



# ANNUAL ENVIRONMENTAL MANAGEMENT REPORT - 2013 (AMENDED)

## DRAYTON MINE

# Annual Environmental Management Report - 2013

<b>Name of Mine:</b>	ANGLO COAL (DRAYTON MANAGEMENT) PTY LTD
<b>Titles / Mining Leases:</b>	CL229, ML395, ML1531
<b>MOP Commencement Date:</b>	OCTOBER 2013
<b>MOP Completion Date:</b>	OCTOBER 2015
<b>AEMR Commencement Date:</b>	JANUARY 2013
<b>AEMR Completion Date:</b>	DECEMBER 2013
<b>Name of Leaseholder:</b>	ANGLO COAL (DRAYTON MANAGEMENT) PTY LTD
<b>Name of mine operator (if different):</b>	
<b>Reporting Officer:</b>	JAMES BENSON
<b>Title:</b>	ENVIRONMENT COORDINATOR
<b>Signature:</b>	
<b>Date:</b>	28 / 3 / 2014

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## Abbreviations

ACARP	Australia Coal Association Research Program
ADL	Ash Dam Levee
AEMR	Annual Environmental Management Report
AHMP	Aboriginal Heritage Management Plan
ANE	Ammonium Nitrate Emulsion
CCC	Community Consultative Committee
CHPP	Coal Handling Preparation Plant
CL	Coal Lease
CTU	Coal Treatment Unit
dBA	Noise decibels (A-weighted)
dB	Noise decibels (linear)
Drayton	Anglo Coal (Drayton Management) Pty Limited
DRE	Division of Resource and Energy
DP&I	Department of Planning and Infrastructure
DSC	Dam Safety Committee
EA	Environmental Assessment
EC	Electrical Conductivity
EEC	Endangered Ecological Community
EIP	Environmental Improvement Plan
EMC	Environmental Management Committee
EMP	Environmental Management Plan
EPL	Environmental Protection License
g/m <sup>2</sup> /mth	Grams per square metre per month
Ha	Hectare

HLRF	Hunter Lowland Redgum Forest
HVAS	High Volume Air Sampler
LAeq(15 min)	Average noise energy over a 15 minute period
LGA	Local Government Area
m	Metres
Mbcm	Million bank cubic meters
MOP	Mining Operations Plan
mg/L	Milligrams per litre
ML	Megalitre
ML	Mining Lease
mm	Millimetres
mm/s	Millimetres per second
MSC	Muswellbrook Shire Council
MSDS	Material Safety Data Sheet
Mtpa	Million tonnes per annum
m <sup>2</sup>	Square metres
m <sup>3</sup>	Cubic metres
NATA	National Association of Testing Authorities
NFR	Non-Filterable Residue
NSW	New South Wales
pH	Potential of hydrogen
PM <sub>10</sub>	Particulate matter with a diameter of less than 10 microns
PPR	Preferred Project Report
PRP	Pollution Reduction Program
OEH	Office of Environment and Heritage
ROM	Run-of-Mine Coal
SHE	Safety, Health and Environment
SHE MS	Safety, Health and Environment Management System
SS	Suspended Solids
t	Tonne
TEOM	Tapered Element Oscillating Microbalance
TDS	Total Dissolved Solids
TSP	Total Suspended Particulates
µS/cm	Microsiemens per centimetre
µg/m <sup>3</sup>	Micrograms per cubic metre
°C	Degrees Celsius

## Executive Summary

Drayton is an open cut mine located near the township of Muswellbrook in the Upper Hunter Valley of New South Wales (NSW). It has approval to mine until 2017 however, approval of the Drayton South Coal Project Environmental Assessment (Hansen Bailey 2012) would extend the mine life to approximately 2040.

This Annual Environmental Management Report (AEMR) details production, environmental management and community relations for the operation during the 2013 calendar year period, and outlines any changes from the current Mine Operation Plan (MOP).

### Operations during the Reporting Period

Drayton uses both dragline and truck and shovel to produce thermal coal for export markets. Run-of-Mine (ROM) product for the 2013 reporting period was 5,488,396 tonnes with a total prime waste and rehandle of 38.785 Million bank cubic meters (Mbcm). Mineral processing at Drayton is undertaken through the Drayton Coal Handling Plant (CHP). In 2013, 4.208 million tonnes of saleable coal was produced, all of which was exported via the port of Newcastle. Coarse reject produced was 922,232 tonnes while tailings disposal accumulated to 347,092 tonnes.

### Environmental Management and Performance

Environmental monitoring is a key component of Drayton's operation. Monitoring undertaken in 2013 included:

**Air Quality** – Dust deposition achieved acceptable levels and total suspended particulates (TSP) and PM10 levels were compliant with statutory limits. A new real time dust monitoring system was installed onsite which included 4 new monitors that monitor upwind and downwind dust emissions from the operation.

**Surface Water** – Lower than average rainfall in the second half of the reporting period resulted in slightly more concentrated levels of electrical conductivity (EC), dissolved solids and metals occurring across all dams, a similar trend to 2012.

**Ground Water** – Groundwater monitoring continued throughout 2013. This monitoring was conducted through groundwater level monitoring surrounding the mine, water level monitoring in mining voids and pump metering. A total of 1232ML of groundwater was calculated to be intercepted by the Drayton operation.

**Flora and Fauna** – Flora and Fauna monitoring occurred in 2013 with no threatened flora recorded. Two new threatened species of fauna were recorded with the Speckled Warbler and Eastern False Pipistrelle recorded in the Northern Offset and the Drayton wildlife refuge. Also found were the Squirrel Glider and Eastern Bentwing Bat which have both previously been recorded at Drayton. Several wild dogs and foxes were sighted in areas around the mine with baiting programs occurring in May and August.

**Weeds** – In 2013 the weed management program targeted noxious and environmental weeds with primary spraying events occurring in April and August.

**Blasting** – A total of 145 blasts were fired at Drayton in 2013 with all being monitored. No blast exceeded overpressure or vibration limits at monitoring locations.

**Noise** – Compliance monitoring occurred in March, June, September and December. During these monitoring periods, no exceedences in operational noise criteria were recorded. Noise emissions monitored from site were lower than those predicted in the Environmental Assessment due to reduced mining activities occurring in the north pit throughout the reporting period.



Visual Aesthetics and Lighting – Trees were planted and seeded into rehabilitation areas that are visible to both the New England Highway and Thomas Mitchell Drive.

Aboriginal and Natural Heritage – No surveys or salvage programmes were conducted in 2013.

Spontaneous Combustion – At the end of 2013, approximately 1090m<sup>2</sup> of surface area was affected by spontaneous combustion. These areas are being managed through a process of active dumping and/or clay capping. 3 new areas were discovered on the South West Tip.

Bushfire - Bushfire mitigation works were carried out during 2013 with slashing in high risk areas and property boundaries conducted.

Hydrocarbon Contamination – During 2013, Drayton ceased the use of its bioremediation facility at the direction of DRE. This facility is currently being redesigned. No significant hydrocarbon incidents occurred in 2013. A total of 63.7t of contaminated materials were removed from the operation in 2013.

Public Safety - There were no incidents of public safety concerns during 2013.

Other Issues and Risks - Environmental risks associated with the Drayton Operations are recorded in Environmental Aspects and Impacts Register which forms the basis of the Environmental Improvement Plan (EIP).

Meteorological Monitoring - Total annual rainfall was 692 millimetres. Temperatures were consistent with the previous year. Wind speeds generally remained between 0 and 4m/sec. The dominant wind directions remained East – South East and West – North West.

## **Community Relations**

A total of 24 complaints were received during the 2013 reporting period. Of these, the highest number was made regarding odour. Drayton has one known odour complainant who lives approximately 30km from Drayton, however seven of the 11 odour related complaints for 2013 were made anonymously via the EPA hotline. Blasting, noise and dust related complaints were also received for the period.

During 2013, Drayton's Community Consultative Committee (CCC) met quarterly and joint CCC with Mount Arthur Coal met every six months to discuss environmental performance and community issues.

In 2013, Anglo American donated cash and equipment to 30 local causes including, the Muswellbrook Scouts and the Denman Devils Football Club. Drayton also participated in the Bursting with Energy Expo at the Upper Hunter Show and supported the Solar Boat Challenge organised by Muswellbrook Shire Council (MSC).

## **Rehabilitation**

During the 2013 reporting period, a total of 26 hectares (Ha) of rehabilitation was completed comprising 13Ha in January, 4Ha in October and 9Ha in December. A further 25 hectares was bulk shaped ready for completion during 2014. In addition, approximately 6200 native seedlings were planted on previously rehabilitated areas.

The Rehabilitation and Offset Management Plan outlines the objectives, methodology and monitoring of Drayton's rehabilitation areas in accordance with condition 39 of the project approval. The Drayton area was traditionally used for beef cattle grazing, so maintaining grazing capacity in pasture areas is a key objective. A second key objective is to maintain ecosystems and biodiversity through the establishment of native trees in a wildlife corridor between remnant woodland areas in the south-west and north-east of the mine.

## **Activities Proposed in the Next AEMR**

Drayton's environmental targets for the 2014 reporting period focus on:

- Dust mitigation;
- Contaminated material management;
- Biodiversity offset area management;
- Dam and mine water management;
- Rehabilitation and final landforms;
- Minimising blasting and noise levels;
- Reduction in spontaneous combustion;
- Continuation of the Community Consultative Committees;
- Maintaining full compliance with environmental legislation and with ISO14000 systems; and
- Continued improvement of the waste management and the Environmental Management systems.

### **Additional Information**

As required under consent condition 6.1 (e) Drayton provided DP&I with coal haulage reports that covered the period of 1<sup>st</sup> January 2013 to 31<sup>st</sup> December 2013. Condition 6.1(b) states that, Coal transported along the Antiene Rail Spur is limited to twenty (20) million tonnes per annum. The Mt Arthur Coal operation has a more recent approval allowing 27 million tonnes to be railed on the Antiene Rail Spur (ARS). In 2013, 21,854,906 tonnes of coal was transported on the ARS. This comprised of 4,097,996 tonnes from Drayton and 17,756,910 tonnes from Mt Arthur Coal.

# 1 INTRODUCTION

Drayton mine is located near the township of Muswellbrook in the Upper Hunter Valley of New South Wales. It is an open cut mine using both dragline and truck and shovel to produce thermal coal for export markets. Currently production is approximately five million tonnes per annum (Mtpa). Drayton commenced operation in 1983 and has approval to mine until 2017. Anglo American currently owns an 88.2 per cent share of the Drayton joint venture and operates the mine 24 hours a day and 7 days a week. Other joint venture partners include: Mitsui Drayton Investment Pty Limited; NCE Australia Pty Limited; Hyundai Australia Pty Limited; and Daesung Australia Limited. Drayton employs approximately 410 permanent employees and engages contractors to assist in some areas of the mine.

This Annual Environmental Management Report (AEMR) is required by Development Application 106-04-00, Project Approval 06\_0202, Coal Lease's 229 and 395 and Mining Lease (ML) 1531. The report covers both the Drayton Mining Operations and the Antiene Rail Spur. The report details production, environmental management and community relations for the operation during the 2013 calendar year period, and outlines any changes from the current Mine Operation Plan (MOP). The current MOP covers a two year period from the 30<sup>th</sup> October 2013.

The AMER has been developed in accordance with the NSW Department of Primary Industries – Mineral Resources 'Guidelines to the Mining, Rehabilitation and Environmental Management Process'. The report will be distributed to:

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

A copy of the AEMR is publicly available on the Drayton website <http://www.angloamerican.com.au/our-operations/thermal-coal/drayton/environment.aspx> Drayton wishes to accept any feedback on this report. If you have any comments on the content of this report, please refer them to:

Environment Coordinator  
Anglo Coal (Drayton Management) Pty Ltd  
PMB 9, Muswellbrook NSW 2333

## 1.1 Consents, Leases and Licences

There are a number of current approval and consent documents related to the Drayton mine operations. The key documents, and their subsequent approval dates, are listed below:

- Drayton operates in compliance with a development consent issued, 1<sup>st</sup> February 2008, under Section 75J of the *Environmental Planning and Assessment Act 1979*. Subsequent modifications were issued in 2009 to extend a further 8 hectares to the existing approval

area and in 2012 for the construction of an explosive storage facility and placing tailings in the east pit.

- A development consent was issued in 2000 for the Antiene Joint Rail User Facility.
- Coal Lease (CL) 395 was granted on the 24<sup>th</sup> June 1992 by the Minister for Mineral Resources under the *Mining Act 1973*. This lease transferred part of Coal Lease 744, comprising approximately 14.5 ha, from the Bayswater Colliery to Drayton. This lease was renewed in 2008 and now extends to 2029.
- Section 100 and section 101 applications, relating to an emplacement area in regard to washery reject material, were granted in 2007 and 2011. This approval remained in place for 2013.
- Drayton's Mining Operations Plan was renewed in 2013 and covers the period of 30<sup>th</sup> October 2013 to 30<sup>th</sup> October 2015.

During the reporting period there were no new development consents, modifications or mining leases approved for Drayton. There was however a variation to Drayton's Environmental Protection Licence and two amendments to the Drayton Mining Operations Plan.

Drayton received a variation to Environmental Protection Licence 1323 on the 5<sup>th</sup> of September 2013. This variation included the implementation of an assessment program under Section 8 – Pollution Studies and reduction Programs.

Drayton received an amendment to the existing MOP on the 15<sup>th</sup> of April 2013. This minor amendment was to vary the extraction area to align with the boundary of the Environmental Assessment. As this was a minor amendment there was no review of the rehabilitation liability for Drayton. This amendment also resulted in a reduction in the life of the MOP period from 2017 to 2015.

On the 11<sup>th</sup> of October 2013, Drayton received a second amendment to the MOP. This amendment was for the remediation of existing rehabilitation works on the South West tip. This amendment resulted in a review of the Drayton Rehabilitation Liability.

A register of current approvals is maintained at Drayton and is updated and circulated as required. Refer to **Appendix A** for a full list of Drayton's consents, leases and licenses.

Anglo American is currently seeking development approval for Drayton South. This new mining area is currently going through an assessment process. Table 1 provides a summary of the assessment process to date. On 2<sup>nd</sup> March 2011, Anglo American made an application under section 75E (now repealed) of the EP&A Act for Project Approval. The application was accompanied by a Preliminary Environmental Assessment (PEA).

On 3<sup>rd</sup> August 2011, the DG of DP&I issued the Director General's Environmental Assessment Requirements (DGRs) for the Project.

Hansen Bailey conducted an environmental assessment of the Project in accordance with the DGRs, the EP&A Act and relevant government policies and guidelines. The findings of the environmental assessments are summarised in Section 3 of the Drayton South Environmental Assessment. This process involved extensive consultation with stakeholders, including the Coolmore and Darley horse studs (more than 25 meetings), to ensure that their concerns were addressed in the EA. Significant modifications to the Project were made to address issues raised by these stakeholders. The EA was lodged in November 2012.

The EA was publicly exhibited for a period of six weeks between 7<sup>th</sup> November and 21<sup>st</sup> December 2012. Following further consultation with stakeholders, including Government agencies and the horse studs, the response to submissions (RTS) was provided to the DP&I on 7<sup>th</sup> May 2013.

Following submission of the RTS, further changes were made to the Project to minimise potential impacts on the horse studs. The Preferred Project Report (PPR) proposed:

- A modified visual bund (Option 4A);
- Earlier establishment of tree screens;
- Changes to the conceptual final landform; and
- Minimum setback from Saddlers Creek of 40 m.

On 16<sup>th</sup> March 2013, the Minister requested the PAC to review the Project in more expansive terms than his revised request on the 17<sup>th</sup> May 2013.

The PAC provided its PAC Report to the Minister on the 10<sup>th</sup> December 2013. On 17<sup>th</sup> December 2013, DP&I requested Anglo American to respond to the PAC Report prior to the preparation of the DG's Environmental Assessment Report, as required under section 75I of the EP&A Act.

**Table 1: Assessment Process Summary**

Date	Process
March 2011	Project Application submitted (accompanied by a PEA) to DP&I
August 2011	DGRs Issued by DP&I
March 2011 – November 2012	Preparation of EA and associated stakeholder consultation
November 2012	EA submitted to DP&I
November – December 2012	Public Exhibition of EA by DP&I
March 2013	Minister requested PAC review (deferred May 2013)
August 2013	PPR submitted to DP&I
August 2013	Revised terms of reference sent to PAC
December 2013	Change the way that noise monitoring data is provided

A response to the PAC and Gateway Panel Reports were submitted to the DP&I in February 2014. If approved, Drayton South will use the Drayton workforce, equipment and infrastructure beyond 2017.

### 1.1.1 Mt Arthur Sublease

In 2006 Drayton Mine granted a sublease over part of CL229 to Mt Arthur Coal for use as part of their operations, specifically for the purposes of depositing overburden and tailings. The sublease was registered by DTIRIS – Division of Resources and Energy (DTIRIS – DRE) on 17<sup>th</sup> December 2008 and the Mt Arthur sublease area was moved from the Drayton Mine colliery holding to the HVEC colliery holding. As of March 2014 DTIRIS – DRE had advised Drayton and Mt Arthur Coal that the sublease has been registered. During the 2013 reporting period, Mt Arthur Coal had full management obligations over the Sublease. Mt Arthur Coal are responsible for holding a MOP and associated rehabilitation security deposit that covers the Sublease area.

## 1.2 Mine Contacts

Contact details of the current Mine Manager and the Safety Health and Environment (SHE) Manager are given in Table 2 below.

**Table 2: Mine Contacts**

Position	Name	Contact Numbers
Mine Manager	Darren Pisters	Ph (02) 6542 0203 M 0417 618 876
Safety, Health & Environment Manager	Peter Forbes	Ph (02) 6542 0256 M 0427 752 397

### 1.2.1 Site Personnel Responsible For Mining, Rehabilitation and the Environment

The SHE Manager at Drayton is supported by the:

- Environment Coordinator
- Environment Officer
- Environment Graduate

An Environmental Management Committee (EMC) was instigated in 1995. The Committee members include the General Manager, the Senior Leadership Team and the Environment Coordinator, Officer and Graduate. The committee meets on a monthly basis to discuss environmental performance and community issues, and to provide the organisation with guidance on environmental management.

Other departments within the company are responsible for specific aspects of environmental management within their respective work areas under the advice of the SHE Department. Individual employees and contractors are accountable for their own environmental performance and have environmental requirements set within their position descriptions.

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.

## 1.3 Actions required at Previous AEMR Review

In 2013 Drayton received comment from the NSW Department of Planning and Infrastructure (DP&I) and the NSW Trade & Investment Resources and Energy (DRE) regarding the 2012 AEMR. Actions are listed in Table 3a and 3b below. Table 3b was added as an amendment in accordance with Actions 1b and 1c of the 2013 AEMR Review Action Plan dated 22<sup>nd</sup> July 2014. The actions in Table 3b do not relate specifically to 2013 AEMR requirements but were the subject of correspondence with DRE throughout the reporting period.

**Table 3a: Actions from the previous AEMR**

Department / Action Number	Action Required in this AEMR	Where dealt with in this AEMR
DRE / 1a 1.	Provide an annual comparison table of Spontaneous Combustion to demonstrate that Spontaneous Combustion is decreasing.	Section 3.14
DRE / 1a 2.	Ensure that the correct MOP approval and Amendment dates are outlined in the AEMR	Section 1.1
DRE / 1a 3.	Tailings management must be fully reported in the AEMR detailing strategy, inspections and monitoring, responsibilities, operation, disposal, quantities, capacities and events.	Section 2.6.4
DRE / 1a 4.	The management of contaminated material and the bioremediation area must be fully reported in the AEMR detailing strategy, inspections & monitoring, responsibilities, operation, disposal, quantities, capacities and events.	Section 3.17
DRE / 1a 5.	Review the sublease arrangements with Mt Arthur and any information relating to the reporting period.	Section 1.1.1
DRE / 1a 6.	Section 5 (Rehabilitation) must be fully addressed in the AEMR	Section 5
DRE / 1a 7.	Operating protocols for the management of weeds within the rehabilitation areas.	Section 3.8
DP&I	EA predictions should be assessed and the performance of the mine reported against these assessments. In particular noise, dust, mining and rehabilitation.	Sections 2.4.4, 3.1, 3.10
DP&I	Change the way that noise monitoring data is provided	Section 3.10.3
DP&I	The AEMR should contain a running tally of year to year of the areas affected by spontaneous combustion.	Section 3.14
DP&I	The Drayton bioremediation area requires a major tidy up and rebuild. Drayton are required to submit a remediation and reconstruction plan for approval prior to operating the area. This information is to be reported in the AEMR.	Section 3.17
DP&I	Rate of rehabilitation is to be reviewed and increased in preparation for mine closure.	Section 5.5

**Table 3b: Actions from the previous AEMR review – DRE Amendment**

Department	Action required, due date and correspondence with DRE during the reporting period	Where dealt with in this AEMR
DRE / 1b	Provide DRE with a revised AEMR for approval that address Section 5 (Rehabilitation) of the AEMR guidelines – Due September 2013 <b>An AEMR addendum report addressing Section 5 (Rehabilitation) was provided to DRE 30<sup>th</sup> September 2013</b>	Section 5
DRE / 2	Provide DRE with a justification and review of topsoil stockpile management to support and maintain seed and microbial viability. Demonstrate how the stockpiled material is tested and managed prior to re-spreading to determine ameliorant requirements – Due October 2013 <b>A topsoil management justification letter was sent to DRE 31<sup>st</sup> October 2013</b>	Section 5
DRE / 3	1. The company is to cease all activities relating to the storage and disposal of contaminated material onsite until Drayton has DRE approval to operate a Bioremediation Area - Immediately 2. Drayton is to provide DRE with a justification and review for the	Section 3.5, 3.17

	<p>management and disposal of contaminated material including offsite and onsite disposal options – September 2013</p> <p>3. If Drayton propose to operate a Bioremediation Area a Management Plan must be submitted to the Department for approval prior to operation and shall incorporate</p> <ul style="list-style-type: none"> <li>• legislative review</li> <li>• management protocol and responsibilities</li> <li>• design and criteria</li> <li>• operating standards and inspection regime and</li> <li>• quarterly reporting to the DRE</li> </ul> <p><b>Drayton reviewed practices relating to the existing Bioremediation Area and provided DRE with a letter including an action plan addressing the above matters on 19<sup>th</sup> August 2013. Enclosed with the letter was a Draft Bioremediation Management Plan which was subsequently re-developed by Hanson Bailey and re-submitted to DRE on 22<sup>nd</sup> November 2013</b></p>	
DRE / 4	<p>1. Provide DRE with a justification and review of Old Tailings Cells with a plan for formally decommission the Cells – October 2013</p> <p>2. Engage and expert Tailings Geotechnical Engineer to review and justify if the current tailings management system is designed and managed to facilitate consolidation of tailings to support an engineered cover capping structure for long-term rehabilitation to an agreed landform that minimises safety and environmental risk – October 2013</p> <p>3. In consultation with DRE, develop and submit for approval a Tailings Management Plan that outlines operation strategies ie disposal options (design, minimal time between deposition layers), methodology, structure design, dimensions, decanting options, density and bench criteria, freeboards, spillways, etc – October 2013</p> <p><b>A tailings management justification letter was sent to DRE 31<sup>st</sup> October 2013 which addressed the above matters. Enclosed with the letter was a tailings storage facility report by Henderson Geotech Pty Ltd and the Drayton Tailings Management Plan approved by DRE September 2011</b></p>	Section 2.6.4
DRE / 5	<p>In consultation with DRE and DPI commence the development of the full Closure Plan incorporating the DRE comments and Draft Guidelines – August 2013</p> <p><b>In August 2013, Drayton met with DRE and DP&amp;I to discuss requirements for Mine Closure Plan (MCP). A draft MCP was requested and provided by December 2013</b></p>	Section 5.5
DRE / 6	<p>Provide DRE with a full Rehabilitation Calculation for Drayton against 2013 activities – September 2013</p> <p><b>A full Rehabilitation Calculation for Drayton was provided to DRE on 11<sup>th</sup> October 2013</b></p>	Section 5.5



## 2 SUMMARY OF OPERATIONS

### 2.1 Exploration

In 2013, having drilled the Drayton in mine plan areas out to capacity, the focus was on meeting the requirements set down in the exploration license conditions for A 173. The main area of concern was the area immediately to the south of the current mining area, South Pit east. Three PQ sized partly cored holes and one HQ sized partly cored hole were drilled in the A 173 area. Three rotary holes were also completed to improve the aerial distribution of structural data points. The three PQ sized holes had a two phase purpose, they were drilled to obtain both fugitive emissions data and also to obtain wash-ability data for this area.

### 2.2 Land Preparation

Drayton owns the land contained within CL229 and CL395. The land in ML1531 is owned by Macquarie Generation and is leased to Drayton. Drayton has a long term agreement allowing for mining operations to occur under our current development consent.

Throughout the 2013 reporting period Drayton cleared approximately 38Ha in preparation for mineral extraction activities, predominantly in the SPE, SPW, and NN areas. A further 10Ha was cleared for access and stockpiles during stage 1 of the Southern Offset area remediation work detailed further in Section 5.2.

Before any land is disturbed at Drayton a Permit to Disturb must be authorised by the Environment Department. A plan of the area to be disturbed along with supporting documentation is provided to the Environment Coordinator. The proposed disturbance area is pegged and clearly marked prior to any work commencing. If required, an inspection of the site is undertaken by a member of the Environment Department to identify any additional environmental issues that may need further management. Where required, due diligence works are undertaken to manage Aboriginal heritage matters. Topsoil is salvaged during the clearing process along with the mulch that is generated during vegetation clearing, and is used directly on rehabilitation areas or stockpiled for future use.

Topsoil stockpiles are generally kept to less than three metres in height where possible, with large stockpiles not exceeding four metres in height. Sites for long-term stockpiles are selected so that double handling of topsoil can be avoided. Mechanical handling of topsoil is minimised to avoid soil structure deterioration. Long-term soil stockpiles are spread with pasture seed to prevent erosion and to prevent weed growth through competition. Long term topsoil stockpiles are located on the Great North Tip and the South Pit regions.

Regular soil sampling and amelioration practices are in place at Drayton. These include:

- Limiting topsoil stockpile height to four metres maximum;
- Shaping and seeding topsoil stockpiles with temporary cover crop / pasture;
- Adding soil ameliorants during construction of rehabilitation areas;
- Testing soils on newly rehabilitated areas to collect baseline data;
- Testing soils on rehabilitated areas as part of regular monitoring; and
- Providing further ameliorants where soil quality is found to inhibit vegetative cover or contribute to erosion to an extent inconsistent with intended future land use.

## 2.3 Construction

No major construction works occurred during the 2013 reporting period.

## 2.4 Mining

The current business plans have Drayton's long term mine annual production rate remaining around 5 million tonnes and decreasing to 3 million tonnes in about 2016-2017 however, upon completion of further exploration and review of mining options, this will ultimately change in the forthcoming years.

The mining operation advances north and south, with the bulk of remaining reserves being in the South Pit. This area contains complex geology including multiple faults and steeply dipping coal seams. The introduction of high capacity excavators and changes in economics has now made it feasible to mine this area.

As at 31<sup>st</sup> December 2013 the remaining total resources is 10.338 million tonnes. Of this 6.507 million tonnes is within the mine plan with the balance outside the mine plan. Resources within the mine plan will largely be mined within the term of the existing MOP.

At the end of 2013, the estimated mine life for Drayton extends to 2015. The actual mine life is subject to economic conditions and may extend to 2017 under the current consent approval. Drayton surface facilities are planned to be retained for use as part of potential future mining operations at Drayton South if approved. Approval of the Drayton South application would extend Drayton's mine life to approximately 2040.

### 2.4.1 Changes in Mining Equipment and Method

During 2013, there were several changes to the Drayton fleet with the addition of new equipment and disposal of older machines. Current major equipment consists of:

- BE 1370 Electric Dragline
- Two Hitachi EX 5500 Excavators
- Hitachi EX 3600 Excavator
- Hitachi EX 3500 Excavator
- One Le Tourneau L1100 Loader
- One Le Tourneau L1400 Loader
- 26 Caterpillar 789B / 789C Trucks
- One Svendala SKF50 Drill
- One Sandvik DK45S
- One Sandvik DR460
- One Atlas Copco PV235 Drill
- Two Cat 777D water carts
- One Cat 777F Water Cart
- 7 D11R track dozers

- Three D10T track dozers
- One 834 rubber tyre dozer
- One Tiger 690/Cat 854 rubber tyre dozer
- 3 Cat 16H graders
- One Cat 992 Front End Loader

### 2.4.2 Overburden Handling

Overburden and interburden is predominantly removed by the dragline and the excavators, with assistance where required from front-end loaders. Overburden, parting and coal thicker than two metres is blasted. All overburden and parting material is 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 2013 are shown in Table 4.

**Table 4: Production and waste schedule**

	Cumulative Production (m <sup>3</sup> )		
	Start of Reporting Period	End of reporting Period	End of Next Reporting Period (Estimated)
Topsoil stripped	922,590	946,590	946,590
Topsoil used/spread	477, 640	502,640	542,640
Waste Rock (Mbcm) (approximate only)	649	688	720
Ore	N/A	N/A	N/A
Processing Waste *	N/A	N/A	N/A
Product (units Tonnes)	80.3MT	85.8MT	89.1MT

### 2.4.3 ROM Production History and Forecast

Run-of-Mine (ROM) product for the reporting period was 5,488,396 tonnes with a total prime waste and rehandle of 38.785 Million bank cubic meters (Mbcm). A comparison showing the ROM production at Drayton for the past reporting periods is provided in Table 5.

**Table 5: History of ROM Coal production and target**

Year	Production (Mt)
1985	1
1986	2
1987	3
1988	3
1989	3.55
1990	3.48

1991	3.96
1992	3.85
1993	3.97
1994	3.77
1995	3.85
1996	3.5
1997	4.2
1998	4.5
1999	4.8
2000	5.07
2001	5.23
2002	4.84
2003	5.04
2004	4.98
2005	4.73
2006	5.021
2007	4.691
2008	4.171
2009	4.821
2010	5.425
2011	5.312
2012	5.456
2013	5.488

#### 2.4.4 Comparison with Environmental Assessment Predictions

The coal and overburden that Drayton mined during 2013 varied to those reported in the 2007 Environmental Assessment. Table 6 shows a comparison of 2013 production figures compared to EA predictions.

**Table 6: 2013 production figures compared to EA predictions**

	Total Prime (Mbcm)	ROM Coal (Mtpa)	Product Coal (Mtpa)
2013	38.785	5.488	4.208
EA Prediction (Yr 6)	48.03	6.50	6.04

Mining production figures that occurred in 2013 were well below those predicted in the EA for year 6 of the operation. The reason for the lower production figures is due to market decisions not being conducive to capital upgrades in order to increase production. Drayton have decided in the current market that areas previously earmarked for mining such as the EN area are not currently economically viable.

## 2.5 Mineral Processing

Drayton produces coal suitable for electricity generation, cement manufacture and industrial processes. It has high specific energy, low ash and medium sulphur levels. Mineral processing at Drayton is undertaken through the Drayton Coal Handling Plant (CHP). This facility comprises of a series of small 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. This plant has provided Drayton with greater scope to market its coal.

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

In 2013, 4.208 million tonnes of saleable coal was produced, all of which was exported. Export coal from Drayton is 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.

During the reporting period all tailings disposed of occurred in the ES void and is further discussed in Section 2.6.4.

## 2.6 Waste Management

Drayton has an existing waste management system which incorporates waste reuse and recycling and addresses issues relevant to the management of waste. As predicted in the 2007 Environmental Assessment (EA), the original waste management system and sewage treatment plant has continued to be utilised for the project. There has been no significant change or additional demand for waste services as the respective number of employees has not significantly changed.

### 2.6.1 General Waste

Designated waste storage areas are in place across the site in accordance with EPA requirements. The waste storage areas have suitable containment systems in place for the type of waste being stored. A separate hazardous waste storage area is in place in order to minimise environmental harm. Spills that occur within these areas 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 transported to and 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. These waste streams and the 2013 reporting period waste volumes are outlined in Table 7.

**Table 7: Waste streams and end of 2013 volumes**

Waste Stream	Treatment and Disposal	Volume	Unit
<b>Metal</b>	Recycled off-site	366.99	tonne
<b>General Waste</b>	Off-site landfill	220.44	tonne
<b>Confidential document bins</b>		1.692	tonne
<b>Batteries</b>	Recycled off-site	24.21	tonne
<b>Empty 205L gallon drums</b>	Recycled off-site	22	each
<b>Empty 20L drums</b>	Recycled off-site	234	each
<b>Oil Filters</b>	Recycled / disposed of off-site	12,772	each
<b>Oil</b>	Recycled / disposed of off-site	479,150	litres
<b>Sewage</b>	On-site treatment and disposal	2,089 000	litres

### **2.6.2 Recycling Initiatives**

Drayton attempts to recycle or reuse specific waste streams to minimise the environmental effects of the product. Employees are encouraged to minimise their waste generation through regular updates on waste management and improved housekeeping strategies. 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. Empty resealable drums are available in the store for the collection and storage of waste grease. If reasonably uncontaminated, the grease is recycled, as well as the drums. Reimbursements are received for waste oil, batteries and metal waste streams. Used printer cartridges are returned to the manufacturer for recycling.

### **2.6.3 Sewerage Treatment / Disposal**

Drayton's sewerage treatment plant collects and treats on-site effluent. The treated effluent is then distributed into two settlement ponds. Overflow from the ponds is pumped to an area of rehabilitation on the East Tip. A number of septic tanks on site (i.e. those at the CHP and crib huts) are not connected to the onsite treatment station. Effluent from these tanks is collected by Remondis and pumped into the on-site treatment plant. During the 2013 reporting period 2089kL of effluent was treated onsite.

### **2.6.4 Mineral Waste**

As described in the 2013-15 MOP, the primary area for placement of waste materials is the mined out area of East Pit. The Great North Tip extends over the ES, EN and NN strips as one active emplacement, albeit with several dumping faces at different levels. A similar arrangement will exist in the Rocky Knob and South Pit areas as mining progresses.

There are no further out-of-pit overburden emplacement areas proposed in the MOP other than as stated above and Macquarie Generation's Liddell Ash Dam, which will require emplacement of waste material on their land to raise the level of the wall for ash disposal purposes.

In 2012, Drayton received planning approval to deposit tailings from the Drayton Coal Handling Preparation Plant (CHPP) into the ES void. The tailings were approved to be deposited into water, and accumulated volumes were predicted using a conservatively low tailings density of 0.6t/m<sup>3</sup>. This was coupled with a forecast tailings production of 200,000 t/year to produce a facility life of 10 years for 3.35 Mcu.m (3,350ML) capacity.

During the reporting period all tailings were deposited into the ES void which is also the primary water storage location onsite. The tailings discharge point was moved on regular basis to build a tailings beach against the northern endwall of the ES void. Tailings disposal in 2013 totalled 347,092 tonne. A return water pump in the southern end of the ES void pumps water to the Access Road Dam which is then transferred to the CHPP for reuse.

The tailings line from the CHPP to the ES void is inspected on a weekly basis by a CHPP operator. The ES void is inspected daily by the Open Cut Examiner with any tailings issues conveyed to the CHPP supervisor. In October 2013 a tailings dam specialist inspected the tailings storage facility and reported on the management of the facility since tailings were first deposited in March 2012. This inspection found that many original restraints on the tailings storage facility were no longer present as mining in the EN pit is not preceding. Tailings generated by the CHPP were found to be higher than that forecast and the height of tailings beaches were higher than forecast at RL 109m.

Coarse reject from the CHPP is transported by truck to the ES void or has been used in other areas of the mine to sheet haul roads. The total amount of rejects produced in 2013 was 922,232 tonnes.

A tailings management justification letter was sent to DRE 31<sup>st</sup> October 2013 which addressed the matters included in Action 4 of the 2012 AEMR Review Action Plan. Enclosed with the letter was a tailings storage facility report by Henderson Geotech Pty Ltd and the Drayton Tailings Management Plan approved by DRE September 2011.

## **2.7 Ore and Product Stockpiles**

Drayton has four product coal stockpile pads each with a nominal capacity of 80,000 tonnes. Coal from varying areas of the pit is blended on the product pads to meet overall customer specifications. One stockpile pad is dedicated for the higher ash export market. The other three pads are used to provide different quality products to the low ash export market.

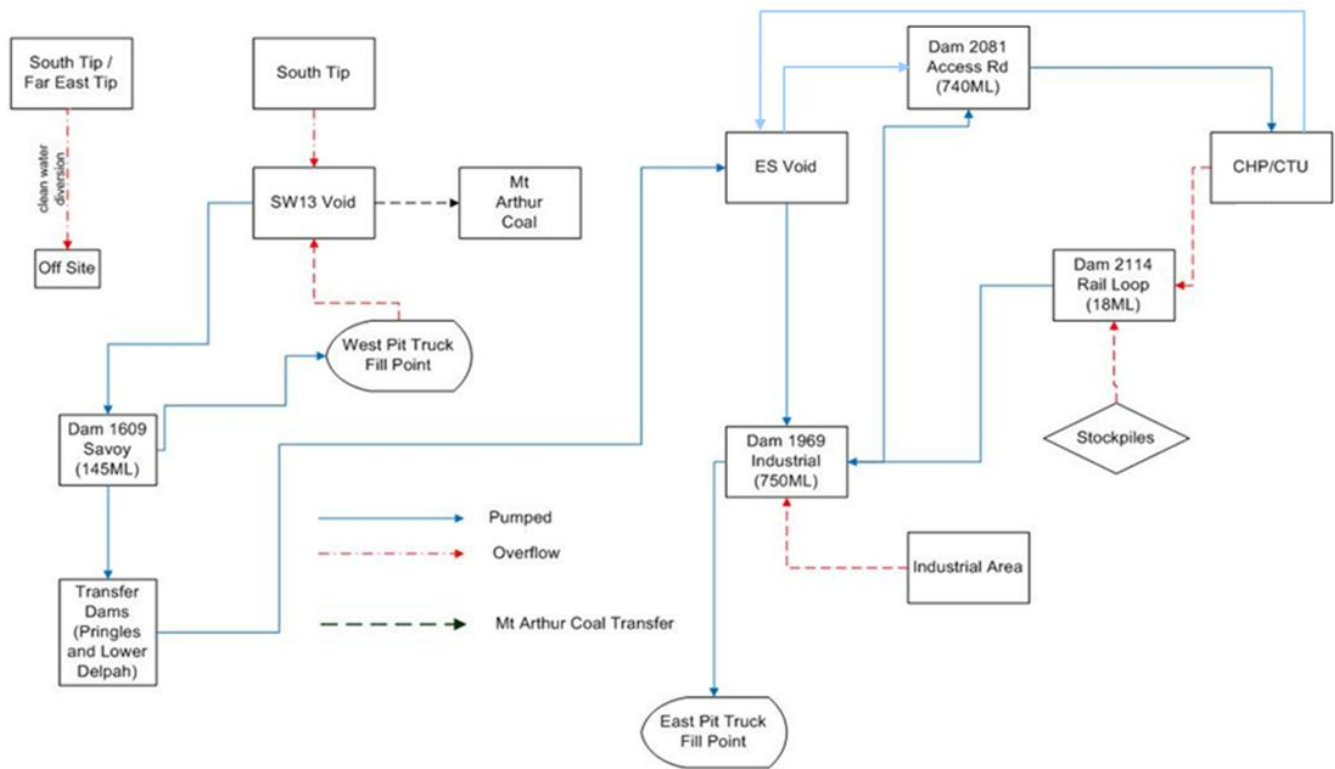
Export coal is stacked in piles of up to 40,000 tonnes. The reclaimers are transferred between stockpiles using a rail-mounted transfer car, which is located at the northern end of the stockpiles. Coal is typically not stored for longer than twelve weeks due to the risk of self-heating. Eight weeks after a stockpile is completed it is routinely monitored for spontaneous combustion with the stockpile re-circulated if the heating coal cannot be loaded onto a train before the temperature reaches critical levels.

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

## **2.8 Water Management**

### **2.8.1 Water Management System**

As predicted in the EA Drayton's mine water management system has been expanded for the project, and while the volume of water managed through the system has increased, the water balance has remained substantially unchanged. Unlike many other mines in the Upper Hunter, the Drayton water management system is a closed system which sources all of its process water internally from within the existing mining operational area, rather than direct extraction from the Hunter River. Potable water however, is supplied by pipeline from the MSC. The Drayton water management system consists of a series of on-site dams and in-pit water storage areas (see Figure 1).



**Figure 1: Water Management Flow Diagram**

The total storage capacity of the water management system was 7,135ML at the end of the 2013 reporting period. This consisted of 1,635ML capacity in major mine water storage dams and 5,500ML in the voids. Water volumes in major storages are given in Table 8 below.

The Far East Tip Dam (Dam 1895) has a capacity of approximately 130ML however; it has no connection with mining activities and is not included in the overall site storage capacity. 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 18ML capacity of the Rail Loop Dam is also not included in the overall site storage capacity as the dam is maintained as close to zero volume 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 0.05ML capacity. The tank is maintained at capacity for use as needed.

**Table 8: Stored Water – December 2013**

		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	79	71	145
	Industrial (1969) Dam	401	377	750



	Access Road (2081) Dam	395	376	740
	Rail Loop (2114) Dam	0	5	18
SW13 Void		0	374	1,000
ES Void		2,577	3,858	4,500
Controlled discharge water (salinity trading scheme)		Nil	Nil	Nil
Contaminated Water		Nil	Nil	Nil

### 2.8.2 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. Water that enters the pit areas is pumped to mine water storage dams allowing this water then to be utilized for mining activities. During the 2013 reporting period approximately 668ML of runoff from rainfall was captured onsite. Any potentially contaminated rainfall runoff from the workshop area is diverted to the Oil Pollution Control Dam. The Oil Pollution Control 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.

Drayton currently has several Water Licences issued by the NSW Office of Water. Most relate to piezometers which are for monitoring purposes only. One allows groundwater extraction of up to 985ML per annum from the mining operations due to ground water inflow. Calculated groundwater inflow to active workings in North Pit, East Pit and South Pit does not exceed 972ML per annum. Pit water extracted from Drayton's operation is a combination of both ground water and surface runoff from the areas within the pit during periods of rainfall.

### 2.8.3 Water Consumption

During 2013, total mine water consumption was approximately 2,136ML. Of the total consumption, 570ML consisted of industrial usage mainly through washdown in the workshop and truck wash bays and approximately 689ML was sprayed onto haul roads for dust suppression purposes. Approximately 877ML was used by the CHP to process coal through the Coal Treatment Unit (CTU), for washdown and in 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 where it can be reused.

During the 2013 reporting period Drayton used 9.26ML of potable water for drinking, showering and toilets within the mining operation areas. Table 9 below outlines the main water storages, the source of their water supply and where the water is consumed.

**Table 9: 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
<b>2081</b>	Access Dam	Road	Runoff from undisturbed and rehabilitated land and pumping in from Industrial Dam and ES Void	Industrial areas, CHP and fire system
<b>2114</b>	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
<b>1609</b>	Savoy Dam		Runoff from undisturbed and rehabilitated land, SW Void and ES Void transfer point	Mine water storage or transfer to tanker fill stations
<b>ES Void</b>	East Pit Void	South	Tailings and water storage	Water extracted and transferred to Access Road Dam or Savoy Dam
<b>SW13 Void</b>	West Pit Void		This storage is key buffer storage for wet weather, a source of water in dry weather and contains a large volume of water which is otherwise unaccounted for in the system.	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.

Historically, Drayton's water balance has remained in surplus. Throughout drought periods, water storage levels have previously dropped however, water storage supplies still remained sufficient for normal mining operations to occur without adverse impacts on operations. At the end of the month water storage levels in dams and voids are surveyed. At the end of 2013, approximately 824ML was being stored in established dams and 5,738ML in pit voids. This equates to approximately 50% of available dam storage capacity and approximately 77% of available void storage capacity.

Drayton does not possess a discharge licence however, it has a water sharing arrangement which allows it to transfer up to 600ML of excess mine water to the neighbouring Mt Arthur Coal mine.

## 2.9 Hazardous Material Management

Drayton Mine holds a Licence to Store Explosives issued by WorkCover for the storage of detonators, boosters, detonating cord and primers. Drayton also held licences issued by NSW EPA for keeping radioactive devices used in the Coal Scan and the dense medium feed, both located within the CHP. On the 12<sup>th</sup> December 2013, all radiation licences were rolled into the one licence. The applicable licences and registrations are listed in Table 10 below.

**Table 10: Hazardous materials - Licence and registration details**

Licence / Registration Description	Issuing Authority	Expiry Date
Licence to Store Explosives	Work Cover	22/11/2016
Radiation Management Licence – RML31157	EPA	18/06/2014

Drayton received an 'Acknowledgement of Notification of Dangerous Goods on Premises' for the storage of liquid fuels and gases from Workcover. Fuel containment during the 2013 reporting period consisted of a series of above ground storage tanks. The major containment for diesel is in a Class C1 above ground tank with a capacity of 860,000 litres. There are also three other above ground tanks located around the mine. Each being Class C1, one has a capacity of 27,000 litres and two tanks with 110,000 litre capacities.

All dangerous goods are stored in accordance with the appropriate legislation and standards. Regular inspections of the storage sites are undertaken to ensure compliance.

Orica Explosives operate an ammonium nitrate emulsion (ANE) storage on the mine site. They hold a Dangerous Goods licence issued by Work Cover for 80 tonnes of ANE and 60000L of diesel or canola oil.

All chemicals that are used, or are proposed to be used on site, are checked and approved for their safety and environmental effects by the SHE Department. For each chemical a material safety data Sheet (MSDS) is maintained in a central register, the ChemAlert Database.

All contractors working with chemicals must carry the relevant MSDS when using the chemical, and must follow any instructions given by the SHE Department with regard to personal protective equipment and handling requirements.

The ChemAlert Database is also used to log environmental hazards associated with the use of each chemical, and the necessary measures to control these hazards.

## 2.10 Other Infrastructure Management

The Antiene Joint Rail User facility has specific conditions of consent. These conditions are detailed in **Section 7.1** of this report.

### 3 ENVIRONMENTAL MANAGEMENT AND 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 follows the appropriate Australian Standard, with collection of samples by site personnel with the analysis of water and dust samples performed by an independent laboratory that is NATA accredited.

#### 3.1 Air Quality

##### 3.1.1 Management System

In 2011 the OEH developed a Pollution Reduction Program (PRP) to be included in Environmental Protection Licences (EPL) for each coal mine in NSW. The amendments to the EPL required Drayton to conduct site-specific Best Management Practices and prepare a report on the practicability of implementing additional measures to reduce emissions of particulate matter. The Drayton PRP report was submitted to the OEH in June 2012. Subsequent variations to Drayton's Environmental Protection Licence in March and September 2013 included the reporting of PRP commitments and monitoring.

Throughout the 2013 reporting period there were a number of sources of air emissions from Drayton's mining operations. These were primarily fugitive sources, such as windblown dust, blasting, CHP activities, vehicles travelling on unpaved roads, loading and unloading of trucks, the operation of dragline and other equipment and general mining activities. The dust control measures currently employed at Drayton were identified in the PRP report and are summarised in Table 11.

**Table 11: Summary of current dust controls and level of control applied**

Mining Activity	Control Measure currently in place	Level of control applied (%)
Drilling	Water injection while drilling	70
	Skirts on drill vehicles	Not quantified
Hauling	Water sprays	80
	Use of larger vehicles	Not quantified
Wind erosion - Exposed areas & overburden emplacement area	Water applied to 10% of the area	50
	Rehabilitation goals	Not quantified
	Vegetative wind breaks	30
	Water sprays	50
Grading roads	Grader speed reduction from 16 km/h to 8 km/h	Not quantified
Wind erosion and maintenance – Coal stockpiles	Some coal bypasses stockpiles	Not quantified
	Reduced pile height	Not quantified

Bulldozers on overburden	Minimise travel speeds and distance – Restricted to 2nd gear on haul roads	Not quantified
	Travel routes kept moist	Not quantified
Blasting	Delay shot to avoid unfavorable weather conditions	Not quantified
	Minimise area blasted	Not quantified
Dragline	Minimise drop height	Not quantified
	Modify activities in windy conditions	Not quantified
	Minimise site casting	Not quantified
Loading and dumping overburden	Modify activities in windy conditions	30
	Minimise drop height from 3 m to 1.5 m	50
Dumping ROM coal to ROM hopper	One side of hopper covered and the other three sides sprays when dumping is triggered	Not quantified
Conveyors and transfers	Water applied at transfers	Not quantified
	Belt cleaning and spillage minimisation	40
	Wind shielding – roof or side wall	50
	Application of water at transfers	Not quantified
Train and truck load out and transportation	Limit load size to ensure coal is below sidewalls	Not quantified
	Maintain a consistent profile.	Not quantified

On the 4<sup>th</sup> December 2013, aerial seeding was conducted on the spoils in areas where spoils are expected to be inactive for a period of several months, and in areas with steep grades along haul roads. The purpose of the seeding was for effective dust control on temporarily inactive spoil materials. Germination and establishment of cover will be assessed through visual monitoring during 2014. Aerial seeding has been scheduled again in 2014 to reduce dust off exposed areas.

In 2013, Drayton installed a new dust management system where upwind and downwind real time monitors provide feedback to a software package that assesses Drayton's dust contribution. This system alerts when Drayton's dust emissions are elevated and trigger actions for employees. This has been outlined in Drayton's Air Quality Management and Monitoring Plan.

Predictive weather modelling has also been used throughout 2013 to provide a forecast for dust enhancing weather and trigger preparatory actions prior to dusty conditions.

