evaluator*" software to quantify the contributions of the various noise source(s) to the overall. The noise sources are listed in the comments column with the contribution of each shown in brackets. The noise goal (criterion) for mining operations at DCM is variable depending upon the location (as per the table from Schedule 3 shown in Appendix A). The relevant criterion is shown in brackets in the "Location" column in the tables. The contribution of mine noise from DCM is shown in bold. Any exceedances of the EPL and project approval noise criteria are shaded grey.

Table 2
DCM Noise Monitoring Results – 12 October 2016 (Evening)

Location (Criterion)	Time	dB(A), $L_{eq(15min)}$	Wind speed/ direction	Identified Noise Sources
Doherty (41)	8:22 pm	37	2.0/318	Traffic (34), frogs (31), other mine (30), DCM (<20)
Kerr (37)	7:43 pm	49	1.8/320	Traffic (49), frogs (33), DCM (<20)
Skinner (40)	7:18 pm	39	1.9/313	Frogs (35), traffic (35), DCM (<20)
Robertson (37)	8:43 pm	41	2.1/312	Traffic (39), DCM (36), frogs (22)
Sharman (35)	9:32 pm	55	1.2/319	Traffic (55), DCM (30)
Horder (36)	9:07 pm	52	1.9/312	Frogs (52), traffic (39), DCM (32)
Wilson (35)	8:05 pm	42	1.8/317	Traffic (42), frogs (30), DCM (<20)
Smith (35)	8:21 pm	38	2.0/318	Traffic (38), frogs (22), DCM (<20)

Table 3
DCM Noise Monitoring Results – 12 October 2016 (Night)

Location (Criterion)	Time	dB(A), $L_{eq(15min)}$	Wind speed/ direction	Identified Noise Sources
Doherty (39)	10:01 pm	36	Calm	Other mine (33), traffic (30), frogs (29), DCM (<20)
Kerr (37)	10:26 pm	43	1.2/340	Traffic (43), frogs (30), DCM (20)
Skinner (39)	10:03 pm	39	Calm	Traffic (37), frogs (34), DCM (30)
Robertson (42)	10:20 pm	48	1.2/340	Traffic (46), DCM (42), frogs (22)
Sharman (41)	11:05 pm	52	1.2/331	Traffic (52), DCM (33)
Horder (42)	10:42 pm	51	0.9/337	Frogs (51), DCM (40), traffic (38)
Wilson (36)	10:50 pm	39	1.0/335	Traffic (39), frogs (25), DCM (<20)
Smith (36)	11:13 pm	37	1.2/325	Traffic (37), frogs (24), DCM (<20)

Table 4 DCM Noise Monitoring Results – 12 October 2016 (Night)					
Location (Criterion)	Time	dB(A), $L_{1(1minute)}$	Wind speed/ direction	L_{A1} source	Identified Mine Sources ($L_{1\ (1\ min)}$)
Doherty (47)	10:01 pm	50	Calm	Frogs	n/a
Kerr (47)	10:26 pm	50	1.2/340	Highway	n/a
Skinner (47)	10:03 pm	42	Calm	Traffic	Dozer tracks (35)
Robertson (47)	10:20 pm	68	1.2/340	Traffic	Truck revs (46)
Sharman (47)	11:05 pm	66	1.2/331	Highway	Truck revs (39)
Horder (47)	10:42 pm	58	0.9/337	Frogs	Truck revs (45)
Wilson (47)	10:50 pm	42	1.0/335	Highway	n/a
Smith (47)	11:13 pm	47	1.2/325	Highway	n/a

The results in Tables 1 to 3 show that the applicable operational noise criteria were not exceeded at any location or at any time throughout the monitoring survey. The audible noise sources from DCM included truck revs and general mine hum and occasional dozer tracks. There were no trains loaded during the monitoring period.

The results in Table 4 show that the sleep disturbance criteria ($L_{1(1minute)}$) was not exceeded at any monitoring location during the night time period.

Data from those times where DCM operations were audible were analysed using the *"Evaluator"* software. This analysis showed the noise did not contain any tonal, impulsive or low frequency components as per definitions in the NSW Industrial Noise Policy.

The operational noise levels at other receivers listed in the DCM Project Approval were determined using the ENM noise model in point calculation mode. The noise model was set up with a series of point noise sources representing the DCM operations and then calibrated to be consistent with the measured noise levels from the attended survey under similar atmospheric conditions to those at the time of the monitoring. Point calculations were then performed for each of the listed residential locations with results shown in **Appendix B**. As the $L_{1(1minute)}$ levels were well below the sleep disturbance criterion at the attended monitoring locations, no modelling of $L_{1(1minute)}$ levels was conducted for other receiver locations, as these are all at greater distance from the DCM.

We trust this report fulfils your requirements at this time, however, should you require additional information or assistance please contact the undersigned on 4954 2276.

Yours faithfully,
SPECTRUM ACOUSTICS PTY LIMITED

Author:

Neil Pennington
Acoustical Consultant

Review:

Ross Hodge
Acoustical Consultant

SCHEDULE 3
SPECIFIC ENVIRONMENTAL CONDITIONS

NOISE

Noise Impact Assessment Criteria

1. The Proponent shall ensure that the noise generated by the project does not exceed the noise impact assessment criteria in Table 1 at any residence on privately-owned land, or on more than 25 percent of any privately-owned land.

Table 1: Noise impact assessment criteria dB(A)

Land Number	Day	Evening	Night	
	$L_{Aeq(15\ min)}$	$L_{Aeq(15\ min)}$	$L_{Aeq(15\ min)}$	$L_{A1(1\ min)}$
34	35	35	36	45
29	35	35	36	47
31	35	35	37	47
33, 86	35	35	38	45
32	35	35	40	47
71, 75	35	35	41	47
70	35	36	41	47
76	35	36	42	47
28	35	37	40	47
69	35	37	41	47
13	36	36	35	45
12	36	36	36	47
25	36	37	37	47
26	36	37	38	47
27	36	37	39	47
72	36	37	42	47
17	37	38	36	47
21, 22	38	38	38	45
18	38	39	38	47
20, 61	39	40	39	45
14	40	39	38	47
19	40	40	39	47
16	41	41	39	47
23	35	35	35	47
All other privately-owned land	35	35	35	45

However, if the Proponent has a written negotiated noise agreement with any landowner of the land listed in Table 1, and a copy of this agreement has been forwarded to the Department and DECC, then the Proponent may exceed the noise limits in Table 1 in accordance with the negotiated noise agreement.

Notes:

- *For information on the numbering and identification of properties used in this approval, see Appendix 5.*
- *To determine compliance with the $L_{Aeq(15\ minute)}$ noise limits, noise from the project is to be measured at the most affected point within the residential boundary, or at the most affected point within 30 metres of a dwelling (rural situations) where the dwelling is more than 30 metres from the boundary. Where it can be demonstrated that direct measurement of noise from the project is impractical, the DECC may accept alternative means of determining compliance (see Chapter 11 of the NSW Industrial Noise Policy). The modification factors in Section 4 of the NSW Industrial Noise Policy shall also be applied to the measured noise levels where applicable.*
- *To determine compliance with the $L_{A1(1\ minute)}$ noise limits, noise from the project is to be measured at 1 metre from the dwelling façade. Where it can be demonstrated that direct measurement of noise from the project is impractical, the DECC may accept alternative means of determining compliance (see Chapter 11 of the NSW Industrial Noise Policy).*

- *The noise emission limits identified in the above table apply under meteorological conditions of:*
  - *wind speeds of up to 3 m/s at 10 metres above ground level; or*
  - *temperature inversion conditions of up to 3°C/100m, and wind speeds of up to 2 m/s at 10 metres above ground level.*

Land Acquisition Criteria

2. If the noise generated by the project exceeds the criteria in Table 2 at any residence on privately-owned land or on more than 25 percent of any privately-owned land, the Proponent shall, upon receiving a written request for acquisition from the landowner, acquire the land in accordance with the procedures in conditions 8-10 of Schedule 4.

Table 2: Land acquisition criteria dB(A)

Land Number	***Day/Evening/Night*** $L_{Aeq(15min)}$
12, 14, 16, 17, 18, 19, 23, 25, 26, 27, 28, 29, 31, 32, 69, 70, 71, 72, 75, 76	42
All other private land owners not listed in Table 1, or on more than 25 percent of, any privately owned land.	40

Note: Noise generated by the project is to be measured in accordance with the notes to Table 1.

Cumulative Noise Criteria

3. The Proponent shall take all reasonable and feasible measures to ensure that the noise generated by the project combined with the noise generated by other mines does not exceed the following amenity criteria at any residence on privately-owned land or on more than 25 percent of any privately owned land:
   - $L_{Aeq(11\ hour)}$ *50 dB(A) – Day;*
   - $L_{Aeq(4\ hour)}$ *45 dB(A) – Evening;*
   - $L_{Aeq(9\ hour)}$ *40 dB(A) – Night.*

4. If the noise generated by the project combined with the noise generated by other mines exceeds the following amenity criteria at any residence on privately owned-land or on more than 25 percent of any privately owned land, then upon receiving a written request from the landowner, the Proponent shall acquire the land on as equitable basis as possible with the relevant mines in accordance with the procedures in conditions 8-10 of Schedule 4:
   - $L_{Aeq(11\ hour)}$ *53 dB(A) – Day;*
   - $L_{Aeq(4\ hour)}$ *48 dB(A) – Evening;*
   - $L_{Aeq(9\ hour)}$ *43 dB(A) – Night.*

Notes: The cumulative noise generated by the project combined with the noise generated by other mines is to be measured in accordance with the relevant procedures in the NSW Industrial Noise Policy.

APPENDIX B MODELLED NOISE LEVELS as Leq (15 min)				
Location	Evening		Night	
	Noise Level	Noise Goal	Noise Level	Noise Goal
34	<30	35	<30	39
29	<30	35	<30	36
31	<30	35	<30	37
33	<30	35	<30	38
86	<30	35	33	38
32	<30	35	31	40
71	<30	35	30	41
75*	30	35	33	41
70	<30	36	30	41
76*	32	36	33	42
28	<30	37	<30	40
69	<30	37	<30	41
13	<30	36	<30	35
12	<30	36	<30	36
25*	<30	37	<30	37
26	<30	37	<30	38
27	<30	37	<30	39
72*	36	37	42	42
17	<30	38	<30	36
21	<30	38	<30	38
22	<30	38	30	38
18	<30	39	<30	38
20	<30	40	30	39
61*	<30	40	34	39
14	<30	39	<30	39
19	<30	40	<30	39
16*	<30	41	<30	39
23	<30	35	<30	35
35*	<30	35	<30	35
42*	<30	35	<30	35
37	<30	35	<30	35

* Measurement location

24 November 2016

Ref: 03012/6835

James Benson
Anglo Coal (Drayton Management) Pty Limited
PMB 9
Muswellbrook NSW 2333

RE: NOVEMBER 2016 NOISE MONITORING RESULTS

This letter report presents the results of noise compliance monitoring conducted for the Drayton Coal Mine (DCM) on Wednesday 2nd November 2016. The purpose of the measurements was to quantify the overall noise levels at the nearby residences and determine the contribution from DCM operations.

