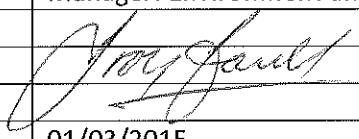
Wambo Coal Pty Ltd
(WCPL)

Annual Environmental Management Report
2014
(AEMR)

MARCH 2015

Peabody ENERGY

Name of Mine	Wambo Coal
Titles / Mining Leases	CL365, CL374, CL397, CCL743, ML1402, ML1572, ML1594, A444, EL7211
Open Cut MOP Commencement Date	01/07/2010
Open Cut MOP Completion Date	30/06/2016
Underground MOP Commencement Date	23/05/2013
Underground MOP Completion Date	30/03/2015
AEMR Commencement Date	01/01/2014
AEMR Completion Date	31/12/2014
Name of Leaseholder	Wambo Coal Pty Limited
Reporting Officer	Troy Favell
Title	Manager: Environment and Community
Signature	
Date	01/03/2015

1. *EXECUTIVE SUMMARY*

This Annual Environmental Management Review (AEMR) satisfies the requirements of the Wambo Coal Pty Ltd (WCPL) Development Consent and conditions of mining leases held by WCPL. The period of report cover from **1 January 2014 to 31 December 2014**.

The AEMR has been complied in accordance with the NSW Department of Trade and *Investment EDG03 Guidelines to the Mining, Rehabilitation and Environmental Management Process* and the NSW Department of Planning and Infrastructure Draft *Guideline for Preparation of Annual Environmental Management Review (AEMR) December 2012*.

The Wambo Mine Complex (WMC) (Open Cut & Underground) produced 9.6 million tonnes of run-of-mine (ROM) coal during 2014, and 6.1 million tonnes of saleable coal, against an approved ROM coal production rate of 14.7 million tonnes per annum (mtpa). This was a slight increase on the forecasted ROM coal production for 2014 of 8.8 mtpa.

A high level summary of Environmental performance for 2014 is provided below.

Noise

During the 2014 attended noise monitoring program noise levels from the WMC complied with relevant criteria at all sites during the attended noise monitoring. It is noted that wind speeds and/or temperature inversion conditions were at levels greater than which the development consent conditions would apply for the mine activities in some instances (Section 4.2 p24).

Blasting

Blast monitoring units are installed at 3 fixed locations on private property, one within the grounds of the Wambo Homestead complex and one located in the southern district (Wambo Road) of the operations. There were no blasting non-compliances during the reporting period of 2014. A number of blast event results were unable to be recorded due to software and communications failures which were serviced and rectified. A blast fume event was reported and is currently under further investigation with the NSW EPA (Section 4.3, p32).

Air Quality

All four HVAS continued to operate on a six day cycle during the reporting period and all units during the reporting period attained a 100% capture rate with results under consent condition criteria for 2014. Depositional Dust gauge results for the complex were also within criteria limits. PM10 monitoring was below the annual average for the site, with a number of days exceeding the 24hr average due to extreme heat, wind and a bushfire event (Section 44, p34).

Surface Water

Surface water monitoring undertaken during the reporting period were in general compliance with criteria for the WMC. Although there were a number of recordings outside the criteria limits, these recordings can be described as being heavily influenced by the ephemeral nature of surface water flows due to the intermittent and low rainfall pattern. The sampling of stagnant pools and sample sites which are located a significant distance from the WMC and not reflecting the operations of the complex should be taken into account. These remote sites have been removed from the 2015 surface water sampling program. The recorded ph, EC and TSS for the creeks and streams surrounding the WMC varied depending on rainfall frequency, intensity and therefore volumetric flow. There were no complaints or reportable instances relating to surface water in 2013 (Section 4.6, p42).

Groundwater

Groundwater levels did fall outside trigger levels for some of the monitoring sites. Further analysis and investigation is required on a number of monitoring sites for clarification. Groundwater alluvial sites are heavily influenced by regional rainfall events and the thus the level local streams and rivers. There were no complaints or reportable instances relating to groundwater in 2014 (Section 47, p45).

Mine Subsidence

During the reporting period, Longwall Panel 7 (LW7) with a total retreat of 3294m was completed on 18th January 2014. Longwall 8a (LW8a) commenced secondary extraction on the 22 February 2014 and was completed on 6 August 2014. Longwall 9 (LW9) secondary extraction commenced on 24 August 2014 and was completed on the 13 January 2015 with a total retreat of 1773m for LW8 and 1740m for LW9. Longwall 10 commenced on the 29 January 2015 (Section 4.8, p47).

Erosion and Sediment Control

In 2014, a review of the Erosion and Sediment Control Plan (ESCP) was undertaken as part of an overall review of the WMP to ensure contemporary standards and best practice methods are applied throughout the WMC. A dedicated diesel pump has been ordered for Hales crossing sump with a float switch and alarming system (Section 4.9, p50).

Heritage (European and Aboriginal)

Ongoing survey works continued throughout 2014 as required and have been registered on the AHIMS database. Additional sites were identified in 2014 during archaeological survey in participation with representatives of the Registered Aboriginal Parties (RAPs). Site cards for these sites were submitted to the OEH for inclusion on the AHIMS database.

No sites were salvaged during the reporting period but ongoing artefact analysis associated with previous salvage of sites in 2013 under Consent #2222 continued (Section 4.10, p52).

2014 consisted of works completed on the Horse Yards which forms part of the historic complex. In addition to this major works, Wambo Coal and GML also commenced work on the Oral History program for the Wambo Homestead. Historians, Professor Ian Jack and Roslyn Burge were commissioned to interview local community members and persons with an intimate knowledge of

the Wambo Homestead in order to capture its unique history and character to be preserved in audio for the local community.

The Oral History interviews and program was completed in late 2014. The final transcripts and audio recordings will be placed in the Singleton Library, Singleton Historical Society and the NSW Heritage Branch, along with copies at Wambo Coal. Compact Disc copies of the Oral History program can be obtained on request from Wambo Coal, by contacting the Environment and Community Manager on (02) 6570 2209 (Section 4.11, p53).

Visual Amenity and Lighting

During the reporting period of 2014 there were 5 lighting complaints in relation to the WMC operations. Upon investigation these were sourced to mobile lighting plants. Actions taken included tool box talks and pre-shift information meetings to highlight the awareness to direct lighting plants away from sensitive receivers at all times. There were no visual amenities or lighting non-compliances during the reporting period of 2014 (Section 4.12, p54).

Fauna and Flora

A series of monitoring programs were conducted during 2014. Executive summaries are provided below. Full reports and data are available upon request should further investigation be required. A review of the Flora and Fauna Monitoring Program aims, objectives and methodologies was undertaken in late 2014. Due to the review being undertaken in late 2014, changes to current methodologies could not take place for the 2014 monitoring program. Current methodologies for the monitoring program are still valid. WMC is committed to see these reviews and recommendations being implemented in the second quarter of 2015 to ensure that the monitoring program aligns with the goals of the sites revised Rehabilitation Management Plan and new MOP (Section 4.15, p57).

Rehabilitation and Land Management

During the reporting period of 2014 rehabilitation works were undertaken at the RL140 at the WMC. Approximately 20 ha of mining disturbed land (against a forecast of 20ha) were shaped, topsoiled with an application of Organic Growth Medium (OGM) to assist with soil construction and vegetative growth. 2015 Rehabilitation consists of two main areas, the Homestead Backfill project (23.1ha) and an area above the Homestead of 10.4 ha. Seed collection also commenced in 2014 within Wambo lands in an effort to produce local providence tube stock for planting along NWCD Stage 3 in 2015/2016 (Section 6, p71).

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2. INTRODUCTION

2.1 DOCUMENT PURPOSE

This Annual Environmental Management Report (AEMR) for the calendar period of 2014, details the environmental and rehabilitation performance of the Wambo Mine Complex (WMC) against mining lease and development consent conditions, as well as relevant plans and programs associated with the WMC. The AEMR has been produced in accordance with the NSW Department of Trade and Investment (EDG03 Guidelines to the Mining Rehabilitation and Environmental Management Process and the NSW Department of Planning and Infrastructure Draft Guideline for Preparation of Annual Environmental Management Review (AEMR) December 2012**.**

Copies of the 2014 report are available on the Peabody Energy website www.peabodyenergy.com and have been distributed to relevant external stakeholders (**Table 1**).

Table 1: Distribution List AEMR-2014

Name	Organisation
New South Wales Government	Department of Planning and Infrastructure
New South Wales Government	Industry and Investment – Division Resources and Energy
New South Wales Government	Office of Environment and Heritage
New South Wales Government	Environmental Protection Authority
New South Wales Government	Office of Water
Singleton Council	Manager Singleton Council
Miss Lisa Andrews	Chairperson Community Consultative Committee
Mr. David Thelander	Community Consultative Committee
Mr. Shane Gee	Community Consultative Committee
Mr. Stephen Schmidt	Community Consultative Committee
Mr. Bob Kowen	Community Consultative Committee
Mr. Ron Fenwick	Community Consultative Committee

2.2 STATEMENT OF COMPLIANCE

Table 2 outlines a summary of the conditions of the consent relevant to this annual review, and a reference to where it is addressed in this report

Table 2: Compliance Quick Reference Guide

Performance Condition	*Compliance with Project Approval Conditions*
Noise	Section: 4.2
Blasting and Vibration	Section: 4.3
Air Quality	Section: 4.4
Meteorological Monitoring	Section: 4.1
Surface Water	Section: 4.6
Ground water	Section: 4.7
Erosion and Sediment Control	Section: 4.9
Aboriginal Heritage	Section: 4.10
European Heritage	Section: 4.11
Bushfire	Section: 4.5.13
Flora and Fauna	Section:4.15
Rehabilitation	Section:6

During 2014, there were three reportable events. On 14 May 2014 Blast event M20WWA3 was initiated. Following the blast event, a number of community complaints were registered with the WMC which resulted in the triggering of the Pollution Incident Response Management Plan (PIRMP) (Section 4.3.4. p34). On the 7 April 2014 the Hunter River Salinity Trading Scheme monitoring probes where found to be defective during an authorised discharge event (Section 4.6.2). On 25 April 2014, a rain event resulted in over 24.41 mm in a period of approximately 2 hours, 19.58mm in the time of 30 minutes at the WMC leading to an overflow of a catchment sump located adjacent to Wollombi Brook (Section 4.9.3 p50).

2.3 APPROVALS, LEASES AND LICENSES

Table 3 provides an overview of the WMC relevant approvals and licenses. **Table 4** describes in summary the various modifications which the WMC has undertaken to the original Development Consent approval of 2003 (DA 305-7-2003). **Table 5** provides the WMC current water license status.

Table 3: – WCPL Mining Leases and Authorisations

Lease Reference	Area (ha)	Date Granted	Expiry Date
Coal Lease 365 (Coal Mining Act 1973)	530	19/09/1990	19/09/2032
Coal Lease 374 (Coal Mining Act 1973)	382	06/12/1991	21/03/2026
Coal Lease 397 (Coal Mining Act 1973)	1,480	04/06/1992	04/06/2013*
Consolidated Coal Lease 743 (Coal Mining Act 1973)	3,000	09/03/1990	14/08/2022
Mining Lease 1402 (Coal Mining Act 1973)	352	23/09/1996	14/08/2022
Mining Lease 1572 (Coal Mining Act 1973)	1,012	21/12/2005	21/12/2026
Mining Lease 1594 (Mining Act 1992)	263	01/05/2007	30/04/2028
Exploration Licence A444	3,060	04/10/2007	16/05/2016
Exploration Licence EL7211	967	22/01/2013	29/09/2016

Notes: - United has a strata title lease to the Arrowfield seam in the northern 1.5 km of CCL743 and CL397.
- Mining Lease 1402 covered surface rights to enable development of the Wollemi Mine.
- A444 is an Authority to Prospect granted under *Coal Mining Act 1973*.
- * A renewal application has been submitted into DTIRIS, pending approval.

Table 4: WCPL Development Consent & Modifications - 2014

Approval Name	Number	Approval Authority	Date Granted	Expiry Date
WCPL Mining Operations				
Original consolidated consent for mine operations	DA 108/91	SSC	17/02/1992	21 years from issue of coal lease
Modification to include Wollemi Box Cut and mine	DA 108/91	SSC	16/10/1996	21 years from issue of coal lease
Modification to include Brambles Coal Transport System	DA 108/91	SSC	21/12/1998	21 years from issue of coal lease
Expansion of open cut and underground mining operations	DA 305-7-2003	DP&I	04/02/2004	Nov 2026
(MOD 1) Modification to allow DA No. 108/91 to remain active	DA 305-7-2003	DP&I	2004	Nov 2026
(MOD 2) Re-orientation of the Wambo seam underground mine longwall panels	DA 305-7-2003	DP&I	04/05/2005	Nov 2026
(MOD 3) Upgrade of open cut workshop and underground surface facilities	DA 305-7-2003	DP&I	10/01/2006	Nov 2026
(MOD 4) Extraction of the Wollemi remnants	DA 305-7-2003	DP&I	19/04/2006	Nov 2026
(MOD 5) Construction of a temporary by-pass of North Wambo Creek	DA 305-7-2003	DP&I	20/10/2006	Nov 2026
(MOD 6) Construction of the North Wambo Creek Diversion, gas and dewatering wells	DA 305-7-2003	DP&I	25/01/2007	Nov 2026

(MOD 7) Construction of internal water storage dam (Chitter Dam)	DA 305-7-2003	DP&I	22/06/2009	Nov 2026
(MOD 8) Construction of internal water storage dam (South Dam)	DA 305-7-2003	DP&I	27/08/2009	Nov 2026
(MOD 9) - Montrose East U/Ground	DA 305-7-2003	DP&I	WITHDRAWN	WITHDRAWN
(MOD 9) Preparation of an Extraction Plan rather than a Subsidence Management Plan	DA 305-7-2003	DP&I	28/02/2011	Nov 2026
(MOD 10)	DA 305-7-2003	DP&I	WITHDRAWN	WITHDRAWN
(MOD 11) Montrose Water Storage Dam	DA 305-7-2003	DP&I	Approved	Nov 2026
(MOD 12) Southern Longwall Modification	DA 305-7-2003	DP&I	DGRs Issued	-
(MOD 13) NWU Extension LW9 & LW10	DA 305-7-2003	DP&I	Approved	Jan 2014
(MOD 14) NWU Extension LW10a	DA 305-7-2003	DP&E	Approval Pending	-
WCPL Rail Development				
Jerry's Plains Rail Line	DA 235/97	SSC	16/07/1998	Perpetuity
Modification to DA235/97 to correct residents list and allow the preparation of management plans in a staged manner	DA 235/97	SSC	01/05/2003	Perpetuity
Altered alignment of Jerry's Plains Rail Line	DA 235/97.3	SSC	03/12/2004	Perpetuity
WCPL rail and coal loading infrastructure	DA 306-7-2003	DP&I	01/06/2004	01/06/2025
WCPL rail and coal loading infrastructure (altered alignment of rail loop)	DA 117-8-2004	DP&I	16/12/2004	16/12/2025
(MOD 1) Upgrade of Wallaby Scrub Road / Golden Hwy Intersection	DA 117-8-2004	DP&I	15/12/2006	16/12/2025
(MOD 2) Establishment of a locomotive provisioning facility adjacent to the WCPL Rail Loadout Facility	DA 117-8-2004	DP&I	12/02/2012	16/12/2025