### 3.1.2 Monitoring System

Specific requirements relating to air quality monitoring are detailed in EPL 1323 and Development Approval 06\_0202. As a required by section M2.1 of the EPL, the Drayton air quality monitoring program monitored depositional matter, Total Suspended Particulates (TSP) and particulate matter less than 10 micrometers in diameter (PM<sub>10</sub>). Using the results from the monitoring program, Drayton is able to determine compliance with the licence conditions. Drayton also monitor air quality using the Upper Hunter Air Quality Monitoring Network (UHAQMN). Monitors surrounding Drayton are reviewed to determine regional air quality as well as PM<sub>2.5</sub>.

## Deposited Dust

Dust depositional gauges have been in operation for the duration of 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 2).

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), at the beginning of each calendar month. The samples are analysed by a National Association of Testing Authorities (NATA) certified laboratory for total solids, insoluble solids, ash residue and combustible matter. A field observational assessment is also noted as to possible contamination of samples. To determine compliance the depositional dust results are compared to the licence conditions outlined in Table 12.

**Table 12: 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/m <sup>2</sup> /month	4 g/m <sup>2</sup> /month

## Total Suspended Particulates

Drayton operates two high volume air samplers (HVAS) at locations indicated in Figure 2 below. The Met Station monitor is located onsite in the CHP area and used to indicate TSP levels onsite. 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 2013 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 licence conditions outlined in Table 13.

**Table 13: Long term impact assessment criteria for TSP**

Pollutant	Averaging period	Criterion
Total suspended particulate (TSP) matter	Annual	90 µg/m <sup>3</sup>

## PM10

Commissioned in late 2009, Drayton's Tapered Element Oscillating Microbalance (TEOM) continuously monitors PM10. This monitor is located between Drayton's mining operations and the near neighbours boundaries (refer to Figure 2) and used to indicate real time dust levels between the operation and near residents. The TEOM was calibrated, in accordance with

AS3580.9.8-2008 and the TEOM Service Manual, in May and November 2013. It is required that dust levels at neighbouring residences fall below the criteria outlined in Table 14 in order to be compliant with licence conditions.

**Table 14: Short and long term impact assessment criteria for PM10**

Pollutant	Averaging period	Criterion
Particulate matter <10µm (PM <sub>10</sub> )	24 hour	50 µg/m <sup>3</sup>
Particulate matter <10µm (PM <sub>10</sub> )	Annual	30 µg/m <sup>3</sup>



**Figure 2: Dust monitoring sites**



### 3.1.3 Results

Deposited dust, total suspended particulates and real time PM10 were all measured in accordance with the requirements of the EPL and Project Approval conditions as well as the appropriate Australian Standards. The results from the air quality monitoring program are published monthly via the Anglo American website, reported internally to site management, and reported annually in the AEMR.

#### Deposited Dust

The Drayton Mine Extension Environmental Assessment 2007, has estimated emissions to air for years one, five and ten, and modelled the dispersion and deposition for emissions for these years. The 2013 reporting period coincides with year seven of the EA therefore, the 2013 results will be compared to the closest years predictions.

The 2007 EA predicted that no privately owned residences would experience dust deposition levels above the assessment criteria during year 5. The 2013 dust deposition levels displayed acceptable levels which generally fell below the maximum criteria outlined in Table 12 above. Most of the depositional dust levels remained similar to long term averages except for gauge 2197 and 2208. The 2013 average insoluble solids for gauge 2197 were significantly higher and gauge 2208 was significantly lower than the long-term average (see Table 15). This is consistent with 2012 results.

**Table 15: 2013 Average Dust Deposition Gauge Results**

Site Number	Ash (g/m <sup>2</sup> .month)	Combustible Matter (g/m <sup>2</sup> .month)	Insoluble Solids (g/m <sup>2</sup> .month)	No of Samples	Long Term Average (Insoluble Solids)	
					g/m <sup>2</sup> .month	Period
2130	1.5	0.7	2.2	12	1.9	May99 – Dec13
2157	1.5	0.9	2.3	12	2.1	Oct82 – Dec13
2175	1.3	0.9	2.2	12	1.8	Dec86 – Dec13
2197	2.6	1.3	3.9	12	2.8	Dec86 – Dec13
2208	1.3	0.4	1.7	12	2.3	Dec86 – Dec13
2230	1.8	1.2	2.9	12	2.4	Dec87 – Dec13
2235	1.5	0.6	2.1	12	2.0	Jan85 – Dec13
2247	1.5	0.6	2.0	12	1.6	Oct82 – Dec13

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'.

When compared to the previous reporting period gauge 2130 displayed a decrease in average ash and insoluble solids. Gauge 2197 had a decrease in average combustible matter and 2235 decreased in average insoluble solids. Gauges 2157, 2175 and 2230 displayed an increase across average ash, combustible matter and insoluble solids.

Figure 3 displays a prediction of the average annual dust (insoluble solids) deposition rate due to emissions from Drayton and other sources for year 5 for the 2007 EA. In 2013 the overall average level of insoluble solids across all eight gauges from all sources was 2.41g/m<sup>2</sup>. This

was an increase of 0.15 g/m<sup>2</sup> compared to the 2012 average insoluble level of 2.26g/m<sup>2</sup> but was consistent with 2011 levels.

The 2007 EA predicted the average dust (insoluble solids) deposition due to Drayton and other sources at specific residences would be within acceptable limits. The actual monitoring results compared to those predicted in the EA can be found in Table 16.

**Table 16: Dust Deposition results compared with EA**

Residence ID	Representative Dust Gauge	2013 Average Insoluble Solids (g/m <sup>2</sup> /month)	EA Prediction Year 5 Average Insoluble Solids (g/m <sup>2</sup> /month)
16	2235	2.1	1.5
61	2247	2.0	1.4
27	2230	2.4	1.3
71	2175	2.2	1.3

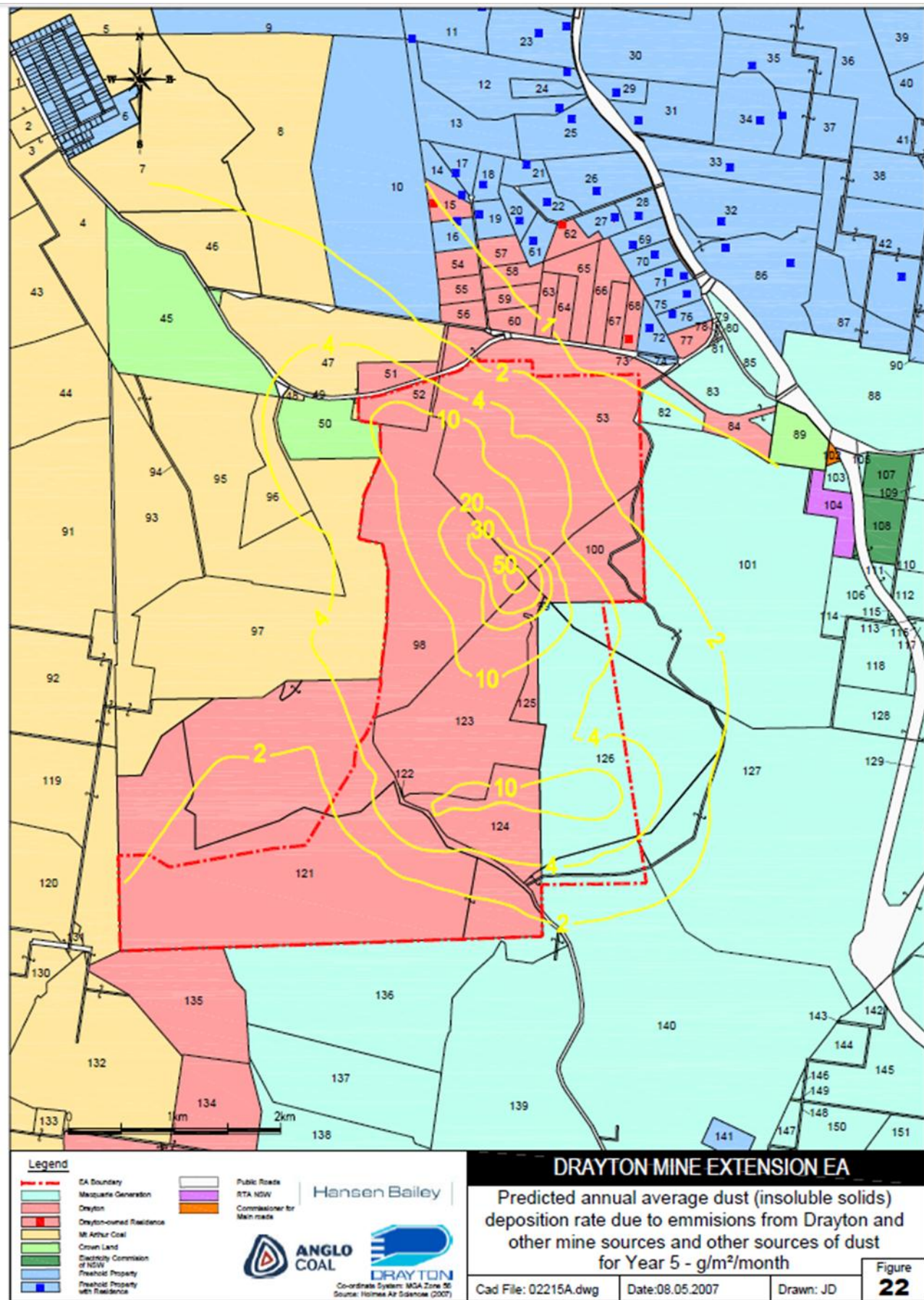
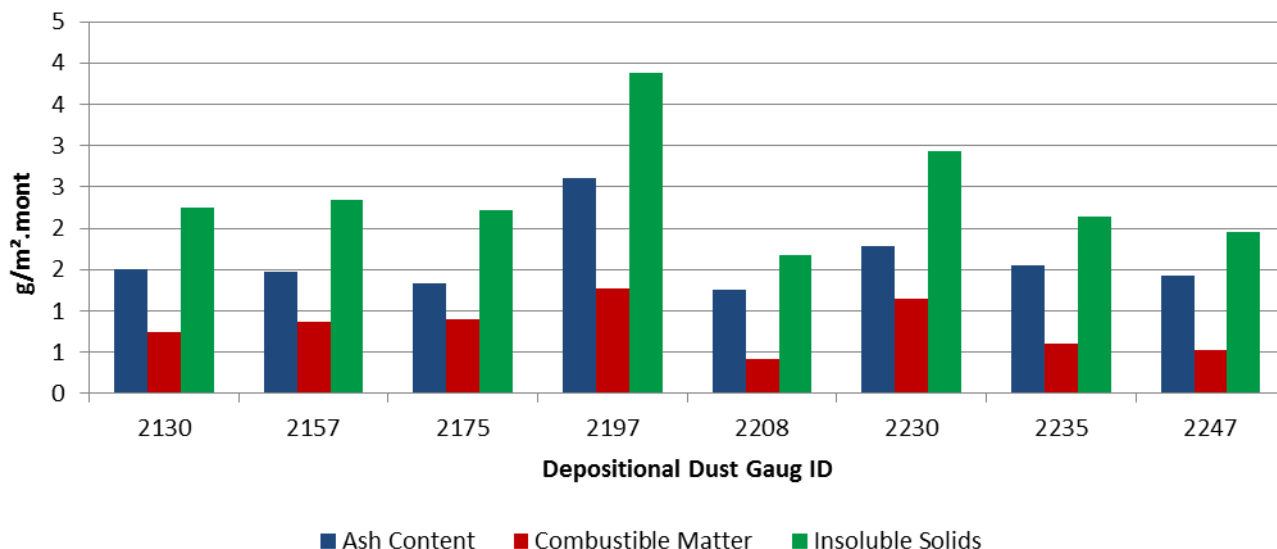


Figure 3: Predicted Annual Average Deposited Dust - Year 5

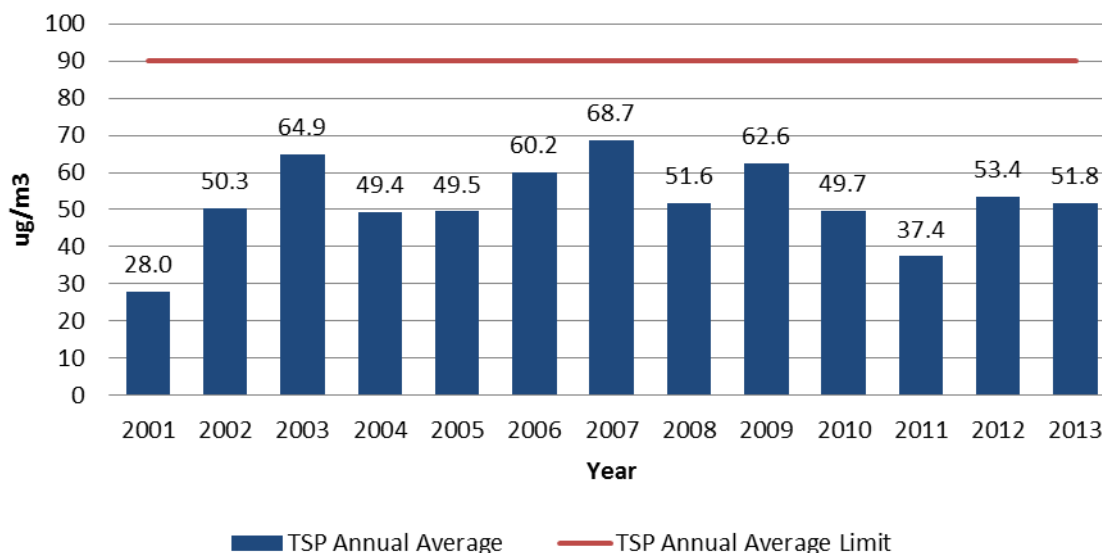
Figure 4 summarises the year's results of total solids, insoluble solids, ash and combustible matter in the eight compliance gauges. Out of the eight gauges, gauge 2197, to the west of the Antiene area, had the highest average result levels consistent with the previous reporting period. Due to the nature of Dust Deposition Gauges, contamination of samples by bird droppings, insects and vegetation is a common occurrence. Details relating to each individual gauge on a monthly basis are outlined in **Appendix C**.



**Figure 4: Average Depositional Dust Gauge Results 2013**

### Total Suspended Particulates

The 2013 annual mean TSP for the Antiene station was well below the annual mean limit of 90µg/m³ (see Figure 5). The 2013 annual mean displayed a decrease of 1.6µg/m³ in comparison to 2012 figure. The annual mean results are summarised in Table 17 below and the complete results for the 2013 reporting period are in **Appendix C**.



**Figure 5: Long Term Annual Average TSP from Lot 22 HVAS**

**Table 17: Total Suspended Particulates 2013**

Location	Yearly Average ( $\mu\text{g}/\text{m}^3$ )	Range ( $\mu\text{g}/\text{m}^3$ )	No. Samples	Long Term Average $\mu\text{g}/\text{m}^3$	EA Prediction Residence 14 Year 5
<b>Lot 22 Antiene</b>	51.8	14 - 118	61	55.9 (2001 – 2013)	72.4

The 2007 EA prediction of the annual TSP concentrations due to emissions from Drayton and other sources for year 5 is presented in Figure 6. The EA predicted that annual average TSP concentrations due to Drayton and other sources for residence 14 in year 5 would be  $72.4\mu\text{g}/\text{m}^3$ . The 2013 annual concentration of  $51.8\mu\text{g}/\text{m}^3$  and the long-term average of  $55.9\mu\text{g}/\text{m}^3$  (see Table 17 above) are below the EA prediction.

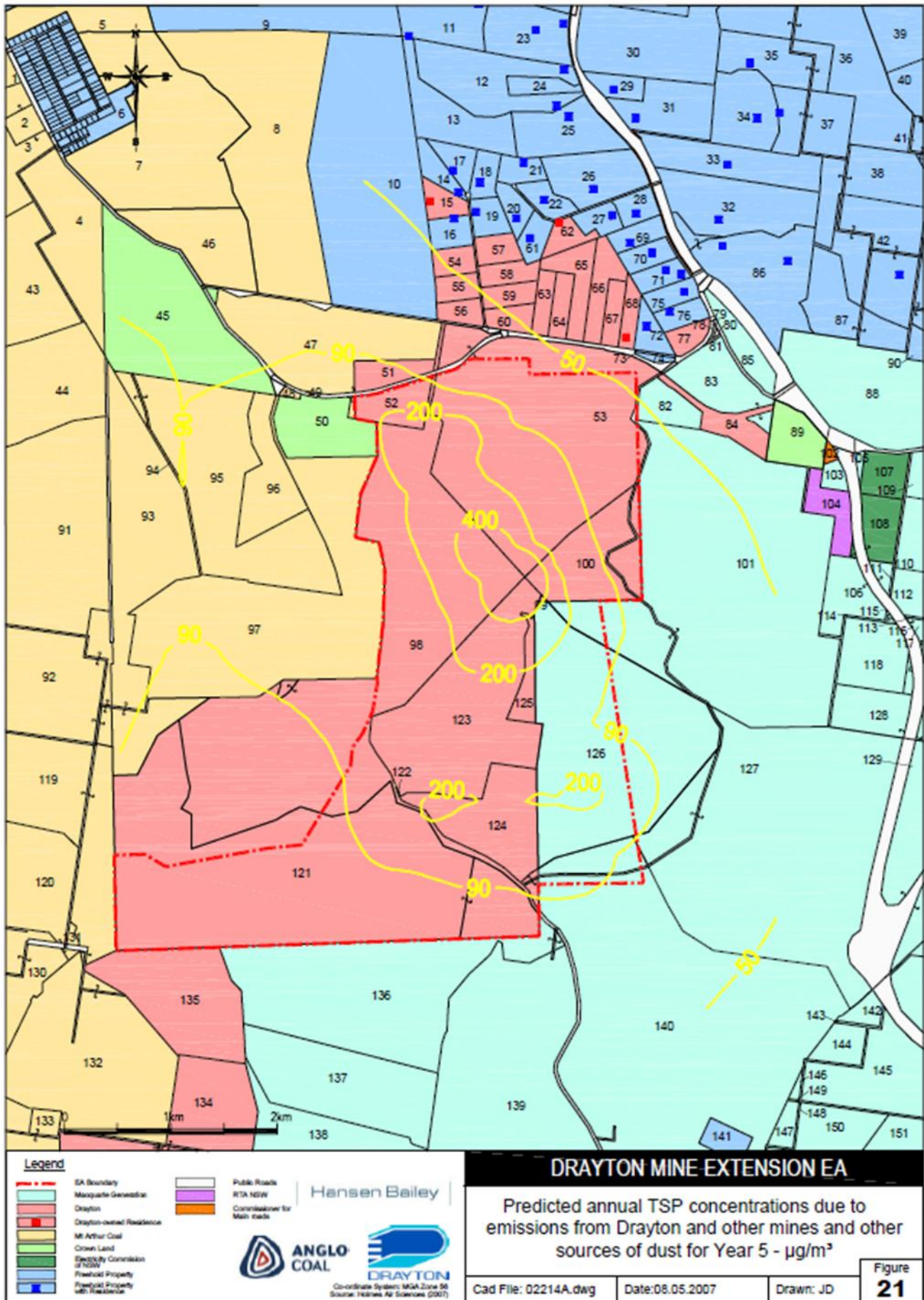


Figure 6: Predicted Annual TSP Concentrations - Year 5

Figure 7 indicates that TSP levels were higher during the second half of 2013, consistent with the previous reporting period. Increases in TSP levels throughout 2013 coincide with decreased rainfall. TSP decreased in November consistent with an intense rainfall event which occurred during the month.

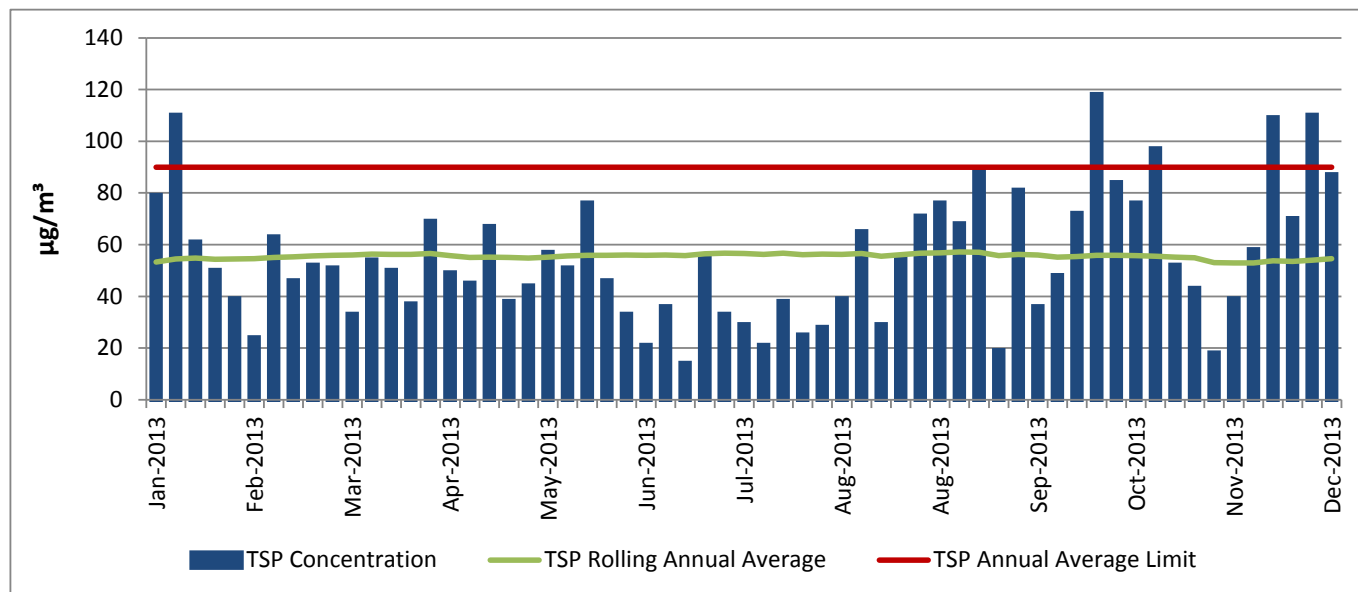


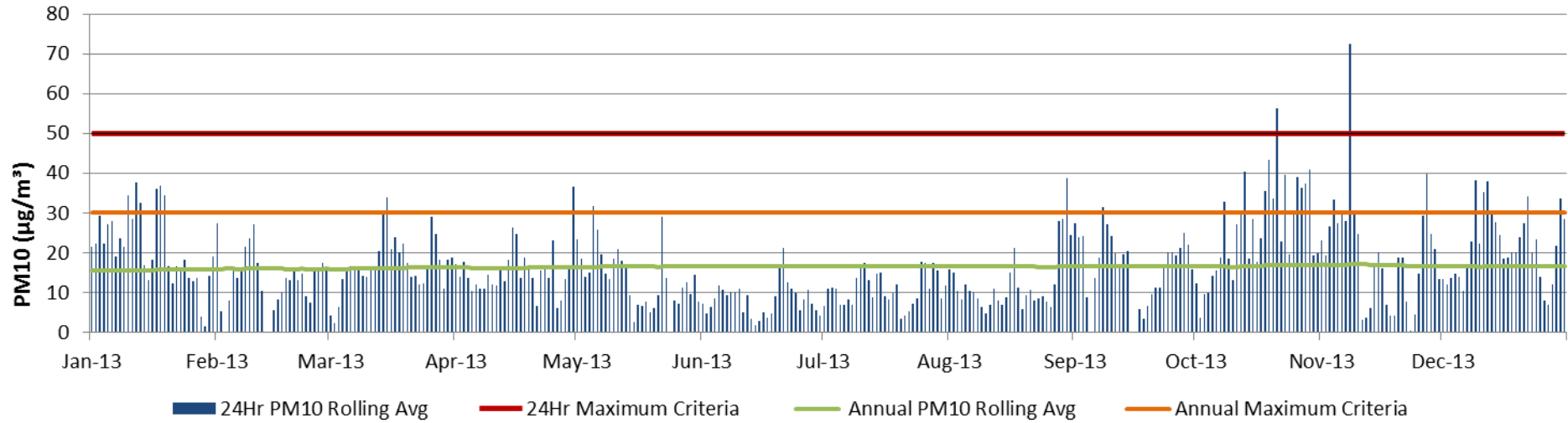
Figure 7: TSP from Lot 22 HVAS 2013

## PM<sub>10</sub>

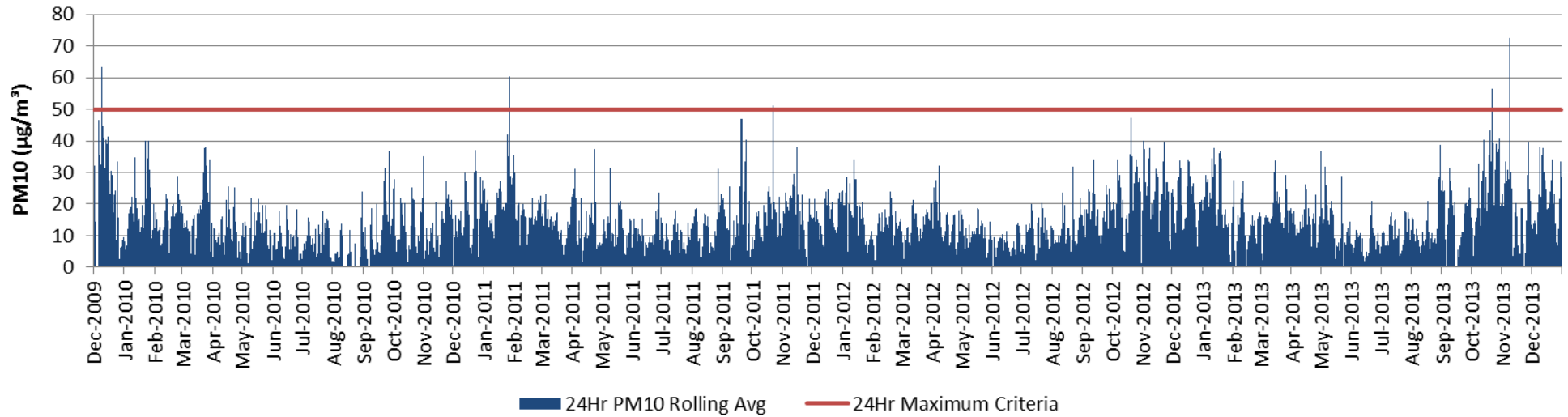
The real time dust monitoring results show that the annual average criterion of 30µg/m<sup>3</sup> was not exceeded in 2013 (see Figure 8). The 24-hour average PM<sub>10</sub> was also well below the 50µg/m<sup>3</sup> criteria throughout the majority of the year. Two high results were recorded on the 21<sup>st</sup> of October and the 8<sup>th</sup> of November 2013 (see Figure 8). Further investigations into these results using wind directional data found that the predominant wind direction on both days was from the west to north-west. As the TEOM was receiving winds not predominantly from the direction of the mine on these days the high results are not attributable to Drayton's operations. Additionally, bushfires occurring in the Hunter region throughout October and November 2013 may have contributed to the PM<sub>10</sub> levels on these days.

The 2013 PM<sub>10</sub> data shows a similar trend to the 2012 data, with higher PM<sub>10</sub> levels occurring from October to January. This trend is also apparent in the historical data in Figure 9 and could be attributed to the hot summer months. The 24hours rolling average PM<sub>10</sub> results are presented in **Appendix C** and summarised in Figure 8.

The 2007 EA prediction of the annual PM<sub>10</sub> concentrations due to emissions from Drayton and other sources for year 5 is presented in Figure 10. The EA predicted that the annual average PM<sub>10</sub> concentrations from all sources for residence 72 would be 24.9µg/m<sup>3</sup>. The 2013 annual average concentration of PM<sub>10</sub> at the Lot 9 TEOM was 16µg/m<sup>3</sup> and is below the EA's predicted level.



**Figure 8: PM10 Data 2013**



**Figure 9: PM10 Historical Data**



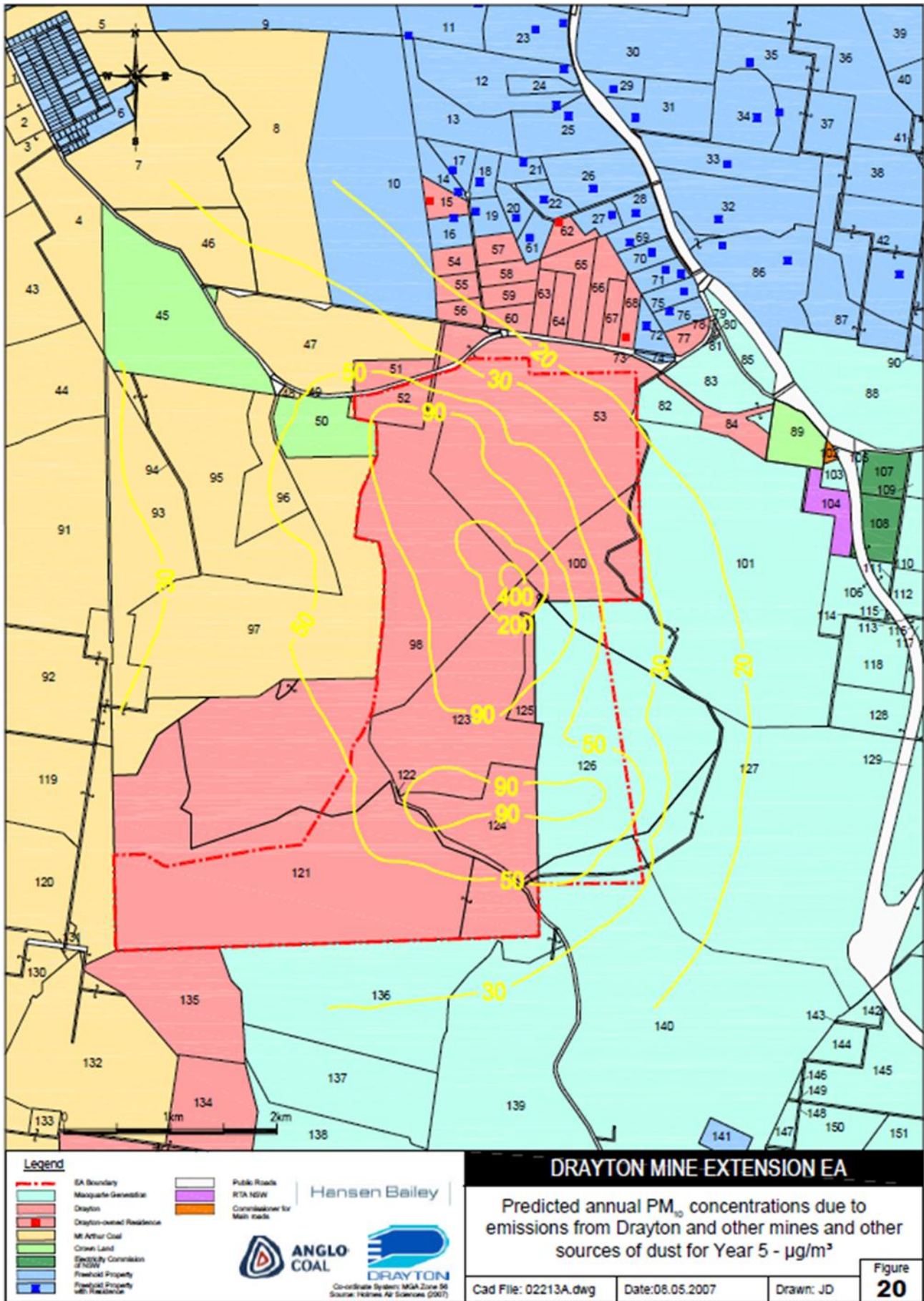


Figure 10: Predicted Annual PM10 Concentrations - Year 5

### **3.1.4 Greenhouse Gas and Energy Efficiencies**

Drayton continued to focus on reducing greenhouse gases and improving energy efficiencies through key projects of installing electrical and diesel metering, increasing efficiencies of the dragline. During the 2012/2013 financial year Drayton reported to the Clean Energy Regulator a total of 98,027t CO<sub>2</sub>-e in scope 1 emissions and 34,712t CO<sub>2</sub>-e in scope 2 emissions. Also during this financial year, Drayton consumed 1,427,359 gigajoules of energy and produced 119,152,091 gigajoules of energy on the form of coal mined.

## **3.2 Erosion and Sediment**

During the 2013 reporting period, erosion and sediment control at Drayton was managed in accordance with the site Water Management Plan and the 2013-15 MOP. The control measures implement throughout the year included:

- Dust suppression measures;
- Limiting the number of roads and tracks established;
- Limiting the extent of disturbance ahead of mining operations;
- 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
- Diversion banks on rehabilitated land designed at 0.5% - 1% grade and are 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. These sediment ponds were desilted throughout 2013.

Drayton does not possess a licence to discharge water off site so sediment is not dislodged from mining areas to subsequently enter streams leading off site.

## **3.3 Surface Water**

### **3.3.1 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 recalculated each month using the surveyed storage levels, meter readings and rainfall volumes recorded by the onsite meteorological station. This information is provided to site managers at the monthly EMC meetings to enable effective surface water management through regular assessment of the current storage capacity and monthly water usage requirements.

Since all mine water is contained within the internal mine water management system and is not discharged off site, downstream management is minimal.

### 3.3.2 Monitoring System

As part of the surface water monitoring plan, monthly surface water monitoring was undertaken at nine locations including:

- On-site dams;
- Dams located along the creeks on site; or
- In the creeks themselves when sufficient water was available.

These monitoring locations are illustrated in Figure 11. Most of these dams are mine water dams with the exceptions being dam 2221.



Figure 11: Surface water monitoring sites

Bayswater Creek and Ramrod Creek were selected to represent the main drainage basins that leave the Drayton site and the structures located on each. Bayswater Creek flows south eastward from the Drayton boundary. It is monitored on a monthly basis from dam 1895 located at the Far East Tip. This dam has a total storage capacity of 130ML and collects runoff water from non-mining related areas.

The Access Road Dam (2081) is located on a tributary of Ramrod Creek, leading off the site to the northeast. It has a storage volume of 750ML and is used to supply water to the CHP and the workshop area. Dam 2081 is a prescribed dam regulated by the DSC and undergoes periodic inspections as required by the DSC.

Since Drayton is located at the headwaters of streams, surface water flows in Bayswater and Ramrod creek rarely occur. However, should excessive rainfall occur that leads to surface runoff in streams, the creeks are sampled as per the normal regime of monitoring, with the same suite of analytes as normally sampled.

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)

### 3.3.3 Results

During the reporting period Drayton received 692mm of rain, the majority of which fell during the first quarter of the year and in November. Water levels in the main dams remained stable throughout 2013 and water quality monitoring continued as in previous years.

Ongoing monitoring of the Far East Tip Dam (1895) has revealed that the water quality in this dam has an alkaline pH and higher than traditional background salinity levels. This reflects natural saline conditions typical of upper Hunter catchments. The results of water quality sampling from the Dam 1895 are provided in Table 18.

**Table 18: Water Quality – Far East Tip (1895) Dam**

Date	EC µS/cm	pH	TDS mg/L	NFR* mg/L	Magnesium mg/L	Chloride mg/L	Sulphate mg/L	Sodium mg/L
Jan 13	4440	8.70	3040	5	264	604	1310	800
Feb 13	4830	8.70	3260	6	278	577	1270	706
Mar 13	4460	8.40	3050	5	241	555	1180	659
Apr 13	1620	8.40	5050	57	378	623	2310	541
May 13	4850	8.30	3470	30	278	612	1220	744
Jun 13	4900	8.40	3090	4	290	580	1340	737

<b>Jul 13</b>	4840	8.40	3280	5	271	603	1320	777
<b>Aug 13</b>	5080	8.60	2860	5	300	665	1400	845
<b>Sep 13</b>	5410	8.80	3830	5	293	669	1340	818
<b>Oct 13</b>	5780	8.90	3590	5	298	696	1450	800
<b>Nov 13</b>	4520	9.00	2860	6	259	569	1290	700
<b>Dec 13</b>	5300	8.90	3640	5	282	675	1500	787
<b>Average</b>	4669	8.63	3418	12	286	619	1411	743

\*Note: NFR is non-filterable residue.

During the reporting period Drayton returned water recovered from the ES Void tailings storage to the Access Road Dam (2081). The Access Road Dam has a high turnover of water which is pumped from the Industrial Dam (1969) or the ES Void. During the reporting period the EC and TDS in the Access Road Dam remained fairly stable however, TDS fluctuated from July to December. During the drier winter months the Access Road Dam pH increased. In November EC, pH, TDS and metals noticeably decreased, which was consistent with the heavy rainfall received during the month. The results of water quality sampling from the Access Road Dam are provided in Table 19.

**Table 19: Water Quality – Dam 2081**

<b>Date</b>	<b>EC µS/cm</b>	<b>pH</b>	<b>TDS mg/L</b>	<b>NFR mg/L</b>	<b>Magnesium mg/L</b>	<b>Chloride mg/L</b>	<b>Sulphate mg/L</b>	<b>Sodium mg/L</b>
<b>Jan 13</b>	6690	8.00	5860	8	541	706	3550	664
<b>Feb 13</b>	6870	8.10	5540	6	554	664	3320	625
<b>Mar 13</b>	6500	8.10	5920	6	496	671	3100	575
<b>Apr 13</b>	6840	8.20	5530	11	476	644	3040	553
<b>May 13</b>	6830	8.30	5340	40	534	683	3290	646
<b>Jun 13</b>	6720	8.30	5560	7	488	650	3100	583
<b>Jul 13</b>	6680	8.10	4650	5	522	669	3200	625
<b>Aug 13</b>	6840	8.20	6290	61	567	716	3270	682
<b>Sep 13</b>	7080	8.10	4870	6	531	719	3240	640
<b>Oct 13</b>	7540	8.10	6040	17	540	732	3350	592
<b>Nov 13</b>	5920	7.50	4400	46	451	597	2430	548
<b>Dec 13</b>	6850	8.20	6350	5	515	688	3380	577
<b>Average</b>	6780	8.10	5529	18	518	678	3189	609

Most of Drayton's dams are mine water dams with the exceptions being the Erection Pad Dam (2090) and the Antiene Dam (2221). The Erection Pad Dam (2090) was located at the north of the mine however it was removed in October 2013 to further extend the north pit. 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 (2221) was traditionally a small farm dam however, its sole purpose now is to supply water to native animals. During the reporting period both dams (2090 and 2221) generally had

noticeably lower EC, pH, TDS and metal concentrations in comparison to the mine water dams. The Drayton Mine Extension EA 2007 notes that site water quality is typical of other mines in the area and is moderately saline.

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 2013 consistent with the rainfall. The heavy rainfall which occurred during November resulted in decreased concentration levels of EC, TDS and metals occurring across all dams. A summary of the results of the water quality sampling is presented in Table 20. The complete data is provided in **Appendix B**.

**Table 20: Average Results of Water Quality Sampling for Remaining Dams**

Dam	EC μS/cm	pH	TDS mg/L	NFR mg/L	Magnesium mg/L	Chloride mg/L	Sulphate mg/L	Sodium mg/L	No. Samples
1609	7323	8.22	6418	22	589	673	3668	640	12
1969	5911	8.13	4877	22	405	637	2410	605	12
2090	2204	7.22	1655	21	150	145	896	129	9
2109	3060	7.54	2075	26	121	434	3661	424	12
2114	6203	8.14	5093	11	458	618	2973	575	12
2221	1530	7.96	901	9	48	229	291	210	12

### 3.4 Ground Water

#### 3.4.1 Management System

In the absence of a high-quality aquifer in the vicinity of Drayton, there is limited reliance on the groundwater resources. Groundwater at Drayton is extracted only through infiltration to mine voids however, it was 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. Three piezometers (R4243, R4220 and R4224) have been destroyed during 2013, as mining has progressed.

#### 3.4.2 Monitoring System

Drayton has an established ground water monitoring plan which addresses both standing water levels and water quality. As part of this plan, monthly standing water levels are monitored at piezometers located around the current mining operation as well as offsite locations. The handheld water quality meter is calibrated each month prior to sampling.

At the end of 2013, 6 piezometers were being monitored on a monthly basis. A water level indicating instrument was used to determine the standing water level in the piezometers. Some piezometers could not be sampled on each monitoring occasion due to insufficient water. The locations of the piezometers monitored are illustrated in Figure 12.

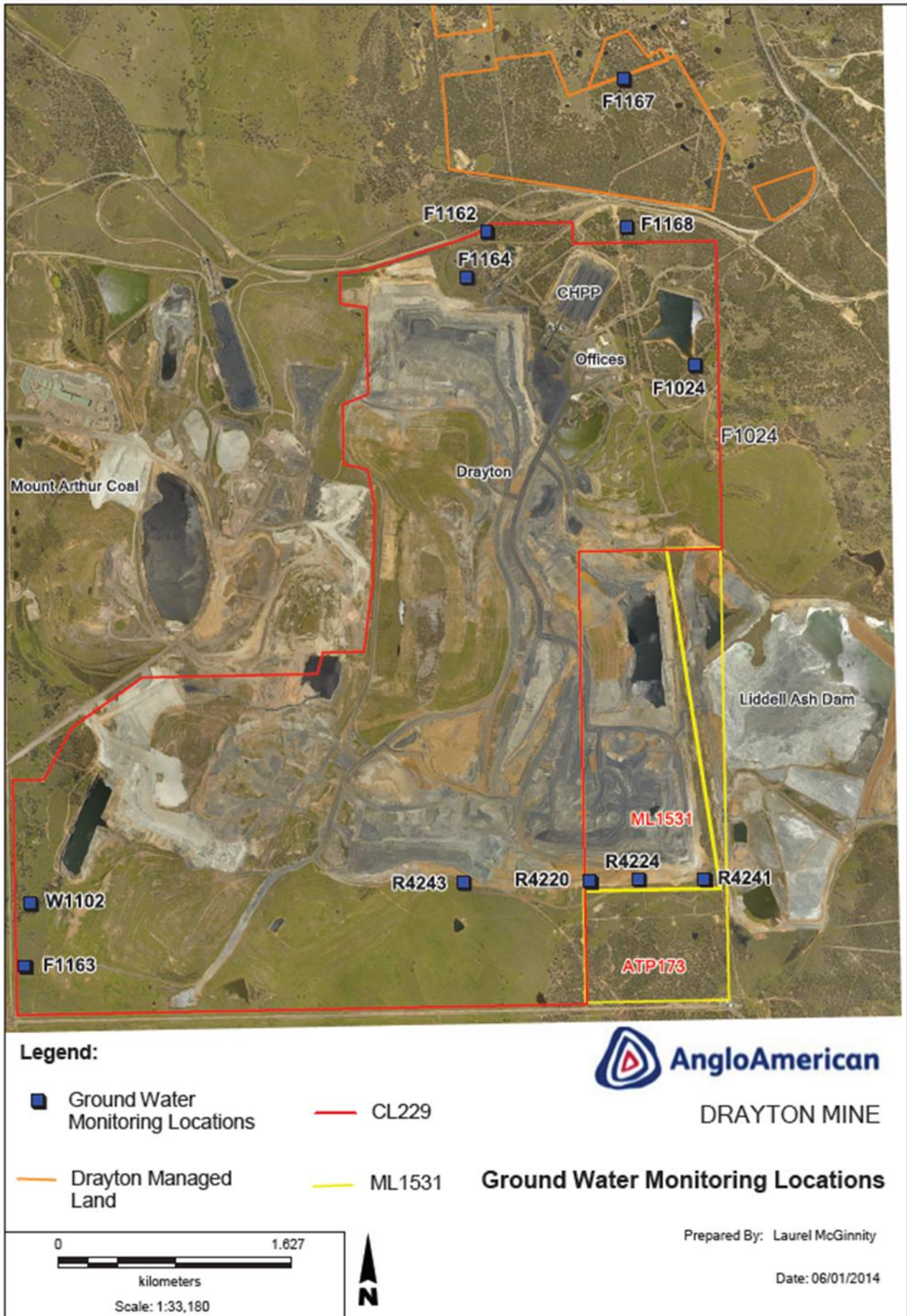


Figure 12: Ground water monitoring sites



### 3.4.3 Results

A summary of the 2013 and long-term piezometer groundwater levels is presented in Table 21. The complete results from the 2013 groundwater monitoring program are shown in Table 49. Throughout 2013 piezometers F1162 and F1164 were over 100m deep and were therefore too deep to obtain a sample. Piezometer F1024 was dry every month except February. Piezometer F1163 was dry every month except March and September. Issues with access to piezometers, equipment reliability and destruction of piezometers through progress of mining caused some samples to be unobtainable for each piezometer except F1167 during the period.

**Table 21: Summary of Groundwater Levels**

Location	Average Depth 2013 (m)	No. Samples in 2013	Long Term Average Depth (m)	Years of Data Available
F1024	179.07	1	200.73	1982 – 2013
F1162*	-	0	156.64	1982 – 2013
F1163	177.4	2	177.60	1982 – 2013
F1164*	-	0	165.65	1982 – 2013
F1167	169.39	12	183.54	1982 – 2013
F1168	163.25	9	187.47	1982 – 2013
W1102	178.38	10	178.18	1982 – 2013
R4220	185.67	4	180.84	2005 – 2013
R4224	123.22	3	151.89	2005 – 2013
R4241	179.41	9	182.88	2005 – 2013
R4243	223.06	4	229.77	2005 – 2013

Note: All measurements adjusted with Relative Levels.

\*Too deep to sample

Piezometer levels from monitoring locations to the south of the mine are generally steady with the exception of piezometer R4220 which continued a slight but steadily dropping trend from 2009 to July 2013, after which it was removed due to mining progression. Piezometer R4224 fluctuates in water level but was trending generally steady to July 2013 before also being lost to mining. Other piezometers to the south of the mining area have remained steady throughout the reporting period despite the progression of mining towards the south. Piezometer R4243, located to the south of the mine was lost to mining in July 2013. Piezometer R4241 remains in close proximity to the limit of mining in the south and continues to exhibit a steady trend.

Piezometer W1102 is also located to the south of the mining lease but is not in close proximity to current operations. This piezometer is located near Saddlers Creek and was closest to mining in the south west pit (now SW13 Void). This piezometer has exhibited a steady water level trend since monitoring at the location began in 1982.

Piezometers located in the northern areas of the mining lease generally display a gradual decline in level. Piezometer F1024 was dry except in February 2013 and the water levels in F1162 and F1164 were too deep to sample during the reporting period. Piezometer F1168 continued to display a slow decline in level during the reporting period. Piezometer F1167, located in the Antiene area further to the north of the mine, also gradually declined after a

significant increase in water level in 2011. The level has not declined to the level prior to the increase but, at the end of 2013, was similar to the 2008 water level.

Drayton hold two groundwater licences for extraction purposes. These are;

Licence Number	Extraction Limit (ML)
20BL122620	402
20BL171958	985

During the reporting period Drayton calculated a total of 1232ML was intercepted by the Drayton operation. This groundwater was intercepted by the north, south and east pits. Groundwater is pumped out of mine workings for safe mining operations to take place. As Drayton is a non-discharge site no groundwater is pumped offsite. The majority of groundwater intercepted onsite is stored in the ES void with some used for dust suppression and washing of coal.

### 3.5 Contaminated Land

No significant land pollution events occurred during the 2013 reporting period. A small amount of contaminated material was removed from the oil pollution control dam lower sump and the apron drain around the workshop and lube bay and was placed in the bioremediation cells in the first half of the year. During the second half of the year contaminated material was removed from site by Drayton's waste contractor. On the 2<sup>nd</sup> July 2013, DRE and DP&I officers attended site for the AEMR inspection and subsequent correspondence requested Drayton to cease using the Bioremediation Area until DRE have approved a Bioremediation Management Plan. Currently the Bioremediation Management Plan is in draft format with comments received from DRE and DP&I. As the Bioremediation Management Plan had not been approved by DRE, the Bioremediation Area remained closed at the end of the reporting period and new contaminated material was being removed from site by Drayton's waste contractor.

Drayton reviewed practices relating to the existing Bioremediation Area and provided DRE with a letter including an action plan addressing the matters outlined in the 2012 AEMR Review Action Plan (Action 3) on 19<sup>th</sup> August 2013. Enclosed with the letter was a Draft Bioremediation Management Plan which was subsequently re-developed by Hanson Bailey and re-submitted to DRE on 22<sup>nd</sup> November 2013. At the end of the reporting period, no response from DRE had been received in regard to the revised Draft Bioremediation Management Plan.

Areas that Drayton continue to classify as contaminated did not change from 2012 and 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 3.17 for further information on Hydrocarbon Contamination.

### 3.6 Threatened Flora

Environmental assessment (EA) surveys undertaken on Drayton land have not identified threatened flora species present. An Endangered Ecological Community (EEC), Hunter Lowland Redgum Forest (HLRF) as listed under the *Threatened Species Conservation Act*

1995 has been identified. Drayton has established offset areas for the project in agreement with DP&I. The offsets are described in Drayton's Offset Strategy and management of these areas is detailed in the Rehabilitation and Offset Management Plan (ROMP).

Drayton Environmental Management Plans relating to threatened flora include:

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

Flora monitoring was undertaken during the 2013 reporting period in rehabilitation and offset areas. No threatened flora species were recorded during surveys.

### 3.7 Threatened Fauna

A total of twelve threatened fauna 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.

Drayton Environmental Management Plans relating to threatened fauna include:

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

Fauna monitoring undertaken during 2013 recorded two new threatened species occurring in the Northern Offset and the Drayton Wildlife Refuge respectively. The Eastern False Pipistrelle (*Falsistrellus tasmaniensis*) and the Speckled Warbler (*Chthonicola sagittatus*), listed as vulnerable under the *Threatened Species Conservation Act 1995*, were each recorded at one survey site. The Speckled Warbler was also noted opportunistically during field surveys.

Fauna monitoring in 2013 also noted two of the previously recorded threatened species, the Squirrel Glider (*Petaurus norfolcensis*) and Eastern Bentwing-bat (*Miniopterus schreibersii oceanensis*). The Squirrel Glider was found to occur in the Drayton Wildlife Refuge and the Southern Offset area. The Eastern Bentwing-bat is wide-spread onsite and was recorded at all eight fauna monitoring sites including in woodland on both rehabilitation and offset areas.