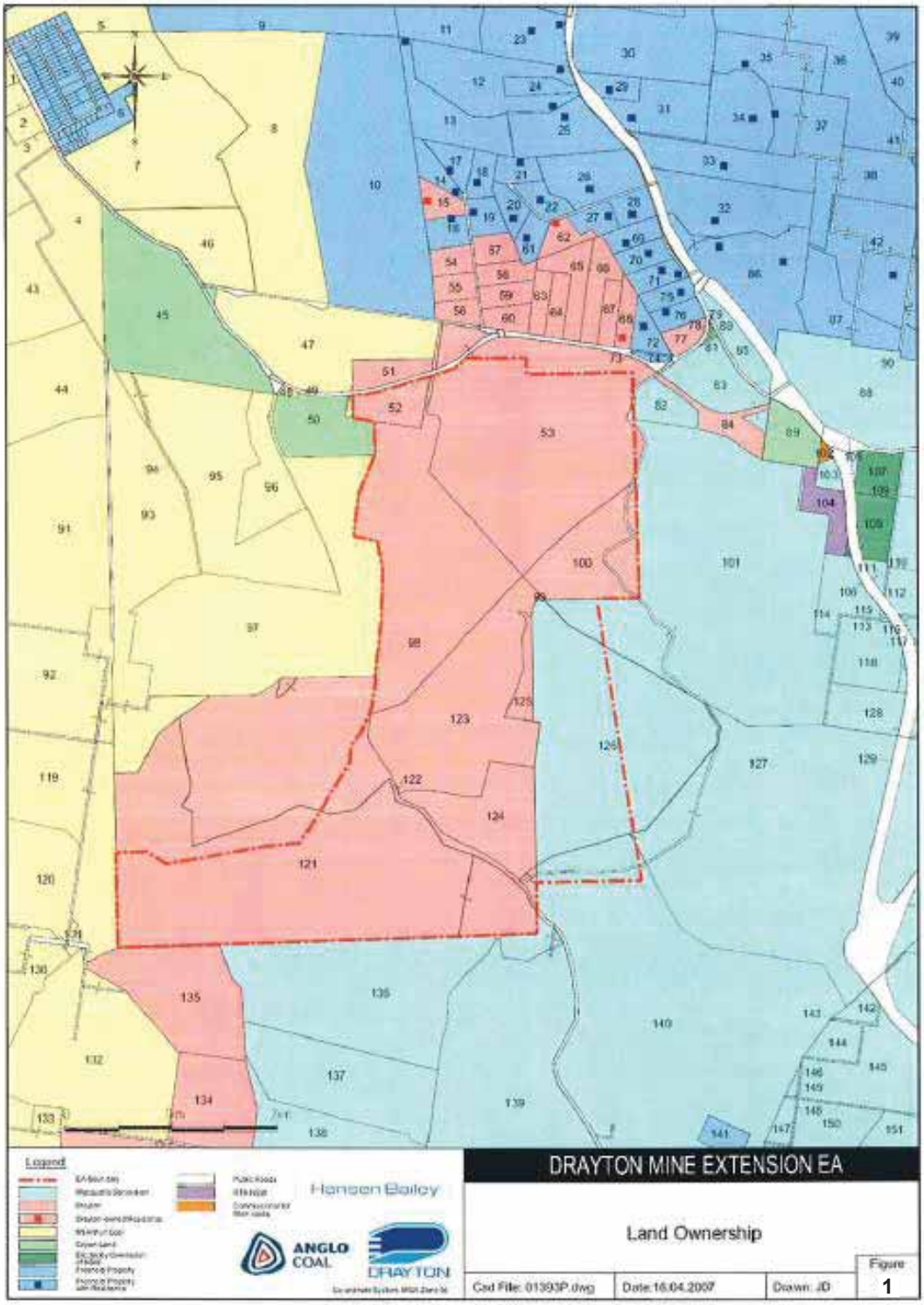
Schedule 3 of the DCM Project Approval details noise impact assessment criteria for 28 specific residential locations. For logistic reasons it is not reasonable to carry out attended noise monitoring at all of the listed locations during the one monitoring survey. As such, the approach taken was to monitor the noise at eight representative residential locations and determine, by noise modelling, the noise level at all of the other locations required in the Project Approval. Noise measurement locations for the attended noise survey are listed below (as shown in **Figure 1**):

Location R16: Doherty
Location R25: Kerr
Location R35: Wilson*
Location R42: Smith*
Location R61: Skinner
Location R72: Robertson**
Location R75: Sharman**
Location R76: Horder

* Additional locations contained in EPL 1323 but not in the Project Approval.
** Monitoring conducted at front gate of property at Landowners request.

Two sets of measurements were made over the "circuit", one during the evening period (from 6 pm – 10 pm) and one at night (after 10 pm). DCM activities were audible at several of the monitoring locations throughout the evening and night time periods.

Meteorological data used in this report was supplied by the mine from their automatic weather station. Wind speeds (in m/s) and direction have been determined as the arithmetic average of the measurements over the monitoring period. The mine operated weather station does not record temperature inversion data.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Land Ownership
Hansen Bailey
ANGLO COAL
DRAYTON
Legend
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Date:16.04.2007
Drawn: JD
Figure
1

Details of the DCM Project Approval with respect to noise emissions are shown as **Appendix A** to this report.

Noise emission levels were measured with Brüel & Kjær Type 2250 Precision Sound Analysers. These instruments have Type 1 characteristics as defined in AS1259-1982 "Sound Level Meters". Calibration of the instruments was confirmed with a Brüel & Kjær Type 4231 Sound Level Calibrator prior to and at the completion of measurements.

Measured noise levels for each monitoring circuit are summarised in the following tables. The total measured L_{eq} is shown in **Tables 1-3** and night time $L_{1(1minute)}$ – approximated as measured L_{max} – in **Table 4**. Table 3 shows the overall $L_{1(1minute)}$ and the contributing source as well as the $L_{1(1minute)}$ from DCM, where this was measurable.

Data were analysed with the Bruel & Kjaer "*Evaluator*" software to quantify the contributions of the various noise source(s) to the overall. The noise sources are listed in the comments column with the contribution of each shown in brackets. The noise goal (criterion) for mining operations at DCM is variable depending upon the location (as per the table from Schedule 3 shown in Appendix A). The relevant criterion is shown in brackets in the "Location" column in the tables. The contribution of mine noise from DCM is shown in bold. Any exceedances of the EPL and project approval noise criteria are shaded grey.

Table 2
DCM Noise Monitoring Results – 2 November 2016 (Evening)

Location (Criterion)	Time	dB(A), $L_{eq(15min)}$	Wind speed/ direction	Identified Noise Sources
Doherty (41)	8:22 pm	35	2.1/313	Insects (34), traffic (27), other mine (25), DCM (<20)
Kerr (37)	7:43 pm	44	1.8/327	Traffic (43), insects (36), DCM (<20)
Skinner (40)	7:18 pm	36	1.8/319	Frogs & insects (34), traffic (29), DCM (26)
Robertson (37)	8:43 pm	50	1.8/324	Traffic (50), DCM (29), insects (29)
Sharman (35)	9:32 pm	55	1.7/315	Traffic (55), insects (34), DCM (25)
Horder (36)	9:07 pm	41	2.0/329	Traffic (40), frogs & insects (31), DCM (27)
Wilson (35)	8:05 pm	45	1.7/318	Traffic (44), frogs & insects (37), DCM (<20)
Smith (35)	8:21 pm	44	1.6/312	Frogs & insects (42), traffic (40), DCM (<20)

Table 3
DCM Noise Monitoring Results – 2 November 2016 (Night)

Location (Criterion)	Time	dB(A), $L_{eq(15min)}$	Wind speed/ direction	Identified Noise Sources
Doherty (39)	10:01 pm	40	1.3/332	Insects (40), traffic (28), DCM (<20)
Kerr (37)	10:26 pm	45	0.3/275	Traffic (45), frogs & insects (32), DCM (<20)
Skinner (39)	10:03 pm	31	1.3/322	Frogs & insects (29), traffic (27), DCM (<20)
Robertson (42)	10:20 pm	49	0.3/275	Traffic (49), DCM (<20)
Sharman (41)	11:05 pm	51	0.5/135	Traffic (51), insects (26), DCM (<20)
Horder (42)	10:42 pm	39	0.6/175	Traffic (39), frogs (27), DCM (<20)
Wilson (36)	10:50 pm	41	0.6/175	Traffic (41), frogs & insects (33), DCM (<20)
Smith (36)	11:13 pm	38	0.8/148	Traffic (35), frogs & insects (35), DCM (<20)

Table 4 DCM Noise Monitoring Results – 2 November 2016 (Night)					
Location (Criterion)	Time	dB(A), $L_{1(1minute)}$	Wind speed/ direction	L_{A1} source	Identified Mine Sources ($L_{1\,(1\,min)}$)
Doherty (47)	10:01 pm	46	1.3/332	Insects	n/a
Kerr (47)	10:26 pm	53	0.3/275	Highway	n/a
Skinner (47)	10:03 pm	34	1.3/322	Highway	n/a
Robertson (47)	10:20 pm	61	0.3/275	Traffic	n/a
Sharman (47)	11:05 pm	63	0.5/135	Highway	n/a
Horder (47)	10:42 pm	46	0.6/175	Traffic	n/a
Wilson (47)	10:50 pm	49	0.6/175	Highway	n/a
Smith (47)	11:13 pm	45	0.8/148	Highway	n/a

The results in Tables 1 to 3 show that the applicable operational noise criteria were not exceeded at any location or at any time throughout the monitoring survey. The audible noise sources from DCM in the evening included general mine hum. There were no trains loaded during the monitoring period.

The results in Table 4 show that the sleep disturbance criteria ($L_{1(1minute)}$) was not exceeded at any monitoring location during the night time period.

Data from those times where DCM operations were audible were analysed using the *"Evaluator"* software. This analysis showed the noise did not contain any tonal, impulsive or low frequency components as per definitions in the NSW Industrial Noise Policy.

The operational noise levels at other receivers listed in the DCM Project Approval were determined using the ENM noise model in point calculation mode. The noise model was set up with a series of point noise sources representing the DCM operations and then calibrated to be consistent with the measured noise levels from the attended survey under similar atmospheric conditions to those at the time of the monitoring. Point calculations were then performed for each of the listed residential locations with results shown in **Appendix B**. As the $L_{1(1minute)}$ levels were well below the sleep disturbance criterion at the attended monitoring locations, no modelling of $L_{1(1minute)}$ levels was conducted for other receiver locations, as these are all at greater distance from the DCM.

We trust this report fulfils your requirements at this time, however, should you require additional information or assistance please contact the undersigned on 4954 2276.

Yours faithfully,
SPECTRUM ACOUSTICS PTY LIMITED

Author:

Neil Pennington
Acoustical Consultant

Review:

Ross Hodge
Acoustical Consultant

SCHEDULE 3
SPECIFIC ENVIRONMENTAL CONDITIONS

NOISE

Noise Impact Assessment Criteria

1. The Proponent shall ensure that the noise generated by the project does not exceed the noise impact assessment criteria in Table 1 at any residence on privately-owned land, or on more than 25 percent of any privately-owned land.

Table 1: Noise impact assessment criteria dB(A)

Land Number	Day	Evening	Night	
	$L_{Aeq(15\ min)}$	$L_{Aeq(15\ min)}$	$L_{Aeq(15\ min)}$	$L_{A1(1\ min)}$
34	35	35	36	45
29	35	35	36	47
31	35	35	37	47
33, 86	35	35	38	45
32	35	35	40	47
71, 75	35	35	41	47
70	35	36	41	47
76	35	36	42	47
28	35	37	40	47
69	35	37	41	47
13	36	36	35	45
12	36	36	36	47
25	36	37	37	47
26	36	37	38	47
27	36	37	39	47
72	36	37	42	47
17	37	38	36	47
21, 22	38	38	38	45
18	38	39	38	47
20, 61	39	40	39	45
14	40	39	38	47
19	40	40	39	47
16	41	41	39	47
23	35	35	35	47
All other privately-owned land	35	35	35	45

However, if the Proponent has a written negotiated noise agreement with any landowner of the land listed in Table 1, and a copy of this agreement has been forwarded to the Department and DECC, then the Proponent may exceed the noise limits in Table 1 in accordance with the negotiated noise agreement.