Table 5 – Water Licence Summary

Licence Number	Description	Facility	Valid To	Extraction Limits
20BL132753	Old Well No. 1	Well	29/07/2018	243ML/year
20BL166910	Dewatering (Bore No. 1)	Bore	21/05/2017	450ML/ year
20BL167737	Well No. 2	Well	08/01/2011*	70ML/year
20SL033872	Wollombi Brook Pump	Pump	06/07/2011*	750ML/year
20BL167810	Well – Domestic, Stock	Well	Perpetuity	11ML/year
20AL200631	Hunter River Pump	Pump	Perpetuity	1,000ML/year
20WA200632	Hunter River Pump	Pump	30/06/2017	6ML/year
20BL168017	Dewatering (Bore No. 2)	Bore	21/05/2017	750ML/year
20BL168643	Dewatering Bore	Bore	7/08/2013	300ML/year
20BL166438	Well - Stock	Bore	Perpetuity	5ML/year
20BL167738	Dewatering Bore	Bore	11/09/2015	57ML/year
20BL168997	Piezometer	Test Bore	Perpetuity	Groundwater monitoring

Licence Number	Description	Facility	Valid To	Extraction Limits
20BL168998	Piezometer	Test Bore	Perpetuity	Groundwater monitoring
20BL168999	Piezometer	Test Bore	Perpetuity	Groundwater monitoring
20BL169000	Piezometer	Test Bore	Perpetuity	Groundwater monitoring
20BL170638	Piezometer	Test Bore	Perpetuity	Groundwater monitoring
20BL166906	Spearpoints	Irrigation	Perpetuity	19ML/year
20BL172061	Dewatering (Bore No.2a)	Bore	22/03/2014*	750ML/year
20BL172156	Dewatering	Excavation	3/05/2019	98ML/year
20BL171155	Dewatering	Excavation	25/09/2012*	243ML/year
20BL172237	GW14, GW18, GW21	Monitoring Bore	Perpetuity	Groundwater monitoring
20BL172238	GW12	Monitoring Bore	Perpetuity	Groundwater monitoring
20BL172240	GW15	Monitoring Bore	Perpetuity	Groundwater monitoring
20BL172242	GW16, GW17	Monitoring Bore	Perpetuity	Groundwater monitoring
20BL172244	GW20	Monitoring Bore	Perpetuity	Groundwater monitoring
20BL172255	GW22	Monitoring Bore	Perpetuity	Groundwater monitoring
20BL172256	GW13	Monitoring Bore	Perpetuity	Groundwater monitoring
20BL172257	GW19	Monitoring Bore	Perpetuity	Groundwater monitoring
20BL173032	Dewatering Bore	Bore	30/11/2016	450ML/ year
20BL173033	Dewatering Bore	Bore	30/11/2016	450ML/ year
20BL173034	Dewatering Bore	Bore	30/11/2016	450ML/year
20BL173035	Dewatering Bore	Bore	30/11/2016	450ML/year
20BL173040	Dewatering Bore	Bore	21/05/2017	750ML/year
20BL173844	Dewatering Bore	Bore	4/11/2019	9ML/year
20BL173290	Piezometer	Monitoring Bore	Perpetuity	Groundwater monitoring
20BL173291	Piezometer	Monitoring Bore	Perpetuity	Groundwater monitoring
20BL193292	Piezometer	Monitoring Bore	Perpetuity	Groundwater monitoring
20BL173293	Piezometer	Monitoring Bore	Perpetuity	Groundwater monitoring

Note: *Renewals submitted licences pending approval from NoW

2.4 ENVIRONMENTAL MANAGEMENT SYSTEM

WCPL operates an Environmental Management System (EMS) to manage compliance and advance continual improvement across the WMC. During 2014 a number of Management Plans were revised and submitted for approval of the relevant regulator. A summary of the status of required management plans is presented in **Table 6**. As per development consent DA 305-7-2003, Schedule 6 Condition 12 requires the applicant to publicly provide access on its website relevant documents in accordance with the DA 305-7-2003 (http://www.peabodyenergy.com). All interested stakeholders are also welcome to contact the WMC directly via the 24hr Community Hotline (02) 6570 2245 or via the community email account wambocommunity@peabodyenergy.com for further information or clarification with regards to the WMC operations and its performance.

Table 6: Management Plan Status

Management Plan	Status (Approved / Revision)
Blast Management Plan	Approved – 2014
Noise Management Plan	Approved – 2014
Air Quality & Greenhouse Gas Management Plan	Approved – 2014
Flora and Fauna Management Plan	Approved – 2014
Bush Fire Management Plan	Approved – 2014
Water Management Plan*	Submitted –Pending Approval
Rehabilitation Management Plan	Submitted – Pending Approval
Conservation Management Plan (European)	To be revised in 2015
Weed Management Plan	Completed 2014
Topsoil Management Procedure	Completed 2014
Waste Management Procedure	Completed 2014

*Includes Surface, Groundwater, Erosion & Sediment and Response plan

2.5 INCIDENTS

Environmental incidents are tracked internally as part of the EMS and used to identify potential future incidents. During 2014 the WMC recorded 13 environmental incidents compared to 11 recorded environmental incidents in 2013 and 7 in 2012. The majority of incidents where related to small hydrocarbon spills within the Open Cut pit. A summary of environmental incidents is included in **Appendix B.**

2.6 MINE CONTACTS

Peabody Energy Australia and Wambo Coal Pty Ltd are committed to implementing best practice environmental management measures to ensure that mining operations have minimal impact. Wambo has a committed and professional environmental team that supports and advises the senior managers and supervisors of the WMC to ensure that environmental standards and procedures are established and met in all areas of the mining operation. The relevant contacts for environmental management issues are listed below:

Mr. Ernest Johnston
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2.7 RESPONSE TO ACTIONS REQUIRED AT PREVIOUS AEMR REVIEW

The annual AEMR site inspection from DP&E and DRE compliance officers for 2013 was conducted on 22 May 2014 and attended by Mr. Scott Brooks: Senior Compliance Officer, Singleton (DP&E), Mr. Neil McElhinney: Inspector Environment (DRE-ESU), Mr. Troy Favell: Manager Environment and Community Wambo Coal. Mr. Peter Jaeger: Senior Environmental Advisor Wambo Coal. The 2013 AMER and subsequent inspection identified some areas to be addressed in the forthcoming reporting period of 2014. **Table 7** provides a summary and status of these actions from the previous reporting period.

Table 7: AEMR Actions for 2014

Action Item	Department	Issue/observation	Action	Status
1	DP&E	Annual assessment against EIS predictions – Annual Validation of noise	AEMR 2014	AEMR 2014 report – assessment against EIS for Air/Noise – Section 4.2
2	DP&E	Rehabilitation performance against commitments in EIS	AEMR 2014	Confirmed in Independent DA Audit reviewed Rehab progress against EIS – see – draft report See Table 43 – Actions 2015
3	DP&E	Where monitoring outside trigger levels for water quality, these should be listed as actions – whist not required to be treated as an incident – AEMR should be reported as Management Actions	AEMR 2014	Monitoring results – Section 4.6, 4.7
4	DP&E	Wambo Homestead inspection – Wambo Homestead Stockyards to be repaired in 2014 – June 2014 action plan	AEMR 2014	Wambo Homestead – Section 4.11
5	DP&E	Concern regarding approaching mining towards sensitive receivers in the North – careful implementation of noise measures to prevent community complaints	AEMR – 2014	Section 4.2
6	DP&E	Environmental monitoring plans in AMER need to be more clear for readers	AEMR – 2014	Plans updated and labelled clearly
7	DTIRI – ESU	AEMR did not report weed management that was undertaken along North Wambo Creek	Ensure weed management is reported as it provides confidence to DRE that rehabilitation is actively managed	AEMR – Weed Management – Section 4.15.4.1

3. *OPERATIONS SUMMARY*

3.1 REPORTING PERIOD - 2014

3.1.1 PRODUCTION STATISTICS

A summary of the WMC production results against is provided below in **Table 8**.

Table 8: Production and Waste Summary

	Cumulative Production				
	Unit	2012 Reporting Period	2013 Reporting Period	2014 Reporting Period	2015 Reporting Period (Prediction)
Topsoil Stripped	m^3	14,554	10,459	80,461	77,583
Topsoil Used/Spread	m^3	117,000	92,400	201,175	10,050
Overburden Moved	bcm	36,108,312	24,333,646	29,461,739	27,554,881
Processing Waste	Mt	2,341	2,773	2,605	3,412
ROM Coal Mined					
- Open Cut	*Mt*	4.2	4.1	5.4	4.8
- Underground	*Mt*	5.2	5.5	4.2	4.7
Product	Mt	6.0	6.2	6.1	6.2

3.1.2 SUMMARY OF CHANGES - 2014

The Wambo Open Cut mine continues to progress in general accordance with relevant approvals during 2014. No significant change in operations occurred throughout 2014. Open cut operations continue to operate in two active open cut pits, Montrose Pit, located to the North of the complex and Bates South pit. The North Wambo Underground Mine (NWU) continued to progress mining in accordance with relevant approvals. Longwall Panel 7 (LW7) with a total retreat of 3294m was completed on 18 January 2014. Longwall 8a (LW8a) commenced secondary extraction on the 22 February 2014 and was completed on 6 August 2014. Longwall 9 (LW9) secondary extraction commenced on 24 August 2014 and was completed on the 13 January 2015 with a total retreat of 1773m for LW8 and 1740m for LW9. Longwall 10 commenced on the 29 January 2015. An Extraction Plan for Longwalls 9 and 10 was approved by the Department of Planning and Environment DP&E on 4 July 2014 and by Department of Industry Investment, Resources and Energy (DIIRE) on 30 July 2014. A modification to DA 305-7-2003 for an addition Longwall panel (LW10a) to the existing approved North Wambo Underground Mine (NWU) was lodged with the DP&E on the 14 September 2014 Longwall 10a at the time of this reports submission was still being assessed by DP&E. Key

operational activities and significant changes that have occurred during the reporting period are summarised below.

3.1.3 EXPLORATION

Exploration drilling at the Wambo mine site was completed over four different mining leases, and two different exploration leases over the 2014 calendar year; these include CL397, ML1402, ML1572, CCL743, A444 and EL7211. Drilling in CL397 focused on gas content and composition delineation, while exploration in ML1402 focused on Limit of Oxidation (LOX) delineation in the Whybrow seam. Drilling in ML1572, EL7211 and A444 targeted coal seams for coal quality analysis, and finally drilling in CCL743 focused on the measurement of mine water in the historical Homestead Underground workings

Four gas exploration boreholes were drilled in CL397 in the reporting period. One of these boreholes (DDHFE05) was drilled as part of the Bates South Pit Extension Fugitive Emissions program which was designed to give the mine site information on the gas content and compositions of coal seams targeted in the open cut, and tie that gas data to historical data in the North Wambo Underground and South Wambo project areas.

The other three gas boreholes drilled in CL397 (DDH908, DDH910 and DDH911) were exploration boreholes for the proposed South Bates underground. These boreholes targeted coal seams for gas content and composition analysis from the Whybrow to Blakefield seams in the Wittingham coal measures.

During the reporting period there were six LOX boreholes drilled within ML1402. These boreholes were drilled in the Bates South Pit Extension area and targeted the Whybrow seam only. Coal chips were analysed as part of this program for moisture and energy content, and fresh coal was found to exist at a shallow depth of cover over an area that has not been mined in the past. One coal quality borehole (DDH909) was drilled and subsequently abandoned within ML1402 due to its proximity to underground workings.

Four boreholes were completed in CCL743 during the reporting period and these included three boreholes that were designed to measure the depth of water currently sitting in the historical Homestead Underground workings in the Whybrow seam that sit above the proposed North Wambo Underground Life of Mine (LOM). The forth borehole drilled in the reporting period was a dewatering borehole that was again inserted into the Homestead workings and is designed to dewatering historical mining as part of risk mitigation efforts for the North Wambo Underground.

One coal quality exploration borehole (WJ151) was drilled in ML1572 and was designed to give the mine site coal quality information on a ply by ply basis near to the current mining area of the Whybrow to Whynot coal seams.

Five coal quality exploration boreholes were drilled on exploration leases A444 and EL7211. Four boreholes were drilled on A444, with two of those boreholes being re-drills due to core loss. A single borehole was drilled on EL7211 during the 2014 calendar year. The exploration boreholes targeted coal from the Whybrow to Blakefield seams for coal quality analysis.

Table: 9 Exploration Drilling Data by Tenement

CL397

BOREHOLE NAME	LEASE	MGA COORDINATES		RL	NON-CORED	CORED	TOTAL METERAGE	BASAL SEAM INTERSECTED
		EASTING	NORTHING	(AHD)	(m)	(m)	(m)	
DDHFE05	CL397	308944.12	6393844.13	96.60	65.00	127.35	192.35	Blakefield
DDH908	CL397	308061.10	6393951.75	135.52	166.00	119.30	285.30	Whynot
DDH910	CL397	308342.64	6393668.78	127.37	160.00	135.46	295.46	Blakefield
DDH911	CL397	308209.30	6394130.00	120.90	130.00	141.15	271.15	Blakefield

ML1402

BOREHOLE NAME	LEASE	MGA COORDINATES		RL	NON-CORED	CORED	TOTAL METERAGE	BASAL SEAM INTERSECTED
		EASTING	NORTHING	(AHD)	(m)	(m)	(m)	
SB_EXT_1	ML1402	309724.83	6394265.01	84.51	17.80	0.00	17.80	Whybrow
SB_EXT_2	ML1402	309668.81	6394217.42	81.36	14.00	0.00	14.00	Whybrow
SB_EXT_3	ML1402	309731.11	6394210.81	82.78	16.80	0.00	16.80	Whybrow
SB_EXT_4	ML1402	309682.33	6394097.59	80.42	17.00	0.00	17.00	Whybrow
SB_EXT_5	ML1402	309948.37	6393778.87	77.63	10.50	0.00	10.50	Whybrow

SB_EXT_6	ML1402	310098.94	6393807.55	85.80	16.50	0.00	16.50	Whybrow
DDH909	ML1402	309657.00	6394111.00	80.93	30.56	6.18	36.74	Whybrow

CCL743

BOREHOLE NAME	LEASE	MGA COORDINATES		RL	NON-CORED	CORED	TOTAL METERAGE	BASAL SEAM INTERSECTED
		EASTING	NORTHING	(AHD)	(m)	(m)	(m)	
1F	CCL743	310144.42	6391551.82	84.79	138.00	0.00	138.00	Whybrow
1G	CCL743	310104.01	6391551.22	84.54	138.00	0.00	138.00	Whybrow
1J	CCL743	309982.38	6391569.39	90.73	143.73	0.00	143.73	Whybrow
4D	CCL743	309946.50	6390716.73	76.28	140.77	0.00	140.77	Whybrow

A444

BOREHOLE NAME	LEASE	MGA COORDINATES		RL	NON-CORED	CORED	TOTAL METERAGE	BASAL SEAM INTERSECTED
		EASTING	NORTHING	(AHD)	(m)	(m)	(m)	
WJ149	A444	305494.92	6397992.67	163.01	89.77	118.73	208.50	Blakefield
WJ149R	A444	305494.95	6397987.74	163.19	193.20	14.37	207.57	Blakefield
WJ150	A444	305016.24	6397573.89	174.30	150.00	108.37	258.37	Blakefield
WJ150R	A444	305019.94	6397571.07	174.98	159.37	14.95	174.32	Whybrow

ML1572

BOREHOLE NAME	LEASE	MGA COORDINATES		RL	NON-CORED	CORED	TOTAL METERAGE	BASAL SEAM INTERSECTED
		EASTING	NORTHING	(AHD)	(m)	(m)	(m)	
WJ151	ML1572	306587.48	6397122.77	141.10	38.20	90.66	128.86	Whynot

EL7211

BOREHOLE NAME	LEASE	MGA COORDINATES		RL	NON-CORED	CORED	TOTAL METERAGE	BASAL SEAM INTERSECTED
		EASTING	NORTHING	(AHD)	(m)	(m)	(m)	
WJ152	EL7211	304028.53	6397573.36	141.26	245.55	135.99	381.54	Blakefield

Table 10: Boreholes Drilling 2014

TITLE	NUMBER OF BOREHOLES	NON-CORED	CORED	TOTAL DEPTH
		(m)	(m)	(m)
CCL743	4.00	560.50	0.00	560.50
CL365	NO EXPLORATION DURING THE REPORTING PERIOD			
CL374	NO EXPLORATION DURING THE REPORTING PERIOD			
CL397	4.00	521.00	523.26	1044.26
ML1402	7.00	123.16	6.18	129.34
ML1572	1.00	245.55	135.99	381.54
ML1594	NO EXPLORATION DURING THE REPORTING PERIOD			
EL7211	1.00	245.55	135.99	381.54
A444	4.00	592.34	256.42	848.76

TOTAL	21.00	2288.10	1057.84	3345.94

3.1.4 LAND PREPARATION

In accordance with the DA 305-7-2003, and authorised mining leases and tenements, all land clearing at the WMC is carried out under approved management plans and procedures. One such approved management plan is the Flora and Fauna Management Plan (FFMP), which includes a Vegetation Clearance Protocol managed via the sites Surface Disturbance Permit (SDP).