#### 3.7.1 Drayton Wildlife Refuge

In 1987 the Drayton Wildlife Refuge 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.

### 3.7.2 Feral Animal Control

Feral animals, such as cats, 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 May and August 2013, 1080 Wild Dog baits were laid in response to reported wild dog sightings in areas south of the mine. Monitoring during the August baiting program noted a number of young dogs and pups in the area. Follow-up baiting was undertaken to target the young animals prior to dispersal into surrounding areas. The baiting was a success with a high percentage of baits being taken. Fauna monitoring undertaken in December 2013 noted evidence of young wild dogs remaining in the area. Further baiting will occur in 2014 to target these animals. Where possible, baiting programs will be coordinated with programs run by neighbouring land holders and the Mt Arthur Wild Dog Association.

Figure 13 and 14 show photos taken using motion detector cameras during monitoring in August and December 2013 in the Southern Offset Area.



Figure 13: Photo taken during August baiting; Figure 14: Photo taken during December monitoring

### 3.8 Weeds

During 2013, an experienced weed control contractor was engaged to conduct a weed survey and undertake weed control. Weeds are targeted for control based on priority. High priority weeds include noxious weeds, weeds establishing on new rehabilitation areas and environmental weeds with the potential to spread 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. A full list of weeds targeted during 2013 is provided in Table 22 below. The weed control program will continue for 2014 and beyond.

Table 22: Weeds treated 2013

Common Name	Scientific Name	Status	Control Method	Dates
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Pampas Grass	<i>Cortaderia selloana</i>	Environmental	Foliar spray	April
Prickly Pear	<i>Opuntia spp.</i>	Noxious – C4	Foliar spray and manual removal	April, August, November
Bitou Bush	<i>Chrysanthemoides monilifera</i>	Environmental	Foliar spray	April
Castor Oil	<i>Ricinus communis</i>	Environmental	Foliar spray	August
African Boxthorn	<i>Lycium ferocissimum</i>	Environmental	Cut and paint	August
Tree Tobacco	<i>Nicotiana glauca</i>	Environmental	Cut and paint	April
Galenia	<i>Galenia pubescens</i>	Environmental	Foliar spray	August

Throughout 2013 Prickly Pear was sprayed and/or removed along the access road; in the CHP area; within the Southern Offset area; in the Drayton Wildlife Refuge; and on the Great North Tip. Prickly Pear continues to be the dominant weed in and around Drayton. Areas targeted for weed control in 2013 are shown in Figure 15 below.

A new system for tracking weed infestations was implemented in 2013. The system uses a Geographical Information System (GIS) to map new infestations and store information regarding timing and method of treatments. Area affected, outcome of each treatment and follow-up treatments for each infestation can be accessed through this system. The system, which consolidates information previously stored separately, will be built over time and is expected to give a more comprehensive picture of changes in infestations than the system previously used.

In December 2013, Drayton received a Property Inspection Report from the Upper Hunter Weeds Authority regarding an infestation of St John's Wort on land north of Thomas Mitchell Drive. The infestation was mapped by Drayton staff in December 2013 and is scheduled for treatment in January 2014. The infestation will be monitored with follow-up inspections during summer flowering and further treatment where necessary.



**Figure 15: Weed infestations targeted during 2013**

## 3.9 Blasting

### 3.9.1 Management System

Blasting is permitted under Drayton's Project Approval between the hours of 0900 and 1700 Monday to Saturday (EST) and 0900 – 1800 Monday to Saturday (DST). Both the mining lease conditions and noise approval conditions include requirements for the monitoring and control of blasting impacts (see Table 23) at any residence on privately-owned land. A maximum of 2 blasts per day can be carried out with a limit of 8 blasts per week averaged over a 12 month period.

**Table 23: Blasting and vibration criteria**

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

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), in regards to the identification of 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.

During 2013, a new weather forecasting tool was implemented at Drayton which 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.

### **3.9.2 Monitoring System**

Drayton utilises 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. During the 2013 reporting period, all blast monitors were calibrated. 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 16.





**Legend:**

- Blast Monitors
- Drayton Managed Land
- CL229
- ML1531

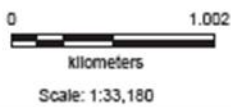


**DRAYTON MINE**

**Blast Monitoring Locations**

Prepared By: Laurel McGinnity

Date: 03/01/2014



**Figure 16: Blast monitoring sites**

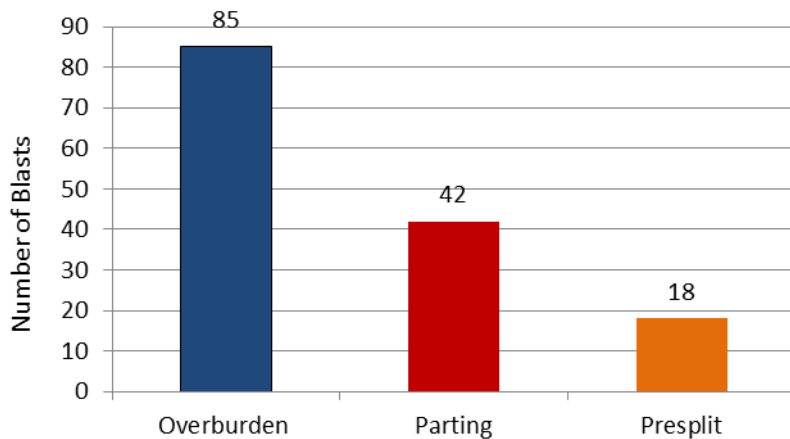
### 3.9.3 Results

A total of 145 blasts were fired at Drayton during 2013. The monitoring results of these blasts are summarised in Table 24 and displayed in **Appendix E**.

**Table 24: Blast Monitoring Summary**

Location	Antiene	DeBoer	Sharman
<b>EN</b>			
Avg Air blast dB(L)	95.60	98.85	96.85
Range dB(L)	88.6 – 101.8	95.3 – 102.4	93 – 101.2
Avg Vibration mm/sec	0.13	0.27	0.14
Range mm/sec	0.04 – 0.21	0.07 – 0.46	0.05 – 0.22
<b>NN Area</b>			
Avg Air blast dB(L)	101.54	102.51	99.79
Range dB(L)	76.5 – 118.8	90.3 – 116.3	91.6 – 109.4
Avg Vibration mm/sec	0.78	0.43	0.22
Range mm/sec	0.05 – 2.10	0.06 – 1.42	0.02 – 0.74
<b>SPE Area</b>			
Avg Air blast dB(L)	90.79	94.50	93.82
Range dB(L)	74.6 – 110.4	75.8 – 110.3	78.7 – 108.3
Avg Vibration mm/sec	0.05	0.14	0.08
Range mm/sec	0.01 – 0.20	0.01 – 0.67	0.01 – 0.28
<b>SPW Area</b>			
Avg Air blast dB(L)	93.83	96.84	96.19
Range dB(L)	86.2 – 105.4	87.1 – 111.4	84.6 – 105.5
Avg Vibration mm/sec	0.05	0.10	0.10
Range mm/sec	0.02 – 0.11	0.04 – 0.27	0.02 – 0.70

Figure 17 shows that the majority of the blasts occurring in 2013 were overburden shots. Just under half of the remaining shots were either parting or prestrip shots.



**Figure 17: Number of blasts by type**

Drayton's EPL1323 outlines blasting limits of 5mm/s and 115dBL for 5 per cent of blasts for ground vibration and overpressure respectively. During 2013, neither of these limits was exceeded. Additionally, all monitoring results were below the maximum limit for ground vibration (10 millimetres per second) and the airblast/overpressure criteria (120 decibels (linear)).

On Friday 2nd August 2013 at 21:57, a shot was fired in the South Pit. This blast was fired outside approved blasting times due to an error in loading resulting in a non-inhibited product being loaded into reactive ground. Permission to fire outside approved blasting times was sought from the OEH and the DP&I. No complaints were received as a result of the blast.

Throughout 2013 a total of 12 blast related enquiries were received, six of which did not relate to Drayton blasting. The majority of the complaints and/or enquiries were in regards to blasts being felt and one was in relation to a blast notification that was not received. All enquiries were investigated and responded to with enquirers given details of monitoring data recorded for the relevant Drayton blast where applicable. Details of enquiries received during 2013 are contained in **Section 4.1** of this report.

### 3.10 Operational Noise

#### 3.10.1 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 2013 reporting period and revised as appropriate:

- Only one loading unit working in the North Pit during the evening or night;
- 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 pre-strip will be 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 will be developed to ensure no active dumping occurs at exposed locations during adverse weather conditions, where noise can be exacerbated toward neighbouring communities;
- Training of coordinators has being undertaken to ensure coordinators are familiar with the complaints response process;
- All trucks and the L1400 loader were 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 installed a second real-time noise monitor, which is located at the end of Balmoral Road.

### 3.10.2 Monitoring System

The EPL and approval criteria (Table 25) for Drayton's noise monitoring sites is measured in LAeq (15 min), which is the average noise energy over a 15 minute period. Drayton undertakes a combination of supplementary monitoring, independent monitoring and real-time monitoring in order to assess mine noise levels against these criteria.

**Table 25: Noise Impact Assessment Criteria**

Land Number	Day	Evening	Night	
	LAeq(15min)	LAeq(15min)	LAeq(15min)	LA1(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
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

\*Supplementary noise monitoring residence

## 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 quarterly basis by an acoustic engineer who incorporates attended monitoring data into a site model to provide a compliance report.

Drayton's Project Approval details noise impact assessment criteria for 28 specific residential locations (see Table 25 above). 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:

- Doherty
- Kerr
- Wilson\*
- Smith\*
- Skinner
- Robertson
- Sharman
- 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).

In 2014, independent attended monitoring will increase in frequency from quarterly to monthly.

## Supplementary Monitoring

Attended noise monitoring is undertaken on a monthly basis at five residences (see Figure 18 below) that are typical noise receptors from the mining operation. Parameters measured at the attended monitoring locations include Leq, LMax, LA1, LA10, LA50 and LA90 being measured over a 15 minute period. The Rion sound level meter, used to carry out the attended noise monitoring, was calibrated in May 2012 and requires calibration every two years. During each

monitoring period, all noise is quantified and characterised. Throughout the 2013 reporting period, attended monitoring was conducted at various times of the day, evening and night to assess noise emissions throughout a 24 hour period.

### **Real Time Monitoring**

Real-time noise monitoring involves the use of a BarnOwl® noise monitoring system. 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. The BarnOwl® has been installed at Lot 9 Antiene, approximately 150m from the Drayton rail spur, and in close proximity to the mine's near neighbors (see Figure 18). This station enables proactive management to minimise noise emissions from the site.

In December 2013, 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 18: Supplementary and real-time noise monitoring locations**

### 3.10.3 Results

#### Independent Attended Monitoring

In 2013 a noise compliance assessment report was submitted to the EPA with the Annual Return as set out in Condition R1 of the EPL. Additionally, under the Condition M8.1 every six months noise must be monitored from the premises to determine compliance with the noise limits, the independent monitoring fulfills this requirement. Drayton currently undertakes independent attended noise monitoring on a quarterly basis to determine compliance against noise criteria. In 2013, independent attended noise monitoring was conducted in March, June, September and December. No exceedances of operational noise criteria were detected during monitoring with full reports in Appendix D.

Predicted noise levels in the 2007 Environmental Assessment were reported for years 1, 5 and 10 of the project. 2013 was year 6 for the project. As a result year 5 predictions have been used below to compare actual monitoring results to predicted noise levels. All of the attended noise monitoring results were below that of predicted noise levels in the Environmental Assessment which is a reflection of the minimal operations that have occurred in the North Pit as well as lower mining rates. Much of the monitoring resulted in Drayton being inaudible. The below tables present the results for day, evening and night monitoring together with the EA prediction for comparison.

**Table 26– Noise Results Day  $L_{eq}$  (15min)**

Daytime Measured Noise Results – Drayton Contribution dB(A) $L_{eq}$ (15min)					
Location (Criterion)	March	June	September	December	EA Prediction (Yr 5)
Doherty (41)	32	35	IA	<30	41
Kerr (36)	IA	IA	IA	IA	36
Skinner (39)	IA	IA	IA	IA	39
Robertson (36)	IA	33	IA	IA	36
Sharman (35)	IA	IA	IA	IA	34
Horder (35)	IA	IA	IA	IA	35
Wilson (35)	IA	IA	IA	IA	30
Smith (35)	IA	IA	IA	IA	<30

IA= Inaudible

**Table 27– Noise Results Evening  $L_{eq}$  (15min)**

Evening Measured Noise Results – Drayton Contribution dB(A) $L_{eq}$ (15min)					
Location (Criterion)	March	June	September	December	EA Prediction (Yr 5)
Doherty (41)	37	37	33	IA	41
Kerr (37)	30	<30	32	IA	36



Skinner (40)	38	38	34	IA	39
Robertson (37)	IA	IA	37	IA	37
Sharman (35)	<30	IA	<35	IA	35
Horder (36)	IA	IA	34	IA	36
Wilson (35)	IA	IA	IA	IA	30
Smith (35)	IA	IA	<30	IA	<30

IA = Inaudible

**Table 28: Noise Results Night  $L_{eq}$  (15min)**

Night Measured Noise Results – Drayton Contribution dB(A) $L_{eq}$ (15min)					
Location (Criterion)	March	June	September	December	EA Prediction (Yr 5)
Doherty (39)	38	38	38	33	39
Kerr (37)	IA	IA	<30	IA	36
Skinner (39)	38	39	39	28	39
Robertson (42)	IA	IA	40	IA	42
Sharman (41)	IA	35	<40	34	40
Horder (42)	IA	<30	36	<35	41
Wilson (36)	IA	IA	31	IA	35
Smith (36)	IA	IA	34	IA	32

IA = Inaudible

**Table 29: Noise Results Night  $L_{1(1min)}$**

Night Measured Noise Results – Drayton Contribution dB(A) $L_{1(1min)}$					
Location (Criterion)	March	June	September	December	EA Prediction (Yr 5)
Doherty (47)	46	43	42	n/a	n/a
Kerr (47)	n/a	n/a	<35	n/a	n/a
Skinner (47)	46	45	46	n/a	n/a
Robertson (47)	n/a	n/a	46	n/a	n/a
Sharman (47)	n/a	39	40	n/a	n/a
Horder (47)	n/a	<35	41	n/a	n/a
Wilson (47)	n/a	n/a	34	n/a	n/a
Smith (47)	n/a	n/a	36	n/a	n/a

n/a = not audible

## Supplementary Attended Monitoring

Attended monitoring results include all noise recorded during a 15-minute period. Average background noise levels recorded at all residences during 2013 were either below the long term average or within 1dB(A) of the long term average. These results include noise from all sources including highway traffic; birds; insects; dogs; wind; rain; and domestic noise.

The de Boer residence is located north east of the mine and approximately 500m from the New England Highway. Major noise influences at this location consist of highway traffic, insects and birds. Attended noise monitoring indicates that noise from rail movements can be audible from this residence.

The Doherty residence is located on Balmoral Road. Attended noise monitoring at this residence indicates that the major influences on noise levels are insects, birds and traffic on New England Highway and Thomas Mitchell Drive. Drayton and other mining operations can be audible from this residence.

The Halloran residence is located on Pamger Drive. Several large native trees surround this site and are frequented by a variety of native birds such as cockatoos, king parrots, galahs and rosellas. This influences ambient background noise levels. Other influences include traffic from the New England Highway and Pamger Drive, wind, rail noise and mining operations.

The Robertson residence is the closest residence to the mining operation. This location is influenced predominantly by traffic on Thomas Mitchell Drive and rail noise with mining related noise also audible during attended noise monitoring. This residence is within a modelled acquisition zone.

The Horder residence, is located east of the mine and west of the New England Highway. Attended noise monitoring at this location commonly detects traffic, birds and wind through the trees. Mine related noise is occasionally audible at this location however the noise is generally not intrusive. This residence also falls into a modelled acquisition zone.

## Real Time Monitoring

A total of 4 noise related complaints were made during the 2013 reporting period. The audio recordings from the BarnOwl® are used to investigate the source of the noise when elevated levels occur. Noise compliance monitoring is conducted by attended noise monitoring whereas Barnowl monitoring is used to trigger when elevated levels occur as well as recording noise for later assessment. For a summary of the 2013 BarnOwl® data that demonstrates monthly trends see Table 30, for the complete dataset see Appendix D.

**Table 30: BarnOwl® Monthly Average Noise Levels**

Month	Day dB(A)	Evening dB(A)	Night dB(A)
January	31.0	30.2	32.0
February	29.9	31.5	32.7
March	32.1	31.7	33.6
April	31.3	33.7	33.6
May	34.0	34.0	34.6

<b>June</b>	33.5	35.8	36.3
<b>July</b>	33.8	35.7	35.7
<b>August</b>	34.4	36.0	36.5
<b>September</b>	32.2	36.0	35.7
<b>October</b>	32.6	34.9	36.6
<b>November</b>	30.8	32.8	34.6
<b>December</b>	30.4	31.8	33.8

The BarnOwl® experienced power outages for several days around 20<sup>th</sup> June and 23<sup>rd</sup> to 25<sup>th</sup> November. Consequently, no valid results were obtained during this time.

### 3.11 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. In the future 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 (refer to section 5). 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 2012 to prevent impact on both Thomas Mitchell Drive and the New England Highway. Potential impacts from lighting plants located on high dumps are an issue discussed by managers at monthly EMC meetings. These lights, essential for night-time operations, are carefully positioned to prevent glare from impacting drivers.

Future rehabilitation design work at Drayton will be conducted using new modelling software that provides not only more sustainable landforms, but also more natural topography of rehabilitated areas. This design work is in response to a request from the MSC.

### 3.12 Aboriginal Heritage

Drayton maintains an Aboriginal Heritage Management Plan (AHMP) in accordance with the development consent. The AHMP 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 on by the project. The Aboriginal heritage sites consisted of isolated artefacts and areas where transient communities may have travelled. Of the 39 sites located within the Open Cut and Services Corridor development zone, 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 is considered to be of medium-high scientific significance following salvage works on a local level.

As indicated in the 2013-15 MOP amendment, no additional surveys or salvage programmes were required in 2013.

### 3.13 Natural Heritage

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

#### 3.13.1 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.

### 3.14 Spontaneous Combustion

Drayton, along with other open cut coal mines mining the Greta Coal Measures, experiences spontaneous combustion problems 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. Drayton also completes six monthly reports to the EPA regarding spontaneous combustion management.

Throughout the 2013 reporting period, mining activities were concentrated within South Pit East, South Pit West and the North Pit. 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, in an attempt to bury high risk material and reduce exposure time. This work has been occurring for several years and is selectively controlling spontaneous combustion.

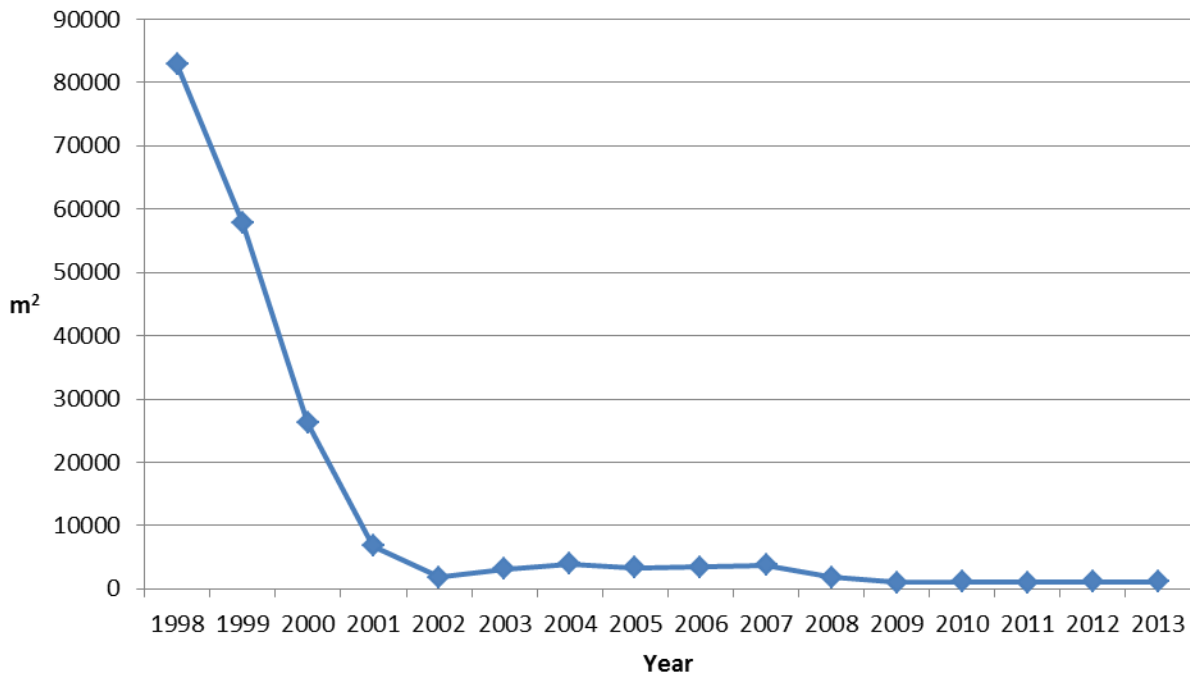
Spontaneous combustion activity within the North Pit was minimal with a number of small flare ups throughout the year all within the low wall side of the pit. There was minimal mining in the north pit during the year.

**Table 31: Area affected by spontaneous combustion by year**

Year	Area Affected (m <sup>2</sup> )
1998	82837
1999	57854
2000	26251
2001	6745

2002	1870
2003	3140
2004	3940
2005	3370
2006	3480
2007	3720
2008	1870
2009	1020
2010	1170
2011	1070
2012	1160
2013	1090

### Area Affected by Spontaneous Combustion by Year



**Figure 19: Area affected by spontaneous combustion by year**

Table 31 and Figure 19 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 1090m<sup>2</sup> of surface area were visibly affected by spontaneous combustion. The areas that continued to burn at the end of the reporting period are being managed through a process of active dumping and/or clay capping.

During the reporting period 3 new areas of spontaneous combustion were reported in the Drayton South West Tip. These areas were identified in June when thermal imaging confirmed visual signs and identified heating within the Tip. These areas will be the focus of clay capping

works in 2014 with a remediation plan compiled to remove spontaneous combustion from the area and improve vegetation growth in the area.

### **3.15 Bushfire**

During the 2013 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 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 August and clearing under power lines occurred across the site prior to bushfire season.

### **3.16 Mine Subsidence**

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

### **3.17 Hydrocarbon Contamination**

Drayton has various hydrocarbon (diesel, oils, etc.) storages. The primary diesel tank, with a capacity of 860,000 litres, is located near the workshop. Additionally, there is an in pit fuel facility, with above ground diesel storage tanks with a 247,000 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 (20L on soil) 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 was removed from bunds to ensure sufficient storage capacity in the bund in the event of a spill.

Audits on hydrocarbon management were conducted during 2013 by BP (16/1/2013), Bureau Veritas (13/5/2013 & 9/8/2013) and Anglo American Environmental Auditors (8/4/2013). Audits found general compliance with hydrocarbon management with further focus on hydrocarbon management awareness and training required.

In addition to the permanent bunded areas, portable bunds are used for transient 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 spill 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 sites 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 for bioremediating hydrocarbon contaminated soils which is located to the south of the workshop area. Following feedback from DRE, the bioremediation

cells were closed in July. This facility was only utilised in the first half of the year with any contaminated material in the second half of the year removed by Drayton's waste contractor. The facility has been built to receive hydrocarbon contaminated material, primarily from spills that may occur on the mining lease as well as contaminated soils that accumulate in several sediment sumps. Contaminated material is transported to the facility by small rear dump trucks at the direction of the Maintenance Supervisor. In 2013 approximately 17m<sup>3</sup> was put into the bioremediation cells with no material being removed from the cells. Inspections of the facility were conducted by the environmental officer on a fortnightly basis with sediment samples being taken on the 3 occasions when new material was deposited into the cells. The facility is the responsibility of the Maintenance Supervisor and the Environmental Officer who have varying responsibilities within this area. A Bioremediation Management Plan was still being finalised at the end of the reporting period with comments received from DRE. Drayton plan to redesign the bioremediation facility and will seek approval from DRE in 2014 to recommence bioremediation works at Drayton.

In the second half of 2013, Drayton's waste contractor Remondis removed several tonne of hydrocarbon contaminated material from site. This material primarily came from a sediment sump that is located above the Oil Pollution Control Dam. A total of 55.18t of contaminated soil was removed from site and taken to a contaminated waste facility in Windsor.

Small hydrocarbon spills that occur onsite are cleaned up using materials from emergency spill kits. These materials are then placed in 'Oily Rag' bins that are located near spill kits. During 2013 a total of 8,513kg of contaminated materials was removed from site by Remondis. A breakdown of weight by month can be seen in Table 32.

Drayton continued the operation of its oil pollution control dam throughout 2013. 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 contaminants 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. This system is inspected on a weekly basis.

**Table 32: Hydrocarbon contaminated material removed from site in 2013**

Month	Contaminated material removed in bins (kg)	Contaminated material removed by vacuum truck (t)
January	674	0
February	594	0
March	828	0
April	548	0
May	653	0
June	799	0
July	774	0
August	864	0
September	766	40.7
October	741	8.06
November	817	0
December	455	6.42
<b>2013 Total</b>	<b>8513</b>	<b>55.18</b>

### 3.18 Methane Drainage / Ventilation

Methane drainage and ventilation is not an issue at Drayton as it is an open cut coal mine with no underground workings.

In June 2013, Drayton reported fugitive emissions from the operation in accordance with the National Greenhouse and Energy Reporting (NGER) guidelines. In order to determine fugitive emissions from Drayton, seven boreholes were selected for gas testing according to Australian Standard 3980/1999 and International Standards ASTM D1945-03 and ISO6976-1995. Investigations revealed the existence of a single gas domain at Drayton which is a carbon dioxide 'depleted' zone where the ramp up of gas content starts to occur at depth greater than 240m. It was determined that Drayton has lower gas emissions than the government default of 0.045 CO<sub>2</sub>-e (t/t) for NSW coal mines. The scope 1 emissions figures that Drayton reported for the 2012/2013 financial year was 7,249t CO<sub>2</sub>-e of Carbon Dioxide and 1,127t CO<sub>2</sub>-e of Methane.

### 3.19 Public Safety

Public and workplace safety is a major consideration in achieving the Anglo American corporate goal of zero harm. Drayton offers no access to the public of 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 except for the main entrance and construction pad. A boom gate system on key access routes restricts on-site access to employees and inducted contractors. Contract security is in place during weekends and public holidays. There were no incidents of public safety concerns during 2013.

### 3.20 Other Issues and Risks

#### 3.20.1 Environmental Risk

Environmental risks associated with the Drayton Operations are recorded in 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 be viewed by all site personnel via the document control system, Drayton SHEC MS Explorer. Table 33 shows the primary aspects of mining rated against the Anglo American Risk Matrix (**Appendix G**).

**Table 33: Environmental Risk Review**

Aspect	Normal Operations		Abnormal Operations		Start Up		Shut Down		Emergency	
	Env	Rep	Env	Rep	Env	Rep	Env	Rep	Env	Rep
Spontaneous Combustion	8M	8M	8M				7M	4L	8M	
Decommissioning of	13H	13H	18H				13H	13H		



<b>Mine</b>						
<b>Water Management</b>	12H	5L	12H			16H
<b>Availability of Inert Material</b>	8M		2L			2L
<b>Statutory Legislation</b>	2L		4L			
<b>Management of Topsoil</b>	8M		5L			5L
<b>Final Void</b>	8M	5L	8M	5L		9M
<b>Waste Management</b>	4L	7M	7M			5L
<b>Equipment Noise</b>	8M	8M		8M		7M 7M
<b>Ground Vibration – blasting</b>	4L	4L		8M		4L
<b>Noise from blasting</b>	4L	4L		4L		4L
<b>Suspended Dust</b>	8M	8M	8M		4L	4L
<b>Dust fallout</b>	4L	4L	4L		4L	4L
<b>Groundwater</b>	4L	4L	4L			4L
<b>Sewerage Treatment Plant</b>	4L		4L			4L
<b>Erosion on Rehabilitation</b>	4L		7M			4L 4L 7M
<b>Workshop Maintenance</b>	4L		4L		4L	4L
<b>Greenhouse Gases</b>	8M	8M				8M
<b>Contaminated Land</b>	4L		7M		4L	7M 4L
<b>Machine Wash down</b>	4L		7M			
<b>Hydrocarbon Spills</b>	4L					7M
<b>Cultural Heritage</b>	4L	8M		8M		16H
<b>Light emissions</b>	4L					
<b>Fauna management</b>	8M			8M		
<b>Flora management</b>	8M					
<b>Uncapped exploration holes</b>	4L					8M
<b>Coal transport – conveyor</b>	2L		4L		4L	
<b>Coal transport – rail</b>	2L	2L		4L		
<b>Radiation devices</b>	4L					
<b>Exhaust emissions</b>	4L					4L
<b>Weed Infestation</b>	4L					
<b>Feral Animals</b>	4L					

### 3.21 Meteorological Monitoring

Real-time meteorological monitoring is a crucial component of Drayton’s environmental monitoring system. Meteorological data including wind speed, wind direction, temperature, rainfall, solar radiation and humidity are monitored using an onsite automatic weather station located at the CHP. The CHP weather station was upgraded in July 2013.

The data from station in the CHP area 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 best suit the current conditions. It also plays a vital role in planning blasting events for appropriate weather conditions.

#### 3.21.1 Results

##### Rainfall

Total annual rainfall for 2013 was 692 millimetres, an increase from the previous year and just above the long term average. The majority of the rainfall occurred in the first quarter of 2013 with November also experiencing an intense rainfall event (see Figure 20).

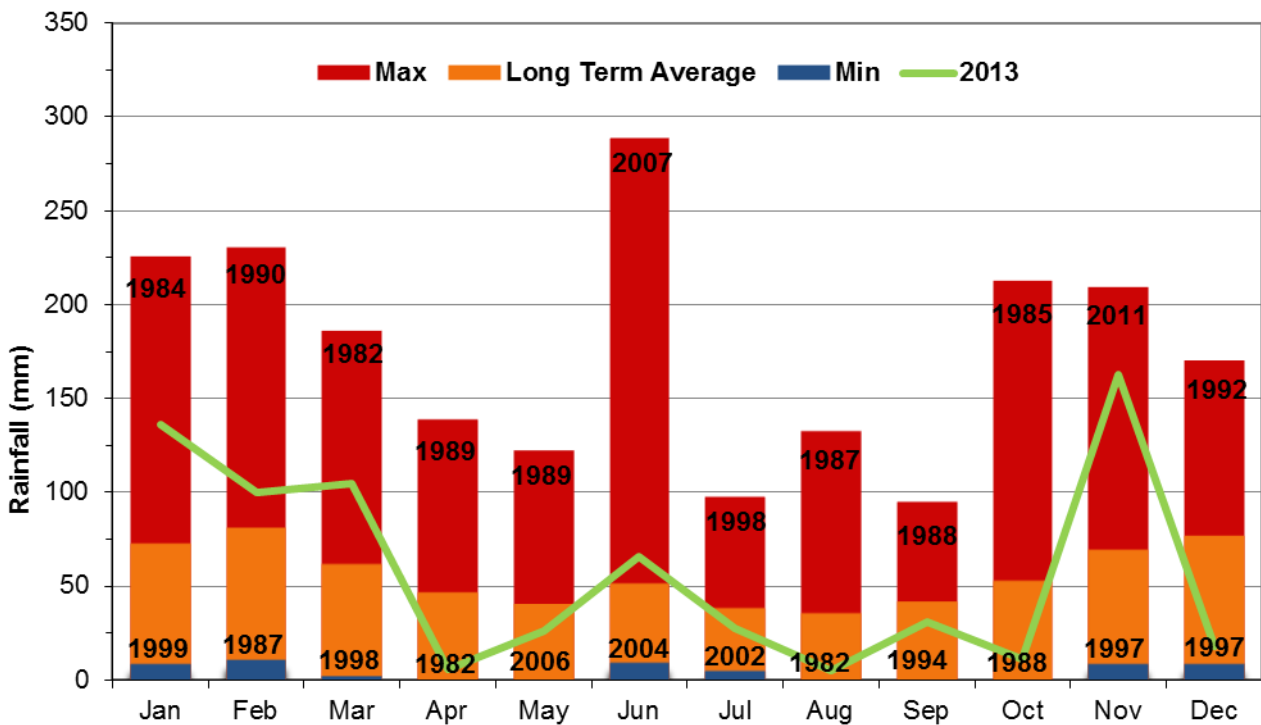


Figure 20: Rainfall history 1981 to 2013

The total monthly rainfall and the total number of rain days during the 2013 reporting period are shown in Table 34.

**Table 34: Total Monthly Rainfall for 2013**

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Rainfall (mm)	136	99.6	104.8	5.4	26	65.4	27.8	5	30.6	10.8	162.6	18	<b>692</b>
No. of rain days	16	13	9	8	17	18	13	3	5	6	13	5	<b>126</b>

Note: A rain day is a day in which more than 0.2 mm of water is recorded by the onsite meteorological station

## Temperature

Ambient temperature was monitored at the CHP meteorological station from July 2013. Prior to July temperature data was accessible from a second meteorological station located on the Great North Tip. This station was installed in mid-January 2013 and is generally used for management purposes only.

The maximum temperature recorded during the year was 41.2°C on the 18<sup>th</sup> of January 2013 and the minimum was 2.9°C on 22<sup>nd</sup> of June 2013. Temperatures in 2013 followed a similar trend to 2012 however 2013 was slightly warmer than the previous year. The temperature range per month throughout 2013 and a comparison of the 2012 and 2013 average temperatures is shown in Table 35 below.

**Table 35: 2013 Monthly temperature range and average daily temperature**

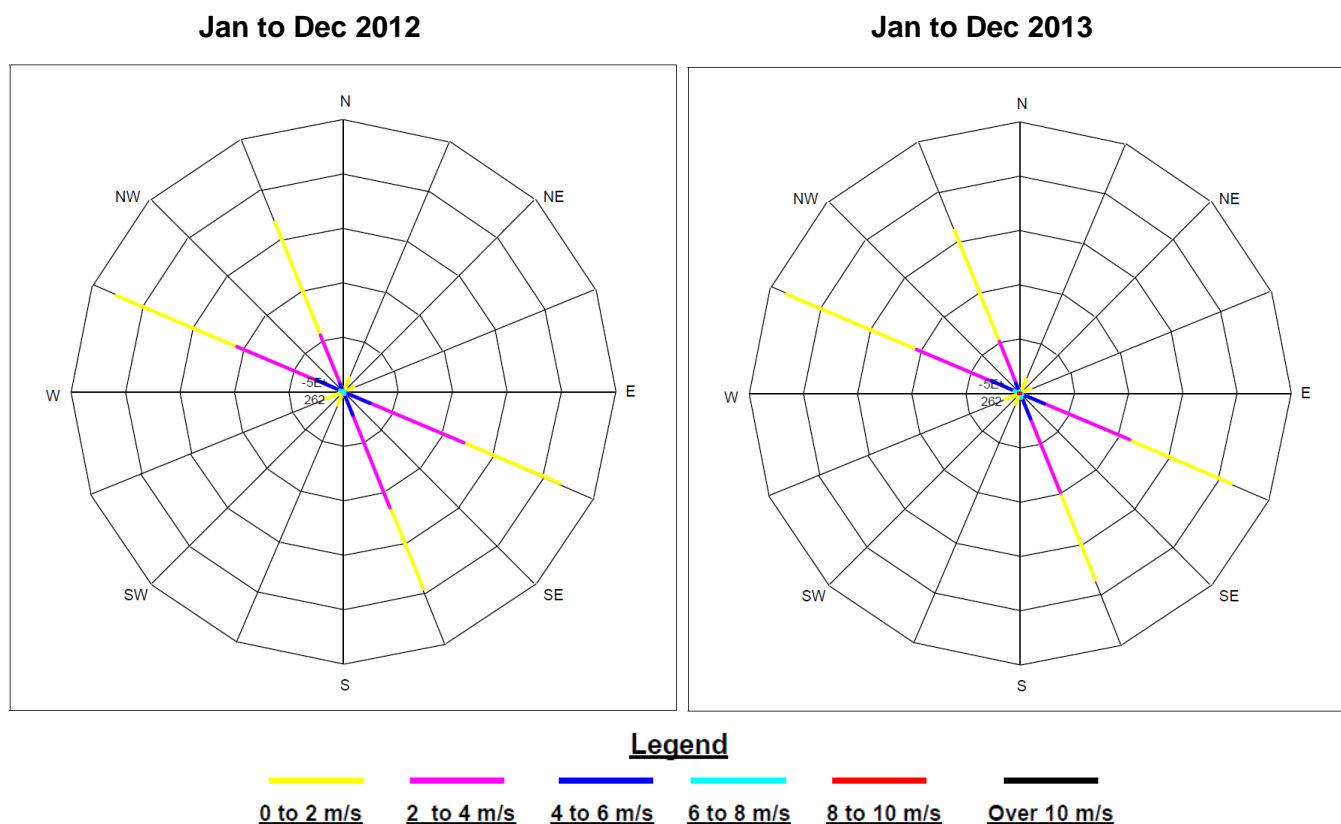
Month	Monthly Temp Range 2013 (°C)	Average Daily Temp 2013 (°C)	Average Daily Temp 2012 (°C)
January	16.6 – 41.2	22.7	22.4
February	15.9 – 30.1	22.0	21.1
March	13.2 – 31.4	21.0	19.9
April	7.4 – 29.7	17.6	17.8
May	3.9 – 28.7	14.3	13.3
June	1.9 – 20.4	12.1	11.5
July	2.3 – 21.8	11.2	10.8
August	0.6 – 27.5	13.2	12.3
September	6.1 – 33.2	17.7	16.0
October	4.4 – 35.9	19.7	18.1
November	8.4 – 37.4	19.8	21.6
December	9.7 – 38.3	22.9	23.7

## Wind Speed and Direction

Similar to previous years, two prominent wind directions prevailed at Drayton during 2013, north westerly and south easterly (see Figure 21). The 2013 summer season (January, February and December) was dominated by east south easterly (ESE) winds from the Lake Liddell direction. The winter months (June to August) were dominated by west north westerly (WNW) winds from the direction of Denman. Autumn (March to May) and spring months (September to November)

experienced a change in dominant wind direction from ESE to WNW during autumn, and WNW to ESE during spring. Monthly windroses for 2013 can be found in Appendix I.

In 2013 the maximum wind speed recorded at Drayton was 18.6m/sec on the 13<sup>th</sup> of October. Average wind speeds were highest throughout January and February. For the majority of the year, wind speeds generally remained between 0 and 4m/s (see Table 36).



**Figure 21 Annual Windroses 2012 and 2013**

**Table 36: Monthly wind velocity and duration (hours)**

Month	0 – 2 (m/sec)	2 – 4 (m/sec)	4 – 6 (m/sec)	6 – 8 (m/sec)	8 – 10 (m/sec)	>10 (m/sec)
January	198	370	154	21	1	0
February	253	277	80	17	2	0
March	403	248	54	3	0	0
April	545	143	6	0	0	0
May	506	207	28	1	0	0
June	510	137	13	1	0	0
July	565	137	37	5	0	0
August	375	257	67	12	1	0
September	383	231	63	14	1	0
October	365	241	99	30	6	0
November	333	271	72	5	0	0
December	89	82	49	6	0	0

**Table 37: Monthly wind direction and duration (hours)**

Month	NNE	ENE	ESE	SSE	SSW	WSW	WNW	NNW
January	13	7	336	223	3	6	81	73
February	6	7	283	260	9	7	28	28
March	12	10	278	215	8	12	94	79
April	14	16	187	140	12	17	184	125
May	9	7	163	148	12	13	225	165
June	7	5	90	121	10	15	258	154
July	11	8	79	99	10	21	314	202
August	6	3	37	41	5	14	377	228
September	12	7	91	89	3	10	286	194
October	15	10	96	138	12	15	274	182
November	21	10	217	181	12	13	132	96
December	2	4	98	64	3	4	29	21

## 4 COMMUNITY RELATIONS

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.

Drayton currently employs approximately 410 permanent employees and engages contractors to assist in some areas of the operation. Approximately 49% of the permanent workforce lives in Muswellbrook and the Upper Hunter with a further 46% hailing from Singleton and the Lower Hunter towns of Maitland and Cessnock (see Table 38).

**Table 38: 2013 Workforce Shire of Origin**

Shire	Number of Employees
Muswellbrook	155
Singleton	107
Cessnock	47
Upper Hunter	46
Maitland	34
Other	21
<b>TOTAL</b>	<b>410</b>

### 4.1 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 also publishes a monthly update of environmental monitoring data to the web page and the 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>). You can also find this by searching for "complaints form" at [www.angloamerican.com.au](http://www.angloamerican.com.au). 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://www.angloamerican.com.au/our-operations/thermal-coal/drayton/environment.aspx>).

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 CCC meetings.

Over the past three years, a low number of complaints has been maintained (Figure 22). A total of 24 complaints were received during the 2013 reporting period. Of these, the majority were odour related complaints (Figure 23). Apart from the 24 complaints logged for the period, there were also six enquiries received regarding blast/vibration that were not related to Drayton operations.

The 11 odour related complaints are not believed to be related to Drayton operations, but are logged as complaints due to the source of the odour being unknown. Seven of the 11 odour related complaints were received anonymously via the EPA. These complaints lack the detail required to effectively investigate the source of the odour noted. The remaining four odour related complaints were made by a single complainant. The complainant is a resident of Scone, approximately 30km from Drayton.

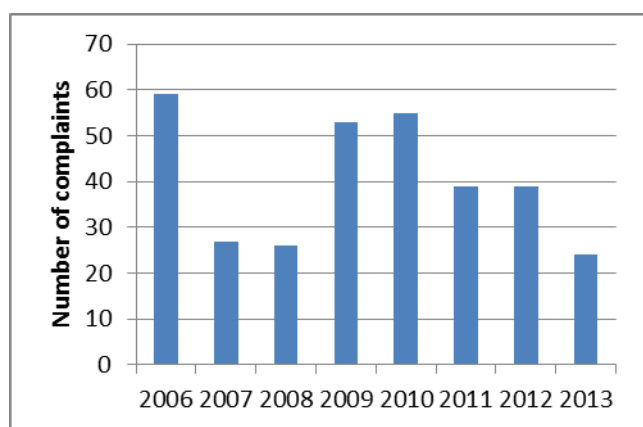


Figure 22: Community Complaints Associated with Drayton (2006 – 2013)

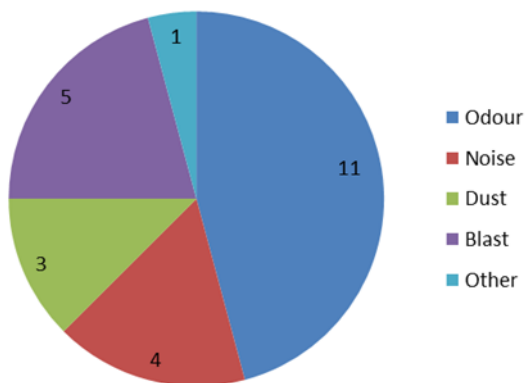


Figure 23: Community Complaints by Type for the 2013 Reporting Period

Further information on community complaints can be found in Table 56 of Appendix F.

## 4.2 Community Liaison

Drayton's 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 Mount Arthur Coal (a neighbouring BHP Billiton mining operation), a joint CCC where discussions are held regarding the shared Antiene Rail Spur. Members of the joint CCC meet on a six monthly basis.

Key aspects discussed at the CCC meetings include environmental complaints and enquiries, air quality, blasting and vibration, waste management, rehabilitation and new developments. The minutes from CCC meetings are published on the Drayton web page.

### 4.2.1 Social / Economic Contributions and Achievements

Drayton supports a diverse range of projects benefiting the communities of Muswellbrook, Singleton and Upper Hunter LGAs. Contributions are made regularly through applications rounds which are advertised in the local papers. Community members belonging to schools and

organisations requiring funding for projects, equipment or events are encouraged to complete the application form (available on the Anglo American website) for consideration. Drayton regularly supports projects relating to: education and training; health and welfare; sport; arts, culture and heritage; and environment.

In 2013, a donation of \$8,000 was presented by Anglo American to the Muswellbrook Scouts towards essential safety upgrades to their hall facilities. A further \$5,000 was donated to Muswellbrook Carelink to help fund the installation of storage facilities for medical supplies. These projects demonstrate Anglo American's commitment to improving social infrastructure and facilities for the ongoing benefit of our local communities.

In 2013 Drayton once again participated in the annual Bursting with Energy Expo in order to connect with the community in a positive and educational environment. Drayton also supports the annual Solar Boat Challenge organised by the Muswellbrook Shire Council.

## 5 REHABILITATION

Drayton has conducted rehabilitation activities since 1983 with 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 new Muswellbrook Shire Council Mining Rehabilitation Policy have been incorporated where possible and the general principles of the NSW Department of Resources and Energy - Mineral Resources '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. A second 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.

An AEMR addendum report addressing Section 5 (Rehabilitation) was provided to DRE 30<sup>th</sup> September 2013 in response to Action 1b of the 2012 AEMR Review Action Plan. The further detail provided in the addendum report has been updated for the 2013 period and provided in this section of the AEMR.

A topsoil management justification letter was sent to DRE 31<sup>st</sup> October 2013 in response to Action 2 of the 2012 AEMR Review Action Plan. Commitments regarding topsoil stockpile height restrictions are covered in the MOP which is approved by DRE.

### 5.1 Buildings

No buildings are scheduled for removal during the 2012-17 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 2013 reporting period.



## 5.2 Rehabilitation of Disturbed Land

Drayton proposed in the MOP to complete 13Ha of rehabilitation in 2013. A total of 25Ha was completed and comprised of 12Ha in January, 4Ha in October and 9Ha in December. A further 25Ha in the ES area was bulk shaped ready for completion during 2014. The areas that were rehabilitated in 2013 were on the northern and eastern slopes of the Great North Tip and in South Pit West (SPW).

The areas that were rehabilitated in 2013 varied compared to Plan 5 in the Drayton MOP. According to the plan, the area completed in January at the northern end of the Great North Tip was scheduled for rehabilitation in 2012. The area completed in October, on the eastern slope of the Great North Tip, was scheduled for rehabilitation in 2015. The area completed in December, located in the SPW area, is not scheduled for rehabilitation until 2016. These areas were rehabilitated in 2013 due to opportunities arising in areas no longer needed for operational activities.

The areas indicated on Plan 5 of the Drayton MOP to be rehabilitated in 2013 were located in the ES area. As noted previously, 25Ha in ES was bulk shaped ready for rehabilitation by 31<sup>st</sup> December 2013 however this area is in the process of being expanded to include all adjacent areas which are no longer needed for operational activities and significant works are underway to ensure adequate drainage is in place to divert mine water around the rehabilitated area once completed. This rehabilitation is therefore expected to be completed by 31<sup>st</sup> December 2014.

Post mining rural land capability classification has not yet been fully assessed for these areas. The 2013 annual monitoring addressed vegetation establishment; presence of weeds; erosion requiring remediation; evidence of impacts from feral animals; habitat for native fauna; and any further works required to meet completion criteria. Further monitoring in 2014 will expand on the performance and completion criteria by assessing soil sampling results and developing completion criteria for pasture areas based on palatable species establishment. Rural land capability classification assessment will be included for areas where grazing has been identified as the final land use.

Post mining land use for the site is grazing with biodiversity values being protected via the establishment of a habitat corridor. Of the 25Ha completed in 2013, 9Ha located in SPW was seeded to pasture with some native shrubs included to provide increased stabilisation on slopes. The remaining 16Ha of the rehabilitation completed during the 2013 reporting period will be returned to woodland to expand and enhance the habitat corridor being established on the Great North Tip. This corridor is designed to link the Southern Offset area to the Northern Offset area and is consistent with the MOP. These areas will in turn link to other offsite conservation areas.

The 12Ha area completed in January 2013 and the 4Ha area completed in October were sown with native woodland species outlined in Table 43. Areas seeded with native tree species were mixed with kitty litter as a bulking agent to assist with even distribution of seed. The contour banks were seeded with pasture species for stabilisation. All areas seeded with a pasture species mix had fertiliser applied with the seed at a rate of 250 kilograms per hectare. The pasture species mix used for the contour banks is detailed below in Table 41.

The 9Ha completed in December 2013 was seeded with the pasture species mix outlined in Table 41. Steeper slopes in the area were seeded with a mixture of exotic pasture and native shrub species detailed in Table 44 to aid future stabilisation.

All seeding mixtures included millet as a cover crop to aid soil stabilisation. Germination and growth of native species sown on rehabilitation areas will be monitored over time.

Pasture areas continue to exhibit high groundcover establishment levels. A period of four months of below average rainfall from July 2013 proved challenging for pasture areas

established during 2011 and 2012, however heavy rainfall received in late November 2013 caused a flush of new germination on these areas demonstrating the resilience of the species sown. Stability of slopes and condition of contour banks were assessed at the end of the reporting period. The high intensity rainfall event in November 2013 caused some rill erosion on the newly seeded 4Ha area near the magazine. Despite this, the majority of the area is showing good groundcover establishment. Some follow up maintenance will be required on this rehabilitation area to repair erosion damage. This follow up work will occur in 2014 during planned rehabilitation work.

Areas rehabilitated during the reporting period were bulk shaped then capped with inert material at a minimum depth of two metres to minimise the risk of spontaneous combustion. Bulk shaping and compaction works were conducted by D11 dozers. Topsoil was spread over the areas with a minimum coverage of 100mm. Contour bank construction and seeding was conducted by the NSW Soil Conservation Service. All contour banks on Great North Tip rehabilitation areas have been designed with a 1 degree slope with all runoff being collected in the mine water system.