Notes:

- *For information on the numbering and identification of properties used in this approval, see Appendix 5.*
- *To determine compliance with the $L_{Aeq(15\ minute)}$ noise limits, noise from the project is to be measured at the most affected point within the residential boundary, or at the most affected point within 30 metres of a dwelling (rural situations) where the dwelling is more than 30 metres from the boundary. Where it can be demonstrated that direct measurement of noise from the project is impractical, the DECC may accept alternative means of determining compliance (see Chapter 11 of the NSW Industrial Noise Policy). The modification factors in Section 4 of the NSW Industrial Noise Policy shall also be applied to the measured noise levels where applicable.*
- *To determine compliance with the $L_{A1(1\ minute)}$ noise limits, noise from the project is to be measured at 1 metre from the dwelling façade. Where it can be demonstrated that direct measurement of noise from the project is impractical, the DECC may accept alternative means of determining compliance (see Chapter 11 of the NSW Industrial Noise Policy).*

- *The noise emission limits identified in the above table apply under meteorological conditions of:*
  - *wind speeds of up to 3 m/s at 10 metres above ground level; or*
  - *temperature inversion conditions of up to 3°C/100m, and wind speeds of up to 2 m/s at 10 metres above ground level.*

Land Acquisition Criteria

2. If the noise generated by the project exceeds the criteria in Table 2 at any residence on privately-owned land or on more than 25 percent of any privately-owned land, the Proponent shall, upon receiving a written request for acquisition from the landowner, acquire the land in accordance with the procedures in conditions 8-10 of Schedule 4.

Table 2: Land acquisition criteria dB(A)

Land Number	***Day/Evening/Night*** $L_{Aeq(15min)}$
12, 14, 16, 17, 18, 19, 23, 25, 26, 27, 28, 29, 31, 32, 69, 70, 71, 72, 75, 76	42
All other private land owners not listed in Table 1, or on more than 25 percent of, any privately owned land.	40

Note: Noise generated by the project is to be measured in accordance with the notes to Table 1.

Cumulative Noise Criteria

3. The Proponent shall take all reasonable and feasible measures to ensure that the noise generated by the project combined with the noise generated by other mines does not exceed the following amenity criteria at any residence on privately-owned land or on more than 25 percent of any privately owned land:
   - $L_{Aeq(11\ hour)}$ *50 dB(A) – Day;*
   - $L_{Aeq(4\ hour)}$ *45 dB(A) – Evening;*
   - $L_{Aeq(9\ hour)}$ *40 dB(A) – Night.*

4. If the noise generated by the project combined with the noise generated by other mines exceeds the following amenity criteria at any residence on privately owned-land or on more than 25 percent of any privately owned land, then upon receiving a written request from the landowner, the Proponent shall acquire the land on as equitable basis as possible with the relevant mines in accordance with the procedures in conditions 8-10 of Schedule 4:
   - $L_{Aeq(11\ hour)}$ *53 dB(A) – Day;*
   - $L_{Aeq(4\ hour)}$ *48 dB(A) – Evening;*
   - $L_{Aeq(9\ hour)}$ *43 dB(A) – Night.*

Notes: The cumulative noise generated by the project combined with the noise generated by other mines is to be measured in accordance with the relevant procedures in the NSW Industrial Noise Policy.

APPENDIX B MODELLED NOISE LEVELS as Leq (15 min)				
Location	Evening		Night	
	Noise Level	Noise Goal	Noise Level	Noise Goal
34	<30	35	<30	39
29	<30	35	<30	36
31	<30	35	<30	37
33	<30	35	<30	38
86	<30	35	<30	38
32	<30	35	<30	40
71	<30	35	<30	41
75*	<30	35	<30	41
70	<30	36	<30	41
76*	<30	36	<30	42
28	<30	37	<30	40
69	<30	37	<30	41
13	<30	36	<30	35
12	<30	36	<30	36
25*	<30	37	<30	37
26	<30	37	<30	38
27	<30	37	<30	39
72*	<30	37	<30	42
17	<30	38	<30	36
21	<30	38	<30	38
22	<30	38	<30	38
18	<30	39	<30	38
20	<30	40	<30	39
61*	<30	40	<30	39
14	<30	39	<30	39
19	<30	40	<30	39
16*	<30	41	<30	39
23	<30	35	<30	35
35*	<30	35	<30	35
42*	<30	35	<30	35
37	<30	35	<30	35

* Measurement location

23 December 2016

Ref: 03012/6

James Benson
Anglo Coal (Drayton Management) Pty Limited
PMB 9
Muswellbrook NSW 2333

RE: DECEMBER 2016 NOISE MONITORING RESULTS

This letter report presents the results of noise compliance monitoring conducted for the Drayton Coal Mine (DCM) on Tuesday 20th December, 2016. The purpose of the measurements was to quantify the overall noise levels at the nearby residences and determine the contribution from DCM operations.

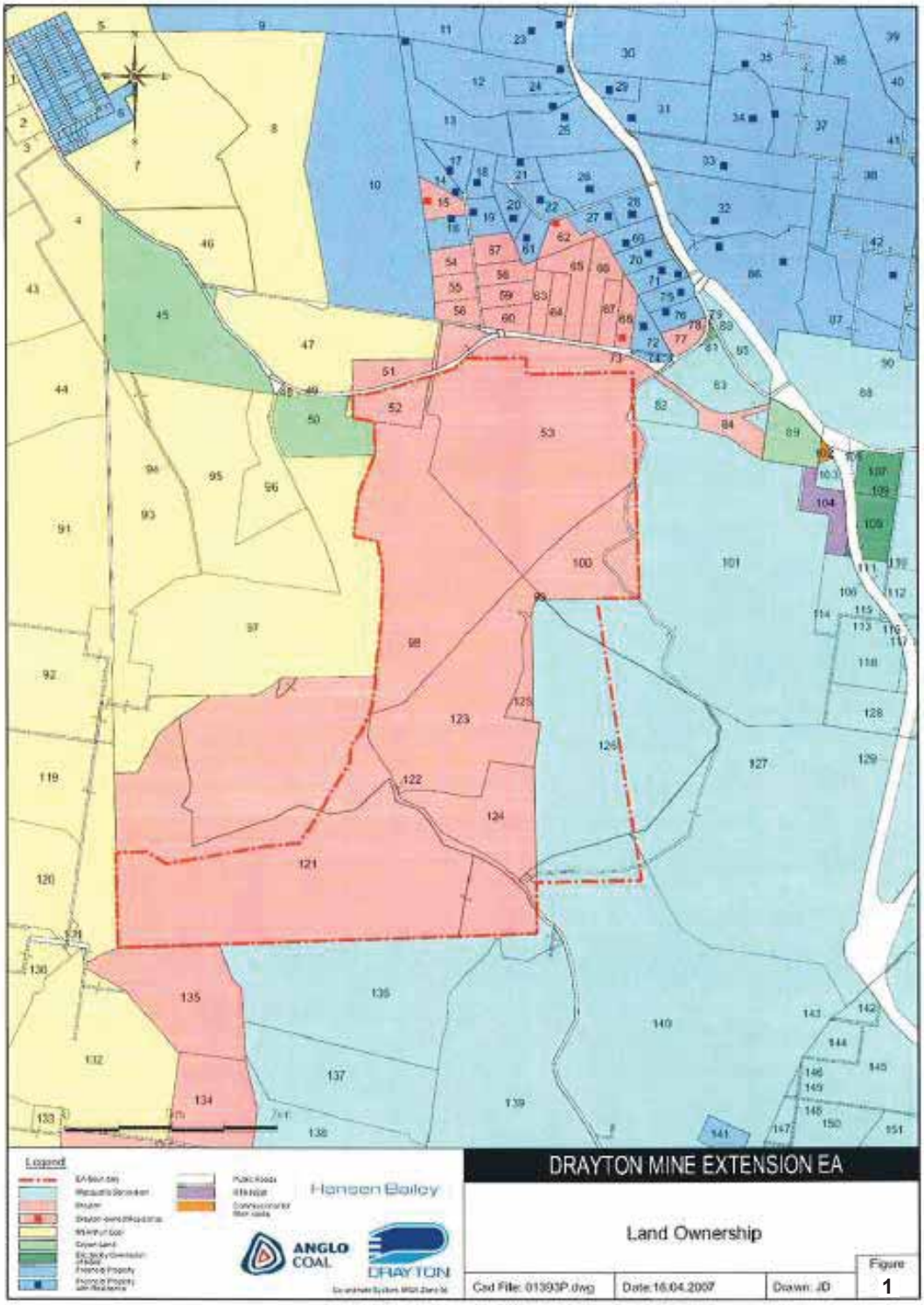
Schedule 3 of the DCM Project Approval details noise impact assessment criteria for 28 specific residential locations. For logistic reasons it is not reasonable to carry out attended noise monitoring at all of the listed locations during the one monitoring survey. As such, the approach taken was to monitor the noise at eight representative residential locations and determine, by noise modelling, the noise level at all of the other locations required in the Project Approval. Noise measurement locations for the attended noise survey are listed below (as shown in **Figure 1**):

Location R16: Doherty
Location R25: Kerr
Location R35: Wilson*
Location R42: Smith*
Location R61: Skinner
Location R72: Robertson**
Location R75: Sharman**
Location R76: Horder

* Additional locations contained in EPL 1323 but not in the Project Approval.
** Monitoring conducted at front gate of property at Landowners request.

Three sets of measurements were made over the "circuit", one during the day time period (before 6 pm), one during the evening period (from 6 pm – 10 pm) and one at night (after 10 pm). DCM activities were audible at many monitoring locations throughout the survey.

Meteorological data used in this report was supplied by the mine from their automatic weather station. Wind speeds (in m/s) and direction have been determined as the arithmetic average of the measurements over the monitoring period. The mine operated weather station does not record temperature inversion data.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Details of the DCM Project Approval with respect to noise emissions are shown as **Appendix A** to this report.

Noise emission levels were measured with Brüel & Kjær Type 2250 Precision Sound Analysers. These instruments have Type 1 characteristics as defined in AS1259-1982 "Sound Level Meters". Calibration of the instruments was confirmed with a Brüel & Kjær Type 4231 Sound Level Calibrator prior to and at the completion of measurements.

Measured noise levels for each monitoring circuit are summarised in the following tables. The total measured L_{eq} is shown in **Tables 1-3** and night time $L_{1(1minute)}$ – approximated as measured L_{max} – in **Table 4**. Table 3 shows the overall $L_{1(1minute)}$ and the contributing source as well as the $L_{1(1minute)}$ from DCM, where this was measurable.

Data were analysed with the Bruel & Kjaer "*Evaluator*" software to quantify the contributions of the various noise source(s) to the overall. The noise sources are listed in the comments column with the contribution of each shown in brackets. The noise goal (criterion) for mining operations at DCM is variable depending upon the location (as per the table from Schedule 3 shown in Appendix A). The relevant criterion is shown in brackets in the "Location" column in the tables. The contribution of mine noise from DCM is shown in bold. Any exceedances of the EPL and project approval noise criteria are shaded grey.