The SDP requires the approval of WCPL's environmental department prior to any clearing activities taking place. The SDP aims to identify any environmental issues such as Cultural Heritage sites, flora and fauna communities, surface drainage, threatened species, and the identification of any timber resources that can be salvaged and any potential emission sources such as air, noise and lighting to mitigate against potential impacts on local sensitive receivers.

During the reporting period approximately 36.09 ha was disturbed to allow continuation of open cut mining. Topsoil recovered during 2014 was either directly placed in the Sarah Marie (RL140) rehabilitation area scheduled for 2014 or placed in Topsoil stockpiles. Soil quality varies considerably across the Wambo Mine complex, generally soils of duplex, weakly structured and low in nutrients and organic material are found. Vegetation prior to disturbance during 2014 was mulched and removed with the topsoil layer in an aid to capture possible seed and woody debris which aids in establishing rehabilitated areas.

3.1.5 *INFRASTRUCTURE DEVELOPMENT / UPGRADES*

During 2014 a number of infrastructure development projects were undertaken. These included the continuation of the Homestead Backfill Project and the development of the South Bates Underground Highwall and portal entries for three longwall panels to access the Whybrow seam

- Homestead Backfill Project

The Homestead Backfill Project (**HBP**) involves the placement of a grouted paste into the old Homestead underground mine workings above a portion of **LW8** (Plan 1). These workings are in the Whybrow seam some 40 metres below the surface. In order to fill the old underground roadways approximately 300 boreholes are planned. The boreholes are drilled down to intersect the old workings and a paste mixer is then used to produce a grouting mix that is gravity fed into the boreholes until the void and boreholes are filled.

The grouting project commenced in 2013 and is expected to be completed by mid-2015. A series of temporary 'all weather access' roads within the HBP boundary are required to allow safe access for mine personnel and equipment during the grouting project. Subject to the completion of the grouting project, the temporary access roads will be removed and the affect areas will be rehabilitated. It is expected that the remediation of the HBP in accordance with the sites Rehabilitation Management Plan and MOP should commence in Quarter 3 2015 dependent upon any unforeseen delays.

- South Bates Underground

The South Bates underground mine is the addition of three Whybrow Seam longwall panels to the already approved NWU mine. During the reporting period of 2014, development of essential infrastructure was undertaken, with highwall stability works and portal entry development in Tailgate 11 and Maingate 11. First workings will continue throughout 2015. Second workings for Longwall Panels 11 to Longwall 13 is scheduled to commence Quarter One 2016 and to be complete in Quarter 3 2017.

3.1.5.1 *MINING*

During 2014, Wambo was committed to ensuring that a completely revised and updated Mining Operations Plan which would see the merger of the current two approved MOP's for the North Wambo Underground and the Wambo Open Cut be submitted for review and approval by DTIRI. In November 2014, an announcement of the proposed Joint Venture partnership between Peabody Energy and Glencore was released. Subsequent to this, the revised MOP planned for submission in late 2014 was withdrawn to be revised again to take into account the above announcement and ensure that the period of the MOP was extended at the request of DTIRI. A revised MOP for the Wambo mine has been submitted to DTIRI on 23 February 2015 for review and approval. Both the NWU Underground and Wambo Open Cut MOP's are approved until 31 March 2015 and 30 June 2016.

Table 8 provides a summary of coal production for the 2014 reporting period. During the reporting period, a combined total for Open Cut and Underground operations mined 9.68 (Mt) of ROM coal, against an approved limit of 14.7 million tonnes of ROM coal per year.

3.1.5.2 OPEN CUT

Open cut operations in the reporting period were undertaken generally in accordance with the Open Cut Mining Operations Plan (MOP 2010-2016) with operations taking place predominately within the Montrose Pit and the established Bates South pit, an extension of the Bates Pit. In 2014, (Mt) of ROM coal was mined, compared to (Mt) in 2013. Coal during the 2014 period was taken from the following seams (Table XXXX). Approximately 29,461,739 bcm of overburden was removed during 2014, compared to 24,333,646 in 2013.

3.1.5.3 UNDERGROUND

Underground operations in the reporting period were conducted generally in accordance with the Underground MOP and DA 305-7-2003. Operations for 2014 produced 4.20 (Mt) of ROM coal against 5.54(Mt) in 2013. Forecasted tonnes for 2015 are for 4.75 (Mt) of ROM coal from underground operations.

The North Wambo Underground (NWU) mines the Wambo seam using continuous miners and longwall mining methods. The first of eight longwall blocks (LW1) was completed in February 2009 and production commenced in the second longwall block (LW2) in March 2009 and was completed in March 2010. In December 2010, extraction of Longwall Panel 3 (LW3) was completed, with production of Longwall Panel 4 (LW4) commencing in January 2011. During November 2011 LW4 was completed. Extraction of Longwall Panel 5 (LW5) was completed in August 2012. Extraction of Longwall Panel 6 (LW6) commenced in September 2012 and subsequently completed in May 2013. Longwall Panel 7 (LW7) with a total retreat of 3294m was completed on 18th January 2014. Longwall

8a (LW8a) commenced secondary extraction on the 22 February 2014 and was completed on 6 August 2014. Longwall 9 (LW9) secondary extraction commenced on 24 August 2014 and was completed on the 13 January 2015 with a total retreat of 1773m for LW8 and 1740m for LW9. Longwall 10 commenced on the 29 January 2015.

At the time of report submission Longwall Panel (LW10) has retreated 255 metres. The NWU continues to operate seven days a week. Subsequent panel sequence is currently scheduled at the time of report submission as follows;

- LW10 completed by June 2015
- LW10a start date June 2015, estimated completion date October 2015 (pending approval)
- LW08b start date November 2015, estimated completion date January 2016
- LW11 start date February 2016, estimated completion date August 2016
- LW12 start date August 2016, estimated completion date February 2017
- LW13 start date February 2017, estimated completion date August 2017

In September 2014, WCPL submitted a development consent modification for DA 305-7-2003 for an additional Longwall panel (LW10a) to extend the life of mine and continuity of workforce employment for the NWU mine. At the time of report submission, assessment and approval for the additional panel has yet to be determined.

3.1.5.4 COAL PROCESSING & RAIL TRANSPORT

Coal from the Open Cut and Underground operations is transferred to the Coal Handling Processing Plant (CHPP) via haul trucks on internal haul roads. Coal is tipped directly into the 400 tonne ROM bin or stockpiled adjacent to the ROM bin and subsequently loaded into the ROM crusher using a front-end loader.

During 2014, the WMC loaded 884export trains with a total haulage of 6,502,825 tonnes. All coal produced by the WMC was transported by rail during the reporting period. **Table 11** summaries the CHPP production statistics for the reporting period of 2014.

Table 11: CHPP Production Summary

	2012	2013	2014
ROM Coal Processed	9,295,304	9,664,542	9,686,510
Average Recovery Rate	64.7	64.6	63.5
Total Rejects	2,341,123	2,773,453	2,861,405

4. *ENVIRONMENTAL MANAGEMENT AND PERFORMANCE*

Wambo Coal is committed to managing its environmental impacts by utilising where practicable, best management practices and procedures to prevent, minimise and mitigate environmental impacts of the operation. The following section will discuss environmental monitoring data from the 2014 reporting calendar. Complete detailed environmental monitoring reports are available upon request if further clarifications are sought by interested parties. These reports can also be found on the Peabody Energy website under Australian Operations (www.peabodyenergy.com).

4.1 METEROLOGICAL

The WMC maintains a weather station in accordance with the Australian Standard AS2923 – 1987. The weather station is located approximately 350m east of the WMC administration building (**Figure 2**). As required under Schedule 4, Condition 10 of Development Consent DA 305-7-2003, the meteorological station records the following parameters:

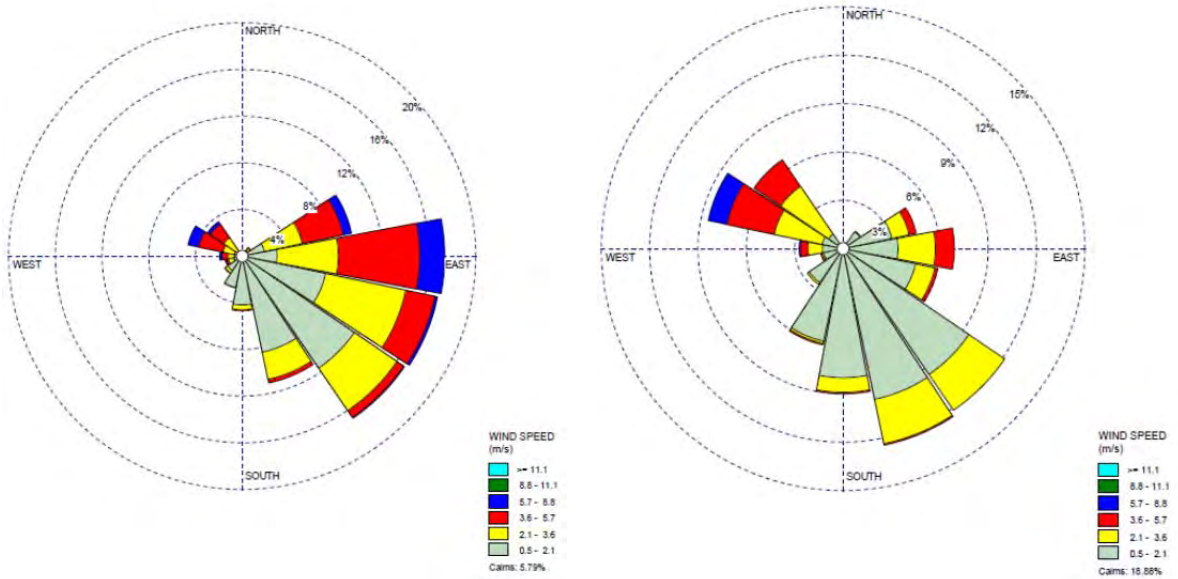
- temperature (at 2 m and 10 m);
- lapse rate;
- wind speed;
- wind direction;
- solar radiation;
- humidity; and
- sigma theta

Annual rainfall for 2014 was 556.44 mm compared to 688.3mm for 2013

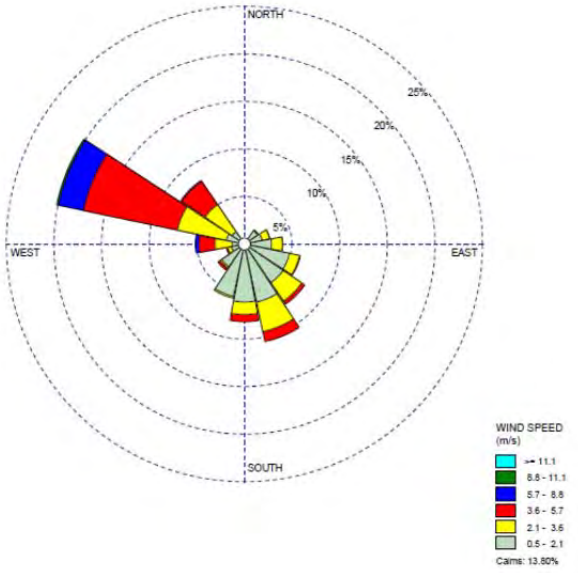
The maximum temperature recorded for 2014 was 45.3^0 Celsius which occurred in November 2014, while the minimum temperature was -1.7^0 Celsius in June 2014 with a mean temperature of 18.11^0 Celsius for 2014.

Summer winds were predominately from the east, south east, while winter winds were dominated by west, north westerlies. Wind roses for 2014 are presented in **Figure 1**. Appendix D provides a more comprehensive data overview of meteorological monitoring for the WMC.

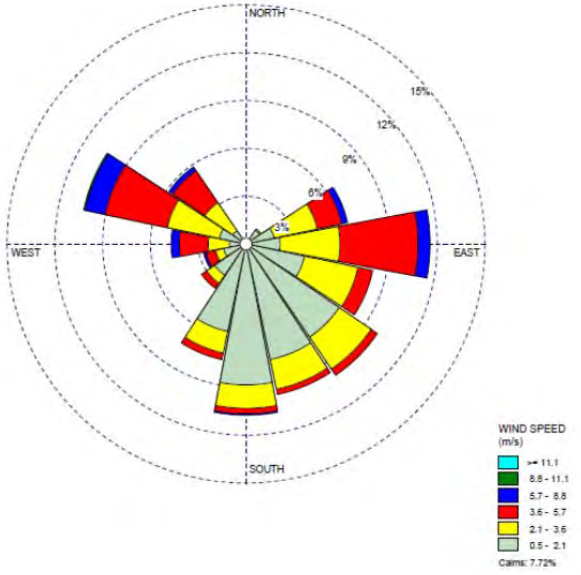
Figure 1 – WMC Seasonal Wind Roses



Summer: 1 Dec 2013 – 28 Feb 2014



Autumn: 1 March 2014 – 31 May 2014



Winter: 1 June 2014 – 31 August 2014

Spring: 1 Sept 2014 – 30 Nov 2014

4.2 OPERATIONAL NOISE

4.2.1 Operational Noise Management

4.2.1.1 Management Strategies / Techniques

Wambo employs various management techniques, strategies and training and education seminars to minimise the generation of noise across the mine site. The WMC has implemented a number of noise management controls in order to mitigate any potential noise impacts from the operation. These noise management controls are typically classified into design controls and operational controls. Generally noise emissions generated by mining operations are low frequency, usually less than 1000Hz. Some of the management techniques and strategies include;

- The construction of noise and visual bunds in strategic operational locations
- Regular preventive maintenance of all mobile equipment
- Monthly independent attenuated noise monitoring
- Daily and exception reviews and analysis of the real time environmental noise monitoring system
- Ongoing Environmental awareness training provided to all site employees
- Implementation of a meteorological forecasting platform for the site to aid in mine planning and daily operational responses to minimise impacts from adverse weather conditions which may in some instances influence emissions from the operations.
- Montrose Ridge Noise Mitigation Strategy (discussed in **4.2.5**)

4.2.1.2 Criteria

Schedule 4, Condition 6 of DA 305-7-2003 specifies noise impact assessment criteria for day, evening and night at individual residences. In addition noise monitoring criteria for the Wambo Rail Development (WRD) is specified in Schedule 4, Conditions 3, 6 and 7 of DA 177-8-2004.