Figures 27 to 32 show cross sections of rehabilitated areas with all areas generally less than 18 degrees. Small portions of the SPW rehabilitation area may be more than 18 degrees due to the complexity of the Geofluid design. This design has been developed to provide surface stability without use of contour banks resulting in a final landform with a “natural” appearance.

Table 39 gives a summary of mining and rehabilitation areas located at Drayton for 2013. Table 40 outlines maintenance activities conducted on rehabilitated land during the reporting period.

**Table 39: Rehabilitation Summary**

<b>Area Affected / Rehabilitated (hectares)</b>		
<b>To Date</b>	<b>Last Report</b>	<b>Next Report (Estimated)</b>

**A: MINE LEASE AREA**

A1 Mine Lease(s) Area	1767.5
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**B: DISTURBED AREAS**

B1	Infrastructure area (other disturbed areas to be rehabilitated at closure including facilities, roads)	101.1	94.5	101.1
B2	Active Mining Area (excluding items B3 – B5 below)	554.5	434.0	549.6
B3	Waste emplacements (active/unshaped/in or out-of-pit)	77.8	104.3	67.8
B4	Tailing emplacements (active/unshaped/in or out-of-pit)	16.2	14.3	16.2
B5	Shaped waste emplacement (awaits final vegetation)	25.1	21.8	0

<b>ALL DISTURBED AREAS</b>		774.7	668.9	734.7
<b>C: REHABILITATION PROGRESS</b>				
C1	Total Rehabilitated area (except for maintenance)	473.0	467.7	513.0
<b>D: REHABILITATION ON SLOPES</b>				
D1	14 to 18 degrees	180.3	180.3	180.3
D2	Greater than 18 degrees	27	27	27
<b>E: SURFACE OF REHABILITATED LAND</b>				
E1	Pasture and grasses	318.9	329.5	358.9
E2	Native forest/ecosystems	149.6	133.7	149.6
E3	Plantations and crops	4.5	4.5	4.5
E4	Other (include no vegetative outcomes)	0	0	0

A weed control program continued during 2013 with Prickly Pear, Castor Oil and Tree Tobacco being the primary target species treated on the rehabilitated areas. This program will continue throughout 2014.

**Table 40: Maintenance Activities on Rehabilitated Land**

NATURE OF TREATMENT	Area Treated (ha)		Comment/control strategies/ treatment detail
	Report period	Next period	
<b>Additional erosion control works</b> (drains re-contouring, rock protection)	16	40	<b>Contour banks installed on newly rehabilitated areas excluding Geofluv trial area</b>
<b>Re-covering</b> (detail - further topsoil, subsoil sealing etc)	25	40	<b>Topsoil spread on newly rehabilitated areas only</b>
<b>Soil treatment</b> (detail - fertiliser, lime, gypsum etc)	9	40	<b>Fertiliser used with pasture seed mix – species and application rates are presented below in Table 41</b>
<b>Treatment/Management</b> (detail - grazing, cropping, slashing etc)	0	0	<b>No grazing cropping or slashing on rehabilitated areas during 2013 reporting period</b>
<b>Re-seeding/Replanting</b> (detail - species density, season etc)	10	25	<b>Replanting into areas originally sown to pasture and Southern Offset with species listed in Table 42 below</b>
<b>Adversely Affected by Weeds</b> (detail - type and treatment)	50	50	<b>Ongoing weed control conducted – main target species on rehabilitated areas during 2013 was Prickly Pear</b>
<b>Feral animal control</b> (detail - additional fencing, trapping, baiting etc)	200	200	<b>Wild dog baiting. South Tip and Southern Offset areas targeted 2013</b>

**Table 41: Pasture Species Mix**

Species	Kg/Ha	Species	Kg/Ha
Millet (cover crop)	40	Haifa Clover Coated	2
Kangaroo Valley Rye	2	Vetch	2
Lucerne Aurora Coated	2	Sephic Medic Coated	2
Couch	5	Granulock 15 (fertilizer)	250

A total of 6000 native trees were planted on rehabilitation areas during 2013. In accordance with the Rehabilitation and Offset Management Plan, these areas are to be returned to woodland forming part of the habitat corridor linking the Southern and Northern Offset areas. Of the 6000 trees planted, 2000 were planted in the Southern Offset area. The planting was timed to coincide with periods of reliable rainfall however establishment was again hampered by prolonged periods of hot, dry weather. Total tree mortality from the areas planted in 2012 and 2013 will be assessed in 2014 with replacement trees to be planted in equal numbers. A tree planting species list is detailed below in Table 42.

**Table 42: Species Planted**

Species	Vegetation Community	Location Planted
<i>Angophora floribunda</i>	Narrow-leaved Ironbark Woodland	Crests – Great North Tip
<i>Eucalyptus crebra</i>	Narrow-leaved Ironbark Woodland	Crests – Great North Tip
<i>Eucalyptus canaliculata</i>	Narrow-leaved Ironbark Woodland	Crests – Great North Tip
<i>Eucalyptus tereticornis</i>	Narrow-leaved Ironbark Woodland	Crests – Great North Tip
<i>Acacia falcata</i>	Narrow-leaved Ironbark Woodland	Crests – Great North Tip
<i>Corymbia maculata</i>	Spotted Gum – Grey Box Woodland	Upper Slopes – Great North Tip
<i>Acacia falcata</i>	Spotted Gum – Grey Box Woodland	Upper Slopes – Great North Tip
<i>Lomandra longifolia</i>	Spotted Gum – Grey Box Woodland	Upper Slopes – Great North Tip
<i>Eucalyptus moluccana</i>	Spotted Gum – Grey Box Woodland	Upper Slopes – Great North Tip
<i>Eucalyptus moluccana</i>	Yellow Box – Grey Gum Woodland	Southern Offset Area
<i>Eucalyptus melliodora</i>	Yellow Box – Grey Gum Woodland	Southern Offset Area

**Table 43: Native species seed mix Great North Tip 2013**

Species	Vegetation Community	Kg/Ha
<i>Angophora floribunda</i>	Narrow-leaved Ironbark Woodland	0.3
<i>Eucalyptus crebra</i>	Narrow-leaved Ironbark Woodland	1.0
<i>Eucalyptus canaliculata</i>	Narrow-leaved Ironbark Woodland	0.2
<i>Brachychiton populneus</i>	Narrow-leaved Ironbark Woodland	0.1
<i>Corymbia maculata</i>	Narrow-leaved Ironbark Woodland	0.2
<i>Eucalyptus moluccana</i>	Narrow-leaved Ironbark Woodland	0.2
<i>Acacia falcata</i>	Narrow-leaved Ironbark Woodland	0.3
<i>Acacia decora</i>	Narrow-leaved Ironbark Woodland	0.3
<i>Acacia paradoxa</i>	Narrow-leaved Ironbark Woodland	0.2
<i>Acacia parvipinnula</i>	Narrow-leaved Ironbark Woodland	0.1
<i>Acacia salicina</i>	Narrow-leaved Ironbark Woodland	0.2
<i>Eucalyptus tereticornis/blakelyi</i>	Spotted Gum – Grey Box Woodland	0.4
<i>Eucalyptus crebra</i>	Spotted Gum – Grey Box Woodland	0.1
<i>Acacia falcata</i>	Spotted Gum – Grey Box Woodland	0.3
<i>Acacia decora</i>	Spotted Gum – Grey Box Woodland	0.3
<i>Acacia implexa</i>	Spotted Gum – Grey Box Woodland	0.1
<i>Acacia salicina</i>	Spotted Gum – Grey Box Woodland	0.2
<i>Corymbia maculata</i>	Spotted Gum – Grey Box Woodland	1.0
<i>Brachychiton populneus</i>	Spotted Gum – Grey Box Woodland	0.1
<i>Eucalyptus moluccana</i>	Spotted Gum – Grey Box Woodland	0.6
Millet	Cover crop both communities	5
Couch	Light pasture both communities	2
Perennial Rye Grass	Light pasture both communities	2
Sephi-barrel Medic	Light pasture both communities	1
Kitty Litter	Bulking agent both communities	62.5

**Table 44: Species mix Geofluv area 2013**

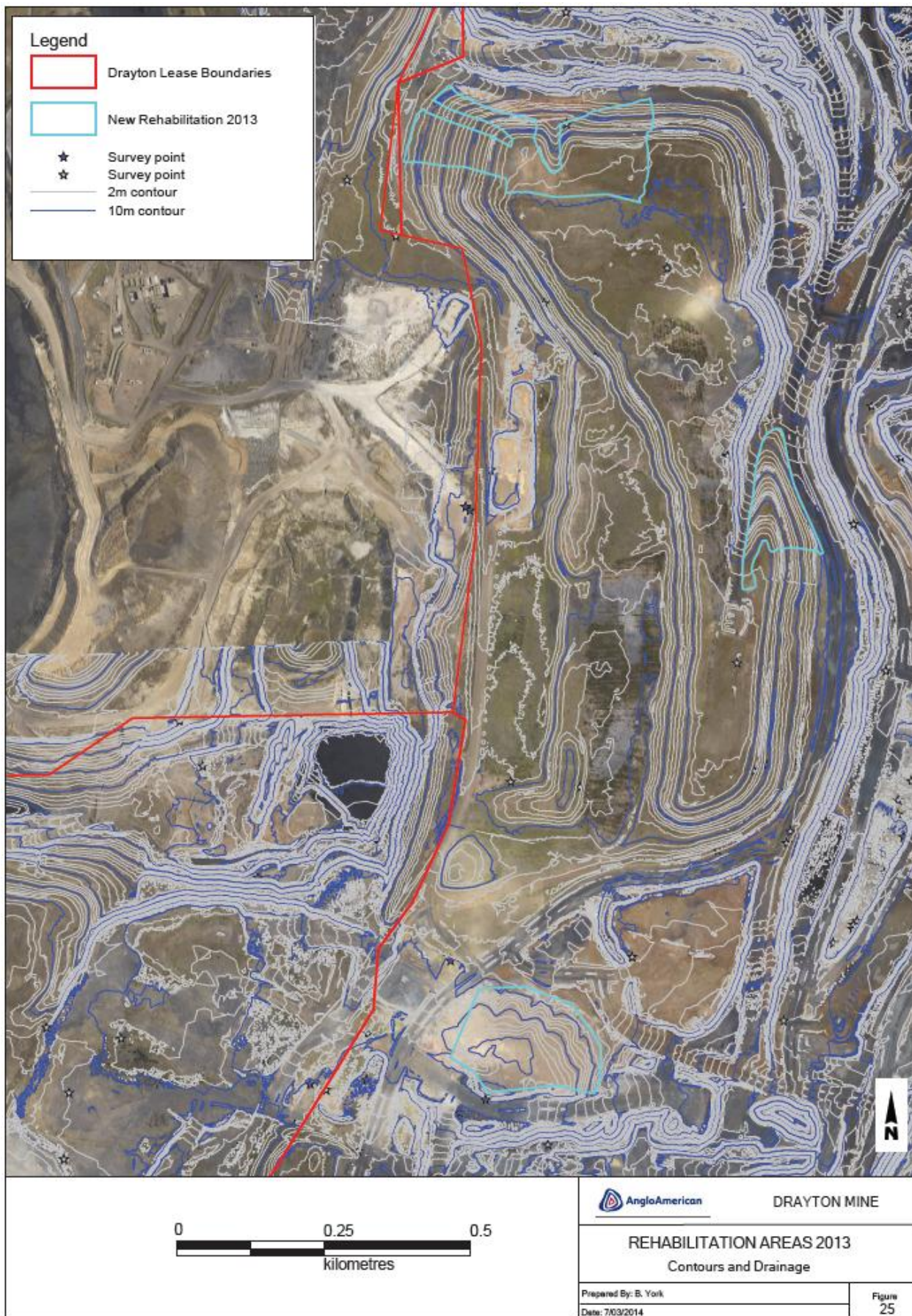
<b>Species</b>	<b>Kg/Ha</b>	<b>Species</b>	<b>Kg/Ha</b>
<i>Acacia falcata</i>	0.4	Millet	10
<i>Acacia decora</i>	0.4	Couch	4
<i>Acacia implexa</i>	0.1	Perennial Rye Grass	4
<i>Acacia salicina</i>	0.2	Sephi-barrel Medic	2
Kitty Litter	62.5		

The current extent of rehabilitated areas at Drayton including those completed during the 2013 reporting period are shown below in Figure 24.



**Figure 24: Rehabilitation Areas 2013**

Contours and drainage of rehabilitated areas are shown below in Figure 25.



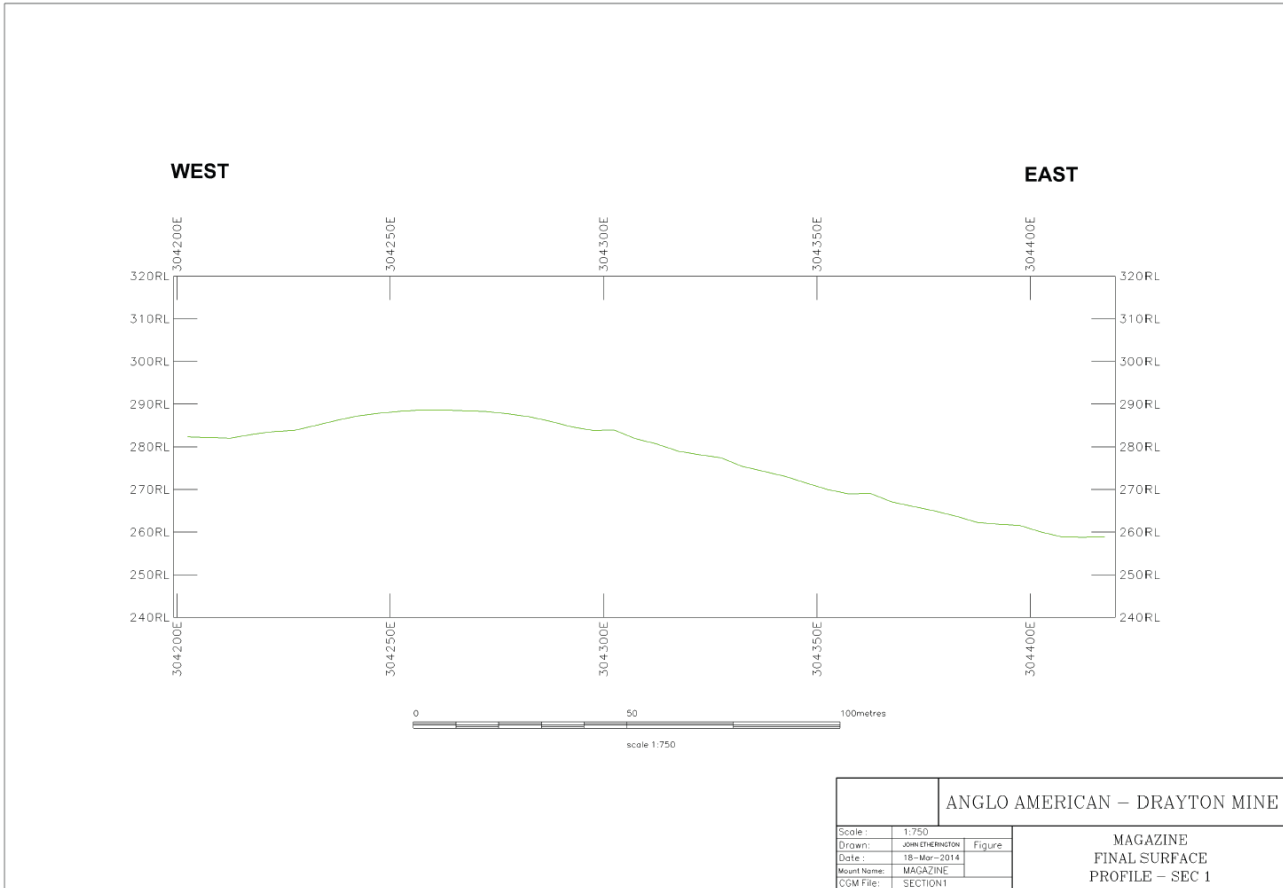
**Figure 25: Rehabilitation Area Contours**



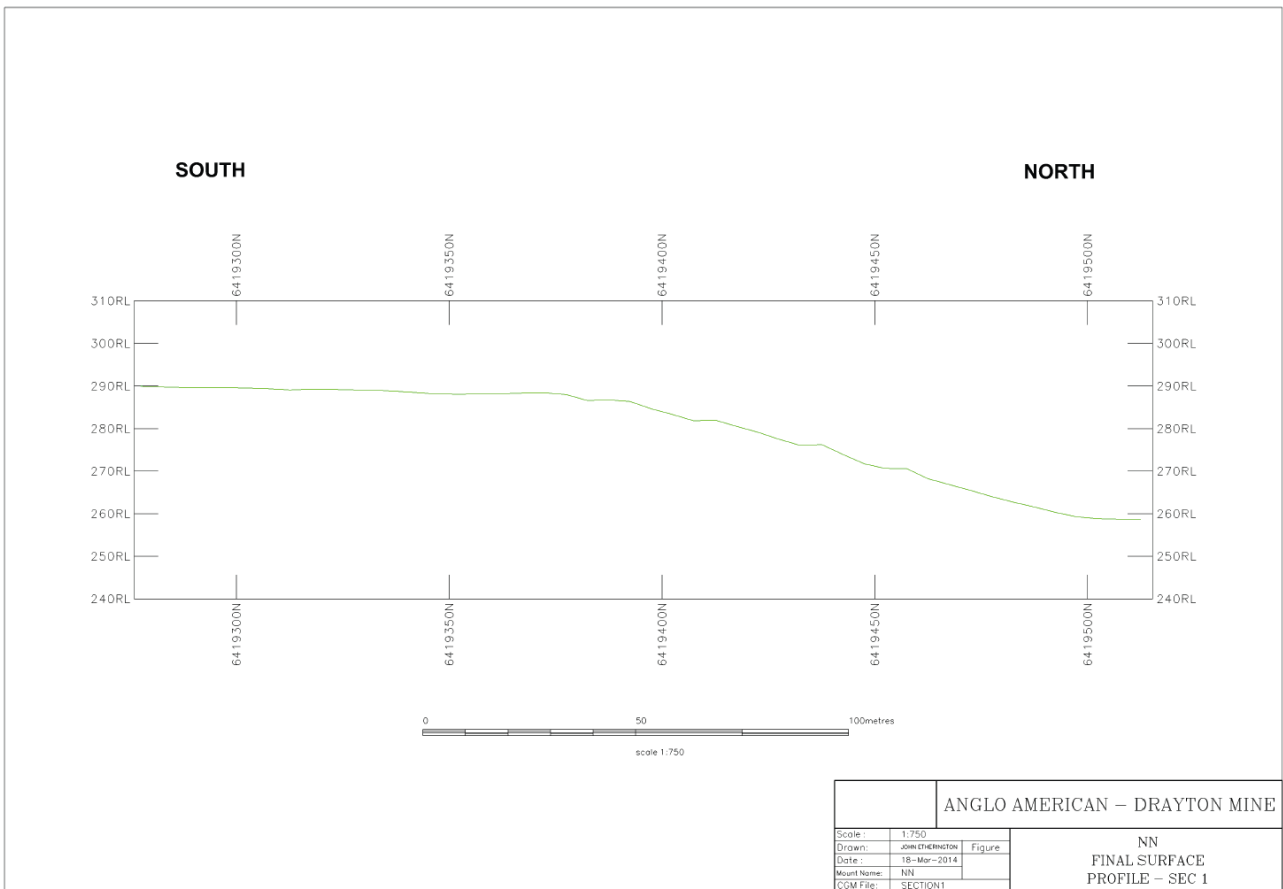
Figure 26 below outlines target vegetation communities on the 2013 rehabilitation areas.



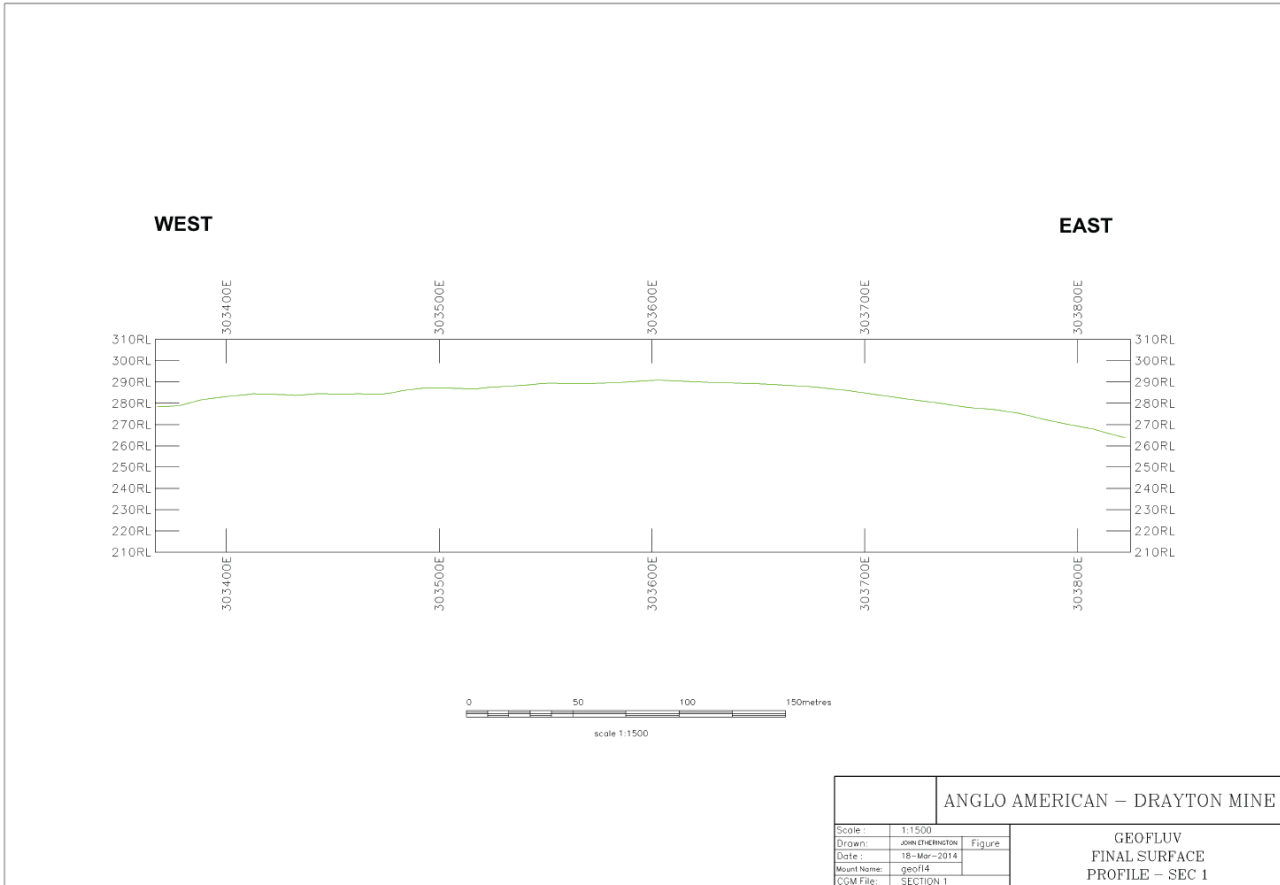
**Figure 26: Rehabilitation Area Target Vegetation Communities**



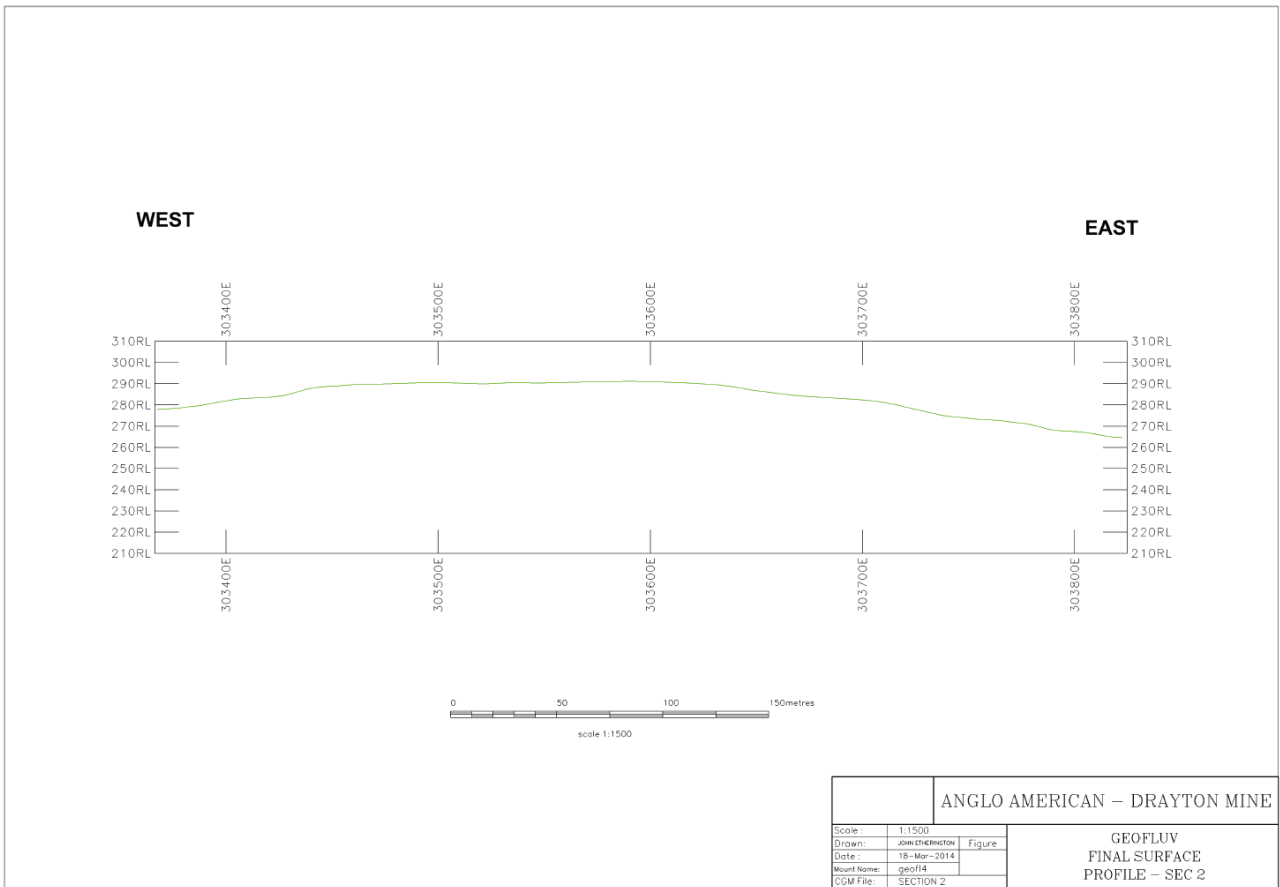
**Figure 27: Cross Section of GNT Eastern Slope Rehabilitation Area**



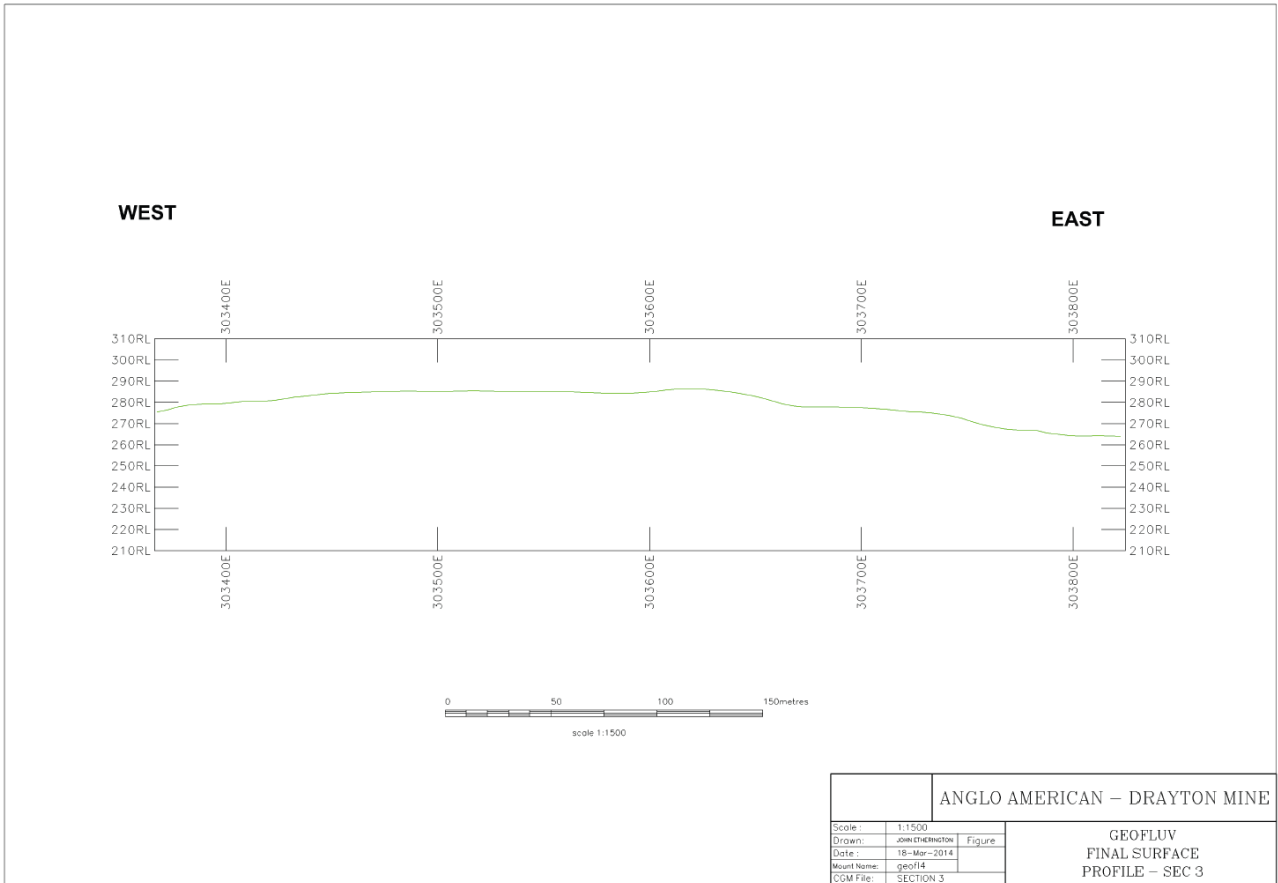
**Figure 28: Cross Section of GNT Northern Slope Rehabilitation Area**



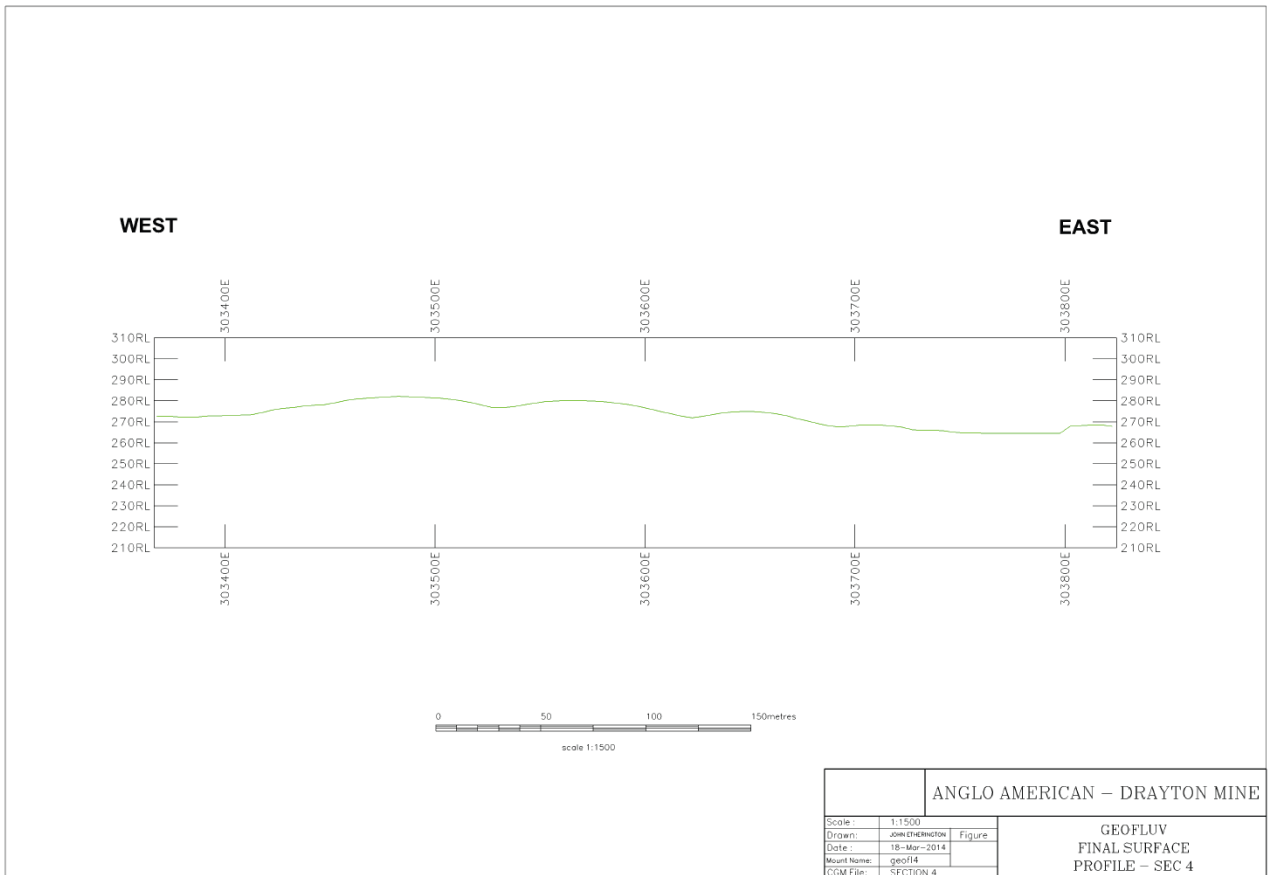
**Figure 29: Cross Section Geofluv Rehabilitation Area 1**



**Figure 30: Cross Section Geofluv Rehabilitation Area 2**



**Figure 31: Cross Section Geofluv Rehabilitation Area 3**



**Figure 32: Cross Section Geofluv Rehabilitation Area 4**

In 2008, 88Ha of land within the Drayton lease was dedicated as an offset area. This land, named the Southern Offset area, is located in the Saddlers Creek catchment and includes both remnant woodland within the creek and an area of post mining rehabilitation. The rehabilitation area is being progressively replanted to establish target vegetation communities outlined in the Offset Strategy. Monitoring of the Southern Offset area during 2013 identified areas where previously existing vegetation was no longer present. Areas of poor vegetation growth were also observed. Further investigation identified the presence of steam in localised areas and a thermography survey of the Southern Offset area was conducted in June 2013. The Thermography Survey Report (Hot Shots, June 2013) revealed an area of approximately 11Ha exhibiting active surface heating.

A proposed restoration strategy was developed and presented in the Southern Offset Area Restoration Report (Hansen Bailey, November 2013). The report outlined proposed restoration of the 11Ha area with active surface heating and a further 14Ha of poor vegetation establishment not exhibiting active surface heating which will also be remediated during the proposed restoration works. The restoration will follow a staged approach with the majority of the works expected to be completed in 2014 and further vegetation establishment and monitoring works to be conducted over the following years.

### **5.3 Other Infrastructure**

Exploration drill pads are subject to the site permit to disturb process. Exploration disturbance is minimised through this process and rehabilitation is conducted as soon as practicable after each drill pad is decommissioned.

No other infrastructure was subject to rehabilitation during the period.

### **5.4 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.

During the 2013 reporting period, monitoring of the rehabilitation trial commenced in 2012 was conducted to examine variables and to determine the methodology for recreating Endangered Ecological Communities (EEC) noted during the Drayton South Environmental Assessment (EA). The two communities examined were:

- Central Hunter Box Iron Bark Woodland
- Narrabeen Slopes Slaty Box Woodland

The trial used a combination of tubestock planting and direct seeding for a wide range of native trees, shrubs and groundcovers both with and without application of fertiliser. The trial was designed to assess the relative merit of several methodologies and species commonly found in each EEC. Soil samples were taken to establish baseline conditions and assess variability prior to establishment of the trial area. The progress of the Drayton South rehabilitation trial was reviewed in August 2013.

The Drayton South Native Woodland Trial Monitoring Report (GSS, August 2013) did not draw any conclusions regarding relative merit of overall techniques due to the potential for further germination given the relatively short (10 month) period since the trial was established. Several general comments were made regarding trial limitations due to conditions. The main areas noted to be affecting overall success of the trial area were:

- Extreme weather conditions including long dry periods followed by heavy rainfall;
- Topsoil quality, treatment and composition;
- Weed invasion and competition;
- Compaction, site preparation and contour bank construction;
- Steep slope contributing to localised erosion; and
- Predation of tubestock by hares.

Native grass seed harvested on Anglo American owned land was trialed on a half hectare plot to the north of the Great North Tip in 2013. The trial involved adding the native grass seed to an area seeded with a native woodland community. The trial area was seeded in March 2013 and monitoring was undertaken in July and December 2013. Monitoring to date has failed to identify germination of native grass species sown. Technique adjustments will be made for future trials.

A 9Ha area of rehabilitation was established in SPW using a Geofluv design, during 2013. The Geofluv software enables the formation of a “natural” landform appearance. The designed landform is expected to be stable without the use of constructed contour banks. Performance of this new rehabilitation technique will be assessed during 2014 and beyond however initial results appear encouraging. Rainfall experienced prior to vegetation establishment resulted in minor rill erosion in the drainage channels consistent with or less than the erosion caused by similar conditions on the 4Ha area established using traditional techniques.

## 5.5 Further Development of the Final Rehabilitation Plan

Rehabilitation inspections during 2013 assessed risk to rehabilitation areas including competition from weeds, insufficient rainfall, erosion, spontaneous combustion and predation by animals.

Rehabilitation areas were assessed for weed infestations in 2013 and treated for Prickly Pear, African Boxthorn, Tree Tobacco and Castor Oil as detailed in Section 3.8. Competition from an infestation of Galenia noted in the Drayton South Rehabilitation Trial area will be addressed in 2014 using a selective herbicide and spot spraying technique.

Rainfall during November 2013 caused erosion in the newly seeded rehabilitation area on the eastern slope of the Great North Tip (GNT). The South Pit West (SPW) Geofluv area will be monitored closely for erosion issues due to the trial technique without use of contour banks. Erosion will be addressed in 2014 using a combination of ripping, seeding and hay mulching depending on the extent and severity of the erosion in each area.

The 2013 rehabilitation areas are currently free of evidence of spontaneous combustion. All areas will be assessed in 2014 using aerial survey techniques to ensure any outbreaks in rehabilitation areas are identified and managed.

Predation by kangaroos and hares has occurred in 2011 and 2012 rehabilitation areas, impacting primarily tubestock trees. Trees planted in 2012 and 2013 in these areas were also impacted by inconsistent rainfall causing high mortality rates both from hot, dry conditions and periods of inundation affecting some areas. A thorough assessment of mortalities will be conducted during 2014 with replacement tubestock to be planted in equal proportion to those lost.

Flora, fauna and soils on rehabilitation areas were monitored during 2013 by Eco Logical Australia (ELA). The 2013 Flora and Fauna Monitoring Report (ELA, March 2014) recommended:

- Further monitoring and control of vertebrate pest species;

- Continued monitoring and control of noxious and environmental weed species;
- Revising performance and completion criteria for target flora;
- Developing performance and completion criteria for fauna and soils;
- Developing performance and completion criteria for pasture areas incorporating palatable species diversity and final rural landform capability classifications;
- Engaging a soil scientist to review monitoring results and identify limiting factors; and
- Increase future monitoring of microchiropteran bat species to ensure full diversity is sampled at all fauna monitoring locations.

The recommendations will be incorporated into Drayton’s Environmental Management System. Monitoring and management adjustments will be made during 2014 as appropriate.

The planned 3Ha trial of an organic waste compost product for growth medium establishment was postponed in 2013. The area set aside for the trial in ES has not been completed due to expansion of the area to be rehabilitated and implementation of drainage to divert mine water around the rehabilitation area. The trial will go ahead in 2014 and will be expanded to include the entire ES rehabilitation area.

Due to the potential for spontaneous combustion, inert capping is applied in areas of rehabilitation that are at risk of an outbreak of spontaneous combustion. Erosion control measures are incorporated into final rehabilitation works where appropriate. During 2013, this methodology was adapted to include greater depth of capping material along contour banks to ensure bank construction and subsequent erosion does not cause thinning of the capping to an inadequate depth over time.

Further development of rehabilitation areas using Geofluc design is being considered for 2014. Designs will be developed and areas where it is feasible to incorporate further Geofluc designs into the rehabilitation areas at Drayton will be assessed in 2014. Implementation will follow in areas where the “natural looking” landforms are feasible.

During the reporting period Drayton compiled a draft Mine Closure Plan. This plan was drafted after consultation with;

- Muswellbrook Shire Council
- NSW Department of Planning and Infrastructure
- Office of Environment and Heritage
- Division of Resources and Energy

The draft plan identifies areas of rehabilitation through to 2017. The rehabilitation targets for the following years are;

Year	Rehabilitation Target (ha)
2014	40
2015	108
2016	230
2017	237

The rehabilitation targets outlined in the draft Mine Closure Plan show a progressive increase in area up to 2017 when Drayton’s development approval expires. Under current approvals

Drayton will cease mining operations in 2017. If the Drayton South operation is approved, rehabilitation targets may change to account for disturbed areas that will be required for the Drayton South operation.

In August 2013, Drayton met with DRE and DP&I to discuss requirements for the detailed Mine Closure Plan (MCP). A draft MCP was requested and provided by December 2013.

A full Rehabilitation Calculation for Drayton was provided to DRE on 11<sup>th</sup> October 2013.



## 6 ACTIVITIES PROPOSED FOR THE NEXT AEMR PERIOD

### 6.1 Environmental Performance

Drayton's environmental targets for the 2014 reporting period include:

- Maintaining full compliance with environmental legislation;
- Full implementation of a new Dust Management System
- Comply with an 80% dust control efficiency on all haul roads;
- Nil discharge of mine water;
- All blasts to be less than 5 mm/sec ground vibration and 115 dB(L) at the nearest residence;
- Dust emissions to be below the statutory limits of 4g/m<sup>2</sup>.month and 50 µg/m<sup>3</sup> TSP at nearby residences;
- Noise emissions to be below statutory requirements;
- Reduction in spontaneous combustion emissions by continued improvement in application of the spontaneous combustion management plan;
- Continuation of the CCC meetings;
- Continuation of the waste management plan and continued improvement in the application of the waste management practices;
- Continuous improvement of the documentation associated with the Environmental Management System;
- Conduct 40ha of rehabilitation;
- Maintain compliance with ISO14000 systems Targets and Objectives for the operation of the Antiene Rail Loop and Drayton Rail Spur will remain consistent with those detailed for the Drayton mining operation;
- Plant a total of 6000 tubestock trees in areas identified within the Drayton final landform as woodland.
- Regulatory approval of revised Mine Closure Plan and Bioremediation Management Plan

## 7 ADDITIONAL INFORMATION

### 7.1 Antiene Joint Rail User Facility

The Antiene Rail Spur is wholly owned and operated by Drayton Mine. Development Consent S99/010170 was obtained in November 2000 to increase the authorised tonnage of the Drayton Loop to 7Mtpa and the Antiene Spur to 20Mtpa. The increased tonnage over the Antiene Spur allows for the output from a potential future Drayton South mine on the Drayton rail loop.

There were no variations to Drayton approvals relating to the rail facility during the 2013 reporting period.

Additionally, condition 8.1 of Department of Urban Affairs and Planning (now DP&I) development consent S99/01070 requires that the following additional information is supplied in relation to environmental management of the Drayton Rail Loop and Antiene Rail Spur development.

#### 7.1.1 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 2013 reporting period, one noise related complaint was made in regards to rail activity. The complaint is indicated in Table 45 below and is sub listed in **Appendix F**.

**Table 45: Rail Related Noise Complaints Received in 2013**

Date	Enquiry, Concern OR Complaint	Nature	Outcome
11/03/2013	Complaint	Noise	Resident made a complaint via the hotline in regards to loud noise, including trains and tipping sounds, most of the night on Saturday and Sunday (9th and 10th March). The investigation found that noise was within limits however, there was some activity in the north pit on the Saturday and Sunday nights but that work is now finished. There was also a train being loaded early on the Monday morning (24:00-02:00hrs). The resident was notified of these findings and that a new real-time noise monitor would be installed at the end of her street during 2013.

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. A dense surrounding of native trees is in place to mitigate the impacts on the surrounding residents. In 2013 no complaints were made in regards to lighting.

The joint Drayton and Mt Arthur Coal CCC held two scheduled meetings during 2013 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 as 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.

### 7.1.2 Monitoring

Under the consent condition 6.1 (e) coal haulage reports are required on a six monthly basis. These reports were provided to the DP&I at the appropriate time, with a summary report being contained in **Appendix H**. Condition 6.1(b) states that, Coal transported along the Antiene Rail Spur is limited to twenty (20) million tonnes per annum. In the 2013 reporting period, 21,854,906 tonnes of coal was transported on the Antiene Rail Spur. This comprised of 4,097,996 tonnes from Drayton and 17,756,910 tonnes from Mt Arthur Coal. Mt Arthur Coal has a more recent development approval allowing up to 27 million tonnes of coal to be transported along the Antiene Rail Spur. A written report detailing the exceedance was provided to the DP&I.

General environmental monitoring also continued throughout 2013 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. There has been fluctuations observed in some of the monitoring characteristics however, characteristics have been within limits.

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. Data sets studied throughout the Antiene rural subdivision generally indicate no increase in dust emissions in the period since the consent was granted.

Noise assessments indicated that there would not be a significant noise impact from these areas provided that appropriate noise abatement measures were adopted. Despite the current noise mitigation measures, in 2013 train noise was audible on 10 out of 39 different attended noise monitoring occasions. The trains were most commonly heard at the Lot 7 (Antiene) residence. On all occasions it was noted that train noise did not comprise more than 40% of the total noise recorded during the monitoring (see Table 46).

**Table 46: Train Noise Perceived during Attended Noise Monitoring**

Location	Date	Time	LEQ	L10	L50	L90	Comments
De Boer	24/04/2013	14:41	34.1	35.6	33.2	30.3	70% wind, 10% traffic, 10% birds, <b>5% train</b> , 5%resident (phone).
Doherty	06/02/2013	06:22	37.0	39.0	35.0	33.1	45% birds, 35% traffic, 10% insects, <b>10% train</b> .
Halloran	07/01/2013	11:50	35.7	37.7	35.0	32.7	40% traffic, <b>10% Train</b> , 40% Birds/Insects, 10% Wind in trees, Mine inaudible
	24/04/2013	14:23	38.1	41.1	34.9	30.9	45% wind, 35% birds, 5% traffic, <b>5% train</b> , 5% plane, 5% dozer and reversing beepers.
Horder	24/04/2013	13:10	34.5	36.6	33.6	30.9	13 x Trucks, 41 x LVs. 60% birds, 35% TMD traffic, <b>5% train</b> .
	13/12/2013	14:50	41.9	39.8	34.3	32.3	30% birds, <b>30% train</b> , 20%traffic, 20% wind
Robertson	04/01/2013	08:30	44.4	48.6	40.6	32.1	Birds 5%, Insects 10%, TMD 45%, <b>Train 40%</b> , Mine inaudible
	18/01/2013	08:30	49.6	51.8	48.5	46.4	45%insects, 40%traffic, 10%birds, <b>5%train</b> . Trucks = 11. Light vehicles = 21.
	19/06/2013	15:07	50.8	54.2	46.5	38.8	6 x trucks and 50 x LVs. 80% traffic (and helicopter), <b>15% train breaks</b> and 5% wind.
	12/07/2013	15:16	49.2	53.6	45.7	34.9	7x trucks and 46x Light vehicles.70% traffic, <b>20% train</b> , 10% birds.
	04/10/2013	07:50	43.6	47.4	40.6	36.1	50% traffic, <b>20% train</b> , 15% whipper-snipper, 15% birds
	15/10/2013	08:15	44.5	49.0	40.7	33.1	70% traffic, <b>20% train</b> , 10% birds

## 7.2 Dams Safety Committee Requirements

### 7.2.1 Liddell Ash Dam

The Liddell Ash Dam Levee (ADL) was constructed to retain ash and minimise the amount of free standing water entering the mine. The DSC issued Drayton with requirements for monitoring and reporting regarding the ADL. In 2013 Drayton complied with the DSC requirements by carrying out:

In 2013 Drayton complied with the DSC requirements by carrying out:

- Annual independent Type 2 engineering assessment;
- Tri-weekly inspections conducted by a competent person;
- An annual review of the Ash Dam Management System;
- 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 50mm/sec to DSC immediately; and
- Providing monthly reports on:
  - seepage
  - ash deposition status
  - blast monitoring results within the notification area
  - mining face positions
  - compliance statement

During 2013, Drayton applied for and received approval to raise the blasting vibration limit for the ADL to 50mm/sec. The vibration limit at the ADL for blasting, set by the DSC, is 50mm/sec with all blast results over 50mm/sec to be reported immediately to the DSC. During 2013, no blasts exceeded the previously set limit of 30mm/sec.

### 7.2.2 Access Road Dam

The Drayton Access Road (2081) Dam is also a DSC prescribed dam. This dam is a 13 metre high significant consequence category dam. A Type 3 surveillance inspection is conducted every five years and results reported to the DSC. The last Type 3 surveillance report for this dam was submitted to the DSC in September 2010. The next report is due in June 2015.