Table 1
DCM Noise Monitoring Results – 20 December 2016 (Day)

Location (Criterion)	Time	dB(A), $L_{eq(15min)}$	Wind speed/ direction	Identified Noise Sources
Doherty (41)	10:33 am	42	3.1/282	Birds (41), wind (33), traffic (29), DCM (<20)
Kerr (36)	11:46 am	50	3.8/284	Traffic (50), birds (36), wind (28), DCM (<20)
Skinner (39)	11:01 am	39	3.3/286	Birds (38), wind (32), traffic (25), DCM (<20)
Robertson (36)	10:55 am	58	3.1/298	Traffic (58), birds & insects (45), DCM (<20)
Sharman (35)	11:42 am	56	3.6/282	Traffic (56), wind (38), birds & insects (34), DCM (<20)
Horder (35)	11:21 am	46	3.3/299	Traffic (44), birds & insects (42), wind (33), DCM (<20)
Wilson (35)	12:10 pm	44	4.7/306	Wind (41), traffic (39), birds (37), DCM (<20)
Smith (35)	12:36 pm	48	4.2/287	Wind (46), birds & insects (44), traffic (29), DCM (<20)

Table 2
DCM Noise Monitoring Results – 20 December 2016 (Evening)

Location (Criterion)	Time	dB(A), $L_{eq(15min)}$	Wind speed/ direction	Identified Noise Sources
Doherty (41)	7:44 pm	38	2.2/247	Birds (37), traffic (32), DCM (<20)
Kerr (37)	7:37 pm	51	2.5/261	Birds & insects (50), traffic (44), DCM (<20)
Skinner (40)	7:15 pm	43	2.3/247	Birds & insects (40), traffic (38), wind (34), DCM (<20)
Robertson (37)	8:06 pm	54	2.4/300	Traffic (53), birds & insects (46), DCM (<20)
Sharman (35)	8:41 pm	54	1.7/303	Traffic (54), insects (40), DCM (<20)
Horder (36)	8:21 pm	50	2.3/294	Birds & insects (48), traffic (45), DCM (<20)
Wilson (35)	7:59 pm	46	2.4/284	Birds & insects (46), traffic (33), DCM (<20)
Smith (35)	8:26 pm	54	2.3/282	Insects (54), traffic (36), DCM (<20)

Table 3 DCM Noise Monitoring Results – 20 December 2016 (Night)				
Location (Criterion)	Time	dB(A), $L_{eq(15min)}$	Wind speed/ direction	Identified Noise Sources
Doherty (39)	10:45 pm	48	2.5/284	Insects (48), traffic (32), DCM (<20)
Kerr (37)	10:58 pm	42	2.3/293	Insects (40), traffic (38), DCM (<20)
Skinner (39)	10:35 pm	46	2.3/299	Frogs & insects (46), traffic (29), other mine (24), DCM (<20)
Robertson (42)	11:06 pm	45	2.4/304	Insects (45), traffic (33), DCM (<20)
Sharman (41)	11:45 pm	51	1.8/308	Traffic (50), insects (44), DCM (<20)
Horder (42)	11:26 pm	41	2.1/303	Frogs & insects (39), traffic (37), DCM (<20)
Wilson (36)	11:23 pm	52	2.1/303	Frogs & insects (52), traffic (39), DCM (<20)
Smith (36)	11:46 pm	42	1.8/308	Frogs & insects (41), traffic (36), DCM (<20)

Table 4 DCM Noise Monitoring Results – 20 December 2016 (Night)					
Location (Criterion)	Time	dB(A), $L_{1(1minute)}$	Wind speed/ direction	L_{A1} source	Identified Mine Sources ($L_{1\,(1\,min)}$)
Doherty (47)	10:45 pm	53	2.5/284	Insects	n/a
Kerr (47)	10:58 pm	52	2.3/293	Highway	n/a
Skinner (47)	10:35 pm	50	2.3/299	Frogs	n/a
Robertson (47)	11:06 pm	49	2.4/304	Insects	n/a
Sharman (47)	11:45 pm	59	1.8/308	Highway	n/a
Horder (47)	11:26 pm	46	2.1/303	Frogs	n/a
Wilson (47)	11:23 pm	56	2.1/303	Insects	n/a
Smith (47)	11:46 pm	44	1.8/308	Highway	n/a

The results in Tables 1 to 3 show that the applicable operational noise criteria were not exceeded at any location or at any time throughout the monitoring survey. DCM noise emission were inaudible at all receiver locations.

Data from those times where DCM operations were audible were analysed using the *"Evaluator"* software. This analysis showed the noise did not contain any tonal, impulsive or low frequency components as per definitions in the NSW Industrial Noise Policy.

The results in Table 4 show that the sleep disturbance criteria ($L_{1(1minute)}$) was not exceeded at any monitoring location during the night time period.

The operational noise levels at other receivers listed in the DCM Project Approval were determined using the ENM noise model in point calculation mode. The noise model was set up with a series of point noise sources representing the DCM operations and then calibrated to be consistent with the measured noise levels from the attended survey under similar atmospheric conditions to those at the time of the monitoring. Point calculations were then performed for each of the listed residential locations with results shown in **Appendix B**.

As the $L_{1(1minute)}$ levels were well below the sleep disturbance criterion at the attended monitoring locations, no modelling of $L_{1(1minute)}$ levels was conducted for other receiver locations, as these are all at greater distance from the DCM.

We trust this report fulfils your requirements at this time, however, should you require additional information or assistance please contact the undersigned on 4954 2276.

Yours faithfully,
SPECTRUM ACOUSTICS PTY LIMITED

Author:

Neil Pennington
Acoustical Consultant

Review:

Ross Hodge
Acoustical Consultant

SCHEDULE 3
SPECIFIC ENVIRONMENTAL CONDITIONS

NOISE

Noise Impact Assessment Criteria

1. The Proponent shall ensure that the noise generated by the project does not exceed the noise impact assessment criteria in Table 1 at any residence on privately-owned land, or on more than 25 percent of any privately-owned land.

Table 1: Noise impact assessment criteria dB(A)

Land Number	Day	Evening	Night	
	$L_{Aeq(15\ min)}$	$L_{Aeq(15\ min)}$	$L_{Aeq(15\ min)}$	$L_{A1(1\ min)}$
34	35	35	36	45
29	35	35	36	47
31	35	35	37	47
33, 86	35	35	38	45
32	35	35	40	47
71, 75	35	35	41	47
70	35	36	41	47
76	35	36	42	47
28	35	37	40	47
69	35	37	41	47
13	36	36	35	45
12	36	36	36	47
25	36	37	37	47
26	36	37	38	47
27	36	37	39	47
72	36	37	42	47
17	37	38	36	47
21, 22	38	38	38	45
18	38	39	38	47
20, 61	39	40	39	45
14	40	39	38	47
19	40	40	39	47
16	41	41	39	47
23	35	35	35	47
All other privately-owned land	35	35	35	45

However, if the Proponent has a written negotiated noise agreement with any landowner of the land listed in Table 1, and a copy of this agreement has been forwarded to the Department and DECC, then the Proponent may exceed the noise limits in Table 1 in accordance with the negotiated noise agreement.

Notes:

- *For information on the numbering and identification of properties used in this approval, see Appendix 5.*
- *To determine compliance with the $L_{Aeq(15\ minute)}$ noise limits, noise from the project is to be measured at the most affected point within the residential boundary, or at the most affected point within 30 metres of a dwelling (rural situations) where the dwelling is more than 30 metres from the boundary. Where it can be demonstrated that direct measurement of noise from the project is impractical, the DECC may accept alternative means of determining compliance (see Chapter 11 of the NSW Industrial Noise Policy). The modification factors in Section 4 of the NSW Industrial Noise Policy shall also be applied to the measured noise levels where applicable.*
- *To determine compliance with the $L_{A1(1\ minute)}$ noise limits, noise from the project is to be measured at 1 metre from the dwelling façade. Where it can be demonstrated that direct measurement of noise from the project is impractical, the DECC may accept alternative means of determining compliance (see Chapter 11 of the NSW Industrial Noise Policy).*

- *The noise emission limits identified in the above table apply under meteorological conditions of:*
  - *wind speeds of up to 3 m/s at 10 metres above ground level; or*
  - *temperature inversion conditions of up to 3°C/100m, and wind speeds of up to 2 m/s at 10 metres above ground level.*

Land Acquisition Criteria

2. If the noise generated by the project exceeds the criteria in Table 2 at any residence on privately-owned land or on more than 25 percent of any privately-owned land, the Proponent shall, upon receiving a written request for acquisition from the landowner, acquire the land in accordance with the procedures in conditions 8-10 of Schedule 4.

Table 2: Land acquisition criteria dB(A)

Land Number	***Day/Evening/Night*** $L_{Aeq(15min)}$
12, 14, 16, 17, 18, 19, 23, 25, 26, 27, 28, 29, 31, 32, 69, 70, 71, 72, 75, 76	42
All other private land owners not listed in Table 1, or on more than 25 percent of, any privately owned land.	40

Note: Noise generated by the project is to be measured in accordance with the notes to Table 1.

Cumulative Noise Criteria

3. The Proponent shall take all reasonable and feasible measures to ensure that the noise generated by the project combined with the noise generated by other mines does not exceed the following amenity criteria at any residence on privately-owned land or on more than 25 percent of any privately owned land:
   - $L_{Aeq(11\ hour)}$ *50 dB(A) – Day;*
   - $L_{Aeq(4\ hour)}$ *45 dB(A) – Evening;*
   - $L_{Aeq(9\ hour)}$ *40 dB(A) – Night.*

4. If the noise generated by the project combined with the noise generated by other mines exceeds the following amenity criteria at any residence on privately owned-land or on more than 25 percent of any privately owned land, then upon receiving a written request from the landowner, the Proponent shall acquire the land on as equitable basis as possible with the relevant mines in accordance with the procedures in conditions 8-10 of Schedule 4:
   - $L_{Aeq(11\ hour)}$ *53 dB(A) – Day;*
   - $L_{Aeq(4\ hour)}$ *48 dB(A) – Evening;*
   - $L_{Aeq(9\ hour)}$ *43 dB(A) – Night.*

Notes: The cumulative noise generated by the project combined with the noise generated by other mines is to be measured in accordance with the relevant procedures in the NSW Industrial Noise Policy.

APPENDIX B MODELLED NOISE LEVELS as Leq (15 min)						
Location	Day		Evening		Night	
	Noise Level	Noise Goal	Noise Level	Noise Goal	Noise Level	Noise Goal
34	<30	35	<30	35	<30	39
29	<30	35	<30	35	<30	36
31	<30	35	<30	35	<30	37
33	<30	35	<30	35	<30	38
86	<30	35	<30	35	<30	38
32	<30	35	<30	35	<30	40
71	<30	35	<30	35	<30	41
75*	<30	35	<30	35	<30	41
70	<30	35	<30	36	<30	41
76*	<30	35	<30	36	<30	42
28	<30	35	<30	37	<30	40
69	<30	35	<30	37	<30	41
13	<30	36	<30	36	<30	35
12	<30	36	<30	36	<30	36
25*	<30	36	<30	37	<30	37
26	<30	36	<30	37	<30	38
27	<30	36	<30	37	<30	39
72*	<30	36	<30	37	<30	42
17	<30	37	<30	38	<30	36
21	<30	38	<30	38	<30	38
22	<30	38	<30	38	<30	38
18	<30	38	<30	39	<30	38
20	<30	39	<30	40	<30	39
61*	<30	39	<30	40	<30	39
14	<30	40	<30	39	<30	39
19	<30	40	<30	40	<30	39
16*	<30	41	<30	41	<30	39
23	<30	35	<30	35	<30	35
35*	<30	35	<30	35	<30	35
42*	<30	35	<30	35	<30	35
37	<30	35	<30	35	<30	35