Wambo Coals Noise Management Plan (NMP) which outlines the WMC noise monitoring requirements, methodologies and responses to ascertain if the WMC continues to meet the noise impact assessment criteria.

4.2.1.3 Monitoring for 2014

Attended environmental noise level assessments were undertaken by an independent third party during the reporting period. Attended environmental noise monitoring described was undertaken on a monthly basis in 2014 (reported quarterly) The purpose is to quantify and describe the existing acoustic environment around the WMC including the Wambo Coal Rail Facility (WCRF) and compare results with relevant development consent conditions for compliance reporting. Attended noise monitoring was conducted at a total of four locations (Plan 3). **Table 12** provides a summary of location and monitoring parameters for the site.

Table 12: Noise Monitoring Locations

Site Reference	Site Location	Monitor Type	Consent Requirements	Frequency [1]
N01	*Lambkin Residence*	Attended	Mine Development Consents	Quarterly
N03	*Kelly Residence*	Real-time & Attended	Mine and Rail Spur Development Consent	Continuous & Quarterly
N16	*Muller Residence*	Real-time & Attended	Mine Development Consent	Continuous & Quarterly
N20	Thelander Residence	Real-time	Mine Development Consent	Continuous
N21	Wambo South Residence	Real-time	Mine Development Consent	Continuous
N23	*Redmanvale Road*	Attended	Mine Development Consent	Quarterly

Notes:

1. *Sourced from the Draft Wambo Coal Noise Monitoring Programme -EMP008, September 2013; and*
2. *Quarterly attended locations are shown in italics.*

4.2.2 Operational Noise Performance - 2014

Noise levels from the WMC complied with relevant criteria at all sites during the attended noise monitoring. It is noted that wind speeds and/or temperature inversion conditions were at levels greater than which the development consent conditions would apply for the mine activities in some instances. An independent review and assessment of attended noise monitoring against operations and comparison against EIS Year 9 operation is provided in **Appendix C.**

Attended noise monitoring was conducted at all sites during night hours. Monitoring was not conducted in the evening period, as consent limits are the same for evening and night periods, and night time monitoring is considered a more suitable time to measure the source of interest. The

duration of all measurements was 15 minutes. Attended monitoring is preferred to the use of loggers when determining compliance with prescribed limits as it allows an accurate determination of the contribution, if any, to measured noise levels by the source of interest.

The terms "Inaudible" (IA) and "Not Measured" (NM) are used in the below tables. When site noise is noted as IA, then there was no site noise at the prescribed monitoring location. If site noise is noted as NM, this means some noise was audible but could not be quantified, which may mean that the noise from the site was very low, or being masked by other noise that was relatively loud.

A summary of the noise emissions generated by the WMC in 2014 applicable to the relevant Development Consent authorities are provide below.

Table 13: $L_{Aeq,15minute}$ Generated by WCM against Noise Criteria – Quarter 1

Location	Start Date and Time	Wind Speed m/s	VTG[7] °C/100m	Criterion $L_{Aeq,15min}$ dB[1]	Criterion Applies?[3]	WCM $L_{Aeq,15min}$ dB[4,5]	Exceedance[6,8]
N01[2]	09/01/2014 23:46	2.0	0.5	NA	NA	IA	NA
N03[2]	09/01/2014 23:16	2.1	0.5	NA	NA	<30	NA
N16	09/01/2014 22:47	2.6	-1.0	40	Yes	IA	Nil
N23	09/01/2014 22:18	2.7	-1.0	38	Yes	IA	Nil
N01[2]	24/02/2014 00:35	1.7	3.0	NA	NA	IA	NA
N03[2]	23/02/2014 23:44	1.4	0.5	NA	NA	37	NA
N16	23/02/2014 23:00	2.4	-1.0	40	Yes	IA	Nil
N23	23/02/2014 22:20	1.7	-1.0	38	Yes	IA	Nil
N01[2]	30/03/2014 22:04	1.0	-1.0	NA	NA	IA	NA
N03[2]	30/03/2014 22:37	1.3	-1.0	NA	NA	46	NA
N16	30/03/2014 23:07	1.1	0.5	40	Yes	IA	Nil
N23	30/03/2014 23:38	1.2	0.5	38	Yes	IA	Nil

Table 14: $L_{A1,1minute}$ Generated by WCM against Noise Criteria – Quarter 1

Location	Start Date and Time	Wind Speed m/s	VTG[7] °C/100m	Criterion $L_{A1,1min}$ dB[1]	Criterion Applies?[3]	WCM $L_{A1,1min}$ dB[4,5]	Exceedance[6,8]
N01[2]	09/01/2014 23:46	2.0	0.5	NA	NA	IA	NA
N03[2]	09/01/2014 23:16	2.1	0.5	NA	NA	<30	NA
N16	09/01/2014 22:47	2.6	-1.0	50	Yes	IA	Nil
N23	09/01/2014 22:18	2.7	-1.0	50	Yes	30	Nil
N01[2]	24/02/2014 00:35	1.7	3.0	NA	NA	IA	NA
N03[2]	23/02/2014 23:44	1.4	0.5	NA	NA	43	NA
N16	23/02/2014 23:00	2.4	-1.0	50	Yes	IA	Nil
N23	23/02/2014 22:20	1.7	-1.0	50	Yes	IA	Nil
N01[2]	30/03/2014 22:04	1.0	-1.0	NA	NA	IA	NA
N03[2]	30/03/2014 22:37	1.3	-1.0	NA	NA	53	NA
N16	30/03/2014 23:07	1.1	0.5	50	Yes	IA	Nil
N23	30/03/2014 23:38	1.2	0.5	50	Yes	IA	Nil

Table 15: $L_{Aeq,15minute}$ Generated by WCM against Noise Criteria – Quarter 2

Location	Start Date and Time	Wind Speed m/s	VTG[7] °C/100m	Criterion $L_{Aeq,15min}$ dB[1]	Criterion Applies?[3]	WCM $L_{Aeq,15min}$ dB[4,5]	Exceedance[6,8]
N01[2]	08/04/2014 23:40	0.6	4.1	NA	NA	IA	NA
N03[2]	08/04/2014 23:00	0.4	4.1	NA	NA	31	NA
N16	08/04/2014 22:29	0.5	4.1	40	No	NM	NA
N23	08/04/2014 22:00	1.1	4.1	38	No	<30	NA
N01[2]	19/05/2014 23:50	0.9	4.1	NA	NA	<25	NA
N03[2]	19/05/2014 23:10	0.7	4.1	NA	NA	42	NA
N16	19/05/2014 22:32	1.0	4.1	40	No	IA	NA
N23	19/05/2014 22:00	0.0	4.1	38	No	IA	NA
N01[2]	10/06/2014 23:50	0.6	4.1	NA	NA	IA	NA
N03[2]	10/06/2014 23:13	0.1	4.1	NA	NA	50	NA
N16	10/06/2014 22:37	0.8	4.1	40	No	NM	NA
N23	10/06/2014 22:07	1.2	3.0	38	No	34	NA

Table 16: $L_{A1,1minute}$ Generated by WCM against Noise Criteria – Quarter 2

Location	Start Date and Time	Wind Speed m/s	VTG[7] °C/100m	Criterion $L_{A1,1min}$ dB[1]	Criterion Applies? [3]	WCM $L_{A1,1min}$ dB [4,5]	Exceedance [6,8]
N01[2]	08/04/2014 23:40	0.6	4.1	NA	NA	IA	NA
N03[2]	08/04/2014 23:00	0.4	4.1	NA	NA	40	NA
N16	08/04/2014 22:29	0.5	4.1	50	No	NM	NA
N23	08/04/2014 22:00	1.1	4.1	50	No	30	NA
N01[2]	19/05/2014 23:50	0.9	4.1	NA	NA	32	NA
N03[2]	19/05/2014 23:10	0.7	4.1	NA	NA	45	NA
N16	19/05/2014 22:32	1.0	4.1	50	No	IA	NA
N23	19/05/2014 22:00	0.0	4.1	50	No	IA	NA
N01[2]	10/06/2014 23:50	0.6	4.1	NA	NA	IA	NA
N03[2]	10/06/2014 23:13	0.1	4.1	NA	NA	53	NA
N16	10/06/2014 22:37	0.8	4.1	50	No	NM	NA
N23	10/06/2014 22:07	1.2	3.0	50	No	38	NA

Table 17: $L_{Aeq,15minute}$ Generated by WCM against Noise Criteria – Quarter 3

Location	Start Date and Time	Wind Speed m/s	VTG[7] °C/100m	Criterion $L_{Aeq,15min}$ dB[1]	Criterion Applies? [3]	WCM $L_{Aeq,15min}$ dB [4,5]	Exceedance [6,8]
N01[2]	02/07/2014 22:00	0.0	4.1	NA	NA	32	NA
N03[2]	02/07/2014 22:32	0.0	4.1	NA	NA	40	NA
N16	02/07/2014 23:04	0.0	3.0	40	No	NM	NA
N23	02/07/2014 23:36	0.0	3.0	38	No	IA	NA
N01[2]	20/08/2014 23:49	1.4	-1.0	NA	NA	IA	NA
N03[2]	20/08/2014 23:09	1.2	0.5	NA	NA	40	NA
N16	20/08/2014 22:31	1.5	0.5	40	Yes	34	Nil
N23	20/08/2014 22:00	1.2	0.5	38	Yes	30	Nil
N01[2]	10/09/2014 23:35	0.2	4.1	NA	NA	<20	NA
N03[2]	10/09/2014 22:59	0.6	3.0	NA	NA	41	NA
N16	10/09/2014 22:30	1.2	0.5	40	Yes	<20	Nil
N23	10/09/2014 22:00	1.0	0.5	38	Yes	NM	Nil

Table 18: $L_{A1,1minute}$ Generated by WCM against Noise Criteria – Quarter 3

Location	Start Date and Time	Wind Speed m/s	VTG[7] °C/100m	Criterion $L_{A1,1min}$ dB[1]	Criterion Applies?[3]	WCM $L_{A1,1min}$ dB[4,5]	Exceedance[6,8]
N01[2]	02/07/2014 22:00	0.0	4.1	NA	NA	32	NA
N03[2]	02/07/2014 22:32	0.0	4.1	NA	NA	40	NA
N16	02/07/2014 23:04	0.0	3.0	40	No	NM	NA
N23	02/07/2014 23:36	0.0	3.0	38	No	IA	NA
N01[2]	20/08/2014 23:49	1.4	-1.0	NA	NA	IA	NA
N03[2]	20/08/2014 23:09	1.2	0.5	NA	NA	40	NA
N16	20/08/2014 22:31	1.5	0.5	40	Yes	35	Nil
N23	20/08/2014 22:00	1.2	0.5	38	Yes	30	Nil
N01[2]	10/09/2014 23:35	0.2	4.1	NA	NA	<20	NA
N03[2]	10/09/2014 22:59	0.6	3.0	NA	NA	41	NA
N16	10/09/2014 22:30	1.2	0.5	40	Yes	<20	Nil
N23	10/09/2014 22:00	1.0	0.5	38	Yes	NM	Nil

Table 19: $L_{Aeq,15minute}$ Generated by WCM against Noise Criteria – Quarter 4

Location	Start Date and Time	Wind Speed m/s	VTG[7] °C/100m	Criterion $L_{Aeq,15min}$ dB[1]	Criterion Applies?[3]	WCM $L_{Aeq,15min}$ dB[4,5]	Exceedance[6,8]
N01[2]	29/10/14 23:37	3.0	-1.0	NA	NA	29	NA
N03[2]	29/10/14 23:00	2.9	0.5	NA	NA	44	NA
N16	29/10/14 22:29	3.8	-1.0	40	No	IA	NA
N23	29/10/14 22:00	4.5	-1.0	38	No	IA	NA
N01[2]	18/11/14 22:26	2.4	-1.0	NA	NA	IA	NA
N03[2]	18/11/14 23:03	1.0	-1.0	NA	NA	38	NA
N16	18/11/14 23:34	1.1	3.0	40	No	29	NA
N23	19/11/14 00:08	1.9	-1.0	38	Yes	25	Nil
N01[2]	02/12/14 22:00	1.7	0.5	NA	NA	IA	NA
N03[2]	02/12/14 22:32	1.7	0.5	NA	NA	43	NA
N16	02/12/14 23:04	1.1	0.5	40	Yes	IA	Nil
N23	02/12/14 23:30	1.5	0.5	38	Yes	IA	Nil

Table 20: $L_{A1,1minute}$ Generated by WCM against Noise Criteria – Quarter 4

Location	Start Date and Time	Wind Speed m/s	VTG[7] °C/100m	Criterion $L_{A1,1min}$ dB[1]	Criterion Applies? [3]	WCM $L_{A1,1min}$ dB [4,5]	Exceedance [6,8]
N01[2]	29/10/14 23:37	3.0	-1.0	NA	NA	37	NA
N03[2]	29/10/14 23:00	2.9	0.5	NA	NA	56	NA
N16	29/10/14 22:29	3.8	-1.0	50	No	IA	NA
N23	29/10/14 22:00	4.5	-1.0	50	No	30	NA
N01[2]	18/11/14 22:26	2.4	-1.0	NA	NA	IA	NA
N03[2]	18/11/14 23:03	1.0	-1.0	NA	NA	44	NA
N16	18/11/14 23:34	1.1	3.0	50	No	40	NA
N23	19/11/14 00:08	1.9	-1.0	50	Yes	34	Nil
N01[2]	02/12/14 22:00	1.7	0.5	NA	NA	IA	NA
N03[2]	02/12/14 22:32	1.7	0.5	NA	NA	51	NA
N16	02/12/14 23:04	1.1	0.5	50	Yes	IA	Nil
N23	02/12/14 23:30	1.5	0.5	50	Yes	IA	Nil

Notes:
1. Development consent criterion;
2. Monitoring location is within Zone of Affectation, criterion not applicable (NA);
3. 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 3ºC/100m, and wind speeds of up to 2 m/s at 10 metres above ground level.*

4. Estimated or measured $L_{A1,1minute}$ attributed to WCM;
5. NM denotes WCM audible but not measurable, IA denotes inaudible;
6. NA in exceedance column means atmospheric conditions outside conditions specified in development consent and so criterion is not applicable, or, there is no applicable criterion;
7. Vertical temperature gradient (VTG) calculated using sigma theta values according to INP procedures; and
8. Bold and red text indicates an exceedance of relevant criterion.

Table 21 provides a summary of the Low frequency assessment carried out as part of the attended noise monitoring program for 2014

Table 21 – Low Frequency Assessment – 2014

Reporting Period	Conditions	Total
Quarter 1	Number of measurements	12
	Number of measurements where WCM was measurable and relevant criteria applied	0
Quarter 2	Number of measurements	12
	Number of measurements where WCM was measurable and relevant criteria applied	0
Quarter 3	Number of measurements	12
	Number of measurements where WCM was measurable and relevant criteria applied	0
Quarter 4	Number of measurements	12
	Number of measurements where WCM was measurable and relevant criteria applied	0

None of the measurements occurred during which WCM was measurable (not 'audible" or "not measurable"), was within 5 dB of the relevant criterion and where meteorological conditions resulted in criteria applying (in accordance with the consent). No further assessment of low frequency noise was required.