## APPENDICES

### Appendix A: Consents, Leases and Licenses

**Table 47: Drayton's Consents, Leases and Licenses**

Consents, Leases and Licences	Date of Issue	Approval Authority
<b>Licence / Approval Title</b>		
DUAP Conditions re Antiene Rail Spur Development	02/11/2000	Department of Planning
PA – Drayton Mine Extension (06_0202)	01/02/2008	NSW Department of Planning
Modification to Drayton Mine Extension	16/10/2009	NSW Department of Planning
Modification 2 to Drayton Mine Extension	17/02/2012	NSW Department of Planning
<b>Lease Conditions</b>		
Exchange of Parts of Coal Lease 229 & Coal Lease 744	25/06/1992	Department of Primary Industries (DMR)
Coal Lease 395	08/03/2007	Department of Primary Industries (DMR)
Coal Lease, Part Transfer of CL744	23/06/1992	Department of Primary Industries (DMR)
Renewal of Authorisation 173	2008	Department of Primary Industries (DMR)
Mining Operation Plan 2013	30/10/2013	Division of Resources and Energy (DRE)
Coal Lease 229	28/05/2003	Department of Primary Industries (DMR)
Mining Lease ML 1531	26/02/2003	Department of Primary Industries (DMR)
Ministerial Approval of an Emplacement Area	22/09/2004	Department of Primary Industries (DMR)
Anglo Sub Lease	29/01/2008	Department of Primary Industries (DMR)
Ministerial Approval of an Emplacement Area	28/10/2011	Department of Primary Industries (DMR)
<b>Current Licence Conditions</b>		
Environmental Protection Licence 1323	5/10/2013	NSW Environmental Protection Authority
Bore Licence 20BL111869	23/04/2000	Department Land & Water Conservation
Bore Licence 20BL122620	24/05/1997	Department Land & Water Conservation
Bore Licence 20BL171956	27/08/2008	Department of Water and Energy
Bore Licence 20BL171957	27/08/2008	Department of Water and Energy
Bore Licence 20BL171958	23/02/2010	NSW Office of Water
Bore Licence 20BL171955	27/08/2008	Department of Water and Energy
Bore Licence 20BL171954	27/08/2008	Department of Water and Energy
Bore Licence 20BL171953	27/08/2008	Department of Water and Energy
Licence to Store Explosives	22/11/2011	Work Cover NSW

Hunter River Salinity Trading Scheme	Nov 1998	Department Environment & Climate Change (EPA)
<b>Other Agreements</b>		
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	Macquarie Generation
Agreement to Access & Occupy Property (Far East Tip)	04/06/2001	Macquarie Generation
Licence Agreement with Muswellbrook Pistol Club	Aug 2001	Drayton Coal Pty Ltd

## Appendix B: 2013 Water Sampling Results

Table 48: 2013 Surface Water Results

Site	Date	Electrical Conductivity µS/cm	pH	TDS mg/L	NFR mg/L	Calcium mg/L	Magnesium mg/L	Chloride mg/L	Sulphate mg/L	Bicarbonate mg/L	Sodium mg/L	Potassium mg/L
<b>1609</b>	Jan	7060	8.10	6910	17	519	593	695	3900	148	704	62
	Feb	7310	8.10	6460	20	486	599	654	3690	160	641	68
	Mar	7240	8.10	6610	10	491	581	661	3470	154	637	78
	Apr	7530	8.00	6300	10	504	562	653	3630	162	602	69
	May	7450	8.00	6710	52	526	612	686	3790	168	686	72
	Jun	7440	8.10	5360	4	520	576	652	3830	170	610	75
	Jul	7240	8.10	5880	5	516	596	674	3520	166	655	73
	Aug	7360	8.20	7070	5	528	620	692	3710	173	678	73
	Sep	7700	8.20	6900	108	510	610	714	3810	140	667	74
	Oct	8020	8.30	6480	5	511	619	714	3720	172	641	88
	Nov	6210	9.00	5790	20	419	516	583	3140	41	563	74
	Dec	7310	8.40	6540	5	498	578	702	3800	123	596	84
Average		7323	8.22	6418	22	502	589	673	3668	148	640	74
<b>1969</b>	Jan	4400	8.00	3360	5	268	298	536	1880	137	493	31
	Feb	5760	8.10	4650	6	321	393	617	2330	198	547	42
	Mar	5550	8.00	4600	54	337	371	597	2410	204	532	48
	Apr	4920	8.40	3220	6	59	250	579	1220	524	681	22



	May	6100	8.10	5150	44	393	424	656	2590	292	637	46
	Jun	6480	8.10	5660	4	365	438	649	2850	320	593	53
	Jul	6220	8.20	5330	32	371	457	660	2760	293	649	53
	Aug	6520	8.20	5640	6	386	496	718	2760	387	709	58
	Sep	6740	8.10	5810	51	380	473	735	2780	329	662	56
	Oct	6970	7.90	5620	28	375	492	737	2700	345	684	69
	Nov	5150	8.10	4140	6	333	368	509	2170	193	496	47
	Dec	6120	8.30	5340	23	368	405	650	2470	220	574	56
	Average	5911	8.13	4877	22	330	405	637	2410	287	605	48

<b>2090</b>	Jan	857	5.70	632	26	70	43	45	365	7	41	11
	Feb	2090	5.90	1850	30	191	158	75	1080	11	30	30
	Mar	1430	7.40	1110	8	106	88	60	572	106	68	24
	Apr	1540	7.50	1170	30	122	98	63	570	153	74	21
	May	1690	7.30	1190	28	131	118	78	648	166	83	25
	Jun	1580	7.60	941	10	110	94	77	555	151	78	27
	Jul	1570	7.50	1090	14	109	99	98	554	155	78	32
	Aug	1860	7.60	1330	8	139	126	124	624	215	103	40
	Sep	2340	7.60	1710	35	165	157	148	800	272	126	47
	Oct	<i>Lost to Mining</i>										
	Average	2204	7.22	1655	21	159	150	145	896	142	129	32

<b>2109</b>	Jan	1700	7.10	1150	178	68	77	244	490	35	223	9
	Feb	3140	7.40	2180	10	124	148	410	945	53	391	12

	Mar	1400	7.50	914	12	51	52	190	34044	44	158	8
	Apr	2220	7.70	1470	8	72	79	302	568	73	276	9
	May	2790	7.70	1780	20	84	113	406	757	81	414	11
	Jun	2810	7.60	1600	10	85	100	399	677	52	361	10
	Jul	3370	7.60	2230	19	101	134	519	979	59	520	10
	Aug	4640	7.70	3240	7	138	195	693	1400	84	743	13
	Sep	5320	7.80	3970	6	162	213	760	1530	88	802	15
	Oct	6520	7.80	4550	7	172	248	896	1850	134	865	18
	Nov	1030	7.10	696	22	35	30	136	263	27	122	6
	Dec	1780	7.50	1120	10	58	59	248	430	48	213	9
	Average	3060	7.54	2075	26	96	121	434	3661	65	424	11

<b>2114</b>	Jan	2860	7.60	2210	19	186	179	296	1300	67	281	19
	Feb	4390	8.10	3590	5	300	297	424	1940	114	422	31
	Mar	6970	8.20	6310	8	450	542	731	3910	158	654	69
	Apr	7340	8.20	6050	10	461	498	724	3260	189	627	58
	May	6760	8.10	5820	48	463	518	689	3300	173	652	61
	Jun	5690	8.20	2840	4	391	456	540	2860	158	582	56
	Jul	6680	8.20	4660	5	461	521	670	3190	182	640	62
	Aug	7050	8.20	6590	5	496	553	725	3480	192	698	62
	Sep	7420	8.20	6740	5	478	551	728	3550	147	690	62
	Oct	7900	8.20	6820	9	461	572	760	3550	195	637	80
	Nov	4950	8.20	4080	9	335	354	474	2170	114	453	43
	Dec	6430	8.30	5410	9	420	460	651	3160	131	560	59

Average	6203	8.14	5093	11	409	458	618	2973	152	575	55
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<b>2221</b>	Jan	1650	7.40	1050	15	42	57	276	392	61	247	10
	Feb	1930	7.80	1200	5	48	63	298	375	127	266	12
	Mar	1360	7.30	822	16	34	42	194	256	87	176	10
	Apr	1430	7.90	874	11	37	43	209	258	113	192	9
	May	1510	7.82	843	12	43	50	225	274	127	218	10
	Jun	1480	7.90	831	4	44	46	210	266	123	190	11
	Jul	1400	8.10	779	5	40	46	217	259	126	200	10
	Aug	1500	8.30	804	5	42	49	231	266	147	218	10
	Sep	1590	8.90	914	5	38	52	236	273	119	226	11
	Oct	1800	9.20	985	5	20	49	264	285	89	229	10
	Nov	1270	7.20	829	10	36	41	180	288	54	174	9
	Dec	1440	7.70	876	9	36	42	209	297	99	182	14
	Average	1530	7.96	901	9	38	48	229	291	106	210	11

<b>1895</b>	Jan	4440	8.70	3040	5	42	264	604	1310	356	800	18
	Feb	4830	8.70	3260	6	43	278	577	1270	361	706	21
	Mar	4460	8.40	3050	5	51	241	555	1180	449	659	25
	Apr	1620	8.40	5050	57	383	378	623	2310	268	541	42
	May	4850	8.30	3470	30	68	278	612	1220	551	744	24
	Jun	4900	8.40	3090	4	69	290	580	1340	516	737	24
	Jul	4840	8.40	3280	5	69	271	603	1320	511	777	23
	Aug	5080	8.60	2860	5	80	300	665	1400	526	845	24

	Sep	5410	8.80	3830	5	65	293	669	1340	430	818	23
	Oct	5780	8.90	3590	5	40	298	696	1450	448	800	26
	Nov	4520	9.00	2860	6	42	259	569	1290	261	700	20
	Dec	5300	8.90	3640	5	37	282	675	1500	338	787	28
	Average	4669	8.63	3418	12	82	286	619	1411	418	743	25

<b>2081</b>	Jan	6690	8.00	5860	8	474	541	706	3550	191	664	60
	Feb	6870	8.10	5540	6	489	554	664	3320	<1	625	67
	Mar	6500	8.10	5920	6	430	496	671	3100	154	575	70
	Apr	6840	8.20	5530	11	444	476	644	3040	180	553	59
	May	6830	8.30	5340	40	467	534	683	3290	174	646	65
	Jun	6720	8.30	5560	7	424	488	650	3100	200	583	64
	Jul	6680	8.10	4650	5	451	522	669	3200	201	625	65
	Aug	6840	8.20	6290	61	477	567	716	3270	203	682	70
	Sep	7080	8.10	4870	6	433	531	719	3240	171	640	65
	Oct	7540	8.10	6040	17	434	540	732	3350	210	592	78
	Nov	5920	7.50	4400	46	370	451	597	2430	137	548	64
	Dec	6850	8.20	6350	5	444	515	688	3380	167	577	78
	Average	6780	8.10	5529	18	445	518	678	3189	181	609	67

**Table 49: 2013 Piezometer Results**

Drill Number	Date	Water Level (m)	pH	Electrical Conductivity	Salinity	Total Dissolved Solids
<b>F1024</b>	January	<i>No water – unable to sample.</i>				
	February	179.07	6.16	280	141	184
	Mar - Dec	<i>No water – unable to sample.</i>				
	Average	179.07	6.16	280	141	184

<b>F1162</b>	Jan – Dec	<i>Too deep – unable to sample</i>				
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<b>F1163</b>	Jan - Feb	<i>No water – unable to sample.</i>				
	March	177.37	6.85	2530	1220	1720
	Apr - Aug	<i>No water – unable to sample.</i>				
	September	177.43	6.96	1225	842	844
	October	<i>No water – unable to sample.</i>				
	November	<i>Unsafe to access due to wet weather – unable to sample.</i>				
	December	<i>No water – unable to sample.</i>				
	Average	177.40	6.91	1878	1031	2564

<b>F1164</b>	Jan – Dec	<i>Too deep – unable to sample</i>				
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<b>F1167</b>	January	170.29	6.64	905	441	629
	February	170.31	6.56	669	361	526
	March	170.23	9.00	460	231	340
	April	169.96	6.70	792	385	553
	May	169.62	6.58	507	<i>Borrowed probe – Salinity and TDS not available.</i>	
	June	168.80	6.65	874	410	598
	July	169.33	6.56	1213	553	809
	August	169.32	6.56	1345	634	900
	September	169.11	6.46	905	453	683
	October	168.72	6.65	1427	699	995
	November	168.57	5.94	396	279	266
	December	168.40	6.21	684	315	476

Average	169.39	6.71	848	433	616
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<b>F1168</b>	January	164.10	7.21	1420	-	994
	February	164.08	7.28	5130	2550	3580
	Mar - May	<i>Issues with sampling equipment – unable to sample.</i>				
	June	163.72	7.10	3690	1920	1930
	July	163.50	7.13	4040	2010	2820
	August	163.37	7.06	3900	2690	3500
	September	163.12	7.60	3580	1017	2000
	October	162.73	7.15	3220	1610	2140
	November	162.60	7.20	3480	2020	2630
	December	162.00	7.49	3420	580	2390
	Average	163.25	7.25	3542	1800	2443

<b>R4220</b>	January	186.75	7.25	3430	1680	2300
	February	186.35	7.26	3480	1700	2420
	Mar - Apr	<i>Issues with sampling equipment – unable to sample.</i>				
	May	186.02	7.90	2165	<i>Borrowed probe – Salinity and TDS not available.</i>	
	June	183.57	7.32	3670	1940	2590
	Jul - Dec	<i>Lost to mining.</i>				
	Average	185.67	7.43	3186	1773	2437

<b>R4224</b>	January	<i>Inaccessible.</i>				
	February	<i>No water – unable to sample.</i>				
	Mar - Apr	<i>Issues with sampling equipment – unable to sample.</i>				
	May	120.78	6.93	3020	<i>Borrowed probe – Salinity and TDS not available.</i>	
	June	126.09	7.07	2860	2050	2000
	July	122.78	7.48	4780	1960	3000
	Aug - Dec	<i>Lost to mining.</i>				
	Average	123.22	7.16	3553	2005	2500

<b>R4241</b>	January	181.27	7.22	3980	1840	2700
	February	182.78	7.21	3610	2630	2660
	Mar - Apr	<i>Issues with sampling equipment – unable to sample.</i>				

May	180.85	6.84	2960	<i>Borrowed probe – Salinity and TDS not available.</i>	
June	180.42	7.14	3880	1680	2520
July	180.31	7.29	4800	1410	2980
August	<i>Bailer lost down piezometer – unable to sample.</i>				
September	177.71	7.13	2890	1740	2200
October	176.28	7.16	3060	1780	2070
November	177.82	7.21	3340	1550	233
December	177.29	7.46	3480	1570	2080
Average	179.41	7.18	3556	1775	2180

<b>R4243</b>	January	221.91	6.88	1940	965	1367
	February	223.93	6.91	1851	901	1288
	Mar - Apr	<i>Issues with sampling equipment – unable to sample.</i>				
	May	223.82	6.69	1325	<i>Borrowed probe – Salinity and TDS not available.</i>	
	June	222.56	6.85	206	1040	1155
	Jul - Dec	<i>Lost to mining.</i>				
	Average	223.06	6.83	1331	969	1270

<b>W1102</b>	January	178.10	6.73	1101	5350	7480
	February	178.44	7.01	8400	4160	5880
	March	178.68	7.03	2600	1060	1550
	April	<i>Issues with sampling equipment – unable to sample.</i>				
	May	178.30	6.97	561	<i>Borrowed probe – Salinity and TDS not available.</i>	
	June	178.44	6.90	3880	1920	2750
	July	178.52	7.08	3710	1990	2600
	August	178.29	6.96	3790	2400	2650
	September	178.38	7.06	3500	1820	2450
	October	178.14	6.99	3410	1520	2230
	November	<i>Unsafe to access due to wet weather – unable to sample.</i>				
	December	178.48	7.45	3260	1290	2590
	Average	178.38	7.02	3421	2390	3353

## Appendix C: 2013 Dust Sampling Results

**Table 50: Depositional Dust Gauge Results**

Site Number	Period	Ash Content (g/m <sup>2</sup> .month)	Combustible Matter (g/m <sup>2</sup> .month)	Total Insoluble Matter (g/m <sup>2</sup> .month)	Total Solids (g/m <sup>2</sup> .month)	Comments
<b>2130</b>	January	2.2	0.9	3.1	4.7	Dust and insects present.
	February	1.7	0.8	2.5	2.9	Clear with dust and insects.
	March	0.9	0.7	1.5	1.6	Plant matter present.
	April	2.2	1.1	3.3	3.5	Slightly turbid with dust and insects.
	May	1.3	0.9	2.2	2.8	Dust, insects and algae present.
	June	0.9	0.3	1.2	1.7	Dust and insects present.
	July	0.7	0.3	1.0	1.0	Clear with dust and insects.
	August	0.9	0.2	1.1	1.2	Dust, insects and algae present.
	September	2.1	2.0	4.0	6.2	Grasshopper, mold and rubber stopper.
	October	2.3	0.6	2.9	3.3	Clear with dust and insects.
	November	1.8	0.8	2.6	4.7	Dust and plant matter present.
	December	1.0	0.5	1.5	2.2	Dust and plant matter present.
Average		1.5	0.7	2.2	3.0	
<b>2157</b>	January	2.1	1.4	3.5	3.7	Plant matter and insects present.
	February	1.2	0.6	1.8	2.1	Clear with dust, insects and plant matter.
	March	0.9	0.7	1.5	2.5	Dust and insects present.
	April	1.6	0.7	2.4	2.4	Dust, insects and plant matter present.



	May	1.6	0.5	2.1	2.2	Dust, insects and algae present.
	June	1.4	0.5	1.9	2.2	Dust and insects present.
	July	0.6	0.3	0.8	0.8	Clear with dust and insects.
	August	1.4	2.1	3.5	3.8	Dust, insects and algae present.
	September	1.3	0.7	2.0	2.2	Dust, insects, plant matter and mold present.
	October	2.1	1.1	3.2	3.3	Dust, insects, plant matter and algae present.
	November	1.6	0.6	2.3	2.6	Dust, insects and plant matter present.
	December	1.9	1.2	3.1	3.7	Dust and insects present.
	Average	1.5	0.9	2.3	2.6	

<b>2175</b>	January	1.9	0.9	2.7	3.2	Dust, insects and plant matter present.
	February	1.3	0.4	1.7	2.5	Clear with dust and insects.
	March	1.0	0.6	1.6	1.7	Clear with dust and insects.
	April	1.5	0.5	2.0	2.0	Dust and insects present.
	May	1.3	0.4	1.8	1.8	Dust and insects present.
	June	1.0	0.2	1.2	1.5	Dust and insects present.
	July	0.5	0.2	0.7	0.7	Clear with dust and insects.
	August	1.0	0.3	1.3	1.5	Dust, insects and plant matter present.
	September	1.4	0.4	1.7	1.7	Dust and insects present.
	October	2.0	0.5	2.4	2.5	Clear with dust and insects.
	November	1.8	6.3	8.1	11.1	Brown and turbid with dust, insects and plant matter.
	December	1.2	0.3	1.5	2.9	Dust and insects present.
	Average	1.3	0.9	2.2	2.8	

<b>2197</b>	January	3.9	3.0	6.9	8.7	Dust, insects, plant matter and algae present. Funnel damaged.
	February	2.5	1.2	3.7	15.2	Clear with dust and insects.
	March	3.0	1.9	4.9	5.0	Dust and bird droppings present.
	April	3.2	1.8	5.0	5.0	Dust and plant matter present.
	May	4.7	1.2	5.9	6.4	Dust and insects present.
	June	2.8	0.9	3.7	4.7	Dust and insects present.
	July	0.9	0.4	1.3	1.5	Clear with dust and insects.
	August	1.6	0.6	2.2	2.4	Grey with dust, insects, plant matter and algae present.
	September	2.3	1.2	3.5	4.5	Dust and ants present.
	October	2.7	1.2	4.0	4.8	Clear with dust and insects.
	November	1.8	0.8	2.5	3.0	Clear with dust and insects.
	December	1.9	1.1	3.0	4.0	Dust, insects and plant matter present.
	Average	2.6	1.3	3.9	5.4	

<b>2208</b>	January	2.3	1.1	3.4	5.0	Dust, insects and a spider present.
	February	1.2	0.3	1.5	1.6	Clear with dust and insects.
	March	0.7	0.7	1.3	1.4	Dust and insects present.
	April	1.4	0.6	2.0	1.9	Dust and insects present.
	May	1.4	0.3	1.6	1.7	Dust, insects and algae present.
	June	1.0	0.2	1.2	1.7	Dust and insects present.
	July	0.5	0.1	0.6	0.8	Clear with dust and algae present.

	August	0.9	0.1	1.0	1.1	Dust and insects present.
	September	1.3	0.4	1.6	1.6	Dust and insects present.
	October	2.0	0.6	2.7	2.8	Clear with dust and insects.
	November	1.4	0.6	2.0	2.5	Dust and insects present.
	December	1.1	0.2	1.3	2.1	Dust and insects present.
	Average	1.3	0.4	1.7	2.0	

<b>2230</b>	January	2.3	1.1	3.5	3.5	Dust and insects present.
	February	1.4	0.7	2.1	2.2	Clear with dust, insects and plant matter.
	March	1.4	0.6	2.0	2.1	Dust and insects present.
	April	1.4	0.7	2.1	2.1	Dust and spiders present.
	May	2.3	0.6	2.9	3.3	Dust and insects present.
	June	2.0	0.5	2.5	2.8	Dust and insects present.
	July	0.5	0.1	0.6	0.9	Clear with dust, insects and algae present.
	August	2.1	6.2	8.3	9.9	Grey with dust, mold, algae and insects present.
	September	1.9	0.6	2.6	2.6	Dust and insects present.
	October	2.7	1.1	3.7	4.1	Clear with dust, insects and plant matter.
	November	1.8	1.0	2.8	3.1	Dust, insects and plant matter present.
	December	1.5	0.6	2.2	3.0	Dust and insects present.
	Average	1.8	1.2	2.9	3.3	

<b>2235</b>	January	2.6	0.9	3.4	3.4	Dust and insects present.
	February	1.7	0.4	2.1	2.3	Clear with dust and insects.
	March	0.9	0.7	1.5	1.6	Clear with dust and insects.

	April	1.9	0.6	2.5	2.4	Dust and plant matter present.
	May	1.3	0.6	1.9	2.3	Dust, insects, algae and a spider present.
	June	1.3	0.4	1.7	2.4	Dust and insects present.
	July	0.3	0.2	0.5	1.2	Dust, insects, plant matter and algae present.
	August	1.1	0.4	1.5	1.6	Dust, insects, plant matter and algae present.
	September	1.4	0.4	1.7	2.0	Dust and insects present.
	October	3.2	1.6	4.8	4.9	Clear with dust and insects.
	November	1.4	0.6	2.0	4.2	Dust, insects and plant matter present.
	December	1.5	0.7	2.2	2.9	Dust and insects present.
	Average	1.5	0.6	2.1	2.6	

<b>2247</b>	January	2.1	1.2	3.2	3.8	Dust, insects and plant matter present.
	February	1.2	0.5	1.7	1.9	Clear with dust, insects and plant matter.
	March	0.9	0.9	1.8	1.9	Clear with dust.
	April	1.4	0.5	2.0	1.9	Clear with dust.
	May	1.5	0.5	2.0	2.1	Dust, insects and algae present.
	June	1.2	0.0	1.2	1.5	Dust and a spider present.
	July	0.7	0.3	0.9	1.5	Dust, algae, spiders and mold present.
	August	1.1	0.2	1.3	1.4	Dust and insects present.
	September	1.8	0.5	2.2	2.4	Dust and insects present.
	October	2.3	0.6	2.8	2.9	Clear with dust and insects.
	November	1.5	0.6	2.2	4.1	Dust and insects present.
	December	1.5	0.6	2.0	3.1	Dust and insects present.
	Average	1.4	0.5	2.0	2.4	

**Table 51: TEOM Real Time PM10 Monitoring Results**

January	PM10 24Hr Av $\mu\text{g}/\text{m}^3$	February	PM10 24Hr Av $\mu\text{g}/\text{m}^3$
1/01/2013	21.4	1/02/2013	27.5
2/01/2013	22.4	2/02/2013	5.3
3/01/2013	29.3	3/02/2013	-
4/01/2013	22.2	4/02/2013	8.1
5/01/2013	27	5/02/2013	16.4
6/01/2013	28	6/02/2013	13.5
7/01/2013	19.1	7/02/2013	15.8
8/01/2013	23.6	8/02/2013	21.5
9/01/2013	21.5	9/02/2013	23.7
10/01/2013	34.5	10/02/2013	27.2
11/01/2013	28.6	11/02/2013	17.3
12/01/2013	37.6	12/02/2013	10.3
13/01/2013	32.5	13/02/2013	<i>Power outage.</i>
14/01/2013	16.8	14/02/2013	<i>Power outage.</i>
15/01/2013	13	15/02/2013	5.6
16/01/2013	18.2	16/02/2013	8.2
17/01/2013	36.1	17/02/2013	10.1
18/01/2013	36.8	18/02/2013	13.5
19/01/2013	34.5	19/02/2013	13.2
20/01/2013	16.7	20/02/2013	16.4
21/01/2013	12.3	21/02/2013	13.1
22/01/2013	16.6	22/02/2013	14.7
23/01/2013	15.2	23/02/2013	9
24/01/2013	18.2	24/02/2013	7.4
25/01/2013	13.5	25/02/2013	15.5
26/01/2013	12.8	26/02/2013	15.9
27/01/2013	13.6	27/02/2013	17.4
28/01/2013	4	28/02/2013	16
30/01/2013	14.2		
31/01/2013	19		

March	PM10 24Hr Av $\mu\text{g}/\text{m}^3$
1/03/2013	4.2
2/03/2013	2.4
3/03/2013	6.3
4/03/2013	13.4
5/03/2013	15.6
6/03/2013	16.5
7/03/2013	15.8
8/03/2013	15.7
9/03/2013	14.3
10/03/2013	13.9
11/03/2013	15.5
12/03/2013	16.1
13/03/2013	20.3
14/03/2013	30.2
15/03/2013	33.8
16/03/2013	21
17/03/2013	24
18/03/2013	20.1
19/03/2013	22.4
20/03/2013	17.5
21/03/2013	14
22/03/2013	14.2
23/03/2013	11.9
24/03/2013	12.3
25/03/2013	15.7
26/03/2013	29.1
27/03/2013	24.6
28/03/2013	18.1
29/03/2013	10.9
30/03/2013	18.1
31/03/2013	18.8

April	PM10 24Hr Av $\mu\text{g}/\text{m}^3$
1/04/2013	17.1
2/04/2013	14
3/04/2013	17.7
4/04/2013	13.5
5/04/2013	10.3
6/04/2013	12
7/04/2013	10.8
8/04/2013	10.9
9/04/2013	14.4
10/04/2013	12.1
11/04/2013	11.8
12/04/2013	16.7
13/04/2013	12.8
14/04/2013	18.2
15/04/2013	26.2
16/04/2013	24.6
17/04/2013	13.5
18/04/2013	18.8
19/04/2013	16.1
20/04/2013	13.5
21/04/2013	6.6
22/04/2013	15.5
23/04/2013	16.9
24/04/2013	13.6
25/04/2013	23.1
26/04/2013	6.1
27/04/2013	8
28/04/2013	13.4
29/04/2013	15.9
30/04/2013	36.6

May	PM10 24Hr Av $\mu\text{g}/\text{m}^3$
1/05/2013	23.3
2/05/2013	18.6
3/05/2013	13.9
4/05/2013	15.1
5/05/2013	31.7
6/05/2013	25.9
7/05/2013	19.6
8/05/2013	14.7
9/05/2013	13.3
10/05/2013	18.6
11/05/2013	20.9
12/05/2013	17.9
13/05/2013	16.6
14/05/2013	9.3
15/05/2013	2.6
16/05/2013	6.9
17/05/2013	6.6
18/05/2013	7.8
19/05/2013	5.1
20/05/2013	6.2
21/05/2013	9.3
22/05/2013	28.9
23/05/2013	13.6
24/05/2013	-
25/05/2013	7.9
26/05/2013	7.2
27/05/2013	11.2
28/05/2013	12.5
29/05/2013	9.7
30/05/2013	14.4
31/05/2013	7.6

June	PM10 24Hr Av $\mu\text{g}/\text{m}^3$
1/06/2013	7.1
2/06/2013	4.6
3/06/2013	6.3
4/06/2013	8.5
5/06/2013	11.7
6/06/2013	10.7
7/06/2013	9.4
8/06/2013	10.1
9/06/2013	10.1
10/06/2013	10.8
11/06/2013	5
12/06/2013	9.3
13/06/2013	3.5
14/06/2013	1.8
15/06/2013	2.8
16/06/2013	5
17/06/2013	3.7
18/06/2013	4.7
19/06/2013	9.1
20/06/2013	16.4
21/06/2013	21.1
22/06/2013	12.6
23/06/2013	10.8
24/06/2013	9.9
25/06/2013	5.6
26/06/2013	8.3
27/06/2013	10.7
28/06/2013	7.2
29/06/2013	5.6
30/06/2013	4.2

July	PM10 24Hr Av $\mu\text{g}/\text{m}^3$
1/07/2013	6.5
2/07/2013	10.8
3/07/2013	11.3
4/07/2013	10.9
5/07/2013	6.9
6/07/2013	6.9
7/07/2013	8.3
8/07/2013	6.8
9/07/2013	13.5
10/07/2013	16.1
11/07/2013	17.4
12/07/2013	13.1
13/07/2013	8.8
14/07/2013	14.8
15/07/2013	15.1
16/07/2013	9
17/07/2013	8.3
18/07/2013	9.8
19/07/2013	12.1
20/07/2013	3.5
21/07/2013	4.3
22/07/2013	5.2
23/07/2013	7.2
24/07/2013	8.5
25/07/2013	17.7
26/07/2013	17.5
27/07/2013	11
28/07/2013	17.3
29/07/2013	15.5
30/07/2013	8.4
31/07/2013	11.8

August	PM10 24Hr Av $\mu\text{g}/\text{m}^3$
1/08/2013	15.7
2/08/2013	15.1
3/08/2013	10.4
4/08/2013	8.2
5/08/2013	12.1
6/08/2013	10.5
7/08/2013	10.2
8/08/2013	8.4
9/08/2013	6.4
10/08/2013	4.6
11/08/2013	6.8
12/08/2013	11
13/08/2013	8.1
14/08/2013	6.8
15/08/2013	8.9
16/08/2013	14.9
17/08/2013	21.1
18/08/2013	11.1
19/08/2013	5.9
20/08/2013	9.3
21/08/2013	10.7
22/08/2013	8
23/08/2013	8.6
24/08/2013	9.1
25/08/2013	7.6
26/08/2013	6.3
27/08/2013	12.1
28/08/2013	28
29/08/2013	28.5
30/08/2013	38.7
31/08/2013	24.3



September	PM10 24Hr Av $\mu\text{g}/\text{m}^3$
1/09/2013	27.5
2/09/2013	23.9
3/09/2013	24.2
4/09/2013	8.7
5/09/2013	-
6/09/2013	13.5
7/09/2013	18.8
8/09/2013	31.4
9/09/2013	27.1
10/09/2013	24.1
11/09/2013	19.8
12/09/2013	16.3
13/09/2013	19.5
14/09/2013	20.5
15/09/2013	<i>Power outage.</i>
16/09/2013	<i>Power outage.</i>
17/09/2013	5.7
18/09/2013	3.3
19/09/2013	6.7
20/09/2013	9.6
21/09/2013	11.2
22/09/2013	11.2
23/09/2013	17.1
24/09/2013	20
25/09/2013	20.2
26/09/2013	19.4
27/09/2013	21.2
28/09/2013	25.1
29/09/2013	21.9
30/09/2013	15.8

October	PM10 24Hr Av $\mu\text{g}/\text{m}^3$
1/10/2013	12.3
2/10/2013	3.6
3/10/2013	9.7
4/10/2013	9.9
5/10/2013	14.3
6/10/2013	15.6
7/10/2013	18.8
8/10/2013	32.7
9/10/2013	18.6
10/10/2013	13.2
11/10/2013	27.1
12/10/2013	30.6
13/10/2013	40.4
14/10/2013	18.6
15/10/2013	28.5
16/10/2013	17.6
17/10/2013	23.5
18/10/2013	35.5
19/10/2013	43.4
20/10/2013	33.5
21/10/2013	56.3
22/10/2013	22.9
23/10/2013	39.5
24/10/2013	19.5
25/10/2013	30.7
26/10/2013	39
27/10/2013	36.4
28/10/2013	37.3
29/10/2013	40.8
30/10/2013	19.3
31/10/2013	19.9

November	PM10 24Hr Av $\mu\text{g}/\text{m}^3$
1/11/2013	23.2
2/11/2013	19.4
3/11/2013	26.6
4/11/2013	33.3
5/11/2013	27.3
6/11/2013	30.7
7/11/2013	28
8/11/2013	72.4
9/11/2013	30
10/11/2013	24.8
11/11/2013	3.1
12/11/2013	3.6
13/11/2013	6.2
14/11/2013	17.5
15/11/2013	20.2
16/11/2013	16.1
17/11/2013	7
18/11/2013	4.1
19/11/2013	4.3
20/11/2013	18.8
21/11/2013	18.7
22/11/2013	7.6
23/11/2013	0.3
24/11/2013	4.5
25/11/2013	14.8
26/11/2013	29.2
27/11/2013	39.7
28/11/2013	24.7
29/11/2013	21
30/11/2013	13.3

December	PM10 24Hr Av $\mu\text{g}/\text{m}^3$
1/12/2013	13.4
2/12/2013	12.1
3/12/2013	13.7
4/12/2013	14.6
5/12/2013	13.8
6/12/2013	10.5
7/12/2013	17.2
8/12/2013	22.9
9/12/2013	38.1
10/12/2013	22.4
11/12/2013	35.3
12/12/2013	37.8
13/12/2013	30
14/12/2013	27.6
15/12/2013	24.5
16/12/2013	18.4
17/12/2013	18.8
18/12/2013	20.1
19/12/2013	20.1
20/12/2013	24
21/12/2013	27.5
22/12/2013	34.2
23/12/2013	20.1
24/12/2013	23.3
25/12/2013	13.8
26/12/2013	8
27/12/2013	6.9
28/12/2013	12.1
29/12/2013	21.6
30/12/2013	33.6
31/12/2013	28.6

**Table 52: High Volume Air Sampler Results**

Lot 22	
Start Date	Particulate Matter $\mu\text{g}/\text{m}^3$
03-Jan-13	79.00
09-Jan-13	110
15-Jan-13	61
21-Jan-13	50
27-Jan-13	39
02-Feb-13	24
08-Feb-13	63
14-Feb-13	46
20-Feb-13	52
26-Feb-13	51
04-Mar-13	33
10-Mar-13	54
16-Mar-13	50
22-Mar-13	37
28-Mar-13	69
03-Apr-13	49
09-Apr-13	45
15-Apr-13	67
21-Apr-13	38
27-Apr-13	44
03-May-13	57
09-May-13	51
15-May-13	76
21-May-13	46
27-May-13	33
02-Jun-13	21
08-Jun-13	36
14-Jun-13	14
20-Jun-13	55
26-Jun-13	33
02-Jul-13	29
08-Jul-13	21

<b>14-Jul-13</b>	<b>38</b>
<b>20-Jul-13</b>	<b>25</b>
<b>26-Jul-13</b>	<b>28</b>
<b>01-Aug-13</b>	<b>39</b>
<b>07-Aug-13</b>	<b>65</b>
<b>13-Aug-13</b>	<b>29</b>
<b>19-Aug-13</b>	<b>55</b>
<b>25-Aug-13</b>	<b>71</b>
<b>31-Aug-13</b>	<b>76</b>
<b>06-Sep-13</b>	<b>68</b>
<b>12-Sep-13</b>	<b>89</b>
<b>18-Sep-13</b>	<b>19</b>
<b>24-Sep-13</b>	<b>81</b>
<b>30-Sep-13</b>	<b>36</b>
<b>06-Oct-13</b>	<b>48</b>
<b>12-Oct-13</b>	<b>72</b>
<b>18-Oct-13</b>	<b>118</b>
<b>24-Oct-13</b>	<b>84</b>
<b>30-Oct-13</b>	<b>76</b>
<b>05-Nov-13</b>	<b>97</b>
<b>11-Nov-13</b>	<b>52</b>
<b>17-Nov-13</b>	<b>43</b>
<b>23-Nov-13</b>	<b>18</b>
<b>29-Nov-13</b>	<b>39</b>
<b>05-Dec-13</b>	<b>58</b>
<b>11-Dec-13</b>	<b>109</b>
<b>17-Dec-13</b>	<b>70</b>
<b>23-Dec-13</b>	<b>110</b>
<b>29-Dec-13</b>	<b>87</b>

## Appendix D: 2013 Noise Monitoring Results

**Table 53: Supplementary Noise Monitoring Results**

de Boer	Date	Time	MAX	LEQ	L1	L10	L50	L90	Comments
	04/01/2013	09:40	52.3	29.7	34.2	31.4	29.3	27.1	40% birds, 40% insects, 20%traffic on New England Highway, mine inaudible.
	07/01/2013	12:15	49.2	33.6	38.5	35.9	32.9	30.5	50% insects, 35% traffic on New England Highway, 15% wind in trees, mine inaudible.
	18/01/2013	09:50	61.3	43.1	47.5	45.3	42.6	40.0	40% wind in trees, 40% traffic, 10% birds, 10% insects.
	25/01/2013	08:35	56.9	33.2	42.0	35.7	30.8	28.1	60% birds, 40% traffic.
	29/01/2013	15:57	61.1	34.5	40.9	38.1	32.1	29.2	40% insects, 35% traffic, 25%birds.
	06/02/2013	07:55	60.3	38.0	46.1	40.5	36.1	33.1	35% traffic, 35% birds, 30% insects.
	15/02/2013	08:15	59.3	38.0	46.3	39.9	36.6	34.9	60% traffic, 40% birds.
	25/02/2013	15:40	57.3	41.9	48.1	46.0	39.2	36.0	40% birds, 40% traffic and 20% insects. Wind speed was recorded as >3m/s however, it was not windy at the residence.
	06/03/2013	09:10	63.6	41.0	52.0	42.5	37.5	34.5	50%birds, 35%traffic, 10% insects and 5% trucks (mine?).
	12/03/2013	10:50	78.2	43.3	47.1	42.9	39.1	36.2	50% Mine Noise (machinery), 25% birds, 25% insects.
	22/03/2013	06:40	66.5	49.0	52.5	45.8	42.5	39.9	40%traffic, 40%birds, 10%insects, 10%wind.
	27/03/2013	06:20	65.6	40.6	46.6	41.8	39.7	37.4	60%Traffic, 35%Insect, 5%Birds.
	04/04/2013	12:05	66.8	36.5	43.0	38.3	35.3	32.9	70%Birds, 28%Traffic, 2%Wind.
	24/04/2013	14:41	59.3	34.1	40.7	35.6	33.2	30.3	70% wind, 10% traffic, 10% birds, 5% train, 5%resident (phone).
	03/05/2013	10:32	64.4	34.6	48.2	38.2	30.7	27.8	90% birds, 10% traffic.
	09/05/2013	15:50	61.1	36.5	43.8	38.3	35.1	32.7	75% birds, 25% traffic
	20/05/2013	17:05	72.2	40.3	46.9	42.6	38.8	34.4	10% birds and 90% traffic. A very quiet afternoon.

29/05/2013	16:07	63.5	37.2	48.0	38.3	33.8	31.0	65% birds, 25% traffic and 10% resident on phone.
04/06/2013	15:23	61.8	34.1	39.1	35.8	33.0	31.2	80% birds and 20% traffic.
13/06/2013	09:01	59.4	41.6	48.3	43.8	40.1	37.8	20% birds, 40% traffic and 40% machinery.
19/06/2013	16:03	58.9	39.5	47.4	41.8	37.9	35.9	50% traffic and 50% birds.
12/07/2013	16:20	62.1	35.7	43.8	36.5	34.2	31.9	60% traffic, 30% dirt bike, 10% birds
18/07/2013	15:10	65.9	31.9	38.3	32.9	28.8	26.3	70% bird and 30% traffic.
25/07/2013	08:05	75.8	48.0	59.4	46.8	43.3	41.2	60% Machinery and 40% birds
01/08/2013	13:00	60.6	34.8	43.4	36.5	32.6	30.4	40% birds, 40% traffic, 20% wind.
07/08/2013	09:40	69.6	37.3	45.6	37.3	33.0	30.4	80% birds, 15% machinery and 5% wind.
14/08/2013	08:50	57.9	39.2	42.8	40.6	39.0	37.5	60% machinery, 40% birds
22/08/2013	08:55	60.0	40.8	47.3	42.4	39.8	38.0	55% birds, 45% machinery (MAC?)
06/09/2013	09:00	59.9	40.5	49.1	41.5	39.0	37.6	50% birds, 50% machinery
09/09/2013	14:50	65.8	36.4	46.5	36.7	30.9	27.5	90% birds, 5% traffic, 5% neighbors tractor
24/09/2013	08:53	79.0	42.8	47.0	40.5	37.1	34.3	Birds 75%, Machinery 20%, Wind in leaves 5%
04/10/2013	08:53	67.7	37.7	44.5	36.4	33.2	31.9	50% birds, 40% machinery, 10% wind in leaves
15/10/2013	09:16	68.3	35.4	45.1	33.8	30.2	27.7	60% birds, 40% traffic
25/10/2013	09:42	73.2	42.5	55.5	39.0	30.5	27.9	70% birds, 30% machinery
29/10/2013	09:20	73.9	47.5	53.7	50.3	45.8	41.6	20% birds, 80% wind (wind speed >3m/s)
07/11/2013	15:45	63.7	31.4	38.0	33.0	29.7	27.2	70% birds, 15% traffic, 15% wind
21/11/2013	11:15	50.8	35.5	41.8	37.0	34.9	33.1	60% birds, 10% insects, 20% traffic, 10% wind
28/11/2013	08:52	62.4	34.8	40.9	36.1	33.8	32.6	70% birds, 25% machinery, 5% insects

Doherty	Date	Time	MAX	LEQ	L1	L10	L50	L90	Comments
	04/01/2013	08:05	59.7	34.7	43.3	37.2	32.6	29.6	70% birds, 20% traffic on Thomas Mitchel Drive, 10% dozer working at the Pistol Club, mine inaudible.
	07/01/2013	10:45	57.5	35.7	43.6	38.6	33.8	31.4	30% birds, 30% traffic, 30% insects, 10% wind in trees, mine inaudible.
	18/01/2013	07:58	48.5	32.6	41.8	36.7	26.6	24.8	30% birds, 25% insects, 25% traffic, 10% cattle, 5% dog barking, 5% sheep.
	25/01/2013	07:00	65.7	39.0	51.6	39.8	34.3	31.8	30% birds, 30% insects, 30% traffic, 5% cattle grazing, 5% car driving up driveway.
	29/01/2013	14:35	64.1	35.3	42.8	38.6	33.1	25.6	40% birds, 40% insects, 20% radio (playing at Doherty residence).
	06/02/2013	06:22	63.0	37.0	45.9	39.0	35.0	33.1	45% birds, 35% traffic, 10% insects, 10% train.
	15/02/2013	06:41	66.5	40.6	53.8	40.4	36.2	33.3	45% birds, 35% traffic, 20% insects.
	25/02/2013	08:00	56.4	36.0	45.6	38.1	34.3	32.3	50% Birds, 40% traffic and 10% insects.
	06/03/2013	07:30	67.9	48.0	59.0	49.5	46.0	43.5	60% birds*, 30% machinery (mine noise?), 10% insects. *Birds very active and audible.
	12/03/2013	09:05	61.3	34.0	44.3	36.7	29.0	25.8	60% birds, 30% traffic, 10% insects.
	22/03/2013	05:25	73.7	34.7	36.9	33.1	30.9	29.7	70% Insects, 25% Traffic, 5% wind.
	27/03/2013	05:15	53.7	39.1	42.3	40.4	38.9	37.6	60% Insects, 40% Mine Noise (reversing beepers and machinery). Very foggy.
	04/04/2013	10:35	55.6	36.0	43.1	37.7	35.1	33.3	60% Birds, 25% traffic, 13% Insects, 2% Power tools.
	24/04/2013	13:00	56.1	34.6	45.5	41.2	33.1	29.0	80% wind in trees, 15% birds, 5% TMD traffic.
	03/05/2013	08:50	67.5	36.7	48.5	38.2	28.6	24.8	99% birds, 1% dog barking.
	09/05/2013	14:45	57.2	34.3	41.9	37.2	32.4	35.3	90% birds, 10% insects. A very quiet day.
	20/05/2013	15:35	74.6	43.1	56.1	37.0	26.4	24.1	98% birds and 2% wind. A very quiet afternoon.
	29/05/2013	14:45	71.9	37.9	48.5	35.5	30.5	28.6	50% birds, 40% traffic, 10% noise from resident (shoveling gravel).

04/06/2013	13:53	61.0	33.7	43.9	35.1	31.6	34.6	60% birds, 35% traffic, 5% wind.
13/06/2013	07:32	68.0	40.5	54.7	39.1	33.7	31.1	70% birds, 20% machinery, 10% traffic.
19/06/2013	14:47	68.8	39.6	47.2	42.2	37.6	35.5	45% birds, 45% traffic and 10% noise from residence (radio).
12/07/2013	14:55	60.2	32.4	43.3	34.1	28.0	25.5	60% birds, 15% wind, 10% traffic, 10% mine, and 5% plane.
18/07/2013	13:50	75.4	42.8	54.4	36.8	24.2	20.4	60% birds, 20% plane and 20% dog barking.
25/07/2013	06:45	70.8	46.7	55.8	46.4	44.3	43.1	50% Machinery and beepers, 30% birds, 20% traffic
01/08/2013	13:22	58.0	33.7	43.7	34.7	31.7	29.9	80% birds, 15% traffic, 5% wind.
07/08/2013	08:12	67.7	42.5	55.4	43.8	35.8	33.1	65% birds, 35% machinery and beepers.
14/08/2013	07:27	64.2	41.3	51.4	43.0	38.7	36.4	70% birds, 20% machinery and 10% traffic.
22/08/2013	07:30	62.0	43.0	48.5	44.6	42.2	40.5	70% machinery, 25% birds, 5% cattle.
06/09/2013	07:25	62.1	41.5	49.6	43.3	39.7	37.9	50% birds, 50% machinery
09/09/2013	13:20	69.2	33.1	41.5	32.7	27.0	24.2	40% neighbors radio, 35% birds, 15% dog barking, 5% insects, 5% ride-on lawnmower
24/09/2013	07:25	70.4	41.2	50.2	41.5	37.9	35.5	Birds 35%, Traffic 15%, Machinery 25%, Cattle 25%
04/10/2013	07:30	68.5	42.9	54.6	43.1	39.1	37.7	60% birds and 40% machinery
15/10/2013	07:55	62.2	38.1	47.6	38.9	36.1	34.0	50% birds, 50% machinery
25/10/2013	08:20	49.6	29.6	37.7	32.0	28.0	26.7	70% birds, 20% tractor/lawn mower, 10% car down driveway
29/10/2013	07:50	63.8	41.5	48.7	44.2	39.8	36.6	60% machinery, 30% birds, 10% dog barking
07/11/2013	14:20	63.0	34.7	46.3	37.3	29.6	25.7	75% birds, 10% wind, 10% ride-on mower, 5% machinery
21/11/2013	09:45	62.5	38.7	50.4	40.9	33.7	30.8	80% birds, 10% traffic, 10% frogs
28/11/2013	07:35	71.3	41.1	48.9	41.1	36.1	34.0	50% birds, 50% machinery (beepers, tracked machinery)
13/12/2013	14:10	56.3	32.8	43.9	34.9	26.7	24.5	70% birds, 30% wind



Halloran	Date	Time	MAX	LEQ	L1	L10	L50	L90	Comments
	04/01/2013	09:15	64.9	46.1	57.9	48.0	33.1	28.0	80% Birds - loud cockatoos, 10% traffic on New England Highway, 5% Plane, 5% Cow, Mine inaudible
	07/01/2013	11:50	53.2	35.7	40.6	37.7	35.0	32.7	40% traffic, 10% Train, 40% Birds/Insects, 10% Wind in trees, Mine inaudible
	18/01/2013	09:27	63.5	44.6	52.5	47.4	42.9	39.9	80%wind, 15% power tools (neighbors renovating), 5%birds.
	25/01/2013	08:15	60.7	34.3	42.8	36.7	32.6	29.6	60%birds, 40%traffic.
	29/01/2013	15:38	64.8	37.9	43.6	40.0	37.8	31.4	0%birds, 35%traffic, 20%insects, 5%dog barking.
	06/02/2013	07:35	69.7	40.8	50.5	41.7	37.2	34.7	60%birds, 30%traffic, 10%insects.
	15/02/2013	07:55	67.2	40.0	52.6	39.8	36.0	33.7	50% traffic, 40% birds, 10% insects.
	25/02/2013	15:20	64.2	51.8	56.3	55.3	51.9	35.9	20% birds, 20% traffic and 60% insects.
	06/03/2013	08:50	69.1	38.6	50.9	37.2	31.2	28.3	80% birds* and 20% traffic. *Birds were very loud and active.
	12/03/2013	10:30	66.4	44.1	55.8	45.8	39.1	35.7	55% Mine Noise (machinery), 35% birds, 10% insects.
	22/03/2013	06:20	54.7	35.0	42.2	37.2	33.6	31.1	30%traffic, 30%birds, 30%insects, 10%wind.
	27/03/2013	06:00	48.3	40.4	42.6	41.4	40.3	39.4	35%Machinery, 35%Traffic, 30%Insects.
	04/04/2013	11:45	57.0	36.9	43.0	39.0	36.1	33.6	50%Birds, 48%Traffic, 2%Wind.
	24/04/2013	14:23	66.7	38.1	47.3	41.1	34.9	30.9	45% wind, 35% birds, 5% traffic, 5% train, 5% plane, 5% dozer and reversing beepers.
	03/05/2013	10:11	69.3	44.0	55.4	46.9	38.3	27.8	90% birds, 10% traffic.
	09/05/2013	15:30	76.4	39.5	48.2	40.7	48.2	38.5	95% birds, 5% traffic.
	20/05/2013	16:47	61.1	33.0	41.6	34.6	30.4	28.2	50% birds and 50% traffic.
	29/05/2013	15:48	58.7	35.5	44.4	38.5	32.9	29.8	85% birds and 15% traffic.
	04/06/2013	15:00	66.0	38.2	51.1	37.4	33.3	30.9	75% birds, 20% traffic and 5% wind.
	13/06/2013	08:41	63.1	40.0	50.5	42.1	36.6	34.9	65% birds and 35% machinery.
	19/06/2013	15:46	52.6	37.9	42.5	39.7	37.5	35.7	45% traffic, 45% birds and 10% wind.