* Measurement location

Appendix E: 2016 Blast Monitoring Results

Table 43: 2016 Blast Monitoring Results

Date	Location/Name	Antiene (AB) dB(L)	Antiene (R) mm/sec	DeBoer (AB) dB(L)	DeBoer (R) mm/sec	Sharman (AB) dB(L)	Sharman (R) mm/sec
13/01/2016	SPW15-C11-BK12-13	88.8	0.02	90.7	0.09	86.4	0.05
14/01/2016	EN01-P22-BK5	84.7	0.02	90.3	0.04	85.2	0.01
25/01/2016	SPW15-HSR-BK17	86.6	0.12	97.7	0.27	96.4	0.23
29/01/2016	SPW15-C11-B12-BK19-21	81.4	0.05	85.6	0.30	91.6	0.07
4/02/2016	SPW15-D-BK11-13	96.5	0.01	94.2	0.04	93.8	0.03
9/02/2016	SPW15-C11-BK19	86.9	0.04	103.0	0.54	93.8	0.06
15/02/2016	SPW15-HSR-BK16	85.6	0.06	89.1	0.10	85.9	0.07
17/02/2016	SPW15-C11-BK14	89.9	0.06	89.0	0.10	89.9	0.05
18/02/2016	NN14-RL-BK6 PS (NN Pit)	96.1	1.10	94.8	0.46	93.1	0.40
23/02/2016	ROM02-R11-R3-BK3-4 +PS (NN Pit)	97.1	0.24	91.8	0.40	94.0	0.33
24/02/2016	ROM02-R11-R3-BK5-6 +PS (NN Pit)	94.7	0.12	90.3	0.23	91.0	0.28
1/03/2016	NN14-RL100-BK5-6 TS (NN Pit)	101.2	1.00	93.6	0.47	88.9	0.24
7/03/2016	NN14-RL100-BK2-4 Part 2 (NN Pit)	102.9	0.85	94.9	0.23	92.3	0.11
8/03/2016	SPW15-B41-C11-BK19-20	90.8	0.02	98.2	0.06	94.0	0.04
11/03/2016	NN14-RL100-BK2-4 Part 3 (NN Pit)	96.7	0.76	93.2	0.23	87.7	0.09
17/03/2016	SPE14-HW-BK1	97.4	0.05	98.9	0.13	98.1	0.07
22/03/2016	NN14-RL100-BK2-6 TRIM (NN Pit)	95.8	0.46	98.5	0.24	87.7	0.13
1/04/2016	ROM02-R13-BK2-3 (NN	98.4	0.38	94.9	0.43	92.4	0.21

Date	Location/Name	Antiene (AB) dB(L)	Antiene (R) mm/sec	DeBoer (AB) dB(L)	DeBoer (R) mm/sec	Sharman (AB) dB(L)	Sharman (R) mm/sec
	Pit)						
5/04/2016	ROM02-R3-BK7-PS (NN Pit)	95.4	0.11	86.0	0.21	87.1	0.23
6/04/2016	SPW15-C11-BK18	97.3	0.06	101.6	0.09	101.6	0.07
8/04/2016	ROM02-R13-BK4-7 (NN Pit)	100.4	0.09	93.1	0.21	94.1	0.16
15/04/2016	NN14-RL100-TRIM part B	96.2	0.52	93.4	0.12	90.6	0.07
19/04/2016	NN15-Y2-BK2-6 PS	83.0	0.7	76.5	0.3	80.9	0.1
26/04/2016	SPW-C11-BK15-17	85.9	0.04	93.4	0.13	82.4	0.04
29/04/2016	SPE14-HW-BK1 Part2a	97.1	0.19	99.5	0.20	101.0	0.33
6/05/2016	NN14-RL85-BK3-5	100.0	1.26	97.0	0.56	94.0	0.32
12/05/2016	NN14-RL85-BK5-6 sth	99.0	0.83	95.5	0.47	99.4	0.22
13/05/2016	SPW15-C11-BK15-16	92.6	0.05	94.1	0.07	88.7	0.05
17/05/2016	SPW15-C11-BK16	96.4	0.04	99.8	0.06	94.0	0.06
20/05/2016	NN15-Y2-BK2-6 PS	94.1	1.19	92.9	0.44	87.4	0.25
20/05/2016	NN15-Y2-BK4-6 PS	94.1	1.19	92.9	0.44	87.4	0.25
26/05/2016	NN14-RL85-BK2-3	98.3	1.28	95.1	0.30	95.5	0.13
2/06/2016	NN15-RL85-BK2-5	101.4	1.81	95.1	0.57	92.0	0.23
3/06/2016	ROM02-R3-BK2-4	107.7	0.04	98.5	0.06	95.9	0.04
8/06/2016	ROM02-R3-BK4-6	92.9	0.03	108.9	0.05	106.9	0.04
14/06/2016	ROM02-R3-BK6-7	96.8	0.02	94.5	0.03	96.2	0.03
16/06/2016	SPW15-D-BK15-17	84.3	0.01	87.8	0.02	90.4	0.02
17/06/2016	SPW15-D-BK15-17 part 2	73.8	0.01	82.2	0.01	85.5	0.02
28/06/2016	SPE14-HW-BK1-PART2 b	84.0	0.04	87.3	0.07	85.7	0.07
6/07/2016	EN02-REH-BK6-9 South	98.1	0.17	90.1	0.30	99.5	0.22
14/07/2016	EN02-REH-BK10-12	100.7	0.13	99.2	0.25	99.9	0.19

Date	Location/Name	Antiene (AB) dB(L)	Antiene (R) mm/sec	DeBoer (AB) dB(L)	DeBoer (R) mm/sec	Sharman (AB) dB(L)	Sharman (R) mm/sec
22/07/2016	EN02-REH-BK6-9 Combo Part 1	96.4	0.12	99.7	0.28	92.8	0.23
29/07/2016	NN15-Y2-BK-2-6 PART A	95.1	**2.87**	94.0	1.13	94.0	0.39
16/08/2016	NN15-Y2-BK-2-6 PART B	105.7	1.81	100.9	0.52	105.6	0.24
23/08/2016	NN15-Y2-BK2-6 Ramp PART A	94.8	0.30	93.0	0.15	93.0	0.07
29/08/2016	NN15-Y2-BK2-6 North Wall	91.9	**2.50**	88.4	0.57	87.1	0.21
31/08/2016	NN15-Y2-BK2-6 Ramp V2	97.6	0.19	96.8	0.10	101.2	0.04
7/09/2016	EN02-REH-BK6-9 Combo	109.8	0.09	104.6	0.21	104.8	0.16
19/09/2016	EN02-REH-BK4-6	95.3	0.12	93.3	0.35	100.3	0.18

Appendix F: 2016 Enquiries, Concerns and Complaints

Table 44: List of Enquiries, Concerns and Complaints Received Throughout 2016

Date	Location	Enquiry, Concern OR Complaint	Nature	Outcome
2016				
27/04/2016	ARTC Rail	Complaint	Fire Safety	Complaint made via ARTC about a fire resulting from Drayton contractor Aurizon undertaking track maintenance work (grinding) on the rail line. Complaint received via email from ARTC 28/4/16. Fire controls in place and fire response on 27/4/16 were discussed. Complainant concerned about safety and possibility of fire entering their property. Complainant asked to be notified prior to future grinding work on rail line. This complainant is to be notified by Drayton prior to future works of this nature.
11/08/2016	Pamger Drive, Muswellbrook	Enquiry	Blast - Vibration	Enquiry received via phone call at 15:47 to complaints hotline regarding vibration issue. It was suggested that there was a loud bang and shook foundations. Site personnel investigated and it was confirmed that no blast was either scheduled or had occurred at Drayton. Further investigation revealed that an earthquake had occurred (at 15:44:08 AEST) which was centred around Bayswater Power Station with a magnitude of 3.3. Drayton blast monitors triggered at 15:44:10 and presented relatively high results due to the earthquake.
11/08/2016	Hassell Road, Muswellbrook	Enquiry	Blast - Vibration	Enquiry received via phone call regarding vibration issue. It was confirmed Drayton had not conducted any blasting that day. It was noted that there had been an earthquake locally and was the likely cause in this instance.
29/09/2016	Singleton	Enquiry	Blast - Cloud	Enquiry received regarding blast cloud in the vicinity of the Denman area. Advised that Drayton had not blasted today and will not be blasting for the remainder of 2016.
21/11/2016	Scone Resident	Complaint	Odour - Spon Com	Enquiry/complaint received via phone call regarding spon com odour at complainant's residence. Complainant adamant Drayton is the source of the odour. Complainant has an on-going history with odour complaints against Drayton and is located in Scone approximately 30km away. It was noted that only rehabilitation activities occurring on site at the moment.

Appendix G: Anglo American Safety, Health and Environment Risk Matrix

Table 45: Anglo American Risk Matrix

AAplc Risk Matrix	Hazard Effect/ Consequence				
Loss Type	**1. Insignificant**	**2. Minor**	**3. Moderate**	**4. High**	**5. Major**
(S/H) **Harm to people (safety /health)**	First aid case / Exposure to minor health risk	Medical Treatment case / Exposure to major health risk	Lost time injury / Reversible impact on health	Single fatality or loss of quality of life / Irreversible impact on health	Multiple fatalities / Impact on health ultimately fatal
(EI) **Environmental Impact**	Minimal environmental harm – L1 incident	Material environmental harm – L2 incident remediable short term	Serious environmental harm – L2 incident remediable within LOM	Major environmental harm – L2 incident remediable post LOM	Extreme environmental harm – L3 incident irreversible
(BI/MD) **Business interruption / Material damage and other consequential losses**	No disruption to operation 5% loss of budgeted operating profit / listed assets	Brief disruption to operation 10% loss of budgeted operating profit / listed assets	Partial shutdown / 15% loss of budgeted operating profit / listed assets	Partial loss of operation / 20% loss of budgeted profit / listed assets	Substantial or total loss of operation 25% loss of budgeted profit / listed assets
(L&R) **Legal and regulatory**	Low level legal issue	Minor legal issue: non- compliance and breaches of the law	Serious breach of law: investigation / report to authority, prosecution and/or moderate penalty possible	Major breach of the law: considerable prosecution and penalties	Very considerable penalties & prosecutions. Multiple law suits & jail terms
(R/S/C) **Impact on reputation, social and community**	Slight impact – public awareness may exist but no public concern	Limited impact – local public concern	Considerable impact – regional public concern	National impact – national public concern	International impact - international public attention

Likelihood	Examples	Risk Rating				
5 (Almost Certain)	The unwanted event has occurred frequently: occurs in order of one or more times per year & is likely to reoccur within 1 year	11 (M)	16 (S)	20 (S)	23 (H)	25 (H)
4 (Likely)	The unwanted event has occurred infrequently: occurs in order of less than once per year & is likely to reoccur within 5 years	7 (M)	12 (M)	17 (S)	21 (H)	24 (H)
3 (Possible)	The unwanted event has happened in the business at some time: or could happen within 10 years	4 (L)	8 (M)	13 (S)	18 (S)	22 (H)
2 (Unlikely)	The unwanted event has happened in the business at some time: or could happen within 20 years	2 (L)	5 (L)	9 (M)	14 (S)	19 (S)
1 (Rare)	The unwanted event has never been known to occur in the business: or it is highly unlikely that it will occur within 20 years	1 (L)	3 (L)	6 (M)	10 (M)	15 (S)

Risk Rating	Risk Level	Guidelines for Risk Matrix
21 to 25	High (H)	Eliminate, avoid, implement specific action plans / procedures to manage & monitor
13 to 20	Significant (S)	Proactively manage
6 to 12	Medium (M)	Actively manage
1 to 5	Low (L)	Monitor & manage as appropriate

Appendix H: 2016 Rail Activity Statement

RAIL ACTIVITY STATEMENT

FOR PERIOD 1/1/2016 - 31/12/2016

(Destination for all trains was Port of Newcastle)