4.2.3 Noise Complaints - 2014

There were a total of 10 community complaints registered with the WMC in 2014 relating to operational noise out of a total of 31 community complaints for the WMC in total. During 2012/2013 the WMC installed noiseless horns on the open cut operational fleet. In addition, the mining sequence in 2013 resulted in operations being predominately located to the lower depths of the active pit. In the later period of 2014, operations within the Montrose Pit extended to higher RL levels along the Montrose ridge line. This potentially may have impacted on local community members from increased noise generation and propagation from the WMC. Wambo adopted a proactive mitigation strategy in advance of operations commencing to mitigate any potential environmental impact on local community receivers discussed further in **4.2.5**.

4.2.4 Operational Noise Non-compliance – 2014

There were no operational non-compliances during the reporting period of 2014

4.2.5 Noise – Improvements

During 2013 Wambo commissioned and designed with the assistance of WeatherZone, a predictive meteorological forecasting platform to aid in the mine planning and response to adverse or potentially adverse meteorological conditions which may increase the potential impacts of operations on the surrounding community receivers. The WeatherZone dashboard has now been rolled out to operations and mine planning personnel (including the blast management team) to assist and provide guidance in forecasting potential impacts which may be propagated by adverse or unfavourable weather conditions.

As mentioned previously, operations within the Montrose Pit had also moved to higher RL levels which may have resulted in an increased noise and air impacts on the local community. As a result Wambo operational staff and the Environment and Community team developed the ***Montrose Ridge Operating Procedure*** and presented a training and education program to all Open Cut personnel. The main elements within this procedure are designed to mitigate wherever possible and respond accordingly to potential and or actual impacts on community members from operation being conducted in this new area. Some of the main elements included;

- Operating Days***: Monday to Friday***
- Restricted Work Hours (***6:30am – 6:00pm***)
- Wind Direction – No work to take place if persistent strong winds are from the South / South East
- PC5500 Only
- Cat Trucks (793 - only)
- Hornless Horns must be in operation (if faulty, remove and fix)
- Water Cart priority area
- D10 Dozer only – (restrict reversing distances)
- Park up Location – not to be located on ridge line – must be below ridge line
- Air and Noise Trigger Alarms set 4 dBL below consent criteria (will be monitored and revised if required)

- Excavator Drop heights – digger operators to minimise drop heights during the loading of overburden

As a result of the above proactive action, Wambo coal received three community complaints during the initial week of production and no further noise complaints have been received to date.

4.3 BLASTING

4.3.1 Blasting Management

Blasting operations at the WMC are managed under the approved Blast Management Plan and Blast Fume Strategy Plan as well by conditions of the development consent and Environmental Protection License (EPL 529). Prior to a blast event, meteorological data is reviewed and used to assist in the determination of potential effects of blasting for the scheduled time of the event. Wind speed and wind direction are taken into account as is the location of the blast in the open cut pit and the size of the blast area are also considered in relation to neighbouring parties and mine site personnel. Wambo Coal also operates a 24 hr. Blasting Information Hotline and a SMS Blasting notification message service for those interested community members who wish to be notified for blast events at Wambo Coal. Wambo Coal also communicates blast events to neighbouring mine sites via an email distribution list to manage potential cumulative impacts on the wider community with regards to blast events. During 2014, on one occasion Wambo Coal rescheduled the timing of a blast event to minimise and any cumulative impact.

Blast monitoring units are installed at 3 fixed locations on private property, one within the grounds of the Wambo Homestead complex and one located in the southern district (Wambo Road) of the operations as shown in **Plan 3**. Results from blast events are housed offsite in an external server to provide security of results. Blast units are calibrated each year and calibration certificates are located on the Peabody Energy website for viewing by interested parties.

4.3.2 Blasting Performance

The WMC EPL 529, DA 305-7-2003 and DA 117-8-2004 outline the relevant criteria for blasting operations at the WMC. The criterion is provided below in **Table 22**.

Table 22: Blasting Criteria

Airblast overpressure level (dB(Lin Peak))	Allowable exceedance
115	5% of the total number of blast over a period of 12 months
120	0%

Peak particle velocity (mm/s)	Allowable exceedance
5	5% of the total number of blast over a period of 12 months

10	0%

During 2014, there were a total of 75 blast events with no blast events recorded on privately owned land in exceedances of the criteria limits as set (**Appendix F**). In 2013, there were 62 blast events with no exceedances in blasting criteria limits as set. Wambo coal is also required not to fire more than three blasts per day and no more than fifteen per week. A summary of blasting performance is provided in **Table 23**.

Table 23: Blasting performance Summary

Blast Summary	Number	% of Blasts
Total Blasts	75	
Blasts > 115dB	0	100%
Blasts >120dB	0	100%
Blasts > 5mm/sec	0	100%
Blasts >10 mm/sec	0	100%
Exceedances	0	100%
Capture Rate	68	91%
Reportable Fume Events	1	99%
> 3 blast events per day	0	100%
>15 blast events per week	0	100%

4.3.3 Blasting Related Complaints

In 2014, the WMC received 31 community complaints in relation to its mining operations. Of these, 13 complaints were specifically related to blast events, 8 regarding noise and vibration and 5 in relation to blast fumes. In 2013, 12 blast related complaints were recorded for blast events in relation to noise and vibration, of these complaints, 9 were received in relation to blast events for blast fumes.

4.3.4 Blasting Non-compliances – 2014

There were no blasting non-compliances against criteria during the reporting period of 2014, however on 7 occasions blast monitors failed to capture recordings from a blast event due to software/hardware malfunctions or loss of power.

On Wednesday 14 May 2014, WCPL conducted a controlled blast event within the open cut mining complex of the Mine (**Blast**). The Blast, blast event **M20WWA3**, was fired at 15:32. The Blast was observed to generate a plume of orange coloured gas. WCPL promptly reported the Blast to the Environment Protection Authority (**EPA**) and other relevant government authorities under the Pollution Incident Response Management Plan (**PIRMP**).

Following the Blast, WCPL received four community complaints from neighbouring properties located towards the North of the Mine relating to vibration and/or fume. WCPL contacted and visited the residence of all persons that made a complaint and provided them with a copy of the NSW Health Fact Sheet, Mine Blast Fumes and You (**NSW Health Fact Sheet**). WCPL also visited the residents of another neighbouring property. On 15 May 2014 WCPL received a request for a full report of the

blast incident in accordance with Condition R3 of its Environment Protection Licence which has been submitted.

Further investigations are currently underway with Wambo assisting the NSW EPA.

4.3.5 Blasting related Improvements

In 2015, Wambo will commission the purchase and installation of a mobile weather station complex. The mobile station will enable Blasting and Production superintendents and environmental staff to more accurately monitor and react to changing weather conditions which are further afield from the fixed weather station located at the Administration building. This mobile station will be used in conjunction with the fixed station and also will have the utility to feed directly into the WeatherZone predictive forecasting platform.

4.4 AIR QUALITY

4.4.1 Air Quality Management

Air Quality at the WMC is managed in accordance with the WMC's

- Air Quality and Greenhouse Gas Management Plan
- Environmental Monitoring Program

Both are a requirement under Consent Condition 4, Schedule 4, and DA 305-7-2004. The Air Quality Management Plan as approved in 2008 and was required in 2013 to undergo a thorough revision and submission to DP&I for approval. Wambo Coal received approval for the revised plan in March 2014 and is now referred to as the Air Quality and Greenhouse Gas Management Plan (AQGGMP).

Wambo Coal's air quality monitoring network is shown in **Plan 2** and includes;

- Four HVAS units measuring TSP
- Four real time TEOM units measuring particulate matter of 10 microns in diameter (PM10) on a continuous basis; and
- 15 depositional dust gauges

4.4.2 Air Quality Monitoring

Wambo uses 4 Tapered Element Oscillating Microbalance (TEOM) units monitoring PM_{10}, which are located strategically upwind and downwind of the WMC. These monitors are integrated into the mines overall environmental monitoring program and provide real-time output to key operational staff via SMS alarm triggers and by allowing real-time viewing via the internet. Used in conjunction with field based observations and real time meteorological data (such as wind speed and wind direction), these units act as a proactive management tool for the site to manage potentially excessive dust emissions from the WMC by modifying mine site activities when and where feasible.

Monitoring of Total Suspended Solids (TSP) via four High Volume Air Samplers (HVAS) is undertaken every six days for a continuous 24 hour period.

Depositional dust samples are collected for analysis every 30+- two days from 15 locations surrounding the mine site. **Plan 2**

4.4.3 Air Quality Performance

Statutory compliance criteria are detailed in the development consents pertaining to the WMC. A summary of air quality compliance criteria is provided in **Table 24** along with a summary of the WMC performance against these criteria.

Table 24: Air Quality Impact Assessment & Compliance Summary 2014

Pollutant	Criterion	Average Period	Source	Compliance
Total Suspended Solids (TSP)	90 µg/m^3	Annual	DA 305-7-2003 – Schedule 3 Condition 4	100%
Particulate Matter <10um (PM_{10})	30 µg/m^3	Annual	DA 305-7-2003 – Schedule 3 Condition 4	100%
	50 µg/m^3	(24 hour average)	DA 305-7-2003 – Schedule 3 Condition 4	99%
Dust Deposition Annual Average Assessment	4 g/m^2/month	Max total deposited dust levels	DA 305-7-2003 – Schedule 3 Condition 4	100%
	2 g/m^2/month	Max increase in deposited dust levels	DA 305-7-2003 – Schedule 3 Condition 4	100%

4.4.3.1 High Volume Air Sampling Monitoring - 2014

Monitoring of TSP occurred at four locations during the reporting period (**Plan 2**);

- HV01 – Coralie
- HV02 – Wambo Road
- HV03 – Thelander
- HV04 – Muller

All four HVAS continued to operate on a six day cycle during the reporting period, in accordance with AS 2724.3 – 1984 – Determination of total suspended particulates (TSP) – High Volume sampler gravimetric method. Both HV01 and HV02 are located within the boundaries of the WMC. HV03 and HV04 are located on privately owned lands.

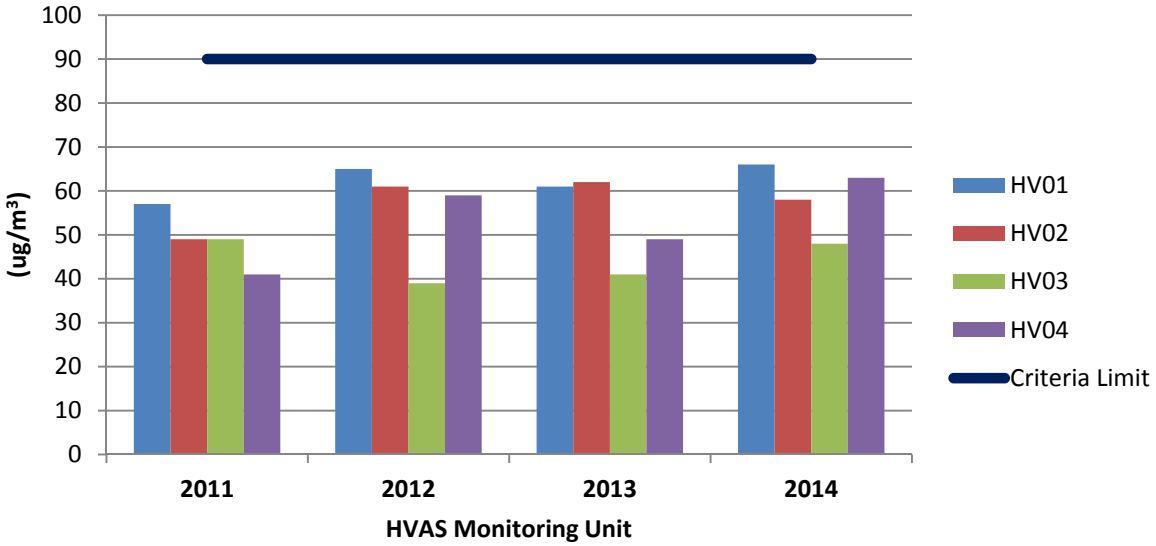
All units during the reporting period attained a 100% capture rate.

TSP monitoring summaries for 2014 are presented in **Table 25** along with a comparison against previous three reporting year results. Results for 2014 are generally consistent with previous years.

Table 25: TSP Recent Annual Averages

High Volume Air Sampling Monitor	2011	2012	2013	2014
HV01	56.7 µg/m^3	64.8 µg/m^3	61 µg/m^3	66 µg/m^3
HV02	48.8 µg/m^3	61.4 µg/m^3	62 µg/m^3	58 µg/m^3
HV03	49.0 µg/m^3	38.9 µg/m^3	41 µg/m^3	48 µg/m^3
HV04	41.0 µg/m^3	58.6 µg/m^3	49 µg/m^3	63 µg/m^3

Figure 2 : Comparison HVAS Annual Average Results 2011 - 2014



The annual average TSP concentration at all four monitoring locations did not exceed the long term impact annual average criteria of **90 µg/m^3** at any residence on any privately owned land.

4.4.3.2 PM10 Monitoring – 2014

Four real-time TEOM PM_{10} units were in operation during the reporting period of 2014 as part of the air quality monitoring program (**Plan 2**);

- AQ01 – Coralie
- AQ02 – Wambo Road
- AQ03 – Thelander
- AQ04 – Muller

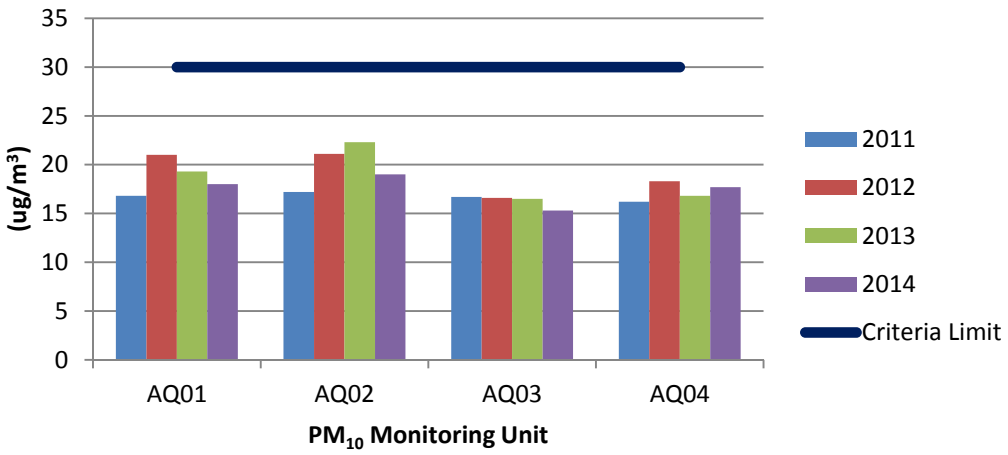
Each TEOM units records the PM_{10} particulates every 15 minutes and calculates a 24hr average which, is compared to the relevant criteria. The units are operated and sampled in accordance with AS 3580.9.8 - 2002, Method for Sampling and Analysis of Ambient Air - Determination of Suspended Particulate Matter - PM_{10} Continuous Direct Mass Method using a Tapered Element Oscillating Microbalance Analyser. Units had a capture rate of AQ01 (98%), AQ02 (100%), AQ03 (99%) and AQ04 (100%). Intermittent power failures and software malfunctions were identified as the causes of data loss.