12/07/2013	16:00	59.2	34.4	43.0	36.8	32.2	29.7	40% birds, 40% dirt bike, 10% traffic, 5% dog, 5% plane
18/07/2013	14:52	65.1	36.4	48.6	38.7	30.3	25.3	90% birds and 10% traffic.
25/07/2013	07:45	64.6	44.1	52.8	46.0	42.2	40.6	50% Machinery and 50% birds
01/08/2013	12:40	74.4	41.6	53.6	40.7	34.9	30.9	45% birds, 40% traffic, 10% plane, 5% wind.
07/08/2013	09:15	75.4	47.0	61.2	44.3	32.8	29.5	45% birds, 45% machinery and 10% wind.
14/08/2013	08:30	65.7	41.9	53.0	43.4	38.7	36.8	45% machinery, 55% birds
22/08/2013	08:35	80.3	49.3	58.2	48.7	40.7	39.0	40% machinery, 40% birds, 20% neighbor (operating machinery)
06/09/2013	08:40	61.8	41.6	51.4	43.7	39.4	36.0	65% birds, 35% machinery
09/09/2013	14:30	62.0	37.1	50.4	38.6	28.7	23.3	95% birds, 5% dog barking
24/09/2013	08:35	73.6	44.3	58.3	42.3	35.5	32.0	Birds 90%, Machinery 10%
04/10/2013	08:33	59.0	36.2	46.2	38.8	32.7	30.5	80% birds, 20% machinery
15/10/2013	08:56	66.7	37.9	49.9	40.0	31.4	28.6	40% birds, 40% helicopter, 20% machinery
25/10/2013	09:23	60.5	34.4	45.8	36.2	29.1	26.4	70% birds, 30% machinery
29/10/2013	09:00	66.0	44.0	52.0	46.1	42.5	39.5	15% birds, 15% insects, 70% wind (wind speed >3m/s)
07/11/2013	15:30	61.5	34.4	56.7	35.3	30.3	26.4	50% birds, 40% traffic, 10% wind
21/11/2013	10:55	66.1	35.3	41.4	38.5	34.2	32.0	50% birds, 15% frogs, 30% traffic, 5% wind
28/11/2013	08:35	66.8	42.6	54.2	45.4	35.3	32.9	40% birds, 35% plane, 25% machinery
13/12/2013	15:10	71.2	39.5	45.0	41.2	36.3	31.7	60% wind, 20% insects, 20% birds

Order	Date	Time	MAX	LEQ	L1	L10	L50	L90	Comments
	04/01/2013	08:50	64.7	37.2	48.7	39.4	31.4	28.6	60% Birds, 30% traffic on Thomas Mitchel Drive, 5% Reversing Beeper, 5% Resident
	07/01/2013	11:30	68.2	43.4	56.5	44.7	36.2	33.5	65% Birds, 15% Insects, 10% traffic on Thomas Mitchel Drive, 10% Wind in trees, Mine inaudible
	25/01/2013	07:48	71.4	41.8	54.7	37.4	32.9	30.3	50% birds, 30% traffic, 20% insects. Note: Cockatoos quite loud in vicinity of monitor.
	29/01/2013	15:16	56.8	38.8	43.7	42.2	37.3	33.6	40% birds, 35% birds, 25% insects
	06/02/2013	07:10	70.0	39.3	48.7	41.7	35.8	33.0	55% birds, 35% traffic, 10% insects.
	15/02/2013	07:32	75.1	43.7	54.4	40.0	35.9	33.6	50% Birds, 30% traffic, 20% insects.
	25/02/2013	14:55	72.4	43.3	51.7	44.4	40.7	37.0	40% birds, 30% traffic and 30% insects. Wind speed was recorded as >3m/s however, it was not windy at the residence.
	06/03/2013	08:20	68.1	38.8	47.4	41.1	36.2	33.2	26 x Trucks, 58 x LVs. 70%traffic*, 20%birds, 10%insects. *Very loud noise resulting from trucks.
	12/03/2013	09:55	75.8	47.5	46.7	47.6	42.2	39.2	85% Mine Noise (machinery and reversing beepers), 10% birds, 5% insects.
	22/03/2013	07:00	65.8	42.9	49.1	74.9	41.9	39.6	50% Birds, 40%Traffic, 5% wind, 5% insects.
	27/03/2013	06:44	65.6	46.4	52.4	47.9	45.9	43.6	70% Machinery, 15%Birds, 15%Insects.
	04/04/2013	11:22	65.4	38.2	48.9	40.2	35.0	32.2	60%Birds, 40%Traffic.
	24/04/2013	13:10	57.4	34.5	40.3	36.6	33.6	30.9	13 x Trucks, 41 x LVs. 60% birds, 35% TMD traffic, 5% train.
	03/05/2013	09:50	67.2	41.2	53.1	42.9	36.6	33.0	80% birds, 20% traffic.
	09/05/2013	15:10	71.1	42.7	52.3	44.9	37.9	33.6	80% birds, 10% insects, 10% traffic.
	20/05/2013	16:25	65.7	42.7	51.6	45.0	40.6	36.7	80% birds and 20% traffic. A very quiet afternoon.
	29/05/2013	15:27	71.3	43.3	52.6	46.1	40.3	35.9	85% birds and 15% traffic.
	04/06/2013	14:36	67.3	42.2	52.4	45.7	37.9	33.5	80% Traffic and 20% birds.

13/06/2013	08:18	65.5	42.5	53.2	43.9	39.4	37.5	90% birds, 5% traffic and 5% machinery.
19/06/2013	15:26	63.0	41.2	49.6	43.8	39.3	37.3	55% birds and 45% traffic.
12/07/2013	15:39	63.5	38.0	45.3	39.9	37.7	35.1	70% traffic, 25% birds, 5% frogs
18/07/2013	14:30	72.4	41.1	51.2	41.7	35.4	30.8	60% birds, 25% traffic and 15% insects.
25/07/2013	07:25	73.3	47.8	55.5	48.8	46.2	41.4	50% Machinery and 50% birds
01/08/2013	12:17	64.2	37.7	48.8	38.9	35.0	31.8	50% traffic, 35% birds, 10% wind, 5% dog barking.
07/08/2013	08:53	86.9	54.6	63.6	50.8	42.9	38.8	80% birds and 20% machinery
14/08/2013	08:10	69.1	47.7	56.6	49.0	45.9	44.1	70% machinery, 25% birds, 5% traffic.
22/08/2013	08:10	67.1	49.9	58.2	53.5	47.2	43.0	45% birds, 35% machinery, 20% helicopter.
06/09/2013	08:20	75.1	49.7	59.9	52.9	43.9	40.6	70% birds, 30% machinery
09/09/2013	14:10	69.9	46.5	56.4	50.9	40.3	31.8	75% birds, 20% traffic, 5% wind through leaves
24/09/2013	08:12	74.7	52.0	60.8	55.1	49.3	43.4	Birds 65%, Traffic 10%, Machinery 25%,
04/10/2013	08:13	66.0	43.8	54.6	46.9	38.7	34.5	70% birds, 20% machinery, 10% traffic
15/10/2013	08:38	68.6	45.3	56.4	48.4	39.6	36.0	65% birds, 35% machinery
25/10/2013	09:03	68.4	46.6	58.4	50.6	36.6	30.0	70% birds, 15% machinery, 15% helicopter
29/10/2013	08:36	66.0	45.5	54.7	48.5	43.2	39.2	50% birds, 30% traffic, 10% wind, 10% machinery
07/11/2013	15:00	58.4	38.3	47.5	41.3	35.6	32.0	60% birds, 30% machinery, 10% wind
21/11/2013	10:35	66.2	36.5	46.4	37.3	33.6	30.9	75% birds, 15% frogs, 10% traffic,
28/11/2013	08:15	60.3	40.5	49.2	42.1	39.0	37.3	45% birds, 45% machinery, 10% insects
13/12/2013	14:50	75.6	41.9	49.1	39.8	34.3	32.3	30% birds, 30% train, 20%traffic, 20% wind

Robertson	Date	Time	MAX	LEQ	L1	L10	L50	L90	Comments
	04/01/2013	08:30	64.4	44.4	54.6	48.6	40.6	32.1	Birds 5%, Insects 10%, TMD 45%, Train 40%, Mine inaudible
	07/01/2013	11:10	67.1	48.4	54.9	50.5	47.6	43.0	TMD 50%, Insects 50%, Mine inaudible
	18/01/2013	08:30	69.7	49.6	56.6	51.8	48.5	46.4	45%insects, 40%traffic, 10%birds, 5%train. Trucks = 11. Light vehicles = 21.
	18/01/2013	08:55	82.0	52.4	63.1	53.1	48.6	43.7	80%wind, 15%birds, 5%traffic. Note: Loud cockatoos in close proximity to the monitor.
	25/01/2013	07:25	67.6	47.8	56.0	52.1	44.3	36.1	20 x Trucks, 53 x Light vehicles.90%traffic, 5%birds, 5%insects.
	29/01/2013	14:55	64.5	53.6	57.7	56.6	53.5	43.7	5 x trucks and 63 x light vehicles. 50%insects, 50%traffic.
	06/02/2013	06:45	65.8	47.7	55.2	51.5	45.6	37.9	15xtrucks, 112xlight vehicles. 98%traffic, 1%birds, 1%insects.
	15/02/2013	07:08	62.5	47.8	54.1	51.6	45.8	47.7	12 x trucks, 82 x light vehicles. 80% traffic, 10% birds, 10% insects.
	25/02/2013	08:21	63.2	46.7	55.5	51.2	42.8	33.1	70% traffic, 20% insects and 10% birds.
	06/03/2013	07:55	71.2	49.2	58.4	52.7	46.0	45.1	
	12/03/2013	09:30	69.4	51.1	60.3	54.2	49.0	42.8	22 x Trucks and 40 x Light vehicles. 45% Machinery / Mine noise, 45% Traffic, 10% Birds.
	22/03/2013	05:50	65.2	50.6	54.2	53.7	49.9	43.6	4 x Trucks, 61 x Light vehicles. 90%Traffic, 10%wind.
	27/03/2013	05:38	67.6	50.0	57.5	53.6	48.4	43.6	6 x Trucks, 101 x Light vehicles. 70%traffic, 20% Insects, 10 High pitched noise (alarm?).
	04/04/2013	11:00	65.8	46.7	55.2	50.8	42.9	33.8	18 x Trucks, 44 x Light vehicles. 45%Birds, 45%Traffic, 10%Insects.
	24/04/2013	13:21	65.9	47.3	56.0	51.0	44.6	38.1	85% TMD traffic, 10% wind in trees, 5% birds.
	03/05/2013	09:25	72.4	49.0	59.3	53.0	42.6	32.1	16 x trucks, 31xLVs. 65% traffic, 35% birds.
	09/05/2013	16:11	66.7	49.2	57.4	52.5	47.1	40.2	9 x Trucks, 69 x Light vehicles. 60% birds, 40% traffic
	20/05/2013	16:07	67.1	48.8	57.8	52.7	45.3	37.2	70% traffic and 30% birds.
	29/05/2013	15:06	73.5	49.0	57.2	52.4	46.5	37.9	13 x Trucks and 71 x Light vehicles. 80% traffic and 20% birds.

04/06/2013	14:15	69.7	44.1	55.1	48.2	38.6	30.1	5 x Trucks and 25 x Light vehicles. 75% Traffic and 25% birds.
13/06/2013	07:53	67.8	50.0	57.4	53.3	47.4	38.3	14 x trucks and 55 x Light vehicles. 90% traffic and 10% birds.
19/06/2013	15:07	73.1	50.8	61.1	54.2	46.5	38.8	6 x trucks and 50 x LVs. 80% traffic (and helicopter), 15% train breaks and 5% wind.
12/07/2013	15:16	65.5	49.2	57.5	53.6	45.7	34.9	7x trucks and 46x Light vehicles.70% traffic, 20% train, 10% birds.
18/07/2013	14:10	64.2	45.8	54.9	49.7	41.8	34.3	85% traffic and 15% birds.
25/07/2013	07:05	66.5	51.3	57.4	54.6	50.4	44.3	17 x trucks and 83 x Light vehicles.10% birds, 90% traffic.
01/08/2013	11:55	68.9	44.2	53.4	49.1	38.4	28.5	80% traffic, 15% birds, 5% wind.
07/08/2013	08:32	68.2	50.8	58.2	54.4	48.7	42.5	80% traffic, 10% birds and 10% beeper
14/08/2013	07:50	66.4	49.1	56.7	52.1	47.7	42.5	6 x Trucks and 97 x LVs. 90% traffic, 10% birds.
22/08/2013	07:50	68.2	50.2	57.8	54.0	48.2	42.5	12 x trucks, 60 x LVs *0% traffic and 20% birds
06/09/2013	08:00	69.1	45.2	53.4	49.1	41.5	38.4	60% traffic, 40% birds
09/09/2013	13:45	62.6	42.3	53.2	46.4	35.6	30.5	50% traffic, 40% birds, 10% wind through leaves
24/09/2013	07:50	71.0	46.7	56.0	49.2	43.2	38.7	14 x Trucks and 35 X Light vehicles. Birds 35%, Traffic 65%
04/10/2013	07:50	64.1	43.6	51.8	47.4	40.6	36.1	50% traffic, 20% train, 15% whipper-snipper, 15% birds
15/10/2013	08:15	62.3	44.5	53.1	49.0	40.7	33.1	70% traffic, 20% train, 10% birds
25/10/2013	08:43	65.5	42.1	53.0	46.1	35.7	29.9	60% traffic, 40% birds
29/10/2013	08:15	64.1	48.4	57.8	51.5	45.6	42.0	33 X Light vehicles, 9 X Trucks. 70% traffic, 20% mine noise, 10% birds
07/11/2013	14:40	63.0	43.2	54.1	47.3	36.1	32.1	29xLVS, 7xTrucks. 70% traffic, 20% birds, 10% insects
21/11/2013	10:10	71.4	46.6	61.1	47.7	38.1	30.0	10 x Trucks, 25 x Light vehicles. 50% traffic, 30% birds, 10% helicopter, 5% wind, 5% insects.
28/11/2013	07:55	65.8	45.7	53.4	49.0	43.5	41.0	16 x Trucks, 31 x Light vehicles. 50% traffic, 30% road works, 20% birds.
06/12/2013	08:05	67.7	50.5	54.4	53.5	49.1	44.4	95% road works, 5% wind (other locations too windy, results invalid)
13/12/2013	14:32	69.4	48.0	56.1	50.7	46.5	41.6	70% road works, 20% traffic, 10% wind

## Independent Noise Monitoring Report March 2013



13 March 2013

Ref: 03012/4704

James Benson  
Anglo Coal (Drayton Management) Pty Limited  
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### RE: MARCH 2013 NOISE MONITORING RESULTS

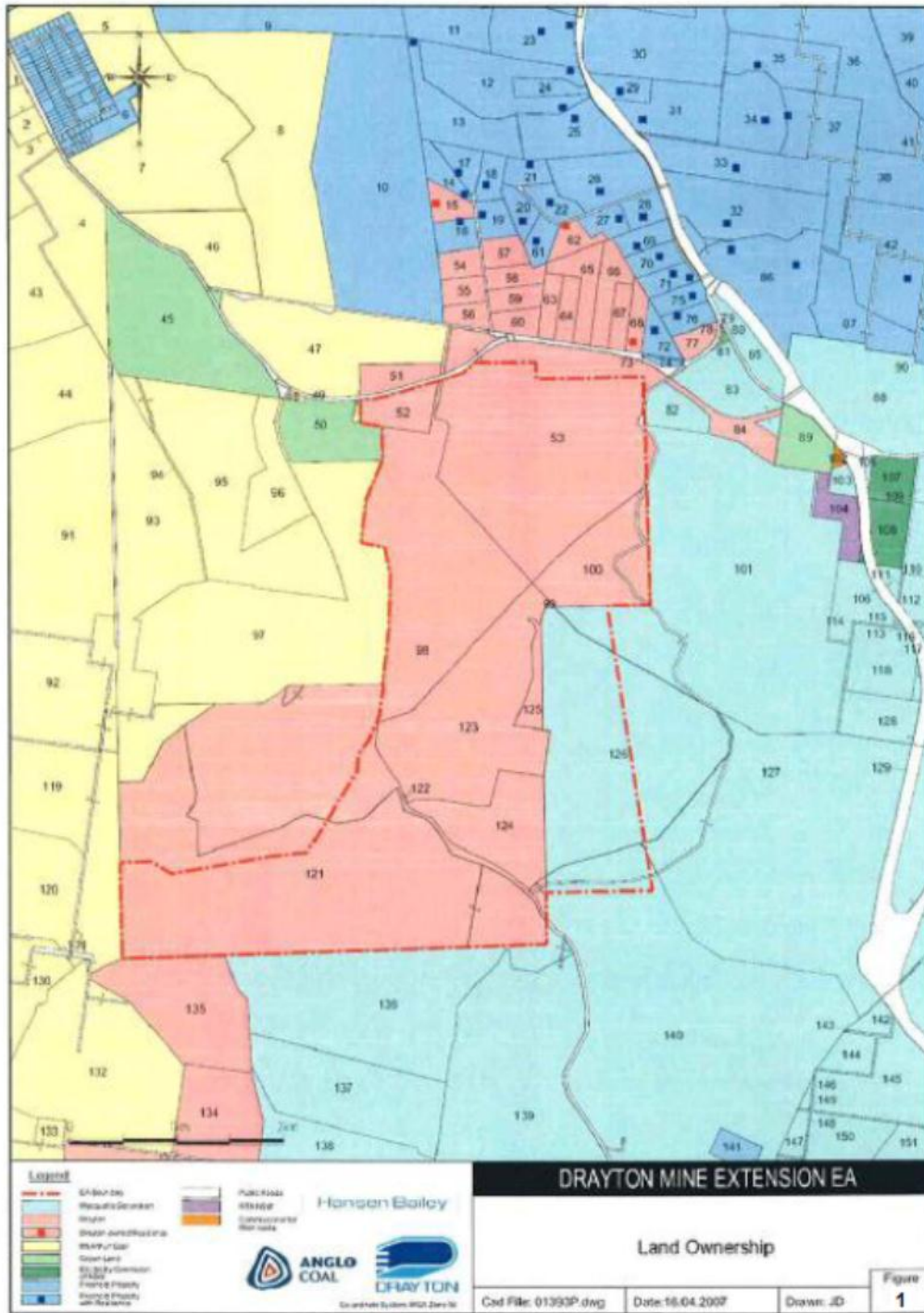
This letter report presents the results of noise compliance monitoring conducted for the Drayton Coal Mine (DCM) on Tuesday 5th March 2013. The purpose of the measurements was to quantify the overall noise levels at the nearby residences and determine the contribution from DCM operations. Schedule 3 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 inaudible at many monitoring locations throughout the survey.

Meteorological data used in this report was supplied by the mine from a new sensor on top of the great North Tip as the existing automatic weather station was not recording during the survey. Wind speeds (in km/h) 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.





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 a Brüel & Kjær Type 2260 Precision Sound Analyser. This instrument has Type 1 characteristics as defined in AS1259-1982 "Sound Level Meters". Calibration of the instrument 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  $L_{Aeq}$  is shown in tables 1-3 and night time  $L_{A1(1minute)}$  attributed to DCM – expressed as  $L_{Amax}$  – in Table 4. Data was 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.

Location (Criterion)	Time	dB(A), $L_{eq(15min)}$	Wind speed/ direction	Identified Noise Sources
Doherty (41)	4:48 pm	44	8.0 / 143	Traffic (43), birds & insects (37), DCM (32)
Kerr (36)	4:40 pm	54	7.5 / 113	Dog (54), traffic (42), birds & insects (40), DCM inaudible
Skinner (39)	5:07 pm	49	6.9 / 124	Wind in trees (46), birds & insects (44), traffic (40), DCM inaudible
Robertson (36)	5:12 pm	48	6.9 / 124	Traffic (47), birds & insects (38), DCM inaudible
Sharman (35)	5:29 pm	53	8.5 / 153	Traffic (51), dogs (45), birds & insects (43), DCM inaudible
Horder (35)	5:34 pm	48	8.5 / 153	Traffic (48), birds & insects (35), DCM inaudible
Wilson (35)	4:16 pm	44	6.9 / 144	Wind (40), birds (38), traffic (37), DCM inaudible
Smith (35)	4:09 pm	43	6.6 / 114	Wind (39), birds (37), traffic (36), DCM inaudible

Location (Criterion)	Time	dB(A), $L_{eq(15min)}$	Wind speed/ direction	Identified Noise Sources
Doherty (41)	8:49 pm	46	8.9 / 155	Frogs & insects (44), traffic (38), DCM (37)
Kerr (37)	9:34 pm	47	9.8 / 152	Traffic (47), insects (33), DCM (30)
Skinner (40)	9:11 pm	44	9.0 / 138	Traffic (40), frogs & insects (39), DCM (38)
Robertson (37)	9:10 pm	42	9.0 / 138	Traffic (39), frogs & insects (38), DCM inaudible
Sharman (35)	8:50 pm	45	8.9 / 155	Traffic (45), birds & insects (35), DCM (<30)
Horder (36)	9:32 pm	50	9.8 / 152	Frogs & insects (50), traffic (40), DCM inaudible
Wilson (35)	8:08 pm	42	10.7 / 140	Wind (40), insects (38), Traffic (34), DCM inaudible
Smith (35)	8:10 pm	44	10.7 / 140	Wind (41), traffic (36), frogs (35), DCM inaudible

Location (Criterion)	Time	dB(A), $L_{eq}(15min)$	Wind speed/ direction	Identified Noise Sources
Doherty (39)	10:30 pm	47	9.0 / 140	Frogs & insects (45), traffic (41), DCM (38)
Kerr (37)	10:30 pm	50	9.0 / 140	Traffic (49), insects (44), DCM inaudible
Skinner (39)	10:51 pm	45	8.9 / 155	Insects (41), traffic (40), DCM (38), train (30)
Robertson (42)	10:53 pm	45	8.9 / 155	Traffic (44), frogs & insects (37), DCM inaudible
Sharman (41)	11:13 pm	44	7.6 / 155	Traffic (42), frogs & insects (38), DCM inaudible
Holder (42)	11:14 pm	50	7.6 / 155	Frogs & insects (50), traffic (38), DCM inaudible
Wilson (36)	11:40 pm	41	7.4 / 164	Wind (39), traffic (36), DCM inaudible
Smith (36)	11:45 pm	43	7.4 / 164	Wind (40), insects (40), DCM inaudible

Location (Criterion)	Time	dB(A), $L_{1(1minute)}$	Wind speed/ direction	Identified Mine Noise Sources
Doherty (47)	10:30 pm	46	9.0 / 140	Haul trucks
Kerr (47)	10:30 pm	n/a	9.0 / 140	n/a
Skinner (47)	10:51 pm	46	8.9 / 155	Haul trucks
Robertson (47)	10:53 pm	n/a	8.9 / 155	n/a
Sharman (47)	11:13 pm	n/a	7.6 / 155	n/a
Holder (47)	11:14 pm	n/a	7.6 / 155	n/a
Wilson (47)	11:40 pm	n/a	7.4 / 164	n/a
Smith (47)	11:45 pm	n/a	7.4 / 164	n/a

The results in Tables 1 to 4 show that the noise criteria were not exceeded at any location.

DCM train schedule during monitoring period:

Date	Start_time	Departure_time	Train_number
08-Mar-13	7:58am	11:34am	DR134
08-Mar-13	7:40pm	11:18pm	DR266
08-Mar-13	2:05pm	5:08am	DR340

A train was identified during the attended monitoring at Skinner commencing at 10:51 pm. This train does not coincide with the DCM train schedule and were therefore associated with another mine. Train DR266 left site during the night survey but was not measured.

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 noise sleep disturbance criteria ( $L_{A1(1minute)}$ ) were not exceeded at any receiver.

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.

Because the  $L_{A1(1\text{minute})}$  levels were well below the sleep disturbance criterion at the attended monitoring locations, no modelling of  $L_{A1(1\text{minute})}$  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**

- 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 <sub>Aeq</sub> (15 min)	L <sub>Aeq</sub> (15 min)	L <sub>Aeq</sub> (15 min)	L <sub>A1</sub> (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
89	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	36	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<sub>Aeq</sub>(15 min) 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<sub>A1</sub>(1 min) 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 <i>L<sub>Aeq</sub>(15min)</i>
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<sub>Aeq</sub>(11 hour)* 50 dB(A) – Day;
  - *L<sub>Aeq</sub>(4 hour)* 45 dB(A) – Evening;
  - *L<sub>Aeq</sub>(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<sub>Aeq</sub>(11 hour)* 53 dB(A) – Day;
  - *L<sub>Aeq</sub>(4 hour)* 48 dB(A) – Evening;
  - *L<sub>Aeq</sub>(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	32	37	32	38
27	<30	36	33	37	33	39
72*	<30	36	<30	37	<30	42
17	<30	37	31	38	31	36
21	<30	38	35	38	35	38
22	<30	38	36	38	36	38
18	<30	38	35	39	35	38
20	<30	39	36	40	36	39
61*	<30	39	38	40	38	39
14	30	40	36	39	37	39
19	31	40	36	40	37	39
16*	32	41	37	41	38	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

## Independent Noise Monitoring Report June 2013



25 June 2013

Ref. 03012/4804

James Benson

Anglo Coal (Drayton Management) Pty Limited

PMB 9

Muswellbrook NSW 2333

### RE: JUNE 2013 NOISE MONITORING RESULTS

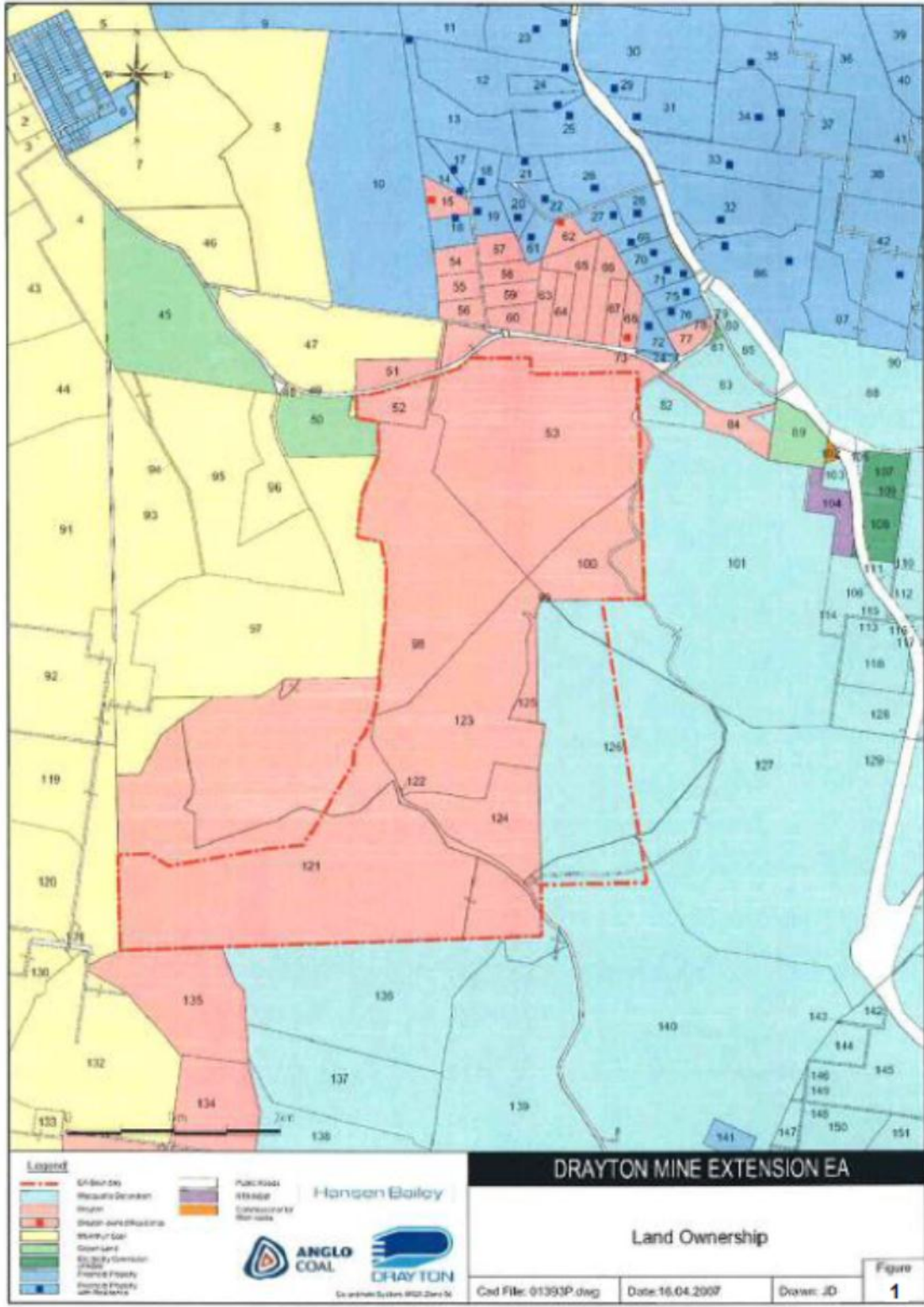
This letter report presents the results of noise compliance monitoring conducted for the Drayton Coal Mine (DCM) on Saturday 8<sup>th</sup> June 2013. The purpose of the measurements was to quantify the overall noise levels at the nearby residences and determine the contribution from DCM operations. 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 inaudible at many monitoring locations throughout the survey.

Meteorological data used in this report was supplied by the mine from a new sensor on top of the great North Tip as the existing automatic weather station was not recording during the survey. 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.





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 a Brüel & Kjær Type 2260 Precision Sound Analyser. This instrument has Type 1 characteristics as defined in AS1259-1982 "Sound Level Meters". Calibration of the instrument 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  $L_{Aeq}$  is shown in tables 1-3 and night time  $L_{A1(1minute)}$  – approximated as measured  $L_{Amax}$  – in Table 4. Table 4 shows the overall LA1 and the contributing source as well as the LA1 from DCM, where this was measurable. Data was 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.

Location (Criterion)	Time	dB(A), $L_{eq(15min)}$	Wind speed/ direction	Identified Noise Sources
Doherty (41)	4:01 pm	43	8.3 / 130	Traffic (41), birds (37), DCM (35)
Kerr (36)	5:03 pm	56	8.8 / 112	Dog (55), traffic (48), wind (38), DCM inaudible
Skinner (39)	4:03 pm	41	8.3 / 130	Birds & insects (39), traffic (33), wind (32), DCM inaudible
Robertson (36)	4:23 pm	46	10.5 / 123	Traffic (43), birds (42), DCM (33)
Sharman (35)	5:03 pm	51	8.8 / 112	Traffic (50), dogs (45), birds & insects (43), DCM inaudible
Horder (35)	4:43 pm	55	7.9 / 125	Birds (55), traffic (41), DCM inaudible
Wilson (35)	4:49 pm	44	7.9 / 125	Birds (42), traffic (38), DCM inaudible
Smith (35)	4:26 pm	42	10.5 / 123	Birds (39), traffic (38), DCM inaudible

Location (Criterion)	Time	dB(A), $L_{eq(15min)}$	Wind speed/ direction	Identified Noise Sources
Doherty (41)	8:16 pm	43	6 / 139	Insects (39), DCM (37), traffic (34)
Kerr (37)	9:08 pm	43	6.3 / 147	Traffic (43), DCM (<30)
Skinner (40)	8:46 pm	41	6.8 / 126	DCM (38), insects (35), wind (34)
Robertson (37)	8:37 pm	42	6.3 / 135	Traffic (38), train (37), insects (35), DCM inaudible
Sharman (35)	9:16 pm	45	6.3 / 147	Traffic (45), DCM inaudible
Horder (36)	8:57 pm	39	6.9 / 145	Traffic (37), flying foxes (33), DCM inaudible
Wilson (35)	8:11 pm	37	6 / 139	Traffic (34), insects (33), DCM inaudible
Smith (35)	8:28 pm	38	6.3 / 135	Wind (33), insects (32), traffic (32), DCM inaudible

Location (Criterion)	Time	dB(A), Leq(15min)	Wind speed/ direction	Identified Noise Sources
Doherty (39)	10:01 pm	42	5.3 / 142	DCM (38), traffic (37), insects (35)
Kerr (37)	11:02 pm	43	4.4 / 135	Dog (40), traffic (40), DCM inaudible
Skinner (39)	10:19 pm	43	4.6 / 119	DCM (39), Insects (39), traffic (35)
Robertson (42)	10:23 pm	40	4.6 / 119	Traffic (37), insects (37), DCM inaudible
Sharman (41)	11:04 pm	45	4.4 / 135	Traffic (44), DCM (35)
Horder (42)	10:44 pm	45	5.1 / 134	Dog (43), traffic (37), train (35), DCM (<30)
Wilson (36)	10:42 pm	34	5.1 / 134	Traffic (32), insects (29), DCM inaudible
Smith (36)	10:02 pm	37	5.3 / 142	Traffic (34), insects (32), DCM inaudible

Location (Criterion)	Time	dB(A), L1(1minute)	Wind speed/ direction	LA1 source	Identified Mine Sources (LA1)
Doherty (47)	10:01 pm	53	5.3 / 142	Birds	Haul trucks (43)
Kerr (47)	11:02 pm	67	4.4 / 135	Dog	n/a
Skinner (47)	10:19 pm	56	4.6 / 119	Birds	Haul trucks (45)
Robertson (47)	10:23 pm	51	4.6 / 119	Birds	n/a
Sharman (47)	11:04 pm	62	4.4 / 135	Highway	Haul Trucks (39)
Horder (47)	10:44 pm	72	5.1 / 134	Dog	Haul Trucks (<35)
Wilson (47)	10:42 pm	42	5.1 / 134	Highway	n/a
Smith (47)	10:02 pm	55	5.3 / 142	Insects	n/a

The results in Tables 1 to 4 show that the noise criteria were not exceeded at any location.

Trains were audible on three occasions during the monitoring, however DCM did not have any train arrivals or departures during 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 4 show that the noise sleep disturbance criteria ( $L_{A1(1minute)}$ ) were not exceeded at any receiver.

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.

Because the  $L_{A1(1minute)}$  levels were well below the sleep disturbance criterion at the attended monitoring locations, no modelling of  $L_{A1(1minute)}$  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**

- 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	
	$L_{Aeq}(15 \text{ min})$	$L_{Aeq}(15 \text{ min})$	$L_{Aeq}(15 \text{ min})$	$L_{A1}(1 \text{ min})$
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  $L_{Aeq}(15 \text{ min})$  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  $L_{A1}(1 \text{ min})$  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 <i>L<sub>eq</sub>(15min)</i>
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<sub>Req</sub>(11 hour)* 50 dB(A) – Day;
  - *L<sub>Req</sub>(4 hour)* 45 dB(A) – Evening;
  - *L<sub>Req</sub>(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<sub>Req</sub>(11 hour)* 53 dB(A) – Day;
  - *L<sub>Req</sub>(4 hour)* 48 dB(A) – Evening;
  - *L<sub>Req</sub>(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	32	38
32	<30	35	<30	35	33	40
71	<30	35	<30	35	35	41
75*	<30	35	<30	35	35	41
70	<30	35	<30	36	34	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	32	37	31	38
27	<30	36	33	37	31	39
72*	33	36	<30	37	<30	42
17	32	37	31	38	31	36
21	33	38	35	38	35	38
22	30	38	36	38	37	38
18	<30	38	35	39	35	38
20	<30	39	36	40	37	39
61*	<30	39	38	40	39	39
14	31	40	36	39	38	39
19	33	40	36	40	38	39
16*	35	41	37	41	38	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

## Independent Noise Monitoring Report September 2013



13 September 2013

Ref: 03012/5005

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

### RE: SEPTEMBER 2013 NOISE MONITORING RESULTS

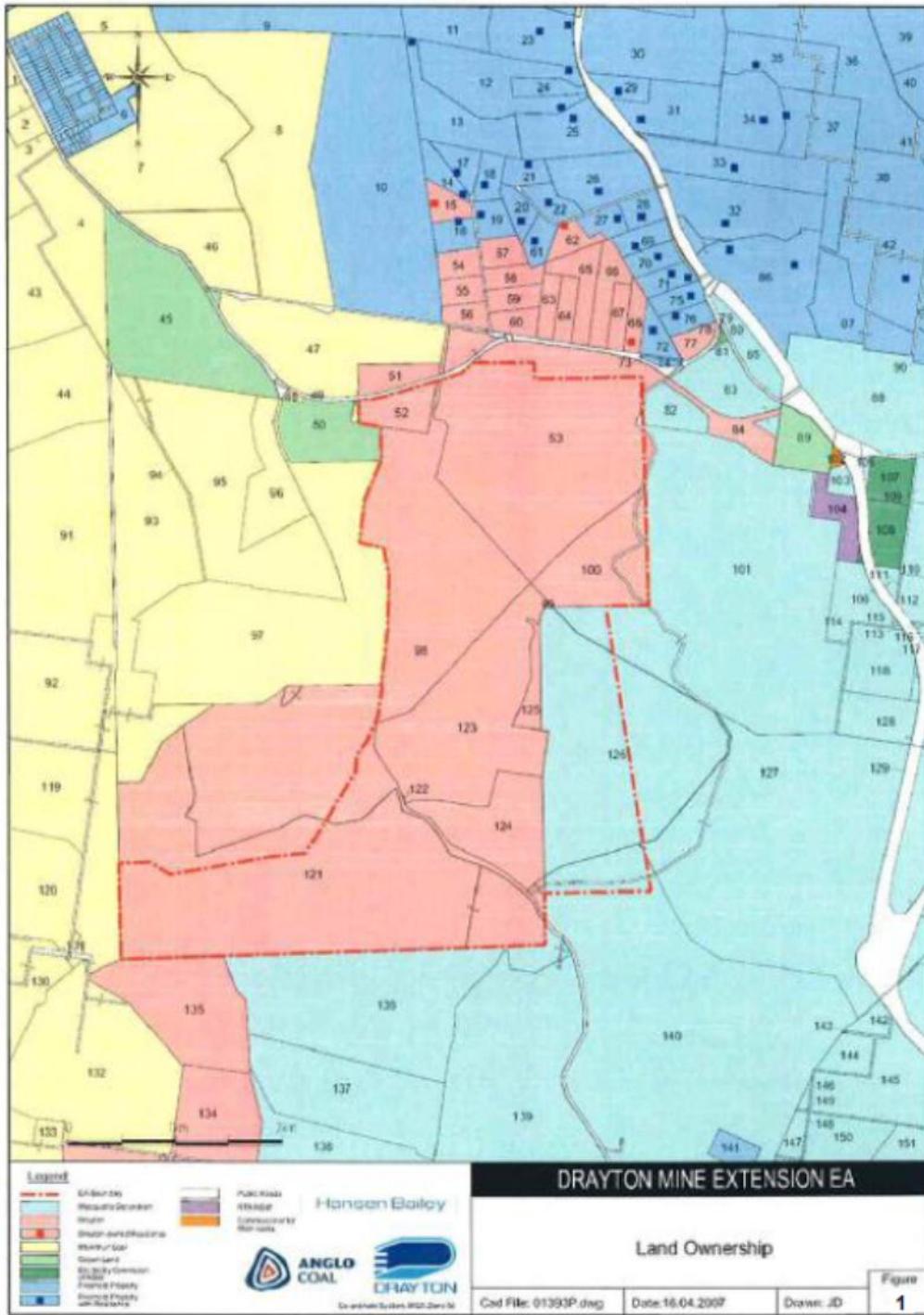
This letter report presents the results of noise compliance monitoring conducted for the Drayton Coal Mine (DCM) on Wednesday 11<sup>th</sup> September 2013. The purpose of the measurements was to quantify the overall noise levels at the nearby residences and determine the contribution from DCM operations. 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 inaudible at many monitoring locations throughout the survey.

Meteorological data used in this report was supplied by the mine from the new 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.





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 a Brüel & Kjær Type 2260 Precision Sound Analyser. This instrument has Type 1 characteristics as defined in AS1259-1982 "Sound Level Meters". Calibration of the instrument 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  $L_{Aeq}$  is shown in tables 1-3 and night time  $L_{A1(1minute)}$  – approximated as measured  $L_{Amax}$  – in Table 4. Table 4 shows the overall LA1 and the contributing source as well as the LA1 From DCM, where this was measurable. Data was 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.

Location (Criterion)	Time	dB(A), $L_{eq(15min)}$	Wind speed/ direction	Identified Noise Sources
Doherty (41)	3:38 pm	40	3.7 / 280	Wind (38), birds (35), DCM inaudible
Kerr (36)	4:00 pm	57	3.2 / 306	Dog (57), birds (43), traffic (41), DCM inaudible
Skinner (39)	3:37 pm	44	3.7 / 280	Wind (40), birds (38), traffic (34), DCM inaudible
Robertson (36)	4:04 pm	47	3.2 / 306	Traffic (44), wind (41), birds (40), DCM inaudible
Sharman (35)	4:49 pm	52	3.9 / 306	Traffic (50), dogs (46), DCM inaudible
Horder (35)	4:25 pm	53	3.1 / 294	Birds (52), traffic (45), DCM inaudible
Wilson (35)	4:26 pm	47	3.1 / 294	Traffic (44), wind (40), insects (37), DCM inaudible
Smith (35)	4:52 pm	42	3.9 / 306	Wind (38), traffic (37), insects (34), DCM inaudible

Location (Criterion)	Time	dB(A), $L_{eq(15min)}$	Wind speed/ direction	Identified Noise Sources
Doherty (41)	8:04 pm	36	1.5 / 283	Insects (33), DCM (33)
Kerr (37)	8:27 pm	51	2.4 / 289	Dog (50), traffic (42), DCM (32)
Skinner (40)	8:00 pm	36	1.5 / 283	DCM (34), insects (30)
Robertson (37)	8:26 pm	43	2.4 / 289	Traffic (41), DCM (37)
Sharman (35)	9:08 pm	50	1.5 / 300	Traffic (50), DCM (<35)
Horder (36)	8:47 pm	43	2.9 / 293	Traffic (39), insects (38), DCM (34)
Wilson (35)	8:54 pm	46	1.7 / 296	Traffic (44), insects (40), DCM inaudible
Smith (35)	9:17 pm	43	0.8 / 317	Traffic (39), insects (38), DCM (<30)

Location (Criterion)	Time	dB(A), Leq(15min)	Wind speed/ direction	Identified Noise Sources
Doherty (39)	10:02 pm	40	1.1 / 347	DCM (38), insects (33)
Kerr (37)	10:44 pm	50	1.3 / 311	Traffic (50), insects (35), DCM (<30)
Skinner (39)	10:01 pm	41	1.1 / 347	DCM (39), Insects (35)
Robertson (42)	10:29 pm	47	1.5 / 344	DCM (40), traffic (45)
Sharman (41)	11:09 pm	53	1.3 / 339	Traffic (53), DCM (<40)
Horder (42)	10:45 pm	45	1.3 / 311	Traffic (43), DCM (36), insects (35)
Wilson (36)	10:23 pm	40	1.5 / 344	Traffic (38), DCM (31), insects (30)
Smith (36)	11:07 pm	38	1.3 / 339	Traffic (35), DCM (34)

Location (Criterion)	Time	dB(A), L <sub>1</sub> (1minute)	Wind speed/ direction	L <sub>A1</sub> source	Identified Mine Sources (L <sub>A1</sub> )
Doherty (47)	10:02 pm	50	1.1 / 347	Birds	Haul trucks (42)
Kerr (47)	10:44 pm	58	1.3 / 311	Traffic	Hum (<35)
Skinner (47)	10:01 pm	51	1.1 / 347	Birds	Haul trucks (46)
Robertson (47)	10:29 pm	46	1.5 / 344	TCM	Haul trucks (46)
Sharman (47)	11:09 pm	61	1.3 / 339	Highway	Haul Trucks (40)
Horder (47)	10:45 pm	49	1.3 / 311	Highway	Haul Trucks (41)
Wilson (47)	10:23 pm	42	1.5 / 344	Highway	Hum (34)
Smith (47)	11:07 pm	41	1.3 / 339	Insects	Hum (36)

The results in Tables 1 to 4 show that the noise criteria were not exceeded at any location.

Trains were audible occasionally during the monitoring, however DCM did not have any train arrivals or departures during 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 4 show that the noise sleep disturbance criteria (L<sub>A1(1minute)</sub>) were not exceeded at any receiver.

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.

Because the L<sub>A1(1minute)</sub> levels were well below the sleep disturbance criterion at the attended monitoring locations, no modelling of L<sub>A1(1minute)</sub> 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**

- 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	
	$L_{Aeq}(15 \text{ min})$	$L_{Aeq}(15 \text{ min})$	$L_{Aeq}(15 \text{ min})$	$L_{A1}(1 \text{ min})$
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	38	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 6.
- To determine compliance with the  $L_{Aeq}(15 \text{ min})$  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  $L_{A1}(1 \text{ min})$  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 <i>L<sub>Aeq</sub>(5min)</i>
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<sub>Aeq</sub>(11 hour)* 50 dB(A) – Day;
  - *L<sub>Aeq</sub>(4 hour)* 45 dB(A) – Evening;
  - *L<sub>Aeq</sub>(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<sub>Aeq</sub>(11 hour)* 53 dB(A) – Day;
  - *L<sub>Aeq</sub>(4 hour)* 48 dB(A) – Evening;
  - *L<sub>Aeq</sub>(9 hour)* 43 dB(A) – Night.

*Note: 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	32	38
32	<30	35	32	35	33	40
71	<30	35	33	35	35	41
75*	<30	35	<35	35	35	41
70	<30	35	32	36	35	41
76*	<30	35	34	36	36	42
28	<30	35	33	37	34	40
69	<30	35	33	37	33	41
13	<30	36	32	36	30	35
12	<30	36	31	36	<30	36
25*	<30	36	32	37	<30	37
26	<30	36	32	37	33	38
27	<30	36	34	37	37	39
72*	<30	36	37	37	40	42
17	<30	37	38	38	35	36
21	30	38	37	38	35	38
22	<30	38	36	38	36	38
18	<30	38	36	39	36	38
20	<30	39	35	40	37	39
61*	<30	39	34	40	39	39
14	<30	40	34	39	38	39
19	<30	40	33	40	38	39
16*	<30	41	33	41	38	39
23	<30	35	<30	35	33	35
35*	<30	35	<30	35	31	35
42*	<30	35	<30	35	34	35
37	<30	35	<30	35	32	35

\* Measurement location

# Independent Noise Monitoring Report December 2013



6 January 2014

Ref. 03012/5026

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

## RE: DECEMBER 2013 NOISE MONITORING RESULTS

This letter report presents the results of noise compliance monitoring conducted for the Drayton Coal Mine (DCM) on Sunday 15<sup>th</sup> December 2013. The purpose of the measurements was to quantify the overall noise levels at the nearby residences and determine the contribution from DCM operations.

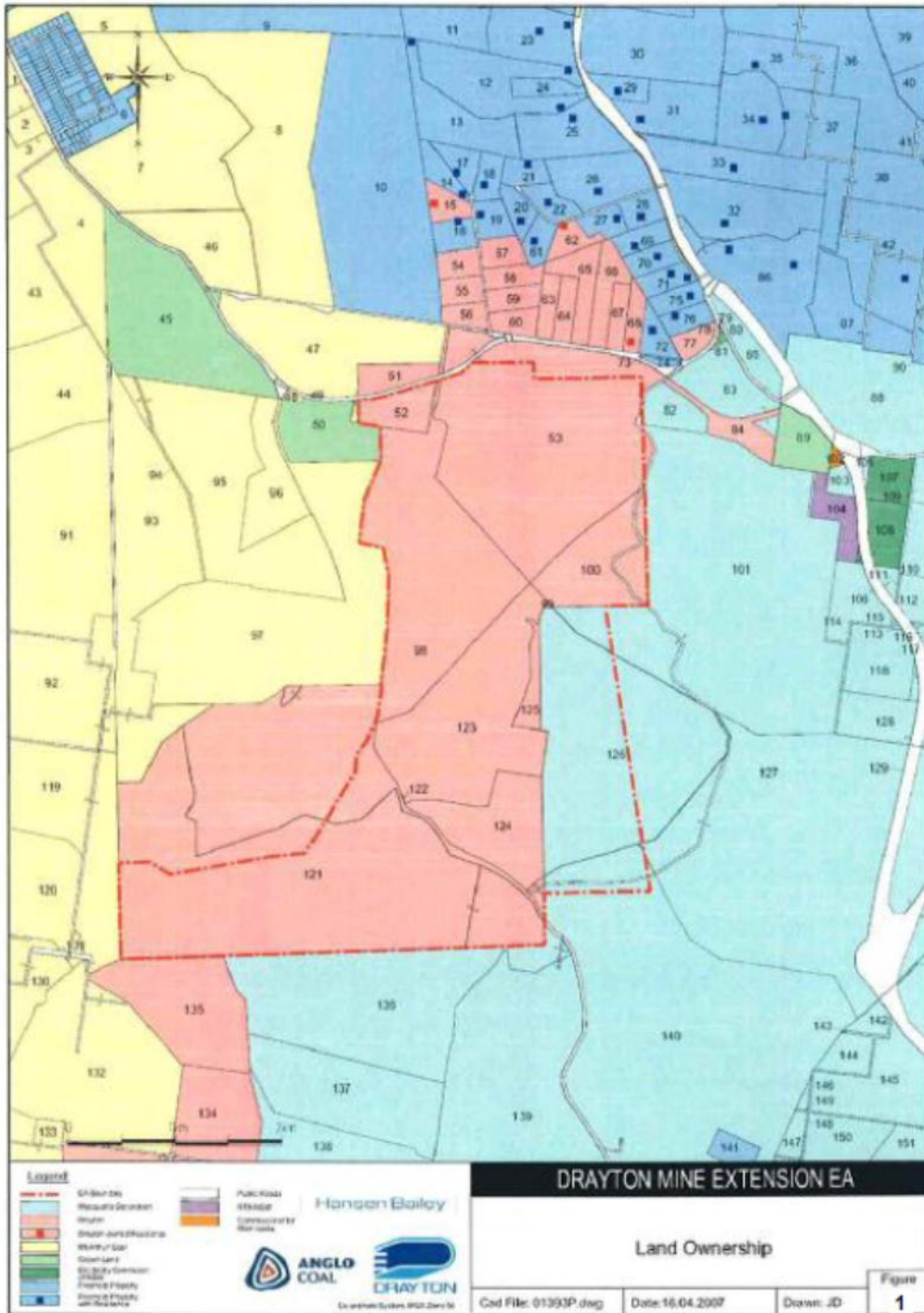
Schedule 3 of the DCM Project Approval details noise impact assessment criteria for 28 specific residential locations. For logistic reasons it is not reasonable to carry out attended noise monitoring at all of the listed locations during the one monitoring survey. As such, the approach taken was to monitor 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 inaudible at many monitoring locations throughout the survey.