	Drayton			Mt Arthur Coal			Total Rail Activity	
Date	Total Trains / day	Total Train Movements/ day	Total tonnage/ day	Total Trains / day	Total Train Movements/ day	Total tonnage/ day	Total Train Movements / day	Total Tonnage/ day
1-Jan-16		0		8	16	69,323.20	16	69,323.20
2-Jan-16		0		8	16	69,323.20	16	69,323.20
3-Jan-16		0		10	20	86,654.00	20	86,654.00
4-Jan-16		0		5	10	43,327.00	10	43,327.00
5-Jan-16		0		3	6	25,996.20	6	25,996.20
6-Jan-16		0		0	0	0.00	0	0.00
7-Jan-16		0		1	2	8,665.40	2	8,665.40
8-Jan-16		0		5	10	43,327.00	10	43,327.00
9-Jan-16		0		4	8	34,661.60	8	34,661.60
10-Jan-16		0		9	18	77,988.60	18	77,988.60
11-Jan-16	2	4	17183	3	6	25,996.20	10	43,179.20
12-Jan-16		0		6	12	51,992.40	12	51,992.40
13-Jan-16		0		8	16	69,323.20	16	69,323.20
14-Jan-16	1	2	8790	1	2	8,665.40	4	17,455.40
15-Jan-16		0		4	8	34,661.60	8	34,661.60
16-Jan-16		0		10	20	86,654.00	20	86,654.00
17-Jan-16		0		7	14	60,657.80	14	60,657.80
18-Jan-16		0		7	14	60,657.80	14	60,657.80
19-Jan-16	1	2	9167.6	8	16	69,323.20	18	78,490.80
20-Jan-16		0		0	0	0.00	0	0.00
21-Jan-16		0		0	0	0.00	0	0.00
22-Jan-16		0		5	10	43,327.00	10	43,327.00
23-Jan-16	1	2	8649	6	12	51,992.40	14	60,641.40
24-Jan-16	2	4	17931.2	3	6	25,996.20	10	43,927.40
25-Jan-16		0		4	8	34,661.60	8	34,661.60
26-Jan-16	2	4	17555.6	5	10	43,327.00	14	60,882.60
27-Jan-16	1	2	8344.2	4	8	34,661.60	10	43,005.80
28-Jan-16	2	4	17463.2	4	8	34,661.60	12	52,124.80
29-Jan-16	3	6	25380	6	12	51,992.40	18	77,372.40
30-Jan-16		0		4	8	34,661.60	8	34,661.60
31-Jan-16	1	2	8421.8	7	14	60,657.80	16	69,079.60
1-Feb-16		0		7	14	60,657.80	14	60,657.80
2-Feb-16		0		5	10	43,327.00	10	43,327.00
3-Feb-16		0		6	12	51,992.40	12	51,992.40

	Drayton			Mt Arthur Coal			Total Rail Activity	
Date	Total Trains / day	Total Train Movements/ day	Total tonnage/ day	Total Trains / day	Total Train Movements/ day	Total tonnage/ day	Total Train Movements / day	Total Tonnage/ day
4-Feb-16		0		4	8	34,661.60	8	34,661.60
5-Feb-16		0		5	10	43,327.00	10	43,327.00
6-Feb-16	1	2	7909.4	4	8	34,661.60	10	42,571.00
7-Feb-16	1	2	8432	0	0	0.00	2	8,432.00
8-Feb-16	1	2	8411.8	0	0	0.00	2	8,411.80
9-Feb-16		0		4	8	34,661.60	8	34,661.60
10-Feb-16		0		5	10	43,327.00	10	43,327.00
11-Feb-16		0		6	12	51,992.40	12	51,992.40
12-Feb-16		0		8	16	69,323.20	16	69,323.20
13-Feb-16		0		6	12	51,992.40	12	51,992.40
14-Feb-16	1	2	8200.2	7	14	60,657.80	16	68,858.00
15-Feb-16	3	6	25700.2	5	10	43,327.00	16	69,027.20
16-Feb-16		0		5	10	43,327.00	10	43,327.00
17-Feb-16		0		4	8	34,661.60	8	34,661.60
18-Feb-16		0		5	10	43,327.00	10	43,327.00
19-Feb-16		0		3	6	25,996.20	6	25,996.20
20-Feb-16	2	4	16483.2	5	10	43,327.00	14	59,810.20
21-Feb-16	1	2	8597.2	3	6	25,996.20	8	34,593.40
22-Feb-16	1	2	8672.8	2	4	17,330.80	6	26,003.60
23-Feb-16		0		0	0	0.00	0	0.00
24-Feb-16		0		0	0	0.00	0	0.00
25-Feb-16		0		0	0	0.00	0	0.00
26-Feb-16	2	4	16525.8	7	14	60,657.80	18	77,183.60
27-Feb-16	1	2	8426.5	3	6	25,996.20	8	34,422.70
28-Feb-16		0		4	8	34,661.60	8	34,661.60
29-Feb-16		0		6	12	51,992.40	12	51,992.40
1-Mar-16		0		4	8	34,661.60	8	34,661.60
2-Mar-16		0		5	10	43,327.00	10	43,327.00
3-Mar-16		0		3	6	25,996.20	6	25,996.20
4-Mar-16		0		2	4	17,330.80	4	17,330.80
5-Mar-16		0		6	12	51,992.40	12	51,992.40
6-Mar-16		0		4	8	34,661.60	8	34,661.60
7-Mar-16		0		3	6	25,996.20	6	25,996.20
8-Mar-16		0		3	6	25,996.20	6	25,996.20
9-Mar-16		0		2	4	17,330.80	4	17,330.80
10-Mar-16		0		5	10	43,327.00	10	43,327.00
11-Mar-16		0		4	8	34,661.60	8	34,661.60
12-Mar-16		0		5	10	43,327.00	10	43,327.00
13-Mar-16		0		9	18	77,988.60	18	77,988.60
14-Mar-16		0		4	8	34,661.60	8	34,661.60
15-Mar-16		0		7	14	60,657.80	14	60,657.80

	Drayton			Mt Arthur Coal			Total Rail Activity	
Date	Total Trains / day	Total Train Movements/ day	Total tonnage/ day	Total Trains / day	Total Train Movements/ day	Total tonnage/ day	Total Train Movements / day	Total Tonnage/ day
16-Mar-16		0		6	12	51,992.40	12	51,992.40
17-Mar-16		0		3	6	25,996.20	6	25,996.20
18-Mar-16		0		5	10	43,327.00	10	43,327.00
19-Mar-16		0		5	10	43,327.00	10	43,327.00
20-Mar-16		0		4	8	34,661.60	8	34,661.60
21-Mar-16		0		5	10	43,327.00	10	43,327.00
22-Mar-16		0		3	6	25,996.20	6	25,996.20
23-Mar-16		0		3	6	25,996.20	6	25,996.20
24-Mar-16		0		6	12	51,992.40	12	51,992.40
25-Mar-16		0		5	10	43,327.00	10	43,327.00
26-Mar-16		0		4	8	34,661.60	8	34,661.60
27-Mar-16		0		2	4	17,330.80	4	17,330.80
28-Mar-16		0		8	16	69,323.20	16	69,323.20
29-Mar-16		0		5	10	43,327.00	10	43,327.00
30-Mar-16		0		6	12	51,992.40	12	51,992.40
31-Mar-16		0		6	12	51,992.40	12	51,992.40
1-Apr-16		0		7	14	60,657.80	14	60,657.80
2-Apr-16		0		6	12	51,992.40	12	51,992.40
3-Apr-16		0		9	18	77,988.60	18	77,988.60
4-Apr-16		0		4	8	34,661.60	8	34,661.60
5-Apr-16		0		4	8	34,661.60	8	34,661.60
6-Apr-16		0		7	14	60,657.80	14	60,657.80
7-Apr-16		0		6	12	51,992.40	12	51,992.40
8-Apr-16		0		6	12	51,992.40	12	51,992.40
9-Apr-16		0		9	18	77,988.60	18	77,988.60
10-Apr-16		0		6	12	51,992.40	12	51,992.40
11-Apr-16		0		4	8	34,661.60	8	34,661.60
12-Apr-16		0		6	12	51,992.40	12	51,992.40
13-Apr-16		0		6	12	51,992.40	12	51,992.40
14-Apr-16		0		4	8	34,661.60	8	34,661.60
15-Apr-16		0		6	12	51,992.40	12	51,992.40
16-Apr-16		0		5	10	43,327.00	10	43,327.00
17-Apr-16		0		6	12	51,992.40	12	51,992.40
18-Apr-16		0		5	10	43,327.00	10	43,327.00
19-Apr-16		0		3	6	25,996.20	6	25,996.20
20-Apr-16	2	4	15064.4	5	10	43,327.00	14	58,391.40
21-Apr-16	2	4	16890.68	7	14	60,657.80	18	77,548.48
22-Apr-16	1	2	8617	7	14	60,657.80	16	69,274.80
23-Apr-16	2	4	16866	5	10	43,327.00	14	60,193.00
24-Apr-16	3	6	25808	9	18	77,988.60	24	103,796.60
25-Apr-16	1	2	8615.22	8	16	69,323.20	18	77,938.42

	Drayton			Mt Arthur Coal			Total Rail Activity	
Date	Total Trains / day	Total Train Movements/ day	Total tonnage/ day	Total Trains / day	Total Train Movements/ day	Total tonnage/ day	Total Train Movements / day	Total Tonnage/ day
26-Apr-16		0		6	12	51,992.40	12	51,992.40
27-Apr-16		0		0	0	0.00	0	0.00
28-Apr-16		0		0	0	0.00	0	0.00
29-Apr-16		0		1	2	8,665.40	2	8,665.40
30-Apr-16	1	2	8752	8	16	69,323.20	18	78,075.20
1-May-16	1	2	8302	5	10	43,327.00	12	51,629.00
2-May-16		0		5	10	43,327.00	10	43,327.00
3-May-16	2	4	16587.4	6	12	51,992.40	16	68,579.80
4-May-16		0		5	10	43,327.00	10	43,327.00
5-May-16	3	6	25677.8	8	16	69,323.20	22	95,001.00
6-May-16	1	2	8741.6	5	10	43,327.00	12	52,068.60
7-May-16		0		5	10	43,327.00	10	43,327.00
8-May-16		0		3	6	25,996.20	6	25,996.20
9-May-16		0		6	12	51,992.40	12	51,992.40
10-May-16	2	4	17343.28	5	10	43,327.00	14	60,670.28
11-May-16	1	2	8709.2	7	14	60,657.80	16	69,367.00
12-May-16	1	2	8279.08	5	10	43,327.00	12	51,606.08
13-May-16		0		7	14	60,657.80	14	60,657.80
14-May-16		0		6	12	51,992.40	12	51,992.40
15-May-16	1	2	9705.6	7	14	60,657.80	16	70,363.40
16-May-16	2	4	16189	4	8	34,661.60	12	50,850.60
17-May-16	1	2	8015	3	6	25,996.20	8	34,011.20
18-May-16	1	2	9230	0	0	0.00	2	9,230.00
19-May-16	1	2	8667	2	4	17,330.80	6	25,997.80
20-May-16		0		4	8	34,661.60	8	34,661.60
21-May-16		0		6	12	51,992.40	12	51,992.40
22-May-16	1	2	9205	5	10	43,327.00	12	52,532.00
23-May-16	2	4	17851.8	3	6	25,996.20	10	43,848.00
24-May-16	1	2	8423.3	3	6	25,996.20	8	34,419.50
25-May-16	1	2	8772.8	4	8	34,661.60	10	43,434.40
26-May-16		0		4	8	34,661.60	8	34,661.60
27-May-16		0		3	6	25,996.20	6	25,996.20
28-May-16		0		3	6	25,996.20	6	25,996.20
29-May-16		0		7	14	60,657.80	14	60,657.80
30-May-16		0		0	0	0.00	0	0.00
31-May-16		0		0	0	0.00	0	0.00
1-Jun-16		0		0	0	0.00	0	0.00
2-Jun-16		0		0	0	0.00	0	0.00
3-Jun-16	1	2	8410	7	14	60,657.80	16	69,067.80
4-Jun-16	2	4	17313	7	14	60,657.80	18	77,970.80
5-Jun-16	1	2	8549	6	12	51,992.40	14	60,541.40