The PM_{10} annual average concentration at all four monitoring locations did not exceed the annual average criteria of **30µg/m³**. PM_{10}. Monitoring summaries for 2014 are presented in **Table 26** along with a comparison against previous reporting year results. On 3 days monitoring results returned values above the 24hr criteria of **50µg/m³**. Full year results are provided in **Appendix G**. A review of meteorological conditions indicates extreme dry and hot period couple with one bush fire event on the 16 January 2014. Results for 2014 are generally consistent with previous years.

Table 26: PM_{10} Recent Annual Averages

PM_{10} Monitoring Unit	2011 Annual Ave	2012 Annual Ave	2013 Annual Ave	2014 Annual Ave
AQ01	16.8 µg/m³	21.0 µg/m³	19.3 µg/m³	18.0 µg/m³
AQ02	17.2 µg/m³	21.1 µg/m³	22.3 µg/m³	19.0 µg/m³
AQ03	16.7 µg/m³	16.6 µg/m³	16.5 µg/m³	15.3 µg/m³
AQ04	16.2 µg/m³	18.3 µg/m³	16.8 µg/m³	17.7 µg/m³

Figure 3: Comparison PM_{10} Annual Average Results 2011 - 2014



4.4.3.3 Depositional Dust Monitoring - 2014

The WMC operates 15 depositional dust gauges surrounding and within the WMC (**Plan 2**). All depositional dust gauges were sampled and analysed for insoluble solids and ash residue in accordance with AS3580.10.1:2003 Methods for Sampling and Analysis of Ambient Air and National Association of Testing Authorities (NATA) requirements.

There was a capture and analysis rate of 100% for all dust gauges. Throughout the period of sampling it was noted some of the dust gauges contained various sources of foreign material including bird droppings, insects, sticks and other organic matter when analysed. Contamination was assessed based on field observations, laboratory observations, and historical data and wind patterns. All monthly dust results deemed to be contaminated were excluded from the annual average.

Table 27: Dust Depositional Annual Averages

Depositional Dust Gauge	2011 Annual Ave	2012 Annual Ave	2013 Annual Ave	2014 Annual Ave
DDG on Private Property				
D24	1.1	1.0	1.1	1.4
D17	1.4	1.7	2.8	1.8
D22	1.2	1.4	2.0	2.2
D25	1.6	2.2	2.7	2.7
D21	1.2	1.4	1.9	1.9
D11	2.0	2.2	2.2	2.5

DDG on Wambo Owned Land				
D01	8.1	15.8	8.8	2.9
D03	3.0	2.2	2.8	3.0
D07	5.2	5.0	5.0	6.0
D09	3.7	4.5	3.9	2.0
D12	2.8	3.2	2.9	3.3
D19	2.5	2.9	3.1	2.9
D20	1.4	1.7	1.7	1.8
D23	2.0	1.8	1.8	2.1
D26	1.2	1.6	1.3	2.0

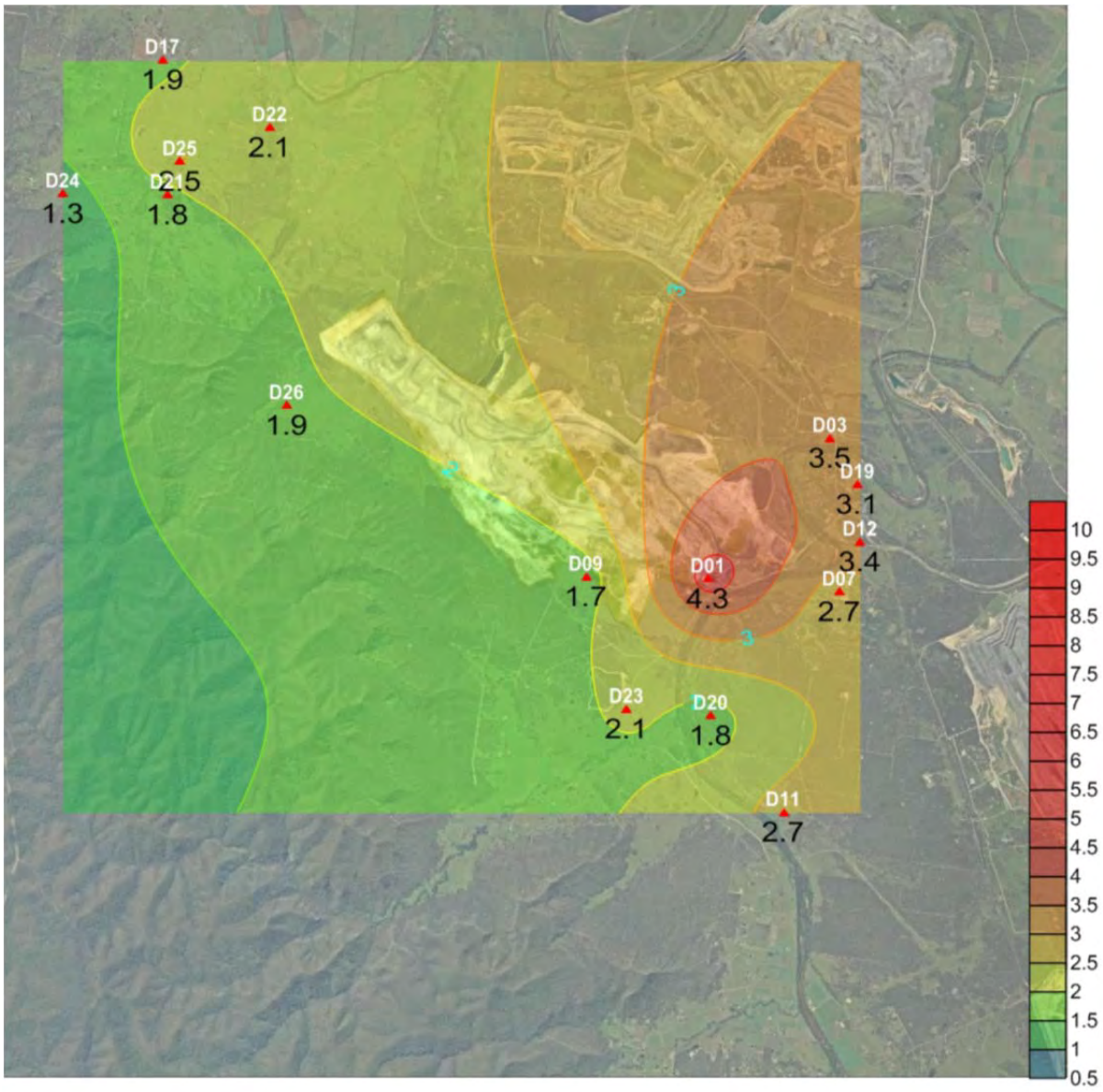


Figure: 4 – 2014 Annual Depositional Dust Gauge Average Isopleths

The above shows the depositional dust levels in g/m2/month. The vertical scale on the bottom right hand corner shows the range of depositional dust levels in g/m2/month

4.4.4 Air Quality Complaints – 2014

For the reporting period of 2014, there were 3 complaints from a total of 31 community complaints made with regards to air quality (dust emissions) in relation to the WMC. One community compliant was in relation to a blast event while the remaining two was in relation to open cut operations whereby visible dust was seen from the Golden Highway whilst works were conducted atop the Montrose ridgeline. All three community members were contacted and operations were notified of compliant. Section 4.4.6 summaries actions to minimise dust emissions from the Montrose ridgeline.

4.4.5 Air Quality Compliance – 2014

During 2014 the WMC remained below the long-term annual average impacts assessment criteria of 90µg/m^3 for TSP and 30µg/m^3 for PM_{10}.

During 2014, there were three days when the short term 24-hour impact assessment criteria of 50 µg/m^3 was exceeded at monitors on privately owned land.

4.4.5.1 Comparison of EIS Air Quality Predictions and 2014 Air Quality Monitoring

The Wambo Development Project Construction, Operating and Transportation Air Quality Assessment (Holmes Air Sciences, 2003) included predicted cumulative TSP, PM10 and dust deposition levels for three operational scenarios (Years 2, 7 and 9). The Year 7 and 9 scenarios best represent current operations at the WMC.

A summary of the predicted cumulative annual average TSP, PM10 and dust deposition levels for the Year 7 and 9 scenarios at the residences assessed in Holmes Air Sciences (2003) that are most representative of the WMC air quality monitoring sites is provided in **Table 28**. The monitored annual average TSP, PM10 and dust deposition levels during 2014 are also provided in **Table 28**.

Table 28: Comparison of EIS Air Quality Cumulative Predictions and 2014 Air Quality Monitoring

Receiver		EIS Prediction[1]		2014 Monitored[2]
Monitoring Site	EIS Residence[1]	Year 7	Year 9	
Annual Average TSP (µg/m^3)				
HV01	19B (L Kelly)	46.7	40.5	66.6
HV02	WC (Wambo Coal Pty Ltd)	12.6	13.4	68.1
HV03	33 (DJ Thelander & JA O'Neill)	17.6	20.0	48.3
HV04	40 (KM Muller)	32.8	30.5	62.3
Annual Average 24-hour PM_{10} (µg/m^3)				
PM01	19B (L Kelly)	39.2	34.5	18.0
PM02	WC (Wambo Coal Pty Ltd)	11.0	11.8	19.0
PM03	33 (DJ Thelander & JA O'Neill)	16.2	18.1	15.3
PM04	40 (KM Muller)	29.1	26.6	17.7
Annual Average Dust Deposition (g/m^2/month)				
D01	No Representative Dwelling Modelled	N/A	N/A	2.9
D03	20 (Jerrys Plains Coal Terminal)	1.0	0.78	3.1
D07	No Representative Residence Modelled	N/A	N/A	6.0
D09	No Representative Residence Modelled	N/A	N/A	2.0
D11	2 (W & D Lambkin)	0.35	0.35	2.5
D12	51 (CM Hawkes Pty Ltd)	1.81	2.09	3.3
D14	No Representative Residence Modelled	N/A	N/A	No data
D17	41B (Jepolo Pty Ltd)	0.31	0.33	1.8
D19	19B (L Kelly)	1.48	1.10	3.0
D20	WC (Wambo Coal Pty Ltd)	0.36	0.36	1.8
D21	33 (DJ Thelander & JA O'Neill)	0.36	0.42	1.9
D22	40 (KM Muller)	0.73	0.73	2.2
D23	WA (Wambo Coal Pty Ltd)	0.28	0.28	2.1
D24	75 (BA Barnes)	0.23	0.24	1.4

D25	37 (IA & JE Lawry)	0.38	0.48	2.8
D26	24 (AJ Long)	0.68	0.34	2.1

[1] *Wambo Development Project Construction*, *Operating and Transportation Air Quality Assessment* (Holmes Air Sciences, 2003) – representative of the WMC and nearby mining operations.

[2] Monitored in accordance with the *Air Quality and Greenhouse Gas Management Plan* (WCPL, 2014).

The annual average TSP concentrations at the four monitoring locations were above the predicted cumulative TSP concentrations at the relevant residences assessed in Holmes Air Sciences (2003) (Table 28).

The annual average PM10 concentrations at the four monitoring locations were below the predicted cumulative annual average PM10 concentrations at the relevant residences assessed in Holmes Air Sciences (2003) with the exception of PM02 (WC – Wambo Coal Pty Ltd).

The monitored dust deposition rates were above the predicted cumulative dust deposition rates at the relevant residences assessed in Holmes Air Sciences (2003) (Table 28).

The difference between the predicted and monitored TSP, PM10 and dust deposition levels is expected due to a number of factors:

- natural variability in background air quality (e.g. dust storms and bush fires);
- current WMC mine layout/progression is similar but not the same as the modelled scenarios;
- the Holmes Air Sciences (2003) cumulative predictions included emissions from surrounding mining operations (i.e. United Colliery, Hunter Valley Operations and Warkworth Mine) but did not include emissions from general background sources as indicated by background monitoring to avoid double counting of existing mining-related emissions; and
- the Holmes Air Sciences (2003) cumulative predictions did not account for emissions from current mining operations that were not approved in 2003).

4.4.6 Air Quality Improvements

As mentioned previously, a mobile weather station is to be commissioned during 2015. In addition, water carts are to be fitted with GPS tracking devices to monitor frequency and movement of water carts across the site. Trials of dust suppression products will resume, previous trials found products to be ineffective along open cut haul roads. Wambo continues to practice minimal clearing and disturbance ahead of mining operations to ensure that land is left undisturbed for as long as possible.

4.5 SPONTANEOUS COMBUSTION

4.5.1 Spontaneous Combustion Management

There were no spontaneous combustion incidents at the WMC during the reporting period of 2014. Inspections for spontaneous combustion form part of the WMC inspection system across the three main operating areas of the Open Cut, Underground and CHPP. WCPL will continue to monitor for signs of spontaneous combustion in the next reporting period as a matter of daily operations.

4.6 WATER MANAGEMENT

The key management document for the management of surface water at the WMC is the Water Management Plan (WMP). The WMP includes the;

- Surface Water Monitoring Program
- Groundwater Monitoring Program
- Erosion and Sediment Control Plan
- Surface and groundwater response plan; and the
- Water Balance model

Wambo Coal in accordance with DA 305-7-2003 manages surface water under an approved Water Management Plan. The WMP was submitted for regulatory review and approval in September 2014. Upon a number of responses from departments, the Water Management Plan for the WMC is currently being updated to take into account departmental recommendations and is expected to be finalised and re-submitted in May 2015.

4.6.1 Surface Water Management

The WMC participates in the Hunter River Salinity Trading Scheme (HRSTS) enabling discharge to the Hunter River under approved river flow conditions in both the Hunter River and in the Wollombi Brook (the point of discharge).

The water management system is designed to ensure

- Water runoff from undisturbed catchment areas is captured and diverted away from the mining disturbance area where possible;
- Sediment laden runoff from disturbed areas is treated prior to re-use in the water management system via settling and catchment dams
- Stormwater runoff collected within pit areas is controlled;
- Minimal discharge of mine water offsite via recycling of captured water to be used onsite

Water quality measurements upstream and downstream of the WMC are conducted in the Wollombi Brook to monitor water quality parameters.

4.6.2 Surface Water Performance

During 2014, the WMC sourced 150.5 ML of water from the Hunter River and 263.3 ML from the Wollombi Brook. In 2013 49.3 ML of water was taken from the Hunter River, while 324 ML was taken from the Wollombi Brook. This freshwater is used solely for the operation of the Wambo Underground mine and the fire suppression system at the WMC. **Table 30** provides details of the sites water balance for 2013 against 2014.

During 2014 under the HRSTS an amount of **9.6 ML** was discharged from site over a total of 1 discharge events under the scheme.

On Monday 7 April 2014, Wambo Coal Pty Ltd (WCPL) received notification from the New South Wales Office of Water (NoW) of an authorised discharge event under the Hunter River Salinity Trading Scheme (HRSTS), in which WCPL is a participant.

The Discharge notice **2014-98(1)** (Appendix A) was for the period of **7 April 2014 1:00pm to 8 April 2014 1:00pm.** A total allowable discharge under this notice was for 752 tonnes. Calculations taking into account criteria for discharge under the EPL 529 were completed which allowed a discharge for WCPL of an amount not exceeding **11 ML** over the allowable 24hr period of discharge.

Under the HRSTS/EPL 529, WCPL is required to monitor continuously throughout a discharge event, the pH and electrical conductivity (EC).

Wambo was not successful in obtaining continuous pH level readings at the discharge point as required under clause M2.3 of EPL 529 due to faulty probes. Probes have been replaced

Surface water monitoring is conducted under the approved Surface Water Monitoring Program (SWMP) which is a component of the sites Water Management Plan (under review). Surface water quality criteria for pH, Electrical Conductivity (EC) and Total Suspended Solids (TSS) for the monitoring locations at the WMC are provided in **Table 29**.