Meteorological data used in this report was supplied by the mine from the existing 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.





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 a Brüel & Kjær Type 2260 Precision Sound Analyser. This instrument has Type 1 characteristics as defined in AS1259-1982 "Sound Level Meters". Calibration of the instrument 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  $L_{Aeq}$  is shown in tables 1-3 and night time  $L_{A1(1minute)}$  – approximated as measured  $L_{Amax}$  – in Table 4. Table 4 shows the overall LA1 and the contributing source as well as the LA1 From DCM, where this was measurable. Data was 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.

Location (Criterion)	Time	dB(A), $L_{eq(15min)}$	Wind speed/ direction	Identified Noise Sources
Doherty (41)	4:18 pm	46	5.1 / 145	Traffic (45), birds (37), DCM (<30)
Kerr (36)	5:30 pm	50	3.8 / 111	Traffic (50), insects (38), DCM inaudible
Skinner (39)	4:43 pm	46	2.5 / 110	Birds & insects (43), traffic (33), DCM inaudible
Robertson (36)	4:41 pm	48	2.5 / 110	Traffic (43), wind (43), insects (42), DCM inaudible
Sharman (35)	5:31 pm	51	3.8 / 111	Dogs (47), wind (46), birds (41), DCM inaudible
Horder (35)	5:08 pm	47	3.3 / 120	Traffic (43), wind (43), birds (41), DCM inaudible
Wilson (35)	5:07 pm	46	3.3 / 120	Insects (43), traffic (42), wind (35), DCM inaudible
Smith (35)	4:20 pm	40	5.1 / 145	Wind (37), traffic (35), insects (32), DCM inaudible

Location (Criterion)	Time	dB(A), $L_{eq(15min)}$	Wind speed/ direction	Identified Noise Sources
Doherty (41)	8:15 pm	49	5.5 / 123	Traffic (45), insects (43), wind (43), DCM inaudible
Kerr (37)	8:08 pm	50	5.5 / 123	Traffic (48), wind (44), insects (40), DCM inaudible
Skinner (40)	8:56 pm	48	4.6 / 142	Wind (47), insects (40), DCM inaudible
Robertson (37)	8:41 pm	50	4.1 / 129	Insects (48), wind (43), traffic (39), DCM inaudible
Sharman (35)	9:26 pm	51	5.3 / 134	Traffic (47), wind (45), insects (41), DCM inaudible
Horder (36)	9:03 pm	49	5.3 / 139	Traffic (44), frogs (44), wind (42), DCM inaudible
Wilson (35)	9:19 pm	47	5.3 / 134	Wind (46), insects (42), DCM inaudible
Smith (35)	8:31 pm	48	4.1 / 129	Wind (47), insects (40), DCM inaudible

**Table 3**  
**DCM Noise Monitoring Results – 15 December 2013 (night)**

Location (Criterion)	Time	dB(A), Leq(15min)	Wind speed/ direction	Identified Noise Sources
Doherty (39)	10:01 pm	50	5.4 / 147	Insects (49), wind (37), traffic (33), DCM (33)
Kerr (37)	10:02 pm	49	5.4 / 147	Wind (47), insects (44), DCM inaudible
Skinner (39)	10:49 pm	46	5.3 / 137	Traffic (42), insects (41), wind (40), DCM (28)
Robertson (42)	10:24 pm	48	4.5 / 138	Traffic (44), insects (43), wind (43), DCM inaudible
Sharman (41)	11:07 pm	46	5.5 / 140	Traffic (44), wind (39), DCM (34)
Horder (42)	10:46 pm	51	5.3 / 137	Frogs (50), traffic (41), DCM (<35)
Wilson (36)	11:12 pm	44	5.5 / 140	Wind (42), insects (37) traffic (35), DCM inaudible
Smith (36)	10:25 pm	47	4.5 / 138	Insects (43), wind (42), traffic (40), DCM inaudible

**Table 4**  
**DCM Noise Monitoring Results – 15 December 2013 (night)**

Location (Criterion)	Time	dB(A), L <sub>1(1minute)</sub>	Wind speed/ direction	LA <sub>1</sub> source	Identified Mine Sources (LA <sub>1</sub> )*
Doherty (47)	10:01 pm	59	5.4 / 147	Birds	n/a
Kerr (47)	10:02 pm	53	5.4 / 147	Wind	n/a
Skinner (47)	10:49 pm	55	5.3 / 137	Insects	n/a
Robertson (47)	10:24 pm	61	4.5 / 138	Birds	n/a
Sharman (47)	11:07 pm	51	5.5 / 140	Highway	n/a
Horder (47)	10:46 pm	64	5.3 / 137	Dog	n/a
Wilson (47)	11:12 pm	51	5.5 / 140	Wind	n/a
Smith (47)	10:25 pm	56	4.5 / 138	Insects	n/a

\*Given the high wind speeds and dominance of non-mine sources, identification of LA<sub>1</sub> (essentially L<sub>max</sub>) levels from DCM was not possible. At most, L<sub>max</sub> levels may have been within a few dB greater than the LA<sub>eq</sub> levels in Table 3, and at least 10dB below the sleep disturbance criterion.

The results in Tables 1 to 4 show that the noise criteria were not exceeded at any location.

Trains were audible on two occasions during the monitoring, however DCM did not have any train arrivals or departures during 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 4 show that compliance with the noise sleep disturbance criteria (L<sub>A1(1minute)</sub>) was not assessable due to excessive noise from non-mine sources.

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.

Because the  $L_{A1(1\text{minute})}$  levels were well below the sleep disturbance criterion at the attended monitoring locations, no modelling of  $L_{A1(1\text{minute})}$  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**

- 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	
	$L_{Aeq}(15 \text{ min})$	$L_{Aeq}(15 \text{ min})$	$L_{Aeq}(15 \text{ min})$	$L_{A1}(1 \text{ min})$
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  $L_{Aeq}(15 \text{ min})$  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  $L_{A1}(1 \text{ min})$  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 <i>L</i> <sub>Aeq</sub> (15min)
12, 14, 16, 17, 18, 19, 23, 25, 26, 27, 28, 29, 31, 32, 69, 70, 71, 72, 75, 76 All other private land owners not listed in Table 1, or on more than 25 percent of, any privately owned land.	42 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*<sub>Aeq</sub>(11 hour) 50 dB(A) – Day;
  - *L*<sub>Aeq</sub>(8 hour) 45 dB(A) – Evening;
  - *L*<sub>Aeq</sub>(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*<sub>Aeq</sub>(11 hour) 53 dB(A) – Day;
  - *L*<sub>Aeq</sub>(8 hour) 48 dB(A) – Evening;
  - *L*<sub>Aeq</sub>(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	31	40
71	<30	35	<30	35	35	41
75*	<30	35	<30	35	34	41
70	<30	35	<30	36	32	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	31	38
22	<30	38	<30	38	32	38
18	<30	38	<30	39	31	38
20	<30	39	<30	40	32	39
61*	<30	39	<30	40	33	39
14	<30	40	<30	39	33	39
19	<30	40	<30	40	33	39
16*	<30	41	<30	41	33	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

**Table 54: Real Time Noise Monitoring**

<b>January</b>	<b>Day dB(A)</b>	<b>Evening dB(A)</b>	<b>Night dB(A)</b>	<b>February</b>	<b>Day dB(A)</b>	<b>Evening dB(A)</b>	<b>Night dB(A)</b>
1/01/2013	32.2	36.4	38.2	1/02/2013	32.1	37.7	29.2
2/01/2013	30	34.3	32.3	2/02/2013	33.3	30.5	35.4
3/01/2013	28.1	30.2	31.6	3/02/2013	34.8	32.7	35.6
4/01/2013	26.8	32	34.1	4/02/2013	30.1	28.7	31.5
5/01/2013	27.5	33.7	34.6	5/02/2013	28.9	29	29.9
6/01/2013	28.2	31.3	30.1	6/02/2013	28.8	29	35
7/01/2013	31.8	31.2	38.8	7/02/2013	29	29.9	32.7
8/01/2013	35.6	27.8	30.4	8/02/2013	29.4	28.4	36.1
9/01/2013	35.5	33.8	32.2	9/02/2013	28.2	32.2	35.7
10/01/2013	30.3	29.8	34.6	10/02/2013	29.6	39.1	33.5
11/01/2013	32.7	30.9	33.1	11/02/2013	29.2	34.7	29.9
12/01/2013	32.6	29.4	28.4	12/02/2013	29.2	28.7	27.1
13/01/2013	28.3	31.3	31.3	13/02/2013	27.5	30.7	34.3
14/01/2013	33.8	28.3	29.6	14/02/2013	28.8	31.1	33.8
15/01/2013	31.3	32.7	29.5	15/02/2013	29.8	39	31.3
16/01/2013	32.3	33.5	32.4	16/02/2013	29.8	33.5	31.7
17/01/2013	36.3	30	31	17/02/2013	27	28.9	36.2
18/01/2013	31.2	29.8	31.5	18/02/2013	28.4	27.9	33.4
19/01/2013	32.6	29	32.7	19/02/2013	27.9	33	33
20/01/2013	30.4	25.2	28.1	20/02/2013	29.2	26.9	28.3
21/01/2013	32.3	27.4	31.9	21/02/2013	31.6	32.2	36.5
22/01/2013	31.6	28.4	34	22/02/2013	34.9	33	35.6
23/01/2013	29.8	33.4	27.5	23/02/2013	35.8	30.1	27
24/01/2013	30.5	25.9	28.3	24/02/2013	25.2	29.6	35.6
25/01/2013	28	25.2	32.1	25/02/2013	29.7	27.6	32.9
26/01/2013	24.4	27.6	33.7	26/02/2013	29.4	33	33.7
27/01/2013	32.1	26.1	28.8	27/02/2013	30.2	34.2	31.6
28/01/2013	30.5	29.3	33.4	28/02/2013	29	29.5	30.3
29/01/2013	31.6	31.7	32.9				
30/01/2013	28.8	29.2	33.4				
31/01/2013	30.7	29.9	36.1				

March	Day dB(A)	Evening dB(A)	Night dB(A)
1/03/2013	-	36.5	35.6
2/03/2013	33.9	36.4	34.8
3/03/2013	35.8	27	32.9
4/03/2013	32.4	28	30.7
5/03/2013	32.7	30.9	32.4
6/03/2013	31.3	31.5	34.5
7/03/2013	30.6	29.9	35.2
8/03/2013	31.2	33.2	36.6
9/03/2013	25.8	24.9	31.4
10/03/2013	28.8	29.4	34.4
11/03/2013	29.7	26	29.5
12/03/2013	34.7	28.5	34.9
13/03/2013	37.2	39.9	42.7
14/03/2013	33	34.7	32.1
15/03/2013	32.2	43.5	32.8
16/03/2013	27.6	40.8	39.6
17/03/2013	34.7	28.7	28.8
18/03/2013	30.8	27.7	29.5
19/03/2013	31.8	28.8	27.4
20/03/2013	31.7	26.1	31
21/03/2013	30.8	35.5	27.9
22/03/2013	30.4	26	32
23/03/2013	34.2	30.2	31.8
24/03/2013	35.4	43.2	34.5
25/03/2013	32.9	29	30.6
26/03/2013	31.8	32.5	41.2
27/03/2013	32.2	29.8	38
28/03/2013	32.9	36.7	35.5
29/03/2013	28.1	32.7	40.1
30/03/2013	33	28.6	30.8
31/03/2013	35.5	25.5	31

April	Day dB(A)	Evening dB(A)	Night dB(A)
1/04/2013	29.8	34	36.1
2/04/2013	34.5	34.6	33.6
3/04/2013	34.9	30.9	36.9
4/04/2013	32.3	31.6	31.1
5/04/2013	29.9	26.5	35.4
6/04/2013	26.4	33.5	32.6
7/04/2013	31	36.8	33.3
8/04/2013	29.2	38.7	31.8
9/04/2013	30.8	31	33
10/04/2013	36.7	37.5	35.7
11/04/2013	28.8	34.9	37
12/04/2013	30.1	28.8	34.7
13/04/2013	31.1	37.9	30.8
14/04/2013	26.9	34.8	39.3
15/04/2013	33	39.5	35.6
16/04/2013	31.9	35.2	31.7
17/04/2013	30.9	33.9	31.5
18/04/2013	33.9	34.7	36.4
19/04/2013	35.7	36.1	35.3
20/04/2013	32.6	35.8	34.5
21/04/2013	30.3	28.3	34.6
22/04/2013	34.3	35.4	33.7
23/04/2013	33.3	34.1	33.4
24/04/2013	33	35.4	32.5
25/04/2013	27.1	33.9	32.5
26/04/2013	30.7	33.2	32
27/04/2013	28.5	29.5	31.8
28/04/2013	27.3	34.6	30.5
29/04/2013	31.5	32.1	34.6
30/04/2013	31.7	28	25.9



May	Day dB(A)	Evening dB(A)	Night dB(A)
1/05/2013	30.8	27.4	28.7
2/05/2013	30.4	27.5	30.5
3/05/2013	30.6	34	30
4/05/2013	32.1	29.9	32.3
5/05/2013			39.8
6/05/2013	31	28.7	34.7
7/05/2013	30.4	30.4	33.6
8/05/2013	31.1	31.9	34.9
9/05/2013	33.7	34.8	38.8
10/05/2013	32.9	32.9	38.3
11/05/2013	29.3	37.8	33.2
12/05/2013	29.9	36.4	40
13/05/2013	35.3	36.1	33.2
14/05/2013	41.7	37.7	35.1
15/05/2013	35.4	35.3	31.1
16/05/2013	37.8	36	33.6
17/05/2013	38.7	36.7	34.9
18/05/2013	36.4	43.5	40.6
19/05/2013	38.6	39.5	33.6
20/05/2013	32.8	35.7	33
21/05/2013	35.8	30.4	32.4
22/05/2013	33.4	31.6	33.1
23/05/2013	32.9	34	39.9
24/05/2013	37.9	38.9	35.3
25/05/2013	34.9	32.8	36.2
26/05/2013	35.7	35	36.2
27/05/2013	32.3	30.4	38.3
28/05/2013	32	32.1	26.1
29/05/2013	36.2	34.3	34.9
30/05/2013	33.2	34.9	36.8
31/05/2013	36.1	32.7	34.8

June	Day dB(A)	Evening dB(A)	Night dB(A)
1/06/2013	30.9	26.9	39.9
2/06/2013	37.6	38.7	43.6
3/06/2013	37.3	41.2	38.6
4/06/2013	34.4	32.8	33.4
5/06/2013	32.4	43.6	38.8
6/06/2013	31.2	30.2	34.7
7/06/2013	39.1	40.8	37.3
8/06/2013	27.5	30.8	33.8
9/06/2013	28.6	42.1	38
10/06/2013	32.3	34.1	43
11/06/2013	33.6	32.5	42.6
12/06/2013	31.4	38.9	40.9
13/06/2013	37.5	38.6	34.4
14/06/2013	35.5	31.1	32.7
15/06/2013	35.1	35.6	34.1
16/06/2013	35.2	35.2	40.4
17/06/2013	33	32	35.4
18/06/2013	36.6	40.1	37.7
19/06/2013	35	34.9	34.6
20/06/2013	-	-	-
21/06/2013	33.8	34.2	38.3
22/06/2013	34.2	33.8	34.1
23/06/2013	32.8	33.6	30.8
24/06/2013	33.4	41.5	36.1
25/06/2013	34.6	37.4	33.2
26/06/2013	35.6	37.4	36.4
27/06/2013	32.7	35.2	28.8
28/06/2013	31.4	30.2	28.6
29/06/2013	29.1	34.3	34.9
30/06/2013	31	40.7	37.2

July	Day dB(A)	Evening dB(A)	Night dB(A)
1/07/2013	34.9	29.1	36
2/07/2013	31.8	38.9	35.3
3/07/2013	32.9	33	40.1
4/07/2013	36.3	33.2	30.4
5/07/2013	42.1	37.6	38.8
6/07/2013	39.8	42.1	38.4
7/07/2013	31.6	33.8	36.5
8/07/2013	32.3	36.3	38.4
9/07/2013	32.1	34.9	33.7
10/07/2013	39.4	33.5	33.6
11/07/2013	29.4	32.7	31.3
12/07/2013	32.5	38.5	38
13/07/2013	33.3	34.3	30.4
14/07/2013	25.7	30.6	30.5
15/07/2013	29	31.7	36.2
16/07/2013	31.7	41.8	36.1
17/07/2013	31.5	33.5	36.4
18/07/2013	32.5	39.9	33.3
19/07/2013	33.9	29.3	33.2
20/07/2013	37.6	42.8	35.3
21/07/2013	35.5	36.8	35.8
22/07/2013	34.6	34.4	38.5
23/07/2013	39.3	40.7	33.2
24/07/2013	34.5	38.5	37.7
25/07/2013	33.3	35.3	38.1
26/07/2013	39.7	39.3	37.3
27/07/2013	30.8	33.8	34.6
28/07/2013	29.5	34	40.9
29/07/2013	34.4	37.3	35
30/07/2013	34.2	35.8	35.9
31/07/2013	32.9	31.8	38.3

August	Day dB(A)	Evening dB(A)	Night dB(A)
1/08/2013	30.9	33.9	40
2/08/2013	36.7	37.9	42
3/08/2013	37.1	38.2	32.1
4/08/2013	38.4	37.3	34.9
5/08/2013	38.7	36.1	40.1
6/08/2013	34.1	36.3	34
7/08/2013	34.1	33.4	34.8
8/08/2013	37.8	38.1	43.2
9/08/2013	33.3	42	35
10/08/2013	34.2	40.8	37.7
11/08/2013	37.9	41.2	39.2
12/08/2013	37.4	33.2	35.5
13/08/2013	35.5	36.8	33.6
14/08/2013	29.4	24.8	33.9
15/08/2013	32	30.9	35.6
16/08/2013	30.4	32.1	41
17/08/2013	30.8	34.1	34.4
18/08/2013	26.4	33.2	30.7
19/08/2013	38.5	36.2	37
20/08/2013	39.7	36.5	35.9
21/08/2013	33.4	38.8	35.1
22/08/2013	37	35.3	37.4
23/08/2013	39.5	41.2	36.7
24/08/2013	27.9	33.7	34.4
25/08/2013	30.3	34.2	36.7
26/08/2013	39.8	40.7	35.9
27/08/2013	37.4	36.7	39.3
28/08/2013	29.1	29.3	34.9
29/08/2013	28.3	34	36
30/08/2013	35.8	40.5	37
31/08/2013	34.3	40	34.8

<b>September</b>	Day dB(A)	Evening dB(A)	Night dB(A)
1/09/2013	30.1	30.9	37.8
2/09/2013	31.9	39.5	36.5
3/09/2013	31	35.4	37.8
4/09/2013	31.4	37.8	43.5
5/09/2013	35.2	42.5	33.8
6/09/2013	33.6	32.4	36.6
7/09/2013	36.9	35.8	32
8/09/2013	26.6	32.7	30
9/09/2013	28.7	35.8	31.4
10/09/2013	31.9	37.4	38.7
11/09/2013	31.9	40.9	34.3
12/09/2013	33.4	39	33.4
13/09/2013	28.4	32.8	36.9
14/09/2013	36.7	39.2	36.7
15/09/2013	26	37.5	33.5
16/09/2013	27.5	28.4	28.3
17/09/2013	31.1	31.6	29.8
18/09/2013	37.8	37.2	34.1
19/09/2013	38.3	38.4	32.2
20/09/2013	38.3	38.4	42.5
21/09/2013	30.5	36.7	34
22/09/2013	28.7	32.2	36.2
23/09/2013	31.3	37.5	38
24/09/2013	35	36.2	37
25/09/2013	36.1	35.8	38.2
26/09/2013	37.8	40.8	35.9
27/09/2013	25.2	33	40
28/09/2013	35.7	37.6	41.7
29/09/2013	26.5	34.6	35.9
30/09/2013	31.8	30.8	32.8

<b>October</b>	Day dB(A)	Evening dB(A)	Night dB(A)
1/10/2013	38.1	29	34.6
2/10/2013	30	37	35.6
3/10/2013	36.1	28.7	34.1
4/10/2013	30.4	31	34.1
5/10/2013	31.6	38.8	34.1
6/10/2013	30.3	44.2	38.7
7/10/2013	29.1	27.2	39.2
8/10/2013	32.2	37.6	32.9
9/10/2013	32.8	29.2	36
10/10/2013	34	34.4	28.6
11/10/2013	28.8	36.4	36.5
12/10/2013	31.9	27.6	35.8
13/10/2013	35.7	36.8	39.9
14/10/2013	33.6	37.3	39.6
15/10/2013	31.3	34.2	35.8
16/10/2013	32.3	35	39.8
17/10/2013	36.3	42.9	37.3
18/10/2013	28.4	32.1	39.3
19/10/2013	30.3	34.8	38.8
20/10/2013	33.2	31.1	40.4
21/10/2013	33.4	45.8	34.6
22/10/2013	32.9	36.6	35.3
23/10/2013	39.7	41.5	40.9
24/10/2013	40	38.6	42.4
25/10/2013	29.8	37.6	41.3
26/10/2013	31.4	37.7	36.3
27/10/2013	33.6	35.6	33.7
28/10/2013	30.8	25.6	37.4
29/10/2013	34.1	36.5	36.6
30/10/2013	31.7	31	33.8
31/10/2013	27	30.9	30

November	Day dB(A)	Evening dB(A)	Night dB(A)
1/11/2013	29.5	30.3	35.3
2/11/2013	30.9	42.1	42
3/11/2013	38.4	39.7	28.7
4/11/2013	30.9	27.6	38.2
5/11/2013	28.3	34.6	41.1
6/11/2013	30.6	33.5	36.2
7/11/2013	31.6	34.6	41
8/11/2013	28	31.3	38.7
9/11/2013	33.5	35.7	30.9
10/11/2013	30.5	32	39.5
11/11/2013	35.1	36.4	34.4
12/11/2013	39.4	30.6	35.5
13/11/2013	34	37.2	39.6
14/11/2013	36.1	39.6	32.7
15/11/2013	25.8	31.6	35.2
16/11/2013	29.4	38.2	31.8
17/11/2013	33.5	36.4	28.6
18/11/2013	30.3	24.8	25.1
19/11/2013	26.4	22.4	31.8
20/11/2013	24.7	27.1	30.3
21/11/2013	23	39.7	36.2
22/11/2013	31.3	32	34.2
23/11/2013	41.2	<i>BarnOwl down.</i>	
24/11/2013		<i>BarnOwl down.</i>	
25/11/2013		<i>BarnOwl down.</i>	
26/11/2013	25.9	32.1	31.4
27/11/2013	26.1	28.8	34.5
28/11/2013	26.3	27.9	34.3
29/11/2013	29.6	25.6	33.2
30/11/2013	32.3	33.4	35

December	Day dB(A)	Evening dB(A)	Night dB(A)
1/12/2013	30.4	32.8	33.8
2/12/2013	30.3	30.3	31.7
3/12/2013	28.2	31.9	35.4
4/12/2013	36.7	36.1	32
5/12/2013	38.6	39.6	37.5
6/12/2013	33.2	37.2	40.2
7/12/2013	31.4	33.2	36.3
8/12/2013	29.1	32.6	32.2
9/12/2013	29.3	23.1	27.3
10/12/2013	34.8	38.1	36.5
11/12/2013	36	36.7	35.7
12/12/2013	23	29.3	31.6
13/12/2013	27.5	32.4	32.3
14/12/2013	28.8	28.7	28.1
15/12/2013	25	29.7	33.8
16/12/2013	31.5	28.3	33.4
17/12/2013	30.6	29	30.9
18/12/2013	25.2	28.2	36.1
19/12/2013	27.2	29.3	37.6
20/12/2013	30.2	35	37.4
21/12/2013	31.7	35.8	30.9
22/12/2013	30.6	27.8	46.4
23/12/2013	28.9	36	33
24/12/2013	33.9	25.6	24.3
25/12/2013	26.4	25.2	25.8
26/12/2013	28.4	31.3	36.5
27/12/2013	28.8	32.3	32.7
28/12/2013	34.3	27.5	36.9
29/12/2013	33.9	29.4	28.5
30/12/2013	29.9	34.4	36.6
31/12/2013	30	37.5	35.3

## Appendix E: 2013 Blast Monitoring Results

**Table 55: Blast Monitoring Results**

Date	Location	Type	Antiene (AB) dB(L)	Antiene (R) mm/sec	DeBoer (AB) dB(L)	DeBoer (R) mm/sec	Sharman (AB) dB(L)	Sharman (R) mm/sec
02/01/13	SPE05	Overburden	103.00	0.09	110.00	0.22	108.30	0.18
04/01/13	EN02	Overburden	88.60	0.10	99.00	0.15	93.00	0.10
11/01/13	SPE06	Parting	84.40	0.02	90.10	0.09	89.50	0.04
11/01/13	SPE13	Overburden	74.60	0.04	87.70	0.09	94.30	0.16
12/01/13	SPE11	Pre-split	86.20	0.07	88.40	0.14	87.60	0.16
12/01/13	SPE12	Pre-split	87.60	0.04	89.90	0.09	87.00	0.08
14/01/13	SPE06	Parting	91.60	0.01	97.80	0.02	95.60	0.02
19/01/12	SPE09	Overburden	95.20	0.09	97.60	0.32	97.70	0.21
25/01/13	NN14	Parting	103.70	0.30	103.40	0.15	98.30	0.11
30/01/13	SPE10	Overburden	85.60	0.05	106.20	0.20	108.00	0.12
31/01/13	SPE10	Pre-split	77.70	0.02	75.80	0.03	82.90	0.03
01/02/13	SPE11	Overburden	80.30	0.04	78.80	0.05	85.90	0.05
08/02/13	SPE11	Overburden	90.90	0.06	97.70	0.16	95.60	0.07
09/02/13	SPE06	Parting	82.80	0.01	90.10	0.02	88.20	0.01
11/02/13	SPE12	Pre-split	99.30	0.04	101.10	0.08	90.40	0.06
13/02/13	SPE5 / SPE6	Parting / Overburden	97.10	0.06	99.60	0.18	97.80	0.10
18/02/13	SPE11	Overburden	88.00	0.07	94.50	0.10	92.60	0.05
18/02/13	SPE06	Parting	87.00	0.02	90.50	0.03	91.10	0.01
21/02/13	NN12	Overburden	98.30	1.55	106.30	1.42	104.70	0.74
27/02/13	SPE06	Overburden	89.40	0.08	93.10	0.39	93.80	0.11

06/03/13	NN13	Overburden	103.50	0.91	100.20	0.22	102.40	0.10
07/03/13	EN02	Overburden	93.60	0.18	98.70	0.46	101.20	0.20
09/03/13	SPE11 / SPE12	Overburden	90.30	0.06	95.30	0.13	96.40	0.10
14/03/13	SPE09	Overburden	98.70	0.03	97.60	0.09	97.50	0.05
18/03/13	EN02	Overburden	98.40	0.21	102.40	0.39	99.60	0.22
20/03/12	NN13	Parting	106.70	0.18	109.50	0.12	101.70	0.06
22/03/13	SPW13	Overburden	94.40	0.03	94.70	0.04	95.00	0.03
22/03/13	SPE12	Overburden	85.50	0.03	87.50	0.11	85.90	0.06
28/03/13	SPW13	Overburden	94.60	0.05	97.70	0.08	96.70	0.04
28/03/13	SPE12 / SPE13	Overburden / Pre-split	88.90	0.05	89.10	0.21	88.60	0.09
02/04/13	SPE06	Overburden	103.10	0.08	107.20	0.17	107.80	0.14
03/04/13	NN13	Overburden	101.10	0.19	103.20	0.15	94.80	0.07
06/04/13	NN13/14	Pre-split	108.30	0.63	106.50	0.35	101.10	0.23
06/04/13	SPE12	Overburden	78.50	0.06	84.70	0.01	86.20	0.01
09/04/13	SPE11	Overburden	93.70	0.10	99.00	0.23	101.20	0.16
11/04/13	SPW13	Overburden	105.40	0.11	111.40	0.27	104.20	0.11
12/04/13	SPE07	Overburden	97.00	0.12	101.60	0.61	99.10	0.25
15/04/13	SPE04	Parting	93.50	0.05	98.90	0.03	97.80	0.02
18/04/13	NN13 / NN13	Overburden / Pre-split	76.50	2.01	90.30	0.83	109.40	0.39
20/04/13	SPE09	Overburden	98.40	0.03	106.80	0.03	104.20	0.02
26/04/13	NN13	Overburden	108.10	1.64	107.50	0.44	106.70	0.25
26/04/13	SPE07	Pre-split	79.10	0.09	87.70	0.07	89.70	0.09
03/05/13	SPE07	Overburden	90.10	0.09	94.00	0.29	99.30	0.13
03/05/13	SPE13	Parting	95.90	0.03	98.10	0.03	96.90	0.02
04/05/13	SPE10	Overburden	94.10	0.04	102.30	0.06	103.30	0.04

06/05/13	EN02	Parting	101.80	0.04	95.30	0.07	93.60	0.05
06/05/13	NN08	Overburden	113.90	0.48	109.60	0.87	100.10	0.32
08/05/13	SPE12	Pre-split	92.50	0.10	93.00	0.17	88.60	0.16
08/05/13	SPE11	Overburden	86.10	0.05	90.50	0.08	89.80	0.07
10/05/13	SPE05	Overburden	90.80	0.06	95.00	0.01	94.30	0.01
11/05/13	NN08	Overburden	105.60	0.24	113.20	0.13	97.30	0.23
13/05/13	SPE10	Overburden	85.10	0.05	89.20	0.05	89.10	0.05
16/05/13	SPE10	Overburden	90.10	0.06	98.80	0.17	100.60	0.13
20/05/13	SPE10	Overburden	103.10	0.11	102.70	0.37	98.20	0.23
22/05/13	SPE07	Parting	100.20	0.03	101.50	0.06	95.00	0.04
28/05/13	SPE10	Overburden	89.70	0.06	95.10	0.29	95.60	0.13
29/05/13	NN13	Overburden	94.70	0.13	94.70	0.06	93.80	0.03
01/06/13	SPE12	Overburden	83.00	0.10	85.00	0.19	87.20	0.16
04/06/13	NN09	Overburden	100.30	0.26	98.80	0.47	96.00	0.17
04/06/13	SPE11	Overburden	91.60	0.05	95.50	0.09	95.70	0.06
05/06/13	SPE07	Parting	89.20	0.04	95.40	0.11	93.00	0.07
07/06/13	SPE011	Overburden	78.10	0.03	90.00	0.02	87.20	0.01
08/06/13	SPE07	Parting	110.40	0.07	110.30	0.26	104.00	0.12
12/06/13	SPE07	Parting	88.20	0.04	94.10	0.22	92.90	0.07
14/06/13	NN13	Pre-split	96.90	1.10	98.60	0.55	100.60	0.37
17/06/13	SPW13	Overburden	104.80	0.10	109.60	0.14	105.50	0.11
18/06/13	SPE07	Overburden	76.10	0.04	78.80	0.01	82.20	0.01
20/06/13	SPE11	Parting	92.90	0.02	94.60	0.06	92.50	0.04
20/06/13	SPE06/7	Parting	92.60	0.02	91.90	0.03	90.30	0.02
21/06/13	SPE11	Parting	101.00	0.03	100.90	0.01	95.10	0.01
26/06/13	SPE10	Overburden	97.20	0.09	99.30	0.34	99.30	0.17

02/07/13	SPE04	Parting	74.70	0.02	85.20	0.05	88.30	0.03
03/07/13	NN13 / NN13	Overburden / Pre-split	102.90	0.79	98.30	0.42	99.10	0.20
04/07/13	SPE06/7	Parting	90.00	0.02	97.10	0.10	104.20	0.03
05/07/13	SPE10	Overburden	84.60	0.11	90.90	0.16	103.70	0.13
08/07/13	SPE07 / SPE09	Parting / Presplit	89.90	0.08	89.40	0.17	86.80	0.14
08/07/13	NN13	Overburden	100.40	0.72	103.40	0.43	98.60	0.32
10/07/13	NN09	Overburden	118.80	0.32	116.30	0.31	105.50	0.23
13/07/13	SPE10	Overburden	92.20	0.10	96.40	0.46	94.00	0.17
15/07/13	NN13	Overburden	96.50	0.79	<b>90.50</b>	0.34	91.60	0.19
16/07/13	SPE10	Parting	85.30	0.02	91.80	0.10	91.30	0.04
18/07/13	NN13	Overburden	92.30	1.29	94.30	0.53	95.70	0.19
22/07/13	SPE10	Parting	94.40	0.02	95.30	0.06	99.60	0.04
26/07/13	SPE10	Parting	96.90	0.02	99.30	0.05	99.50	0.03
27/07/13	SPE09/10	Overburden	88.60	0.09	90.20	0.51	89.90	0.14
01/08/13	NN13	Overburden	99.10	2.10	98.30	0.65	93.30	0.26
02/08/13	SPE13	Overburden	90.30	0.05	94.90	0.09	93.50	0.08
06/08/13	SPE07	Parting	86.00	0.02	87.60	0.07	94.00	0.02
06/08/13	SPW13	Overburden	90.60	0.05	87.90	0.08	92.10	0.05
07/08/13	SPE12	Overburden	91.60	0.04	96.70	0.10	98.80	0.06
08/08/13	SPW14	Presplit	87.00	0.05	97.50	0.05	100.70	0.06
15/08/13	SPW13	Overburden	98.50	0.05	103.00	0.12	101.80	0.70
16/08/13	SPE14	Parting	89.90	0.06	87.80	0.09	80.60	0.06
21/08/13	SPE10 / SPW13	Parting / Overburden	91.20	0.03	90.00	0.07	85.00	0.04
23/08/13	SPE09 / SPW14	Overburden /	85.90	0.05	86.10	0.10	96.30	0.06



		Presplit						
26/08/13	SPE09	Parting	97.20	0.05	102.00	0.18	101.80	0.08
30/08/13	SPE13	Overburden	89.00	0.06	96.50	0.28	87.70	0.15
31/08/13	SPE14 / SPE14	Parting / Overburden	89.60	0.20	88.00	0.06	84.60	0.06
04/09/13	SPE09	Parting	107.50	0.02	106.40	0.22	101.50	0.05
07/09/13	SPE10	Parting	87.90	0.01	93.00	0.04	96.60	0.02
13/09/13	SPE14	Overburden	96.40	0.06	98.80	0.23	95.80	0.16
14/09/13	SPE10	Parting	88.40	0.01	93.00	0.05	96.50	0.03
19/09/13	NN13	Parting	111.00	0.80	111.80	0.53	106.30	0.19
24/09/13	SPE09	Parting	100.20	0.06	100.50	0.22	91.90	0.09
30/09/13	SPE12	Overburden	91.40	0.15	91.70	0.67	96.50	0.28
03/10/13	SPE09	Parting	97.80	0.11	101.00	0.23	99.60	0.12
05/10/13	SPW13	Presplit	86.20	0.06	94.20	0.10	98.30	0.07
10/10/13	SPE09 / SPE12	Parting / Overburden	99.80	0.01	101.50	0.06	96.10	0.04
11/10/13	SPW14	Overburden	96.70	0.02	98.70	0.07	105.40	0.05
18/10/13	SPW13	Overburden	94.70	0.05	107.90	0.11	95.20	0.10
24/10/13	SPE12	Overburden	93.00	0.08	97.70	0.38	95.80	0.17
24/10/13	NN13	Parting	93.70	0.05	98.10	0.08	98.50	0.02
29/10/13	SPW13	Overburden	90.80	0.05	92.60	0.14	86.80	0.09
31/10/13	SPE09	Parting	89.30	0.01	92.20	0.06	85.50	0.02
01/11/13	SPE12	Overburden	80.20	0.03	92.80	0.08	86.10	0.05
05/11/13	SPE12	Overburden	93.60	0.04	101.30	0.08	102.00	0.06
08/11/13	SPE12	Parting	91.10	0.07	93.30	0.19	91.70	0.13
09/11/13	SPW14	Presplit	90.50	0.07	92.80	0.09	100.50	0.07
15/11/13	SPE09 / SW14	Parting /	96.70	0.01	96.20	0.06	93.60	0.02

Overburden								
21/11/13	SPE08	Parting	88.30	0.01	93.10	0.08	92.60	0.03
22/11/13	SPE12	Overburden	97.00	0.06	105.00	0.16	103.20	0.09
26/11/13	SPE06	Parting	86.10	0.01	86.50	0.02	82.90	0.01
27/11/13	SPE12	Overburden	91.10	0.03	93.30	0.15	90.50	0.08
28/11/13	SPW13	Presplit	89.60	0.05	87.80	0.07	84.80	0.04
02/12/13	SPW13	Overburden / Presplit	88.70	0.06	87.10	0.06	84.60	0.05
04/12/13	SPE12	Overburden	81.50	0.02	78.70	0.04	78.70	0.04
11/12/13	SPE12	Overburden	94.90	0.03	93.90	0.10	97.30	0.06
12/12/13	SPE14	Overburden	95.10	0.06	97.00	0.27	98.70	0.11
14/12/13	SPW13	Overburden	96.60	0.02	94.30	0.05	98.20	0.02
19/12/13	SPW14	Overburden	92.10	0.04	92.20	0.09	89.20	0.06
23/12/13	SPE11	Overburden	94.00	0.07	81.20	0.13	89.40	0.09
24/12/13	SPE12	Parting	89.50	0.01	99.50	0.03	89.90	0.02
30/12/13	SPE13	Overburden	89.60	0.02	100.70	0.05	88.60	0.03

## Appendix F: 2013 Enquiries, Concerns and Complaints

**Table 56: List of Enquiries, Concerns and Complaints Received throughout 2013**

Date	Location	Enquiry, Concern OR Complaint	Nature	Outcome
<b>January</b>				
18/01/2013	Balmoral Road Resident	Enquiry	Blast – Noise & vibration	The resident enquired about two blasts, one on the 17 <sup>th</sup> Jan at 10:40am and the second on the 18 <sup>th</sup> Jan at 10:40-45am. The blasts were very loud and shook the house. The matter was investigated and it was found that Drayton did not blast at these times. A source was not identified. The resident was notified of the outcome.
24/01/2013	EPA - Anonymous	Complaint	Spon Com Odour	The EPA forwarded the following complaint to Drayton: The complainant could smell a bad odour, like acid sulphur, coming from the Drayton coal mine at 07:00am on the 24 <sup>th</sup> Jan. It is believed that the caller is a long way from Drayton and that the smell is unlikely to be from Drayton considering the wind direction (SE). The call was logged as a complaint and no further action was required.
<b>February</b>				
11/02/2013	Scone Resident	Complaint	Spon Com Odour	The resident made a complaint on the 11 <sup>th</sup> Feb at 09:03pm in regards to spontaneous combustion odour at 08:52pm on the same day. The Drayton SHE Manager responded to the complaint and discussed the issues with the resident. The SHE Manager invited the resident out to Drayton for a site visit however, they were not interested as they have seen it before. No further follow up was required
<b>March</b>				
9-11/03/2013	Balmoral Road, Muswellbrook	Complaint	Noise	The resident made a complaint on the 10 <sup>th</sup> March regarding loud noises, including trains and tipping sounds, on Saturday and Sunday (9th and 10th March) night. The resident wanted to know what was going on. The Environmental Graduate phoned the resident and informed them that the complaint had been received and was being investigated. The

				investigation found that there was some activity in the north pit on the Saturday and Sunday nights but that work was now finished. There was also a train being loaded early on the Monday morning at 12:00-02:00am. The Environment Graduate notified the resident of these findings and that a noise monitor would be installed at the end of Balmoral Road during the year.
13/03/2013	Thomas Mitchel Drive, Muswellbrook	Complaint	Noise	The resident made a complaint regarding noise coming from the direction of the Drayton Coal Mine on the night of the Wednesday 13 <sup>th</sup> March. The sound was a groan/roar and continued throughout the night. The matter was investigated and the noise was thought to be caused by the intense rail works that were occurring during the week. The resident was notified of these works taking place. The works are scheduled to be finished by Saturday (16/03/13) morning. The Environmental Coordinator spoke to the resident and discussed the rail upgrade works. The resident thought the noise was coming from the pit. The resident said that they could tolerate the noise for this short term project. The SHE Manager also spoke to resident and offered to pay for Motel accommodation in town while the works were going on. The resident declined and no further action was required.
22/03/2013	McClintock Drive, Muswellbrook	Enquiry	Blast	The resident enquired about a blast of 8 to 10 seconds which occurred on the 22 <sup>nd</sup> March at 12:35pm. The Environmental Officer investigated and found it to be a Mt Arthur blast. The Officer called the resident at 01:45pm however, the resident had already tracked the source through their own investigations. The resident thanked Officer for the response.
<b>April</b>				
5/04/2013	EPA - Anonymous	Complaint	Odour	The EPA forwarded the following complaint to Drayton: The complainant could smell an acrid odour coming from the Drayton Coal Mine on Thomas Mitchell Drive on the 5 <sup>th</sup> April at 07:10am. The SHE Manager followed up but the EPA had no further information. The incident was investigated and logged as a complaint. No further action was taken.
18/04/2012	Balmoral Road, Muswellbrook	Complaint	Blast - Dust / Noise	The resident made a complaint regarding dust resulting from the Drayton blast in the North pit at 03:15pm. The resident was in the traffic on Thomas Mitchell Dr, which was held up due to the blast, and made the complaint to traffic control. The resident also made a complaint about noise from the previous night. The resident also forwarded the complaint to the Department of Planning and Infrastructure (DP&I). The Environmental Coordinator spoke to DP&I Officer regarding the complaint and provided the blast results (blast results from the Antiene monitor were 76.5dBI and 2.01mm/s) and noise levels for the previous night.
26/04/2012	Balmoral	Complaint	Blast -	The resident made a complaint regarding blast vibration from a series of four shots on the

	Road, Muswellbrook		Vibration	26 <sup>th</sup> April. The Drayton blast in the North pit at 10:22am corresponded to one of the times listed (10:20am). The resident requested the results from the blast. The Environmental Officer provided the resident with the results (blast results from the Antiene monitor were 108.1dBI and 1.64mm/s) at 10:45am on the 29 <sup>th</sup> April. The delay in the response was due to a delay in the receipt of fax.
20/04/2013	EPA - Anonymous	Complaint	Spon Com Odour	The EPA forwarded the following complaint to Drayton: Odour from the Drayton Coal Mine, between Muswellbrook and Singleton. Acrid sulphur smell from spontaneous combustion of the coal seams. The complainant is 50km away and experiences this problem fairly often. The complainant detected the odour last Saturday afternoon, 20 <sup>th</sup> April. The complaint was investigated and discussed with the EPA. No further action was required.
<b>May</b>				
2/05/2013	EPA - Anonymous	Complaint	Spon Com Odour	The EPA forwarded the following complaint to Drayton: Offensive odours from Drayton, Thomas Mitchell Drive Muswellbrook, affecting a resident of Scone on the 2 <sup>nd</sup> May. The odour was described as acrid sulphur. The complainant first noticed the odour at 08:00am and it was still present when they left for work 15 minutes later. The complaint was investigated and it was found that the wind, between 06:00am and 10:00am, was coming from a SE direction at an average speed of 17.5km/h. The SHE Manager discussed the complaint with the EPA. No further action was required.
6/05/2013	Balmoral Road, Muswellbrook	Complaint	Blast - Notification	The resident made a complaint about not being notified of a shot in the North pit. The resident was informed that the Environmental Graduate had called that day and left a message on the answering service. The message was not received by the resident. No further action was required.
17/05/2013	Balmoral Road, Muswellbrook	Enquiry	Blast	The resident made an enquiry via the DP&I regarding four blasts which occurred in the 3rd week of May. No blasting occurred at Drayton or Mount Arthur at or close to the times provided.
<b>June</b>				
23/06/2013	Scone Resident	Complaint	Spon Comb Odour	The resident called on the 23 <sup>rd</sup> June to report a strong smell in the air. The resident noticed the smell while doing yard work at 03:00pm. The SHE Manager investigated and noted on the complaint form that the resident lives a significant distance from Drayton (30km). The resident has been invited to site previously

and has declined the offer. No further action is required.

26/06/2013	Queen Street, Muswellbrook	Enquiry	Blast - Vibration	The resident felt a vibration at 11:30am on the 26 <sup>th</sup> June and enquired as to whether it was caused by Drayton. It was not a Drayton blast and the Environmental Coordinator contacted other mine sites to identify a source. No other mines blasted at this time however, personnel from Muswellbrook Coal informed the Environmental Coordinator of a small seismic event which occurred at the time. The Environmental Coordinator called the resident at 03:30pm on the 27 <sup>th</sup> June to notify them of the source.
<b>July</b>				
3/07/2013	Balmoral Road, Muswellbrook	Complaint	Blast – Noise & Vibration	The resident made a complaint regarding a blast at 03:03pm. The resident said that the blast was very loud and that it shook the house. The Environmental Officer called the resident at 04:20pm and provided them with the results from the Antiene monitor (102.9dBL and 0.79mm) and the blasting criteria / limits. The resident said that they understood that the blast was within the limits but suggested that the limits need reviewing as the blasts shook even the foundations of their residence. No further action was required.
10/07/2013	Balmoral Road, Muswellbrook	Complaint	Blast – Notification & Vibration	The resident made a complaint regarding a blast in the North pit at 03:18pm. The resident stated that they were notified that the blast would be fired at 03:00pm however the blast was not fired until 03:20pm. The resident also stated that the blast was very severe and not acceptable. The complaint was investigated and a return phone call was made to the resident at approximately 03:40pm. Overpressure levels were elevated above internal standards of 112dB and exceeded the lower statutory limit of 115dB. This is allowable for up to 5% of blasts and was not externally reportable. Overpressure levels were 118.8dB at Antiene and 116.3 at the DeBoer monitor. An incident was raised in the system to address the issue.
18/07/2013	Hassall Rd, Muswellbrook	Complaint	Blast - Vibration	The resident made a complaint in regards to vibration from the shot at approximately 03:50pm on the 18 <sup>th</sup> July. The resident could feel the shot and noticed that cracks were starting to reappear in her house. The resident has felt several blasts over the past weeks and has not complained. The Environmental Coordinator spoke to the resident on the same day, regarding the blast. Blast results were not available at the time however, the Environmental Coordinator called the resident again at 09:00am on the 19 <sup>th</sup> July with the results (Deboer 94.3dBI & 0.53mm/s; Sharman 95.7dBI & 0.19mm/s). The resident mentioned that the cracks in her house are getting quite bad and asked if the Environmental Coordinator would like to inspect the house. The Environmental Coordinator declined an inspection but encouraged the resident to call if future blasts continue to cause problems.