	Drayton			Mt Arthur Coal			Total Rail Activity	
Date	Total Trains / day	Total Train Movements/ day	Total tonnage/ day	Total Trains / day	Total Train Movements/ day	Total tonnage/ day	Total Train Movements / day	Total Tonnage/ day
6-Jun-16	3	6	24742.6	6	12	51,992.40	18	76,735.00
7-Jun-16	2	4	16905	4	8	34,661.60	12	51,566.60
8-Jun-16	1	2	8901.6	3	6	25,996.20	8	34,897.80
9-Jun-16	1	2	8182.4	4	8	34,661.60	10	42,844.00
10-Jun-16		0		7	14	60,657.80	14	60,657.80
11-Jun-16		0		6	12	51,992.40	12	51,992.40
12-Jun-16		0		8	16	69,323.20	16	69,323.20
13-Jun-16		0		7	14	60,657.80	14	60,657.80
14-Jun-16	1	2	9357.4	8	16	69,323.20	18	78,680.60
15-Jun-16	1	2	8666	8	16	69,323.20	18	77,989.20
16-Jun-16		0		3	6	25,996.20	6	25,996.20
17-Jun-16		0		8	16	69,323.20	16	69,323.20
18-Jun-16		0		7	14	60,657.80	14	60,657.80
19-Jun-16	2	4	17955.6	8	16	69,323.20	20	87,278.80
20-Jun-16	1	2	8158.4	6	12	51,992.40	14	60,150.80
21-Jun-16	1	2	8932.4	4	8	34,661.60	10	43,594.00
22-Jun-16	1	2	8646.2	2	4	17,330.80	6	25,977.00
23-Jun-16	1	2	8645.8	4	8	34,661.60	10	43,307.40
24-Jun-16		0		6	12	51,992.40	12	51,992.40
25-Jun-16		0		5	10	43,327.00	10	43,327.00
26-Jun-16		0		3	6	25,996.20	6	25,996.20
27-Jun-16		0		0	0	0.00	0	0.00
28-Jun-16		0		0	0	0.00	0	0.00
29-Jun-16		0		2	4	17,330.80	4	17,330.80
30-Jun-16		0		5	10	43,327.00	10	43,327.00
1-Jul-16		0		8	16	69,323.20	16	69,323.20
2-Jul-16	1	2	8068.6	9	18	77,988.60	20	86,057.20
3-Jul-16	1	2	8528.8	9	18	77,988.60	20	86,517.40
4-Jul-16		0		8	16	69,323.20	16	69,323.20
5-Jul-16		0		5	10	43,327.00	10	43,327.00
6-Jul-16		0		8	16	69,323.20	16	69,323.20
7-Jul-16	1	2	8232.4	5	10	43,327.00	12	51,559.40
8-Jul-16		0		7	14	60,657.80	14	60,657.80
9-Jul-16	1	2	8845.4	9	18	77,988.60	20	86,834.00
10-Jul-16	2	4	17271.6	7	14	60,657.80	18	77,929.40
11-Jul-16		0		8	16	69,323.20	16	69,323.20
12-Jul-16	2	4	17133	2	4	17,330.80	8	34,463.80
13-Jul-16	3	6	25550.4	4	8	34,661.60	14	60,212.00
14-Jul-16	2	4	16820.2	8	16	69,323.20	20	86,143.40
15-Jul-16	1	2	8873	8	16	69,323.20	18	78,196.20
16-Jul-16	3	6	25577.6	5	10	43,327.00	16	68,904.60

	Drayton			Mt Arthur Coal			Total Rail Activity	
Date	Total Trains / day	Total Train Movements/ day	Total tonnage/ day	Total Trains / day	Total Train Movements/ day	Total tonnage/ day	Total Train Movements / day	Total Tonnage/ day
17-Jul-16	1	2	8657	6	12	51,992.40	14	60,649.40
18-Jul-16		0		4	8	34,661.60	8	34,661.60
19-Jul-16	1	2	9390	2	4	17,330.80	6	26,720.80
20-Jul-16		0		0	0	0.00	0	0.00
21-Jul-16	1	2	8775.4	0	0	0.00	2	8,775.40
22-Jul-16		0		0	0	0.00	0	0.00
23-Jul-16		0		0	0	0.00	0	0.00
24-Jul-16	1	2	8553	0	0	0.00	2	8,553.00
25-Jul-16		0		5	10	43,327.00	10	43,327.00
26-Jul-16		0		5	10	43,327.00	10	43,327.00
27-Jul-16		0		3	6	25,996.20	6	25,996.20
28-Jul-16		0		6	12	51,992.40	12	51,992.40
29-Jul-16		0		5	10	43,327.00	10	43,327.00
30-Jul-16	1	2	8576.6	10	20	86,654.00	22	95,230.60
31-Jul-16		0		8	16	69,323.20	16	69,323.20
1-Aug-16		0		7	14	60,657.80	14	60,657.80
2-Aug-16		0		6	12	51,992.40	12	51,992.40
3-Aug-16		0		1	2	8,665.40	2	8,665.40
4-Aug-16		0		2	4	17,330.80	4	17,330.80
5-Aug-16		0		1	2	8,665.40	2	8,665.40
6-Aug-16		0		0	0	0.00	0	0.00
7-Aug-16	1	2	8592.4	4	8	34,661.60	10	43,254.00
8-Aug-16	3	6	21007.2	4	8	34,661.60	14	55,668.80
9-Aug-16		0		3	6	25,996.20	6	25,996.20
10-Aug-16	1	2	8742.8	3	6	25,996.20	8	34,739.00
11-Aug-16	1	2	8466.9	3	6	25,996.20	8	34,463.10
12-Aug-16	1	2	8282.6	3	6	25,996.20	8	34,278.80
13-Aug-16	1	2	8005.3	4	8	34,661.60	10	42,666.90
14-Aug-16		0		4	8	34,661.60	8	34,661.60
15-Aug-16		0		4	8	34,661.60	8	34,661.60
16-Aug-16		0		3	6	25,996.20	6	25,996.20
17-Aug-16		0		5	10	43,327.00	10	43,327.00
18-Aug-16	1	2	8565	4	8	34,661.60	10	43,226.60
19-Aug-16	1	2	8449.4	5	10	43,327.00	12	51,776.40
20-Aug-16	3	6	25062.6	5	10	43,327.00	16	68,389.60
21-Aug-16	1	2	8320	5	10	43,327.00	12	51,647.00
22-Aug-16		0		5	10	43,327.00	10	43,327.00
23-Aug-16		0		0	0	0.00	0	0.00
24-Aug-16		0		0	0	0.00	0	0.00
25-Aug-16	1	2	8394	3	6	25,996.20	8	34,390.20
26-Aug-16		0		2	4	17,330.80	4	17,330.80

	Drayton			Mt Arthur Coal			Total Rail Activity	
Date	Total Trains / day	Total Train Movements/ day	Total tonnage/ day	Total Trains / day	Total Train Movements/ day	Total tonnage/ day	Total Train Movements / day	Total Tonnage/ day
27-Aug-16		0		4	8	34,661.60	8	34,661.60
28-Aug-16	2	4	16553	2	4	17,330.80	8	33,883.80
29-Aug-16	1	2	8017.4	4	8	34,661.60	10	42,679.00
30-Aug-16	2	4	16846.3	5	10	43,327.00	14	60,173.30
31-Aug-16		0		8	16	69,323.20	16	69,323.20
1-Sep-16		0		7	14	60,657.80	14	60,657.80
2-Sep-16	1	2	9032	6	12	51,992.40	14	61,024.40
3-Sep-16	3	6	25563.7	5	10	43,327.00	16	68,890.70
4-Sep-16		0		6	12	51,992.40	12	51,992.40
5-Sep-16		0		8	16	69,323.20	16	69,323.20
6-Sep-16		0		6	12	51,992.40	12	51,992.40
7-Sep-16		0		4	8	34,661.60	8	34,661.60
8-Sep-16		0		8	16	69,323.20	16	69,323.20
9-Sep-16	1	2	8727.2	7	14	60,657.80	16	69,385.00
10-Sep-16	1	2	8557	7	14	60,657.80	16	69,214.80
11-Sep-16	1	2	8105.8	6	12	51,992.40	14	60,098.20
12-Sep-16	1	2	8569.1	5	10	43,327.00	12	51,896.10
13-Sep-16		0		5	10	43,327.00	10	43,327.00
14-Sep-16		0		6	12	51,992.40	12	51,992.40
15-Sep-16		0		6	12	51,992.40	12	51,992.40
16-Sep-16		0		6	12	51,992.40	12	51,992.40
17-Sep-16		0		7	14	60,657.80	14	60,657.80
18-Sep-16		0		6	12	51,992.40	12	51,992.40
19-Sep-16		0		0	0	0.00	0	0.00
20-Sep-16		0		0	0	0.00	0	0.00
21-Sep-16		0		0	0	0.00	0	0.00
22-Sep-16		0		0	0	0.00	0	0.00
23-Sep-16		0		2	4	17,330.80	4	17,330.80
24-Sep-16		0		7	14	60,657.80	14	60,657.80
25-Sep-16		0		5	10	43,327.00	10	43,327.00
26-Sep-16	1	2	7649.6	9	18	77,988.60	20	85,638.20
27-Sep-16		0		6	12	51,992.40	12	51,992.40
28-Sep-16		0		5	10	43,327.00	10	43,327.00
29-Sep-16		0		7	14	60,657.80	14	60,657.80
30-Sep-16		0		5	10	43,327.00	10	43,327.00
1-Oct-16		0		7	14	60,657.80	14	60,657.80
2-Oct-16		0		5	10	43,327.00	10	43,327.00
3-Oct-16		0		6	12	51,992.40	12	51,992.40
4-Oct-16	2	4	15767.6	6	12	51,992.40	16	67,760.00
5-Oct-16		0		1	2	8,665.40	2	8,665.40
6-Oct-16		0		5	10	43,327.00	10	43,327.00