Table 29 – Surface Water Quality Criteria

Stream System	pH Criteria	EC Criteria (µS/cm)	TSS Criteria (mg/L)
WCPL Mine Site			
Wollombi Brook	6.5 - 9.0	3,269	120
North Wambo Creek	6.5 - 9.0	2,140	120
Eagles Nest Dam	6.5 - 9.0	N/A *	120
South Wambo Creek	6.5 - 9.0	581	120
Stony Creek	6.5 - 9.0	581	120
Wambo Rail Development			
Wollombi Brook	Less than 20% more than upstream concentration	Less than 20% more than upstream concentration	Less than 20% more than upstream concentration
Longford Creek			
Doctors Creek			

*Note: * Under Schedule 4, Condition 24 of DA 305-7-2003 and condition L3.3 of EPL 529 the Eagles Nest Dam discharge point is not required to be monitored for EC.*

^ ANZECC Guidelines for Fresh and Marine Water Quality (2000)

All surface water samples are monitored for pH and EC on a monthly basis. Surface water samples collected from natural waterways (except Hunter River) and mine water dams including Eagles Nest Dam, South Dam and Chitter Dam are also analysed for total dissolved solids (TDS) and TSS. In addition, monitoring of oil and grease concentrations is also undertaken. **Appendix H** provides the full results for 2014.

EC and pH are measured in the field while samples are collected and analysed in the laboratory for TDS, TSS, oil and grease. Surface water samples are collected in accordance with AS/NZS 5667.4:1998 – Guidance on sampling from lakes, natural and man-made and AS/NZS 5667.6:1998 – Guidance on sampling of rivers and streams.

A number of surface water monitoring sites within North Wambo Creek, South Wambo Creek and Stony Creek were dry during the monthly sampling regime and therefore no water samples could be obtained.

Surface water monitoring undertaken in accordance with SWMP indicated that WCPL's mining operations had minimal influence on the water quality of the surrounding natural water courses during the reporting period. Although there were a number of recordings outside the criteria limits, these recordings can be described as being heavily influenced by the ephemeral nature of surface water flows due to the intermittent and low rainfall pattern experienced during 2014, the sampling of stagnant pools and sample sites which are located a significant distance from the WMC. The recorded ph, EC and TSS for the creeks and streams surrounding the WMC varied depending on rainfall frequency, intensity and therefore volumetric flow. A review of the SWMP during 2014 has seen the removal of a number of monitoring points which were located a significant distance from the WMC. These sites bare no relation to the daily operations of the mine and where therefore removed from the monitoring program for 2015.

Table: 30 WMC Water Balance 2014

Water Sources (ML)		
	2013	2014
Hunter River	49.3	150.5
Wollombi Brook	324.5	263.3
United Collieries	75.4	0
Rainfall/Run off	1982.3	884.7
Underground Seepage	1339.2	1262
Open Cut Seepage	1238.9	756.9
Wollemi Sump	-	-
Site Wells	-	-
Total Water Inputs	5003.6	3317.4
Water Usage (ML)		
Dust Suppression	1073.6	1037.2
CHPP Consumption	951.9	937.8
Underground	140.7	38.9
United	-	-
Domestic Usage	2	2
Total Water Usage	2168.2	2600.1
Water Loss (ML)		
Evaporation – Mine Water & Tailings Dam	2208.6	1728.00
HRSTS Discharge	1221.4	9.6
Water Balance	-594.6	-1020.3

4.7 GROUNDWATER

4.7.1 Ground Water Management

The WMC manages groundwater in accordance with the Groundwater Monitoring Program (GWMP) under the sites Water Management Plan (under review).

The overall objectives of the GWMP are to establish baseline groundwater quality and water level data and to implement a programme of data collection that can be utilised to assess potential impacts of mining activities on the groundwater resources of the area.

From a hydrogeological perspective, the Wambo area is relatively complex due to the occurrence of alluvium, its proximity to Wollemi National Park and a number of historical and proposed mining developments. Due consideration must also be paid to constraints imposed by the existing and proposed mining operations. Groundwater data is collected on-site on a bimonthly basis, the location of groundwater sites monitored during the reporting period are illustrated in **Figure 5**. **Table 31** provides an overview of the monitoring sites in relation to lithology to be used in combination with 2014 results and location map.

Table 31: Groundwater Monitoring Sites / Lithology

Monitoring Site	Lithology
P1,P3,P11,P16,P20,	Alluvium
P106, P109, P110, P111, P114, P116	Alluvium
P202, P206	Shallow Permian Overburden
P301, P315	Alluvium, Shallow Permian Overburden
GW02, GW08, GW09, GW11	Alluvium
GW21, GW13, GW14, GW15, GW16, GW17, GW18, GW19, GW21, GW22	Alluvium, Shallow Permian Overburden
P12, P13, P15, P17, P18	Alluvium

All groundwater samples were collected in accordance with AS/NZS 5667.11:1998 – Guidance on sampling of ground waters. All samples collected were analysed in the field for pH, EC, temperature and depth to water. Groundwater criteria under the GWMP are displayed in **Table 32**.

Table 32: Groundwater Trigger Levels

Monitoring Site	Depth to Groundwater Level (m)		pH		EC (uS/cm)	
	Min	Max	Min	Max	Min	Max
P106	6.21	13.21	6.1	8.1	292	1069
P109	5.09	7.38	6.0	7.9	367	768
P114	6.02	7.79	6.3	8.2	458	715
P116	4.80	8.53	6.3	7.8	181	8035
P202	6.81	11.35	6.4	7.9	2519	7616
P206	18.34	22.72	7.1	8.5	1848	3175
P301	10.62	14.59	5.7	7.4	3045	12735
P315	4.90	10.42	5.6	7.2	291	522
GW02	5.39	9.36	6.2	7.4	355	734
GW08	2.32	3.55	6.5	7.6	1660	2158
GW09	1.92	3.88	6.6	7.9	1215	2047
GW11	3.99	7.68	6.5	7.8	356	649
GW12[b]	-	-	-	-	-	-
GW13[a]	5.09	5.28	6.81	7.09	4844	5636
GW14[b]	-	-	-	-	-	-
GW15[a]	10.80	11.02	6.81	7.09	635	756
GW16[a]	7.42	7.82	7.51	7.79	522	1036
GW17[a]	10.34	11.14	7.01	7.29	5399	5711
GW18[a]	5.58	9.94	6.90	6.90	9358	10942
GW19[b]	-	-	-	-	-	-
GW20[c]	-	-	-	-	-	-
GW21[b]	-	-	-	-	-	-
GW22[a]	34.13	35.28	7.90	7.90	6945	7455
P1	20.12	30.18	6.5	7.3	6924	10053
P3	5.82	10.53	6.1	8.3	42	329
P5	3.56	8.35	7.0	7.9	1638	5107
P6	2.82	7.10	6.8	8.5	236	4353
P11	4.60	36.27	6.4	7.6	13035	20646
P16	6.61	7.77	6.3	8.1	7681	13988
P20	6.56	8.30	6.5	8.1	7124	14324

a Piezometer installed during November 2009. Trigger levels will be revised as more data becomes available.
b Piezometer installed during November 2009. Insufficient data available at the time of GWMP review. Trigger levels will be revised as more data becomes available.
c GW20 is a vibrating wire piezometer recording pressure fluctuations; therefore no Trigger Levels will be assigned.

The purpose of groundwater impact assessment criteria is to provide “Trigger Levels” for each of the key groundwater parameters, that is, depth to water, pH and EC. The “Trigger Levels” for each existing monitoring site used in the GWMP has been assessed through review of the historical water level and water quality data. For the depth to water level and EC, the upper and lower trigger levels have been assigned as two standard deviations greater and less than the maximum and minimum observed values. In terms of pH, the lower and upper trigger levels have been specified as 6.0 and 9.5 respectively which encompass the normal range for groundwater.

Below is a high level summary of the parameters against the trigger levels for the period 2014.

4.7.2 Environmental Performance

Groundwater monitoring data is provided in **Appendix I.**

4.7.2.1 Depth to Water

In general, water levels remained static across the majority of monitoring locations for most of the reporting period. Some monitoring points did experience increase in depth to water levels that fell outside trigger level during the mid to later period of 2014. Intermittent and low rainfall patterns throughout the 2014 reporting period may have influenced depth to groundwater with little chance of recharge to the groundwater system. GW08 did record depth to water levels outside the trigger level for 2014, which may be attributed to dewatering of the overlying seam above the NWU underground mine (LW9-LW10). This increase in dewatering may be attributable also to the increase ph levels throughout 2014. EC levels for GW08 remained within criteria levels.

4.7.2.2 ph and Electrical Conductivity

The results for pH across the groundwater monitoring network for 2014 remained in general within the trigger parameters. However, a number of groundwater sites did record levels outside the trigger values, these corresponded with increasing depth to water levels as mentioned previously, this occurred for monitoring result for GW08. Electrical conductivity levels across the groundwater monitoring network for 2014 also remained in general, within the trigger parameters. However further investigation and analysis is required for P114 which recorded high EC levels well over trigger values. Wambo shall commission a report for further submission by June 2015. P202 has returned EC values outside trigger levels for August, October and December while EC trigger levels for P12 also warrant review and further investigation for 2015 as results for 2014 are well below trigger values.

4.8 Mine Subsidence

4.8.1 Mine Subsidence Management

The management of subsidence impacts on Wambo Coal land had been undertaken via the approved Subsidence Management Plan (SMP) for the North Wambo Underground Mine for LW1 to LW6. In 2013 approval was granted for secondary extraction of Longwall 7(LW7) and Longwall 8 (LW8) which an Extraction Plan/Subsidence management plan (EP/SMP) was approved for. In 2014 an additional EP/SMP was approved for LW7-LW10, superseding the previous EP/SMP for LW7-LW8. For this AEMR reporting period, the SMP for LW7 > LW1O applies.

4.8.2 Mine Subsidence Performance

In accordance with Consent Condition 22, Schedule 4 of DA 305-7-2003, Wambo Coal Pty Ltd (WCPL) commissioned Strata Engineering Australia Pty Ltd (Strata Engineering) to conduct a detailed subsidence impact assessment for Longwall Panel 1 through to Longwall Panel 6 as part of the NWU mine SMP.

During the reporting period, Longwall Panel 7 (LW7) with a total retreat of 3294m was completed on 18th January 2014. Longwall 8a (LW8a) commenced secondary extraction on the 22 February 2014 and was completed on 6 August 2014. Longwall 9 (LW9) secondary extraction commenced on 24

August 2014 and was completed on the 13 January 2015 with a total retreat of 1773m for LW8 and 1740m for LW9. Longwall 10 commenced on the 29 January 2015.

Table 33 to 35 below are the Actual vs. Predicted S_{max} Values for active longwall mining for the period of 2014.

Table 33 – Actual vs. Predicted S_{max} Values for LW7 – 2014

Monitoring ID Line	Monitoring ID Point	Chainage of Monitoring Line	Depth of Cover (m)	Predicted Smax (m)	Actual Smax (m)	Difference (m)	Within Predicted Range
CL5A	CL5A-02	0-560	222-292	1.75-3.31	2.39	-0.92	Yes
NWU4XL	XL4-135	0-561	230-395	2.15	1.60	-0.55	Yes
NWU5XL	NWUXL528	234	222-243	1.76	1.60	-0.16	Yes
CL7A	CL7A-31	0-430	-	1.75-3.31	2.15	-1.16	Yes
CPLC	CPLC-24	0-141	-	1.75-3.31	0.13	-3.18	Yes
6XL	6XL-01	430	-	1.75-3.31	1.74	-1.57	Yes
NWU2XL	2XL-183	1125	150-180	1.88	1.58	-0.31	Yes
NWU3XL	3XL-308	1754	100-120	1.88	1.75	-0.14	Yes
NWU1XL	1XL-183	2044	75-100	1.76.	1.52	-0.24	Yes
United 8A*	8A30	1605-2124	91-113	1.75-3.31	2.86	-0.45	Yes
United T*	T168	2472-2546	60-65	1.75-3.31	3.01	-0.30	Yes
CL7B	CL7B	3145-3294	60-70	1.75-3.31	2.13	-1.18	Yes

Table 34: Actual vs. Predicted Smax Values for LW8a – 2014

Monitoring ID Line	Monitoring ID Point	Chainage of Monitoring Line	Depth of Cover (m)	Predicted Smax (m)	Actual Smax (m)	Difference (m)	Within Predicted Range
CL7A	CL7A-31	0-430	209-237	1.75-3.31	2.22	-1.09	Yes
CPLC	CPLC-24	0-141	202-230	1.75-3.31	1.83	-1.48	Yes
6XL	6XL-01	430	194-209	1.75-3.31	2.02	-1.29	Yes
NWU2XL	2XL-183	1125	150-180	1.88	1.53	-0.35	Yes

Table 35: Actual vs. Predicted Smax Values for LW9 – 2014

Monitoring ID Line	Monitoring ID Point	Chainage of Monitoring Line	Depth of Cover (m)	Predicted Smax (m)	Actual Smax (m)	Difference (m)	Within Predicted Range
CL9A	CL7A-31	0-430	209-237	2.3	2.07	-0.23	Yes
CPLC	CPLC-24	0-141	202-230	2.3	1.76	-0.54	Yes
6XL	6XL-01	430	194-209	2.3	1.90	-0.40	Yes

Remedial actions regarding subsidence impacts on the surface are assessed and where necessary remediated through the implementation of one or more of the following mitigation measures including filling of minor cracks with gravel and road base material to repair internal access tracks.

Due to the significant amount of established and mature vegetation overlaying the NWU mine with a large proportion being located within the approved Biodiversity Offset areas of the WMC. Appropriate subsidence related remedial actions need to be made in the context of an increase potential disturbance to this protected biodiversity offset habitat. (Such disturbance clash with and jeopardise the values/benefits of the Biodiversity Offsets) As such, during 2014 no remediation actions were undertaken within these areas. Monitoring via the Annual Flora and Fauna Monitoring program continues to guide operations on the need for remediation actions within these sensitive

areas. Subsidence remediation repairs where undertaken along all access roads where subsidence was apparent to ensure employee and public safety and to insure infrastructure integrity where impacted by subsidence.

A detailed Plan (**Plan 6**) of subsidence identified areas above the active longwall panels has been provided for the reporting period. A general description of the subsidence impacts from underground mining operations is provided below in **Table 36**.

Table 36 – Subsidence Recorded Sites - 2014

2014 Site Number	Longwall ID	Chainage	Easting (MGA)	Northing (MGA)	Comments
1	LW7	50	311680	6393755	Surface 200mm step cracking on old Eastern Open cut rehab
2	LW7	10	311705	6393786	Surface cracking <50mm on old Eastern Open cut rehab
3	LW8a	1660	309844	6391202	Surface cracking <50mm TG8a old Homstead UG Goaf aligned
4	LW8a	1450	310152	6391216	Surface cracking <50mm MG8a
5	LW8a	1280	310077	6391498	Surface cracking <50mm TG8a old Homstead UG Goaf aligned
6	LW8a	1080	310386	6391504	Surface cracking <100mm MG8a old Homstead UG Goaf aligned
7	LW8a	910	310332	6391774	Surface cracking <50mm TG8a
8	LW8a	590	310544	6392009	Surface cracking <50mm TG8a
9	LW8a	310	310848	6392130	Surface compression hump TG8a (approx. 180mm)
10	LW8a	250	310780	6392270	Surface cracking <40mm TG8a on Gravel Road
11	LW8a	240	310910	6392170	MG8a Ponding over and adjacent to gravel road
12	LW8a	10	311043	6392356	Surface cracking <40mm MG8a
13	LW8a	1450	310181	6391155	Surface cracking <40mm TG9
14	LW9	1220	310465	6391208	Surface cracking <80mm old Homstead UG Goaf aligned
15	LW9	1150	310571	6391217	Surface cracking <10mm MG9 on South Dam Wall
16	LW9	1000	310470	6391502	Surface cracking <50mm TG9 old Homstead UG Goaf aligned
17	LW9	810	310625	6391616	Surface cracking <50mm on South Dam diversion bund
18	LW9	210	310985	6392095	Surface cracking <20mm TG9 on Gravel Road
19	LW9	110	311040	6392178	Surface cracking <40mm TG9 on old power line easement

4.8.3 Mine Subsidence Non-compliance

There were no mine subsidence non-compliances during the reporting period of 2014. No reported community complaints regarding active mining and subsidence.