August				
1/08/2013	Balmoral Road, Muswellbrook	Complaint	Blast	The resident made a complaint, via the Drayton hotline in regards to a shot in the North pit at 03:27pm on the 1 <sup>st</sup> August. The message was not received by the Drayton Environment Department; the Environment Department was notified of the complaint by the DP&I. The Environmental Graduate attempted to respond to the complaint on the 5 <sup>th</sup> August at 02:46pm but was not able to contact the resident; a message was left on the answering service. The Environmental Graduate contacted the resident at 02:09pm on the 6 <sup>th</sup> August. The Environmental Graduate informed the resident that the issue with the hotline would be looked into, and provided the blast results for the Antiene monitor (99.1dbL and 2.1mm/sec).
7/08/2013	Race Course Road, Muswellbrook	Enquiry	Blast	The resident made an enquiry about a blast at 02:00pm on the 7 <sup>th</sup> August. The Environmental Coordinator called the resident at 10:10pm on the 8 <sup>th</sup> August to no answer. A message was left on the resident's mobile. The resident called back at 10:30am and the Environmental Coordinator informed them that Drayton did not blast at the time specified.
9/08/2013	Balmoral Road, Muswellbrook	Enquiry	Blast - Vibration	The resident made an enquiry about a blast at 09:24am on the 9 <sup>th</sup> August. The Environmental Coordinator phoned the resident and informed them that Drayton had not blasted on the date specified. The Environmental Coordinator told the resident that Drayton could look into it if the resident was unable to find out who the source of the blast was. Minor overpressure from the blast was felt at Drayton. No further action was required.
September				
10/09/2013	EPA - Anonymous	Complaint	Dust	<p>The EPA forwarded the following complaint to Drayton on the 10<sup>th</sup> September:  High winds are whipping up dust from the coal mines. The complainant drove past Drayton at Muswellbrook a few times that morning between 8am and 10am and noticed the quantity of dust is unacceptable. The dust was apparently so dense that driver visibility on the New England Hwy is impaired. "Shouldn't they shut down when the winds are so strong?"</p> <p>The complaint was investigated and it was found that elevated dust levels had been forecast due to high winds as a result, operations were adjusted:</p> <ul style="list-style-type: none"> <li>• Haul roads that were in operation were well watered.</li> <li>• The dragline was down for the day.</li> <li>• Excavator 307 was down.</li> <li>• 2 x D11 Dozers scheduled to conduct rehabilitation works (this work was on elevated land on site) were stopped during the day to reduce off site visible dust.</li> </ul> <p>Additionally, the SHE Manager inspected the New England Highway and did not identify</p>

				any visible dust from Drayton. Whilst not in Drayton's control there was a fire burning towards the east of Bayswater Power Station this appeared to be generating smoke that was blowing over the New England Highway. Drayton did not receive any other complaints in regards to dust on this day. The SHE Manager provided the EPA as a response to the complaint on the 12 <sup>th</sup> September at 03:37pm. No further action was required.
13/09/2013	DP&I - Anonymous	Complaint	Spon Com Odour	The DP&I received a complaint regarding odour from Drayton at 01:34pm on the 13 <sup>th</sup> September. The complainant lives in Aberdeen (20km from Drayton) but was adamant that the odour was from Drayton. The Environmental Coordinator contacted a DP&I Officer at 02:50pm on the same day and discussed the current spon comb status, wind direction and complainant location. The Environmental Coordinator informed the DP&I Officer that there were no spontaneous combustion outbreaks or odour issues that day. The complaint was been logged and no further action was required.
<b>October</b>				
4/10/2013	Pamger Drive, Muswellbrook	Complaint	Noise	The resident made a complaint in regards to machinery operating overnight on the 3 <sup>rd</sup> October and said that it had been going on for a while. The Environment Graduate investigated and found that noise was within limits and that there were no notable changes in noise levels in the past week. Machinery could be heard on the BarnOwl soundwave files for the night of the 3 <sup>rd</sup> October. There was work being carried out down in the North pit however machinery use in this area is minimised overnight to reduce noise. No machinery was being used in the CHP area and no trains were being loaded during the incident time. Loader 1122 was working on the ROM. The Environmental Graduate Grad phoned the resident at 03:55pm on the 4 <sup>th</sup> October to talk to them about the findings of the investigation. The resident said that they heard the noise in the early morning but it was no longer audible. The resident was happy with the response and no further action was required.
16/10/2013	EPA - Anonymous	Complaint	Dust	The EPA forwarded the following complaint to Drayton on the 16 <sup>th</sup> October: The complainant was looking from the Ravensworth area towards the Drayton and Mount Owen mines and can see a plume of dust that must be at least 200m high in the air. The Environmental Graduate investigated on the 17 <sup>th</sup> October and found that the average wind speed at Drayton for the 16 <sup>th</sup> October was 2.2m/s. The only issue recorded on the Environmental (Dust) Check Sheet for the day was dust from the MMG rehab dozer, as a result the dozer push was stopped at 10:30am. No other site issues were recorded. The SHE Manager informed the EPA of these findings on the 21 <sup>st</sup> October and no further action was required.



29/10/2013	EPA - Anonymous	Complaint	Spon Com Odour	<p>The EPA received the following complaint at 22:30hrs on the 29<sup>th</sup> October and forwarded it to Drayton on the 31<sup>st</sup> October:</p> <p>At approximately 10:30pm the complainant was affected by an odour which was described as an acrid sulfur smell, likely from ongoing spontaneous combustion at the mine [Drayton]. The complainant indicated that the local wind conditions contribute to the problem, seemingly worse at night.</p> <p>The Environmental Graduate investigated on the 1<sup>st</sup> November and found that at the time of the complaint the wind direction was from the SE with wind speeds around 3m/s. Despatch did not record any spon com issues that night.</p> <p>The SHE Manager informed the EPA of the findings and no further action was required.</p>
<b>November</b>				
16/11/2013	Scone Resident	Complaint	Spon Com Odour	<p>The resident made a complaint in regards to spon com odour on the 16<sup>th</sup> November. The Environmental Coordinator investigated and contacted the resident at 08:10pm to discuss the issue. No further action was required.</p>
<b>December</b>				
2/12/2013	EPA - Anonymous	Complaint	Spon Com Odour	<p>The EPA forwarded the following complaint to Drayton on the 3<sup>rd</sup> December:</p> <p>The complainant could smell a strong sulphur odour coming from the Drayton Coal Mine at approximately 05:00am on the 2<sup>nd</sup> December. The complainant and that it was affecting their breathing.</p> <p>The Environmental Graduate investigated on the 3<sup>rd</sup> December and found that at the time of the complaint the wind direction was from the SE with wind speeds around 0.771m/s. The average wind speed for the morning (00:00 to 12:00hrs) was 2.134m/s and the wind continued to come from the SE. The OCE did not recall any spon comb issues on the morning of the 2<sup>nd</sup> December and no gas monitors alarmed. The operators did not request any additional gas monitors that day.</p> <p>The SHE Manager informed the EPA of the findings and no further action was required.</p>
14/12/2013	Scone Resident	Complaint	Spon Com Odour	<p>The resident made a complaint in regards to spontaneous combustion odour at 10:20am on the 14<sup>th</sup> December. The OCE at the time informed the resident that there were no spon com issues at the time of the complaint. No further action was required.</p> <p>The EPA contacted the Environment Coordinator to discuss the complaint. The EPA will come to site in 2014 for an inspection.</p>

## Appendix G: Anglo American Safety, Health and Environment Risk Matrix

Table 57: Anglo American Risk Matrix

AAplc Risk Matrix	Hazard Effect/ Consequence				
Loss Type	1. Insignificant	2. Minor	3. Moderate	4. High	5. Major
<p align="center"><b>(S/H)</b> Harm to people (safety /health)</p>	<p align="center">First aid case / Exposure to minor health risk</p>	<p align="center">Medical Treatment case / Exposure to major health risk</p>	<p align="center">Lost time injury / Reversible impact on health</p>	<p align="center">Single fatality or loss of quality of life / Irreversible impact on health</p>	<p align="center">Multiple fatalities / Impact on health ultimately fatal</p>
<p align="center"><b>(EI)</b> Environmental Impact</p>	<p align="center">Minimal environmental harm – L1 incident</p>	<p align="center">Material environmental harm – L2 incident remediable short term</p>	<p align="center">Serious environmental harm – L2 incident remediable within LOM</p>	<p align="center">Major environmental harm – L2 incident remediable post LOM</p>	<p align="center">Extreme environmental harm – L3 incident irreversible</p>
<p align="center"><b>(BI/MD)</b> Business interruption / Material damage and other consequential losses</p>	<p align="center">No disruption to operation 5% loss of budgeted operating profit / listed assets</p>	<p align="center">Brief disruption to operation 10% loss of budgeted operating profit / listed assets</p>	<p align="center">Partial shutdown / 15% loss of budgeted operating profit / listed assets</p>	<p align="center">Partial loss of operation / 20% loss of budgeted profit / listed assets</p>	<p align="center">Substantial or total loss of operation 25% loss of budgeted profit / listed assets</p>
<p align="center"><b>(L&amp;R)</b> Legal and regulatory</p>	<p align="center">Low level legal issue</p>	<p align="center">Minor legal issue: non- compliance and breaches of the law</p>	<p align="center">Serious breach of law: investigation / report to authority, prosecution and/or moderate penalty possible</p>	<p align="center">Major breach of the law: considerable prosecution and penalties</p>	<p align="center">Very considerable penalties &amp; prosecutions. Multiple law suits &amp; jail terms</p>

<b>(R/S/C) Impact on reputation, social and community</b>	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
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Likelihood	Examples	Risk Rating				
<b>5 (Almost Certain)</b>	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)
<b>4 (Likely)</b>	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)
<b>3 (Possible)</b>	The unwanted event has happened in the business at some time: or could happen within 10	4 (L)	8 (M)	13 (S)	18 (S)	22 (H)

	years					
<b>2 (Unlikely)</b>	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)
<b>1 (Rare)</b>	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: 2013 Rail Activity Statement

**RAIL ACTIVITY STATEMENT  
FOR PERIOD 1/1/2013 - 31/12/2013  
(Destination for all trains was Port of Newcastle)**

Date	Drayton Coal		Mt Arthur Coal		Total Rail Activity	
	Total trains per day	Total tonnage per day	No trains	Total tonnage per day	Total Train Movements / day	Total Tonnage per day
01-Jan-13	3	26549.1	7	55671.3	10	82220.4
02-Jan-13			9	71395.8	9	71395.8
03-Jan-13			10	79613.6	10	79613.6
04-Jan-13			8	63325.6	8	63325.6
05-Jan-13	3	25217.95	10	79716.3	13	104934.25
06-Jan-13	1	7973	8	63647.5	9	71620.5
07-Jan-13	1	8629.6	4	31861.9	5	40491.5
08-Jan-13	2	17858	4	31891.2	6	49749.2
09-Jan-13			7	55803.3	7	55803.3
10-Jan-13	1	8575.6	9	71309.4	10	79885
11-Jan-13	1	9476.8	11	87203.9	12	96680.7
12-Jan-13	1	8753.8	6	47585.3	7	56339.1
13-Jan-13			10	79567.9	10	79567.9
14-Jan-13			9	71631.3	9	71631.3
15-Jan-13	2	17024.85	5	39747.8	7	56772.65
16-Jan-13	1	8581.5	3	23953.2	4	32534.7
17-Jan-13			7	54935.3	7	54935.3
18-Jan-13			6	47805.8	6	47805.8
19-Jan-13	1	8274.8	10	79173.6	11	87448.4
20-Jan-13	1	8718	7	55490.2	8	64208.2
21-Jan-13	1	8402	10	78737.9	11	87139.9
22-Jan-13			9	71585.1	9	71585.1
23-Jan-13			8	62952.6	8	62952.6
24-Jan-13			8	62823.9	8	62823.9
25-Jan-13			6	47628.3	6	47628.3
26-Jan-13			5	39719.2	5	39719.2
27-Jan-13	1	7701.25	5	39820.3	6	47521.55
28-Jan-13	1	8427.8	7	56350.1	8	64777.9
29-Jan-13	2	16160.3	8	64381.5	10	80541.8
30-Jan-13	2	13887.6	9	71976.4	11	85864
31-Jan-13	1	8103.4	7	55983.6	8	64087
01-Feb-13	1	8637.1	9	71493.6	10	80130.7
02-Feb-13	1	8975	9	71988	10	80963
03-Feb-13	3	24686.3	10	79786.9	13	104473.2
04-Feb-13	2	16814.35	10	79764.6	12	96578.95
05-Feb-13			8	63292.9	8	63292.9
06-Feb-13			8	64114.6	8	64114.6

07-Feb-13			4	32021.4	4	32021.4
08-Feb-13	2	15790.2	7	55886.8	9	71677
09-Feb-13	3	23588.4	7	55672.3	10	79260.7
10-Feb-13	3	25231.7	8	63641.7	11	88873.4
11-Feb-13	3	24706.15	1	8026.6	4	32732.75
12-Feb-13	1	8200.4	1	7954	2	16154.4
13-Feb-13	2	16983.3	5	39884.7	7	56868
14-Feb-13	2	16019.6	3	23810.3	5	39829.9
15-Feb-13	2	17632.6	6	47978.4	8	65611
16-Feb-13	1	8736.1	5	39568.5	6	48304.6
17-Feb-13	2	16821.2	3	23833.6	5	40654.8
18-Feb-13			8	63694	8	63694
19-Feb-13	3	24844.2	5	39784.4	8	64628.6
20-Feb-13			6	47882.2	6	47882.2
21-Feb-13	1	9430.2	4	31916.5	5	41346.7
22-Feb-13	2	16678.15	5	40161.1	7	56839.25
23-Feb-13	1	8376.8	8	64195.2	9	72572
24-Feb-13	1	7520.8	5	40019.4	6	47540.2
25-Feb-13	1	7573.6	7	54619.5	8	62193.1
26-Feb-13	1	8702.2	6	47497.4	7	56199.6
27-Feb-13	1	9151.45	7	55817.3	8	64968.75
28-Feb-13			2	15990.4	2	15990.4
01-Mar-13	1	8092.6	2	16043.6	3	24136.2
02-Mar-13	2	18242.6	7	56524.4	9	74767
03-Mar-13	4	34100.7	3	23922.4	7	58023.1
04-Mar-13	2	16034	4	32320.6	6	48354.6
05-Mar-13	3	22345.05	5	39826.1	8	62171.15
06-Mar-13			4	32060.3	4	32060.3
07-Mar-13			5	39866.6	5	39866.6
08-Mar-13	3	25301.7	5	39548.4	8	64850.1
09-Mar-13			5	39939.9	5	39939.9
10-Mar-13	2	16188	7	56385.8	9	72573.8
11-Mar-13			6	47550.4	6	47550.4
12-Mar-13					0	0
13-Mar-13					0	0
14-Mar-13					0	0
15-Mar-13					0	0
16-Mar-13	2	17124.2	5	39285.4	7	56409.6
17-Mar-13	1	8633.4	7	55348.7	8	63982.1
18-Mar-13	1	8744	7	55485.6	8	64229.6
19-Mar-13			8	63653	8	63653
20-Mar-13			5	39682.5	5	39682.5
21-Mar-13			5	39916.6	5	39916.6
22-Mar-13			4	31728.2	4	31728.2
23-Mar-13	1	8592.1	6	47652.8	7	56244.9
24-Mar-13	3	24500.8	3	23782.9	6	48283.7

25-Mar-13	1	8361	5	39705.6	6	48066.6
26-Mar-13	2	16435.45	6	47700.2	8	64135.65
27-Mar-13	3	24705.4	6	48017.1	9	72722.5
28-Mar-13	2	17579.05	6	47563.4	8	65142.45
29-Mar-13	3	25686.8	6	47645.6	9	73332.4
30-Mar-13	2	17139.6	5	39660.2	7	56799.8
31-Mar-13	2	17046.45	3	23895.6	5	40942.05
01-Apr-13	2	16722.25	5	39703.9	7	56426.15
02-Apr-13	3	24653.15	5	40297.1	8	64950.25
03-Apr-13	2	16901.8	7	55137	9	72038.8
04-Apr-13	3	25845.85	6	47305.8	9	73151.65
05-Apr-13	1	8489.6	2	15474.6	3	23964.2
06-Apr-13	3	25389.4	6	47418.9	9	72808.3
07-Apr-13	3	25302.65	8	63469.3	11	88771.95
08-Apr-13	1	8348.8	7	56096.1	8	64444.9
09-Apr-13	2	16972.75	7	55888.3	9	72861.05
10-Apr-13	2	17597.2	7	55699.9	9	73297.1
11-Apr-13	1	9109	4	31410.3	5	40519.3
12-Apr-13	2	16620.15	5	39725	7	56345.15
13-Apr-13	2	17026.15	1	7932.9	3	24959.05
14-Apr-13	2	17328.6	4	31746.5	6	49075.1
15-Apr-13	2	16865.25	8	63079.8	10	79945.05
16-Apr-13	3	25921.5	10	79157.9	13	105079.4
17-Apr-13	2	17271.1	11	87115.7	13	104386.8
18-Apr-13	2	17126.15	8	64061	10	81187.15
19-Apr-13	1	9203	5	39218	6	48421
20-Apr-13	1	8589.8	7	55480.9	8	64070.7
21-Apr-13	1	9279	3	23722.6	4	33001.6
22-Apr-13	1	8658	3	23336.2	4	31994.2
23-Apr-13			3	23834.7	3	23834.7
24-Apr-13	1	3853	3	23862	4	27715
25-Apr-13			5	39770	5	39770
26-Apr-13			7	55678	7	55678
27-Apr-13			6	47724	6	47724
28-Apr-13			7	55678	7	55678
29-Apr-13			6	48204.5	6	48204.5
30-Apr-13			7	56278	7	56278
01-May-13			7	56091	7	56091
02-May-13			6	47895.5	6	47895.5
03-May-13			6	47630.6	6	47630.6
04-May-13	1	8587.1	7	55549	8	64136.1
05-May-13	1	8420.1	8	63310.9	9	71731
06-May-13			6	47588.3	6	47588.3
07-May-13			9	72438	9	72438
08-May-13			2	16031.1	2	16031.1
09-May-13	2	16800.6	5	39948.8	7	56749.4

10-May-13	1	8593.9	9	72595	10	81188.9
11-May-13	1	8613	5	40359.5	6	48972.5
12-May-13	3	26405.6	6	47913.4	9	74319
13-May-13	1	9154.6	6	47883.9	7	57038.5
14-May-13					0	0
15-May-13					0	0
16-May-13					0	0
17-May-13					0	0
18-May-13	1	8809.2	6	48053.8	7	56863
19-May-13	2	17495.2	6	47543.9	8	65039.1
20-May-13			5	39442.6	5	39442.6
21-May-13					0	0
22-May-13			1	7954	1	7954
23-May-13	3	26330.35	7	56023.7	10	82354.05
24-May-13	2	16699.6	10	80476.9	12	97176.5
25-May-13	1	9176.85	7	56055.6	8	65232.45
26-May-13	1	8785.2	8	63336.7	9	72121.9
27-May-13	1	8625.05	6	47672.3	7	56297.35
28-May-13	1	8635.95	6	47970.2	7	56606.15
29-May-13	1	8688.8	4	32108.9	5	40797.7
30-May-13	1	8692	7	55842.5	8	64534.5
31-May-13	1	9035.2	8	63889.7	9	72924.9
01-Jun-13	1	8187.6	9	72118.1	10	80305.7
02-Jun-13	4	31727	7	55956.6	11	87683.6
03-Jun-13	3	25148.4	8	64426.2	11	89574.6
04-Jun-13	1	9118.2	6	48203.7	7	57321.9
05-Jun-13	2	17017.4	9	68670.3	11	85687.7
06-Jun-13	1	7982.85	9	70802	10	78784.85
07-Jun-13	1	8817.6	10	79554.8	11	88372.4
08-Jun-13			9	72176.4	9	72176.4
09-Jun-13	1	8747.2	8	64114.4	9	72861.6
10-Jun-13	2	17640	9	72213.5	11	89853.5
11-Jun-13	2	17206.4	6	47617.5	8	64823.9
12-Jun-13	2	18111.5	9	71612.3	11	89723.8
13-Jun-13	2	17562.05	7	56314.2	9	73876.25
14-Jun-13			10	80364.1	10	80364.1
15-Jun-13			7	55652.8	7	55652.8
16-Jun-13	2	17093	10	79781.7	12	96874.7
17-Jun-13			10	79937.1	10	79937.1
18-Jun-13	3	27189	7	56157.2	10	83346.2
19-Jun-13	1	8963	8	63889.3	9	72852.3
20-Jun-13	2	14057.1	2	15867.8	4	29924.9
21-Jun-13	1	8830.2	9	71947.4	10	80777.6
22-Jun-13	1	8993	7	56074.5	8	65067.5
23-Jun-13	1	9262.2	10	80442.1	11	89704.3
24-Jun-13	2	17578	3	24059	5	41637



25-Jun-13	1	8508.5	5	39629.2	6	48137.7
26-Jun-13	3	27090	8	63781.2	11	90871.2
27-Jun-13	1	8901	3	23915.7	4	32816.7
28-Jun-13	1	8717.4	5	39825.8	6	48543.2
29-Jun-13			7	55987.5	7	55987.5
30-Jun-13	1	8474.05	4	31431.7	5	39905.75
01-Jul-13	2	17314.9	2	15930.2	4	33245.1
02-Jul-13	1	8468.2	4	32067.4	5	40535.6
03-Jul-13	2	16790.9	7	55899.3	9	72690.2
04-Jul-13	2	16610.1	7	56190.7	9	72800.8
05-Jul-13	3	24804.3	8	64327.7	11	89132
06-Jul-13	2	17093.6	7	55924.3	9	73017.9
07-Jul-13	1	8453.9	9	72106.8	10	80560.7
08-Jul-13	1	8361	7	55968.8	8	64329.8
09-Jul-13	1	8361	6	48077.6	7	56438.6
10-Jul-13	1	8468.65	6	48013.9	7	56482.55
11-Jul-13			2	16180.1	2	16180.1
12-Jul-13	2	15710.4	6	48189.4	8	63899.8
13-Jul-13	3	22859.6	10	79752.6	13	102612.2
14-Jul-13			8	63716.1	8	63716.1
15-Jul-13	1	8745.8	7	55622.2	8	64368
16-Jul-13	3	23136.8	8	63820.1	11	86956.9
17-Jul-13	2	15112.7	8	64112.5	10	79225.2
18-Jul-13	1	7977.8	4	31749.8	5	39727.6
19-Jul-13	1	7998.6	4	31816	5	39814.6
20-Jul-13	2	16838.4	5	39770	7	56608.4
21-Jul-13	1	7402.4	5	39770	6	47172.4
22-Jul-13			7	55678	7	55678
23-Jul-13	2	17239.8	6	47960.2	8	65200
24-Jul-13	1	9101.4	7	56169.6	8	65271
25-Jul-13	3	26801.2	7	56238.4	10	83039.6
26-Jul-13	1	7715.8	5	39857.3	6	47573.1
27-Jul-13			7	55825.3	7	55825.3
28-Jul-13	1	8558.4	5	39912.9	6	48471.3
29-Jul-13	2	17639.2	8	63718.2	10	81357.4
30-Jul-13	3	27160.9	5	39770	8	66930.9
31-Jul-13	1	8376.4	4	31816	5	40192.4
01-Aug-13	2	17388.6	5	39770	7	57158.6
02-Aug-13	2	17533.4	8	63684.3	10	81217.7
03-Aug-13			6	47765.2	6	47765.2
04-Aug-13	1	8574.8	8	63065.2	9	71640
05-Aug-13	2	16500.8	9	71321.9	11	87822.7
06-Aug-13	1	8430	8	63193	9	71623
07-Aug-13	1	8400.2	6	47300	7	55700.2
08-Aug-13	1	8860.8	7	54541.6	8	63402.4
09-Aug-13	1	8860.8	4	31816	5	40676.8

10-Aug-13	2	17462.8	5	39770	7	57232.8
11-Aug-13	4	33228	7	55678	11	88906
12-Aug-13			2	15908	2	15908
13-Aug-13					0	0
14-Aug-13					0	0
15-Aug-13					0	0
16-Aug-13			2	15908	2	15908
17-Aug-13			7	54717.2	7	54717.2
18-Aug-13			6	47832.8	6	47832.8
19-Aug-13	1	8526	7	55666.8	8	64192.8
20-Aug-13	1	8547	4	32040.4	5	40587.4
21-Aug-13			8	63656.6	8	63656.6
22-Aug-13	1	8444.2	3	22795	4	31239.2
23-Aug-13	2	16960.4	5	39770	7	56730.4
24-Aug-13			5	39789	5	39789
25-Aug-13			7	55644.6	7	55644.6
26-Aug-13	1	9142.4	8	62875.2	9	72017.6
27-Aug-13	2	11072.8	5	39788.8	7	50861.6
28-Aug-13	1	7797.6	6	47723.2	7	55520.8
29-Aug-13	3	19306.4	2	15908	5	35214.4
30-Aug-13	2	16296.6	4	31892.8	6	48189.4
31-Aug-13	3	18933	4	31816	7	50749
01-Sep-13	2	16542.4	5	38670.4	7	55212.8
02-Sep-13	3	25116	8	63000.4	11	88116.4
03-Sep-13	2	16768.2	6	47340.8	8	64109
04-Sep-13	2	17233.4	8	63506.4	10	80739.8
05-Sep-13	3	25126.6	8	63618	11	88744.6
06-Sep-13	2	15553.8	9	72010.2	11	87564
07-Sep-13	2	12505.6	7	55408.4	9	67914
08-Sep-13	2	12397.8	5	39518.2	7	51916
09-Sep-13	2	15059.6	5	39621.4	7	54681
10-Sep-13			5	40004.4	5	40004.4
11-Sep-13	1	8338.6	5	39939.5	6	48278.1
12-Sep-13			7	55192.3	7	55192.3
13-Sep-13			6	47616.3	6	47616.3
14-Sep-13	3	21996.2	9	71799.8	12	93796
15-Sep-13	3	21550.8	9	71991.7	12	93542.5
16-Sep-13	2	15840.2	6	48613	8	64453.2
17-Sep-13			8	63677.8	8	63677.8
18-Sep-13	2	16117.8	3	23965.4	5	40083.2
19-Sep-13	1	6861.4	3	24095.4	4	30956.8
20-Sep-13	1	8123.6	4	32151.8	5	40275.4
21-Sep-13	3	24862.4	6	47786.3	9	72648.7
22-Sep-13	1	7926.4	3	24227.8	4	32154.2
23-Sep-13	3	24302.2	6	48506.5	9	72808.7
24-Sep-13			10	79457	10	79457

25-Sep-13	4	33252.5	2	15848	6	49100.5
26-Sep-13	2	16563.6	7	55024.6	9	71588.2
27-Sep-13	2	15919	5	39524	7	55443
28-Sep-13	3	24130.2	7	55495	10	79625.2
29-Sep-13	1	8585.6	4	31645	5	40230.6
30-Sep-13			5	39238.1	5	39238.1
01-Oct-13			4	31464.9	4	31464.9
02-Oct-13			3	23538.2	3	23538.2
03-Oct-13			2	15497.7	2	15497.7
04-Oct-13	1	8556.8	7	55012.8	8	63569.6
05-Oct-13	1	8495.4	5	39516	6	48011.4
06-Oct-13	1	8249	7	55461	8	63710
07-Oct-13	1	8080.8	5	39528	6	47608.8
08-Oct-13	2	16818.2	3	23999.4	5	40817.6
09-Oct-13	1	8789.6	3	23469.4	4	32259
10-Oct-13	3	25548.2	5	39911.4	8	65459.6
11-Oct-13	1	8179.6	6	47887.3	7	56066.9
12-Oct-13	1	8954.4	7	55739.6	8	64694
13-Oct-13	1	8526	9	71967.9	10	80493.9
14-Oct-13	2	17336.8	9	71361.6	11	88698.4
15-Oct-13	1	8169	7	55703.6	8	63872.6
16-Oct-13	3	26418	7	55531.6	10	81949.6
17-Oct-13	3	25523	6	47420	9	72943
18-Oct-13	1	8121.8	7	55828.6	8	63950.4
19-Oct-13	3	25605.2	9	71856	12	97461.2
20-Oct-13	3	24853.4	7	55408.2	10	80261.6
21-Oct-13	4	34218.6	7	55349	11	89567.6
22-Oct-13	2	16881.8	9	71042.2	11	87924
23-Oct-13	3	26321	10	79672.1	13	105993.1
24-Oct-13	3	23638	11	88180.4	14	111818.4
25-Oct-13			5	39272.8	5	39272.8
26-Oct-13	3	26005.8	9	71928.4	12	97934.2
27-Oct-13	2	16447.2	11	87459	13	103906.2
28-Oct-13			5	39609.2	5	39609.2
29-Oct-13	1	8535	7	55896	8	64431
30-Oct-13	2	16638.6	7	55323	9	71961.6
31-Oct-13	1	5360.8	6	46937.8	7	52298.6
01-Nov-13			9	71768	9	71768
02-Nov-13	3	24770.8	9	71544.8	12	96315.6
03-Nov-13	2	16819.4	8	63828.5	10	80647.9
04-Nov-13	2	16663.6	7	55890	9	72553.6
05-Nov-13	3	24779.6	8	64008.9	11	88788.5
06-Nov-13	3	25209.4	4	32355.4	7	57564.8
07-Nov-13	2	15826	8	64144.5	10	79970.5
08-Nov-13	3	26125.9	5	40336.4	8	66462.3
09-Nov-13	2	17041.2	3	23728.6	5	40769.8

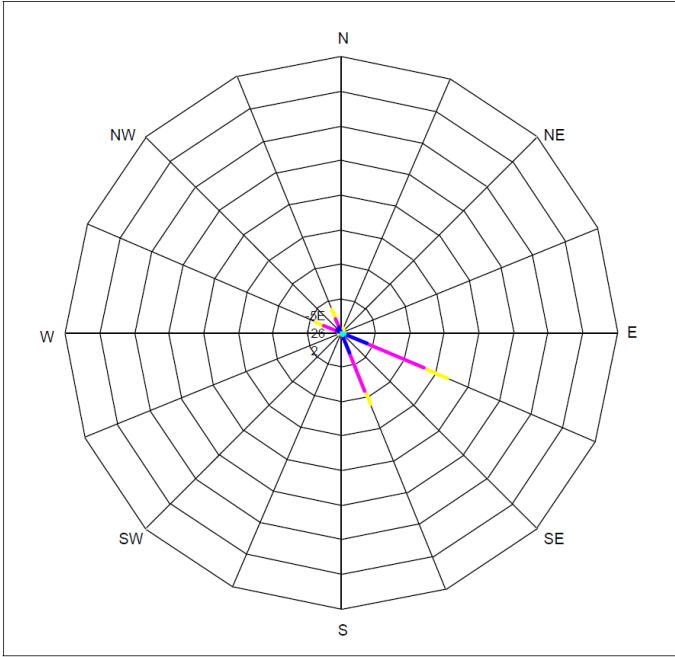
10-Nov-13	1	8638.8	3	23950.1	4	32588.9
11-Nov-13	3	25465.2	4	31951.3	7	57416.5
12-Nov-13	1	8510			1	8510
13-Nov-13			6	47682.2	6	47682.2
14-Nov-13	3	25707.8	8	63832.3	11	89540.1
15-Nov-13	1	8458.6	8	63540.4	9	71999
16-Nov-13	2	17397.4	8	63470.4	10	80867.8
17-Nov-13	2	17571.8	6	47861.8	8	65433.6
18-Nov-13	1	9149.8	5	40068.8	6	49218.6
19-Nov-13			1	8021.2	1	8021.2
20-Nov-13					0	0
21-Nov-13	1	8516.8			1	8516.8
22-Nov-13	1	5493.2	3	23715.4	4	29208.6
23-Nov-13	1	8795.8	8	63661.4	9	72457.2
24-Nov-13			8	64509.9	8	64509.9
25-Nov-13	1	9345.55	10	79647.2	11	88992.75
26-Nov-13	1	8458.6	9	71829	10	80287.6
27-Nov-13	1	9252.6	8	63639.4	9	72892
28-Nov-13	1	9481	6	47239.6	7	56720.6
29-Nov-13	2	15718.4	9	72453.4	11	88171.8
30-Nov-13	2	17881.85	7	54935.6	9	72817.45
01-Dec-13	3	25136.8	10	78622.9	13	103759.7
02-Dec-13	1	5361.8	6	47568.8	7	52930.6
03-Dec-13	2	16473.2	6	47692.6	8	64165.8
04-Dec-13	2	16894.9	5	39518.2	7	56413.1
05-Dec-13	1	7753.9	7	55560.2	8	63314.1
06-Dec-13	3	25010.9	4	31960.2	7	56971.1
07-Dec-13	3	27269	9	71655.2	12	98924.2
08-Dec-13	2	17047.2	8	64317	10	81364.2
09-Dec-13			8	64126.2	8	64126.2
10-Dec-13	1	8204.8	8	63735.4	9	71940.2
11-Dec-13	2	15433.8	8	64149.2	10	79583
12-Dec-13			7	55877.6	7	55877.6
13-Dec-13			8	64825	8	64825
14-Dec-13			7	56020.2	7	56020.2
15-Dec-13			6	48039.2	6	48039.2
16-Dec-13			6	47858.2	6	47858.2
17-Dec-13	2	17003.4	5	39489.6	7	56493
18-Dec-13	1	8460	3	23904.9	4	32364.9
19-Dec-13			9	71511.2	9	71511.2
20-Dec-13	3	25272.4	6	48179.7	9	73452.1
21-Dec-13	3	25517.2	7	56314.2	10	81831.4
22-Dec-13	3	26339.8	8	64279.4	11	90619.2
23-Dec-13	1	8227.6	6	48473.6	7	56701.2
24-Dec-13	1	8993	8	64010.6	9	73003.6
25-Dec-13			9	72076.4	9	72076.4

26-Dec-13	2	17446.8	8	64399.2	10	81846
27-Dec-13	2	16879.2	8	64255.2	10	81134.4
28-Dec-13	2	16818.8	8	64348.2	10	81167
29-Dec-13	3	24905	10	80363	13	105268
30-Dec-13	3	22377.2	5	40332.4	8	62709.6
31-Dec-13	4	29962.4	8	65041.6	12	95004

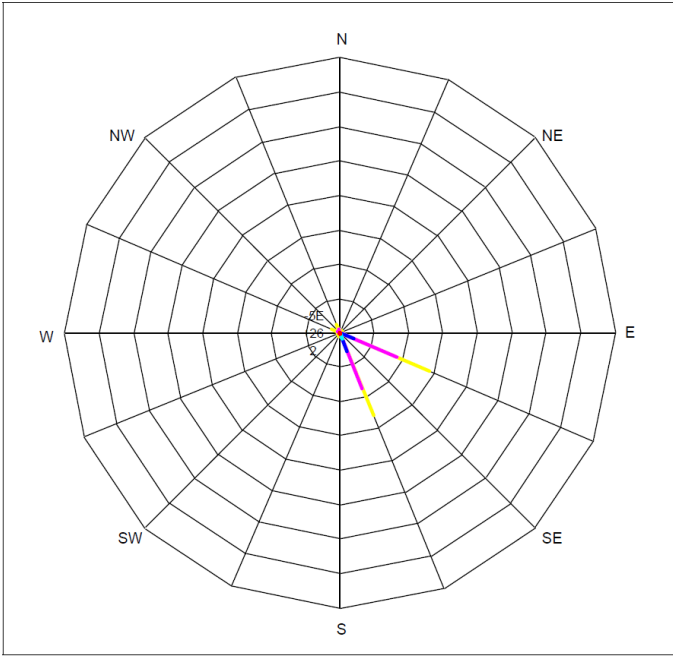
PERIOD SUMMARY			
Maximum train movements / day (Drayton)	8	Limit	12
Maximum train movements / day (MAC)	22	Limit	No Limit
Maximum combined train movements	28	Limit	30
<b>Total Tonnes (Drayton)</b>	4,097,996	Tonnes	
<b>Total Tonnes (Mt Arthur Coal)</b>	17,756,910	Tonnes	

# Appendix I: Monthly Wind Speed and Direction 2013

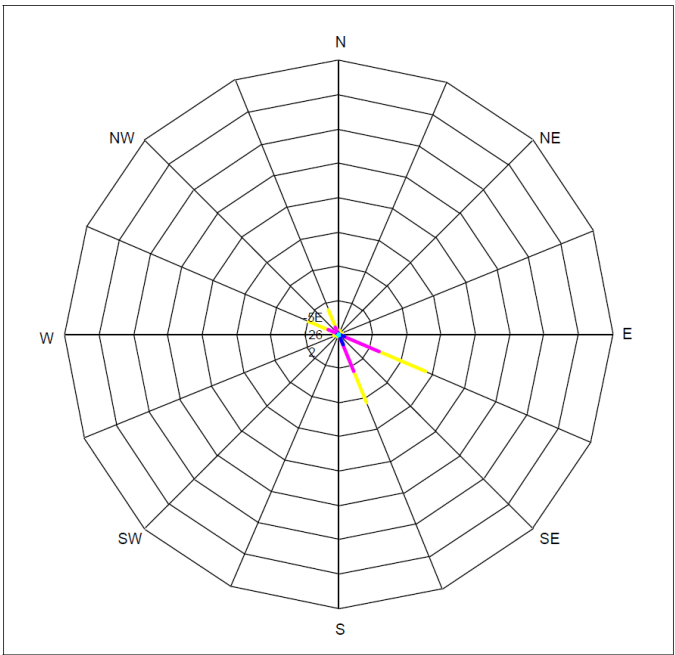
**January 2013**



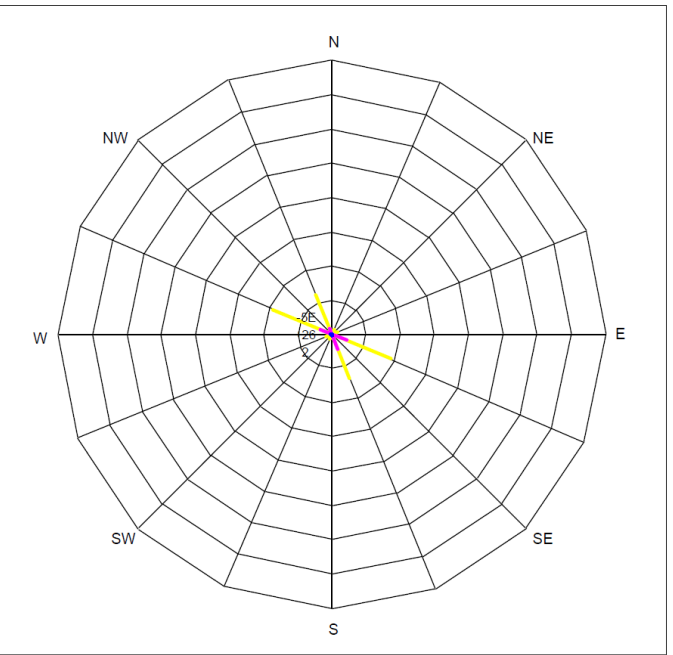
**February 2013**



**March 2013**



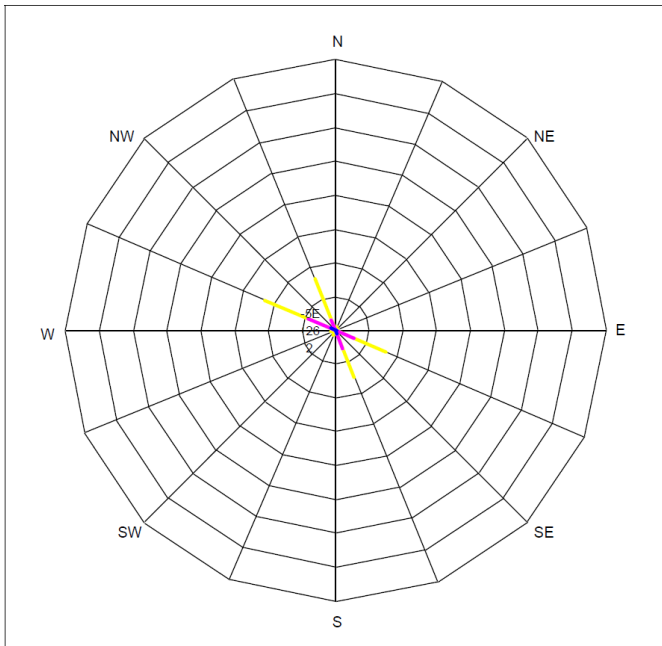
**April 2013**



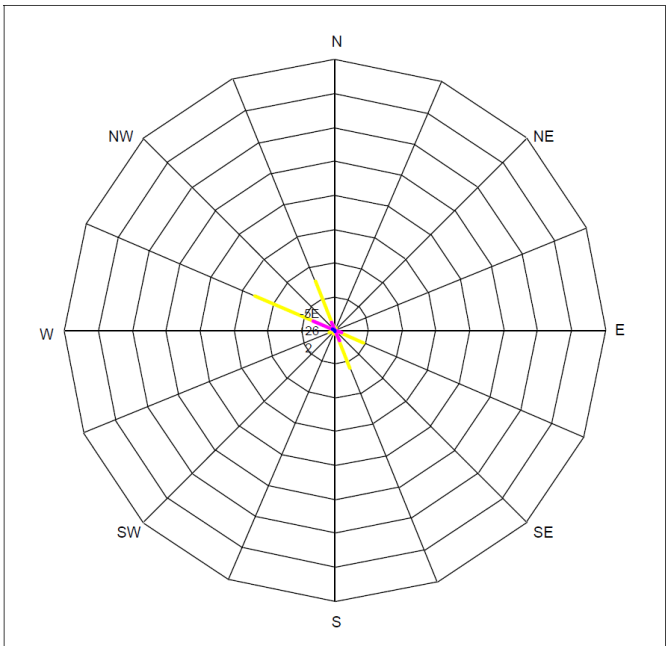
**Legend**

- 0 to 2 m/s
- 2 to 4 m/s
- 4 to 6 m/s
- 6 to 8 m/s
- 8 to 10 m/s
- Over 10 m/s

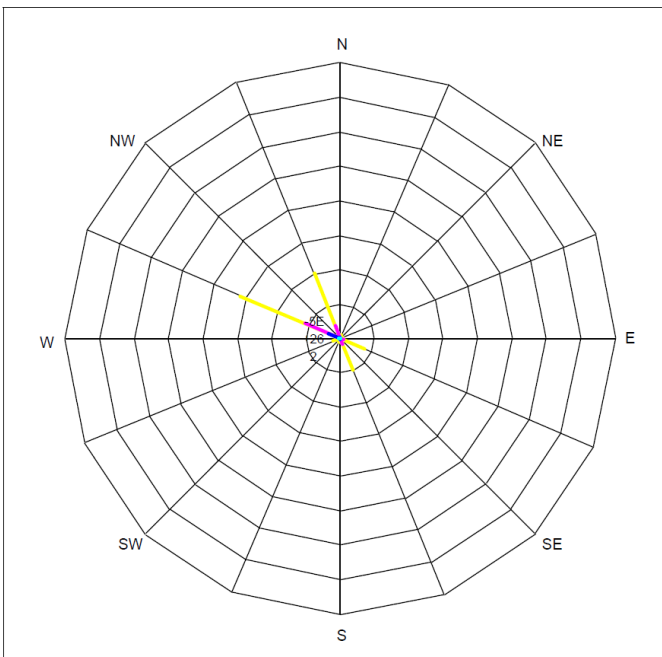
May 2013



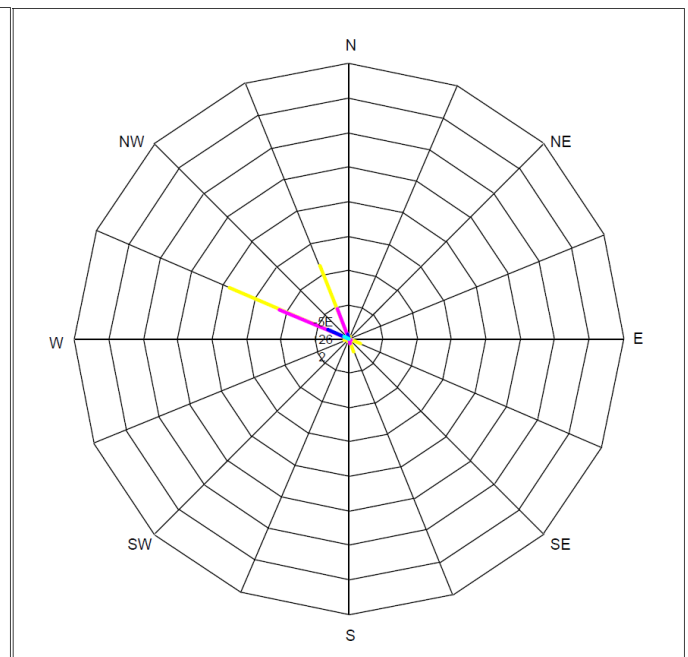
June 2013



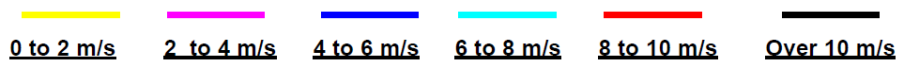
July 2013



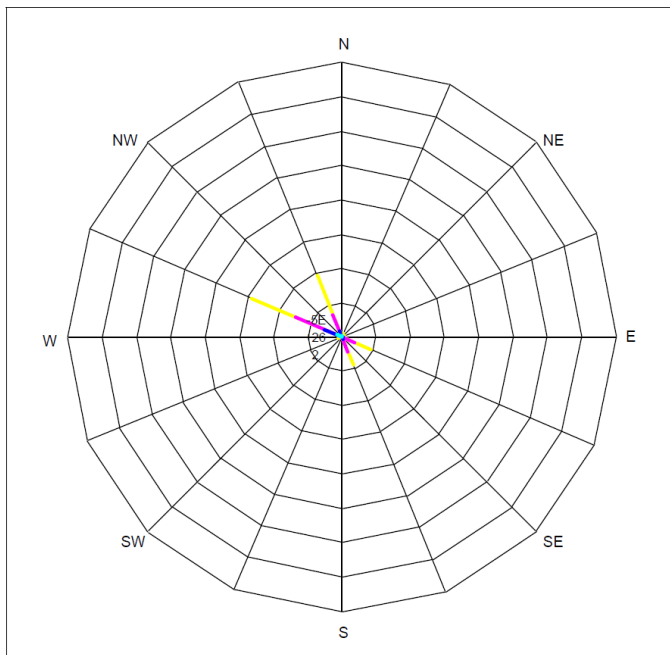
August 2013



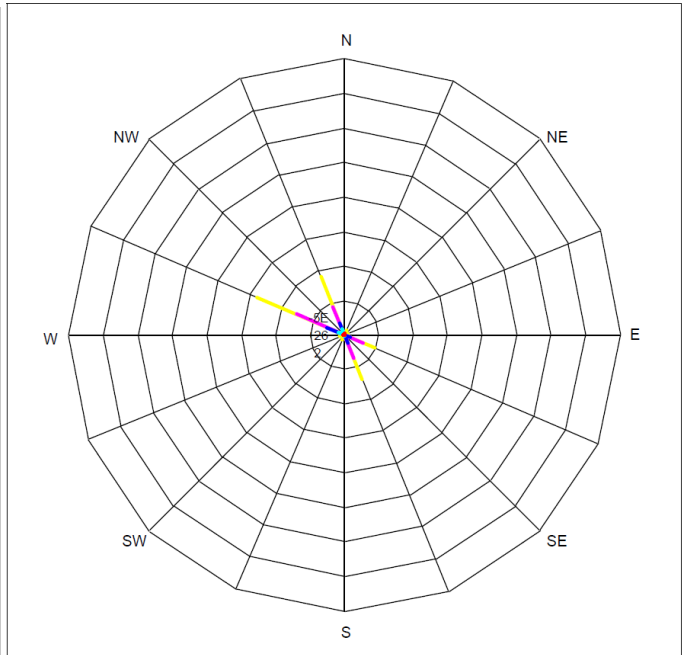
**Legend**



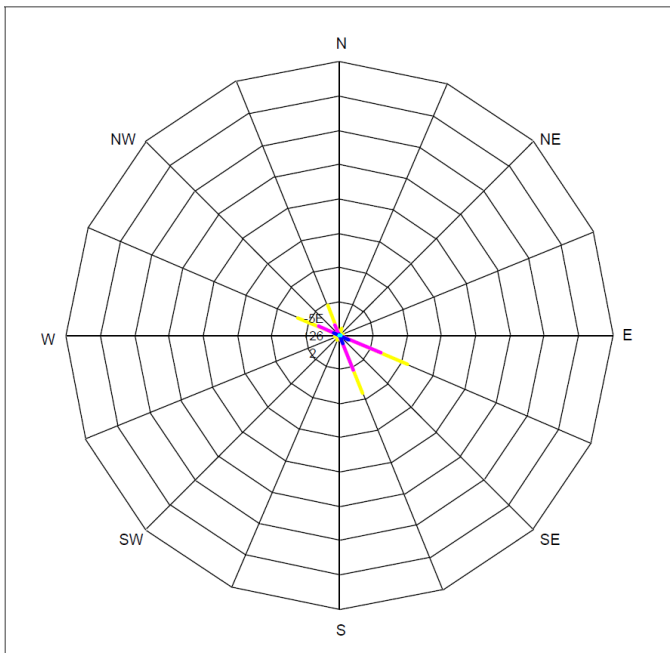
**September 2013**



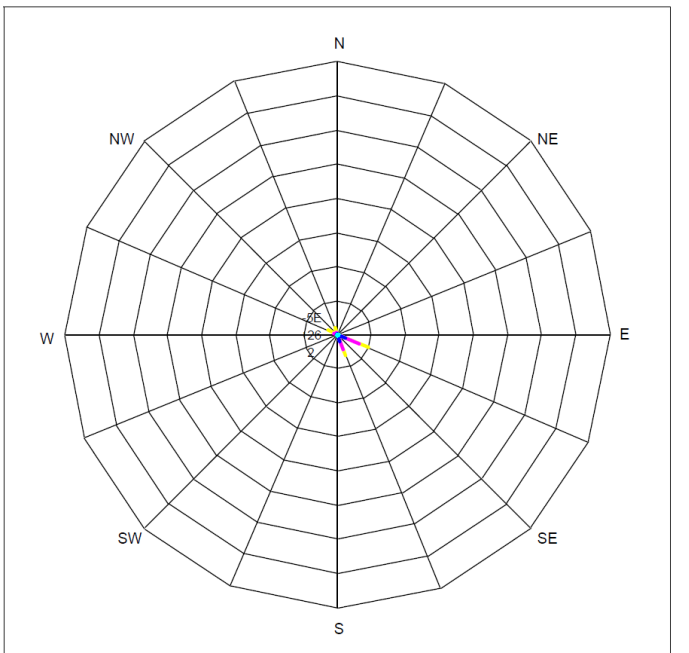
**October 2013**



**November 2013**



**December 2013**



**Legend**

- 0 to 2 m/s
- 2 to 4 m/s
- 4 to 6 m/s
- 6 to 8 m/s
- 8 to 10 m/s
- Over 10 m/s



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