	Drayton			Mt Arthur Coal			Total Rail Activity	
Date	Total Trains / day	Total Train Movements/ day	Total tonnage/ day	Total Trains / day	Total Train Movements/ day	Total tonnage/ day	Total Train Movements / day	Total Tonnage/ day
7-Oct-16		0		6	12	51,992.40	12	51,992.40
8-Oct-16	1	2	8016.4	7	14	60,657.80	16	68,674.20
9-Oct-16	2	4	15308	4	8	34,661.60	12	49,969.60
10-Oct-16		0		7	14	60,657.80	14	60,657.80
11-Oct-16		0		0	0	0.00	0	0.00
12-Oct-16		0		0	0	0.00	0	0.00
13-Oct-16	2	4	17758.7	3	6	25,996.20	10	43,754.90
14-Oct-16	1	2	8409.6	6	12	51,992.40	14	60,402.00
15-Oct-16	2	4	17015.2	6	12	51,992.40	16	69,007.60
16-Oct-16		0		5	10	43,327.00	10	43,327.00
17-Oct-16	1	2	8942.4	7	14	60,657.80	16	69,600.20
18-Oct-16	1	2	8958.2	4	8	34,661.60	10	43,619.80
19-Oct-16	2	4	17460	1	2	8,665.40	6	26,125.40
20-Oct-16	2	4	17070	5	10	43,327.00	14	60,397.00
21-Oct-16	2	4	17067	4	8	34,661.60	12	51,728.60
22-Oct-16	2	4	17471.8	4	8	34,661.60	12	52,133.40
23-Oct-16	2	4	17365.6	6	12	51,992.40	16	69,358.00
24-Oct-16	2	4	16920.8	4	8	34,661.60	12	51,582.40
25-Oct-16	1	2	7504.4	4	8	34,661.60	10	42,166.00
26-Oct-16		0		4	8	34,661.60	8	34,661.60
27-Oct-16		0		4	8	34,661.60	8	34,661.60
28-Oct-16		0		5	10	43,327.00	10	43,327.00
29-Oct-16		0		7	14	60,657.80	14	60,657.80
30-Oct-16		0		4	8	34,661.60	8	34,661.60
31-Oct-16		0		5	10	43,327.00	10	43,327.00
1-Nov-16		0		5	10	43,327.00	10	43,327.00
2-Nov-16		0		6	12	51,992.40	12	51,992.40
3-Nov-16	1	2	9194	7	14	60,657.80	16	69,851.80
4-Nov-16		0		7	14	60,657.80	14	60,657.80
5-Nov-16		0		6	12	51,992.40	12	51,992.40
6-Nov-16		0		4	8	34,661.60	8	34,661.60
7-Nov-16		0		6	12	51,992.40	12	51,992.40
8-Nov-16		0		6	12	51,992.40	12	51,992.40
9-Nov-16	1	2	3012.6	5	10	43,327.00	12	46,339.60
10-Nov-16		0		2	4	17,330.80	4	17,330.80
11-Nov-16		0		6	12	51,992.40	12	51,992.40
12-Nov-16		0		8	16	69,323.20	16	69,323.20
13-Nov-16		0		7	14	60,657.80	14	60,657.80
14-Nov-16		0		6	12	51,992.40	12	51,992.40
15-Nov-16		0		1	2	8,665.40	2	8,665.40
16-Nov-16		0		6	12	51,992.40	12	51,992.40

	Drayton			Mt Arthur Coal			Total Rail Activity	
Date	Total Trains / day	Total Train Movements/ day	Total tonnage/ day	Total Trains / day	Total Train Movements/ day	Total tonnage/ day	Total Train Movements / day	Total Tonnage/ day
17-Nov-16		0		5	10	43,327.00	10	43,327.00
18-Nov-16		0		3	6	25,996.20	6	25,996.20
19-Nov-16		0		5	10	43,327.00	10	43,327.00
20-Nov-16		0		5	10	43,327.00	10	43,327.00
21-Nov-16		0		0	0	0.00	0	0.00
22-Nov-16		0		0	0	0.00	0	0.00
23-Nov-16		0		0	0	0.00	0	0.00
24-Nov-16		0		0	0	0.00	0	0.00
25-Nov-16		0		2	4	17,330.80	4	17,330.80
26-Nov-16		0		3	6	25,996.20	6	25,996.20
27-Nov-16		0		3	6	25,996.20	6	25,996.20
28-Nov-16		0		2	4	17,330.80	4	17,330.80
29-Nov-16		0		4	8	34,661.60	8	34,661.60
30-Nov-16		0		3	6	25,996.20	6	25,996.20
1-Dec-16		0		6	12	51,992.40	12	51,992.40
2-Dec-16		0		5	10	43,327.00	10	43,327.00
3-Dec-16		0		5	10	43,327.00	10	43,327.00
4-Dec-16		0		7	14	60,657.80	14	60,657.80
5-Dec-16		0		5	10	43,327.00	10	43,327.00
6-Dec-16		0		4	8	34,661.60	8	34,661.60
7-Dec-16		0		5	10	43,327.00	10	43,327.00
8-Dec-16		0		4	8	34,661.60	8	34,661.60
9-Dec-16		0		8	16	69,323.20	16	69,323.20
10-Dec-16		0		10	20	86,654.00	20	86,654.00
11-Dec-16		0		9	18	77,988.60	18	77,988.60
12-Dec-16		0		5	10	43,327.00	10	43,327.00
13-Dec-16		0		6	12	51,992.40	12	51,992.40
14-Dec-16		0		2	4	17,330.80	4	17,330.80
15-Dec-16		0		7	14	60,657.80	14	60,657.80
16-Dec-16		0		6	12	51,992.40	12	51,992.40
17-Dec-16		0		9	18	77,988.60	18	77,988.60
18-Dec-16		0		8	16	69,323.20	16	69,323.20
19-Dec-16		0		5	10	43,327.00	10	43,327.00
20-Dec-16		0		6	12	51,992.40	12	51,992.40
21-Dec-16		0		6	12	51,992.40	12	51,992.40
22-Dec-16		0		2	4	17,330.80	4	17,330.80
23-Dec-16		0		3	6	25,996.20	6	25,996.20
24-Dec-16		0		1	2	8,665.40	2	8,665.40
25-Dec-16		0		0	0	0.00	0	0.00
26-Dec-16		0		2	4	17,330.80	4	17,330.80
27-Dec-16		0		2	4	17,330.80	4	17,330.80

	Drayton			Mt Arthur Coal			Total Rail Activity	
Date	Total Trains / day	Total Train Movements/ day	Total tonnage/ day	Total Trains / day	Total Train Movements/ day	Total tonnage/ day	Total Train Movements / day	Total Tonnage/ day
28-Dec-16		0		3	6	25,996.20	6	25,996.20
29-Dec-16		0		5	10	43,327.00	10	43,327.00
30-Dec-16		0		5	10	43,327.00	10	43,327.00
31-Dec-16		0		6	12	51,992.40	12	51,992.40

PERIOD SUMMARY				
Maximum train movements / day (Drayton)		6	Limit	12
Maximum train movements / day (MAC)		20	Limit	No limit
Maximum combined train movements		26	Limit	30
Total Tonnes (Drayton)	1,361,527.9		Tonnes	
Total Tonnes (Mt Arthur Coal)	14,843,830.2		Tonnes	
Combined Tonnes (Antiene Rail Spur)	***16,205,358.1***		Tonnes	

Appendix I: Rehabilitation Data Sheets

Table 46 Native Species Seed Mix - Woodland Rehabilitation 2016

Species	Vegetation Community	Kg/Ha
Acacia decora	Narrow-leaved Ironbark Woodland	0.3
	Spotted Gum Grey Box Woodland	0.4
	Yellow Box Grey Box Woodland	0.5
	Forest Red Gum Woodland	0.8
Acacia falcata	Narrow-leaved Ironbark Woodland	0.6
	Spotted Gum Grey Box Woodland	0.6
Acacia implexa	Spotted Gum Grey Box Woodland	0.3-0.4
	Yellow Box Grey Box Woodland	0.4
Acacia paradoxa	Narrow-leaved Ironbark Woodland	0.4
	Yellow Box Grey Box Woodland	0.4
Acacia parvipinnula	Spotted Gum Grey Box Woodland	0.2-0.3
Acacia salicina	Narrow-leaved Ironbark Woodland	0.3
Angophora floribunda	Narrow-leaved Ironbark Woodland	0.1
Brachychiton populneus	Narrow-leaved Ironbark Woodland	0.1
	Yellow Box Grey Box Woodland	0.1
Breynia oblongifolia	Narrow-leaved Ironbark Woodland	0.3
	Spotted Gum Grey Box Woodland	0.2
	Forest Red Gum Woodland	0.6
Bursaria spinosa	Spotted Gum Grey Box Woodland	0.4
	Yellow Box Grey Box Woodland	0.4
	Forest Red Gum Woodland	0.4
Corymbia maculata	Narrow-leaved Ironbark Woodland	0.1
	Spotted Gum Grey Box Woodland	0.4-0.5
	Yellow Box Grey Box Woodland	0.1
	Forest Red Gum Woodland	0.2
Daviesia ulicifolia	Spotted Gum Grey Box Woodland	0.2
	Yellow Box Grey Box Woodland	0.1
	Forest Red Gum Woodland	0.3
Dodonaea viscosa	Narrow-leaved Ironbark Woodland	0.4
	Spotted Gum Grey Box Woodland	0.3
	Yellow Box Grey Box Woodland	0.4
Eucalyptus albens	Narrow-leaved Ironbark Woodland	0.05
	Yellow Box Grey Box Woodland	0.1

Species	Vegetation Community	Kg/Ha
Eucalyptus blakelyi	Narrow-leaved Ironbark Woodland	0.05
	Yellow Box Grey Box Woodland	0.1
Eucalyptus crebra	Narrow-leaved Ironbark Woodland	0.6
	Spotted Gum Grey Box Woodland	0.2
	Forest Red Gum Woodland	0.2
Eucalyptus melliodora	Yellow Box Grey Box Woodland	0.4
Eucalyptus moluccana	Narrow-leaved Ironbark Woodland	0.1
	Spotted Gum Grey Box Woodland	0.3
	Yellow Box Grey Box Woodland	0.3
	Forest Red Gum Woodland	0.2
Eucalyptus tereticornis	Spotted Gum Grey Box Woodland	0.1-0.2
	Yellow Box Grey Box Woodland	0.1
	Forest Red Gum Woodland	0.5
Indigofera australis	Narrow-leaved Ironbark Woodland	0.3
	Spotted Gum Grey Box Woodland	0.4
Myoporum montanum	Yellow Box Grey Box Woodland	0.3
	Forest Red Gum Woodland	0.7
Notelaea microcarpa	Spotted Gum Grey Box Woodland	0.2
	Yellow Box Grey Box Woodland	0.4
	Forest Red Gum Woodland	0.4
Ozothamnus diosmifolius	Narrow-leaved Ironbark Woodland	0.3
Senna artemesioides	Narrow-leaved Ironbark Woodland	0.4
Solanum cinereum	Narrow-leaved Ironbark Woodland	0.2
	Spotted Gum Grey Box Woodland	0.3
	Forest Red Gum Woodland	0.5
Aptriplex semibaccata	All Woodland Mixes	0.3
Aristida mix	All Woodland Mixes	0.6
Austrodanthonia mix	All Woodland Mixes	0.4
Bothriochla macra	All Woodland Mixes	0.6-0.8
Calotis lappulacea	All Woodland Mixes	0.1
Chloris truncata	All Woodland Mixes	0.6-0.7
Chrysocephalum apiculatum	All Woodland Mixes	0.1
Cymbopogon refractus	All Woodland Mixes	0.3
Dicanthium sericeum	All Woodland Mixes	0.6-0.8
Einadia mix	All Woodland Mixes	0.04
Eremophila debilis	Spotted Gum Grey Box Woodland	0.1

Species	Vegetation Community	Kg/Ha
Gahnia aspera	All Woodland Mixes	0.2
Hardenbergia violacea	All Woodland Mixes	0.1
Lomandra longifolia	All Woodland Mixes	0.2
Microlaena stipoides	All Woodland Mixes	0.3
Swainsona galegifolia	All Woodland Mixes	0.1
Themeda australis	All Woodland Mixes	0.6-0.8
Vittadinia mix	All Woodland Mixes	0.03
Wahlenbergia communis	All Woodland Mixes	0.03-0.05
Millet/Oats	Cover crop	2-5
Single Super	Bulking agent	26-30

Table 47 Pasture Species Mix

Species	Kg/Ha	Species	Kg/Ha
Millet (summer)	**40**	**Oats (winter)**	**40**
Ryegrass	**4-5**	**White Clover**	**2-5**
Lucerne	**5-10**	**Vetch**	**2-5**
Couch	**5**	**Medic**	**2-5**
Panic	**2**	**Croplift 15 (fertilizer)**	**100-250**
Kikuyu	**0-3**		