4.9 EROSION AND SEDIMENT CONTROL

4.9.1 Erosion and Sediment Management

Erosion and sedimentation is managed in accordance with WCPL Erosion and Sediment Control Plan (ESCP), a requirement of Consent Condition 32, Schedule 4 of DA305-7-2003. The ESCP is a component of WCPL's Site Water Management Plan as required under Condition 30, Schedule 4 of DA305-7-2003. The main principles of the ESCP include:

- Separation of runoff from disturbed and undisturbed areas where practicable;
- Construction of sediment structures or utilisation of existing mine water storages to capture runoff up to a specified design criterion;
- Construction of surface drains to facilitate the efficient transport of surface runoff. Drains are designed using trapezoidal or parabolic cross-sections; and
- Progressive rehabilitation stabilisation of mine infrastructure areas.

These principles take into account the general recommendations for site drainage works presented in "Managing Urban Stormwater – Soils and Construction Volume 1" (Landcom 2004) and Managing Urban Stormwater, Soils and Construction Volume 2E Mines and Quarries (DECC, 2008).

A number of strategies are used on site for erosion and sediment control including:

- The establishment of diversion banks on the upstream side of the site to divert clean water around the site and into natural drainage lines;
- The establishment of catch drains in accordance with relevant criteria (outlined in the ESCP) to direct sediment-laden water into sediment control structures;
- The strategic placement and design of sediment control structures on site to treat sediment laden water before it leaves site;
- The placement of dissipation devices along catch drains to control the velocity of flow and prevent scouring;
- The establishment of sediment ponds and/or utilisation of existing mine water structures to treat sediment laden water;
- The establishment of sediment fencing as required on the down-slope side of soil stockpiles;
- Monthly monitoring of all sediment control structures and maintenance as required; and
- Limiting clearance and disturbance of the natural environment

4.9.2 Erosion and Sediment Performance

Inspections of the sediment control structures and capture dams/ponds were carried out every month throughout 2014 and/or when a rain event was recorded at >20mm in a 24hr period. Maintenance programs and repairs are conducted throughout the year to ensure storage and runoff structures are functioning.

4.9.3 Erosion and Sediment Non-Compliance

On Friday 25 April 2014 a significant rain event was recorded at the Wambo Mine Complex (WMC). A total of 24.41mm of rain fell on the WMC on the 25 April 2014. Importantly, between the hours of 07:30am to 09:25am a total of 24.17mm was recorded and between 07:55am to 08:20am a total of 19.58mm was received at the WMC which resulted in significant surface water catchment and run-off. Hales Crossing Sump (HCS) is located adjacent to the Wollombi Brook along the main entrance road to the WMC. The HCS receives surface water runoff from the adjacent entrance road and from the Rail Loading Facility. At approximately 08:30am it was discovered by the Environment and Community Manager (Troy Favell) that the HCS had reached capacity and was overflowing into the adjacent Wollombi Brook. The over flow event when detected, lasted for approximately 1 to 2 hours.

Upon identification of the overflow, water samples were taken from the HCS for independent laboratory analysis. Results for the analysis are provided in the **Table 37**.

Table 37 – Water Analysis Results – Hales Crossing

Sample ID	Description	Date	Ph	Conductivity	TSS	TSP	Oil & Grease
21187	Hales Crossing	25 April 2014	8.6	131uS/cm	825 mg/L	1070mg/L (52.6% Ash / 47.4% Combustible)	<5 mg/L

The volume of water discharge is estimated to have been of between 40,000 to 45,000 lts given the size of the catchment area and rainfall event experienced.

During the rain event, the WMC was under a Code Red for lightning strike. This prevented any immediate action to be taken as it is a requirement for all personnel to remain in the cabin of a machine or to take refuge within a building until such time as the Code Red is lifted. Once the Code Red was lifted, an onsite Vacuum Truck was employed to reduce the water level. The vacuum truck was engaged until full capacity of the HCS was returned.

WCPL, as holder of Environment Protection Licence No.529 (**EPL 529**) in accordance with Part 5.7A of the *Protection of the Environment Operations Act 1997* (**POEO Act**) and Part 3A of the *Protection of the Environment Operations (General) Regulation 2009* (**Regulation**) reported the event to the relevant authorities.

4.9.4 Erosion and Sediment Improvements

In 2014, a review of the Erosion and Sediment Control Plan (ESCP) was undertaken as part of an overall review of the WMP to ensure contemporary standards and best practice methods are applied throughout the WMC. A dedicated diesel pump has been ordered for Hales crossing sump with a float switch and alarming system. A review of the mine sites catchment area and subsequent mapping has been scheduled for early 2015 to enable a more accurate predicted water balance and predictive storage capacity forecast under different rain event scenarios, and sonar dam surveys are also scheduled for the second quarter of 2015.

4.10 ABORIGINAL HERITAGE

4.10.1 Aboriginal Heritage Management

Archaeology and Cultural Heritage is managed in accordance with the National Parks and Wildlife Act 1974 (NPW Act), the Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010 (ACHCRs) and the Environmental Planning and Assessment Act 1979 (EP&A Act). The NPW Act provides protection for Aboriginal objects or places, while the EP&A Act ensures that Aboriginal cultural heritage is properly assessed in land use planning and development. The NPW Act provides statutory protection for all Aboriginal heritage, places and objects with penalties levied for breaches of the Act. This legislation is overseen by the Office of Environment and Heritage (OEH). Part 6 of this Act is the relevant part concerned with Aboriginal objects and places, with Section 86, 87, 89A and Section 90 being the most pertinent

Disturbance Permit (SDP) process requires that a check is made of the location of the proposed disturbance to ensure that an archaeological heritage assessment has been conducted. This is to ensure that any Aboriginal objects or sites likely to be impacted have been salvaged in accordance with relevant permits issued under the NPW Act or that they are protected from disturbance.

The OEH released a publication entitled Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales on 24th September 2010. This Code of Practice was developed with the express intention of satisfying the due diligence requirement contained within s87(2) of the NPW Act 1974. In September 2010, the NSW Minerals Council released a publication entitled NSW Minerals Industry Due Diligence Code of Practice for the Protection of Aboriginal Objects which is a recognised industry specific Code of Practice. Due diligence inspection relates to the physical identification of Aboriginal objects. Community consultation is only required once Aboriginal objects have been detected and in the event that an Aboriginal Heritage Impact Permit (AHIP) is deemed necessary. The OEH due diligence requirements are described as the minimum standard of care required, however, it is noted within that Code of Practice that any industry-specific due diligence procedures of a higher standard should be followed instead.

The Aboriginal Cultural Heritage Consultation Requirements for Proponents (ACHCR's) were issued by OEH on 12th April 2010 which generally replace the previously issued Interim Community Consultation Requirements (ICCR) for Applicants (DEC 2004). The ACHCR guidelines apply to all AHIP applications prepared after 12th April 2010. For Aboriginal consultation (including advertising and notification of stakeholders) for ongoing projects that commenced before the 12th April 2010, then consultation may be continued under the previous ICCR guidelines.

4.10.2 Aboriginal Heritage Performance

Aboriginal heritage sites within the WCPL mining leases identified and assessed during the 2003 EIS and ongoing survey works since that time have been registered on the AHIMS database. Additional sites were identified in 2014 during archaeological survey in participation with representatives of the Registered Aboriginal Parties (RAPs). Site cards for these sites were submitted to the OEH for inclusion on the AHIMS database.

No sites were salvaged during the reporting period but ongoing artefact analysis associated with previous salvage of sites in 2013 under Consent #2222 continued. Aboriginal objects salvaged during the course of the salvage programme were placed into the Temporary Keeping Place under Permit #3130 for Care and Control of Aboriginal Objects Salvaged under Section 87/ Section 90 permits #2085 and #2222 in accordance with the NPW Act (1974 as amended).

4.10.3 Aboriginal Heritage Non–Compliances

There were no non-compliances during the reporting period of 2014.

4.10.4 Aboriginal Heritage Improvements

Wambo will continue to engage with the local Aboriginal representatives on matters with regards to Aboriginal Heritage. Wambo will continue to enforce strict due diligence requirements through the internal Surface Disturbance Permits with regards to disturbance of lands on which Wambo own. Site employees and contractors will continue to be made aware through the induction process of the rich and important archaeological sites which have been salvaged and those which may potentially remain within the boundaries of the WMC. Classification and archiving of salvage materials shall continue under the guidance of permit #3130. New signage is required to replace worn and faded signage on the Safe Keeping Place container in 2015.

4.11 EUROPEAN HERITAGE

4.11.1 European Heritage Management

Godden Mackay Logan Pty Ltd (GML) was commissioned by Wambo Coal to review and update the 2006 Conservation Management Plan (CMP) for the Wambo Homestead Complex (WHC). The focus of the CMP review is to provide appropriate conservation policies for managing the significant heritage components and values for the place within a wider site that is changing dramatically. The report covers current conditions and future management options to identify the realistic ‘opportunities and constraints’ facing the WMC as well as taking into account the broader stakeholder community. In 2015 a revised CMP shall be undertaken and submitted for departmental review and approval which shall outline a proposed program of works for the WHC from 2015 to 2018.

4.11.2 European Heritage Performance

In accordance with the 2012 Conservation Management Plan for the WHC, routine pest inspections and baiting programs for termites and rodents continued. Essential repair works continued where necessary to ensure integrity of fabric and structure.

2014 consisted of works completed on the Stock Yards which forms part of the historic complex. In addition to this major works, Wambo Coal and GML also commenced work on the Oral History program for the Wambo Homestead. Historians, Professor Ian Jack and Roslyn Burge were commissioned to interview local community members and persons with an intimate knowledge of the Wambo Homestead in order to capture its unique history and character to be preserved in audio for the local community. Advertisements were placed in the Singleton Argus, Muswellbrook Chronicle and the Newcastle Herald as well as in the Singleton Library and Singleton Council offices inviting persons of interest to register for interview. The Oral History interviews and program was completed in late 2014. The final transcripts and audio recordings will be placed in the Singleton Library, Singleton Historical Society and the NSW Heritage Branch, along with copies at Wambo Coal. Compact Disc copies of the Oral History program can be obtained on request from Wambo Coal, by contacting the Environment and Community Manager on (02) 6570 2209.

4.11.3 European Heritage Non-compliances

There were no European Heritage Non-compliances during the reporting period of 2014.

4.11.4 European Heritage Improvements

Wambo will continue to investigate appropriate mitigation works to the Wambo Homestead complex. 2015 will see the continuation of this program with the primary focus being on the repair and maintenance appropriate structures located within the boundaries of the curtilage. Maintenance works such as essential grounds keeping, termite and other pest control activities along with the monthly inspections to ensure that building fabric is in place and that drainage diversion systems in place are at all times functional. A review of the Conservation Management Plan is also to take place in 2015.

4.12 VISUAL AMENITY AND LIGHTING

4.12.1 Visual Amenity and Lighting Management

To minimise lighting impacts on WCPL's neighbours there is a plan depicting all the neighbours on display in the Open Cut Examiners (OCE) office to reference for lighting plant positioning.

All mobile lighting plants are strategically positioned to avoid light being directed towards our neighbours and other potential sensitive receptors as identified.

4.12.2 Visual Amenity and Lighting Performance

In accordance with Consent Condition 86, Schedule 4 of DA305-2033, WCPL completed an assessment of all external lighting associated with the mine to Australian Standard AS4282 (INT) 1995 – Control of Obtrusive Effects of Outdoor Lighting.

The independent audit completed in June 2011 concluded WCPL lighting did meet the requirements of AS4282. Wambo is committed to ensuring that lighting impacts are minimised where practical a lighting audit was anticipated for 2014 and shall now be undertaken in 2015.

4.12.3 Visual Amenity and Lighting Complaints

During the reporting period of 2014 there were 5 lighting complaints in relation to the WMC operations. Upon investigation these were sourced to mobile lighting plants. Actions taken included tool box talks and pre-shift information meetings to highlight the awareness and need to direct lighting plants away from sensitive receivers at all times. There were no visual amenity complaints during the period.

4.12.4 Visual Amenity and Lighting Non-compliances

There was no visual amenity or lighting non-compliances during the reporting period of 2014.

4.13 WASTE MANAGEMENT

4.13.1 Waste Management

Waste management at WCPL is undertaken by contract by a licensed waste management company under the basic principles of Total Waste Management System (TWMS). Some of the significant benefits under the TWMS include:

- segregation of waste at the source;
- expansion of recycling capabilities;
- reduction in the risk of contaminating non-hazardous waste;
- comprehensive monthly reports detailing volumes, recycling, disposal and transportation of waste; and
- improved data capture to increase the efficiency and accuracy when reporting.

4.13.2 Waste Performance

In 2014, the WMC manages waste onsite with the contactor and under the Waste Management procedure to ensure that contemporary standards and best practice methods are maintained across the WMC. **Table 38** provides a summary of Waste removal from the WMC for 2014. Total waste for the 2014 period was 4,860,142kgs. Of this 82.82% was recycled waste and 17.48% was general landfill waste. In 2013, total waste for the WMC was 1,615,289kgs again 82.10% was recorded as recycled waste while 17.90% (289,158kgs) was recorded as general landfill.

Table 38: WMC Total Waste Production 2014

Wambo Coal	Jan-14	Feb-14	Mar-14	Apr-14	May-14	Jun-14	Jul-14	Aug-14	Sep-14	Oct-14	Nov-14	Dec-14	FYTD
Chemical Anchors	154	2901	1723	-	-	1396	-	1513	2593	3396	-	-	13676
Medical Waste	-	-	-	-	-	-	-	-	-	-	-	-	-
Oily Rags	593	663	657	731	555	586	671	581	552	551	455	549	7144
Miscellaneous Chemical disposal	-	-	-	-	-	-	93	-	-	-	-	-	93
Hazardous Disposal	747	3,564	2,380	731	555	1,982	764	2,094	3,145	3,947	455	549	20,913
General Waste Bulk	32,920	72,020	56,800	34,760	34,400	23,720	148,120	59,300	41,760	51,580	27,860	54,400	637,640
General Waste Front Lift	14,895	13,265	12,590	14,380	13,610	11,850	13,600	11,052	15,614	13,507	13,358	15,895	163,616
Pallets/Timber Recycling	5,360	3,400	4,040	2,280	1,640	0	3,940	0	2,160	2,100		2,420	27,340
Non-Hazardous Disposal	53,175	88,685	73,430	51,420	49,650	35,570	165,660	70,352	59,534	67,187	41,218	72,715	828,596
Total Disposal	53,922	92,249	75,810	52,151	50,205	37,552	166,424	72,446	62,679	71,134	41,673	73,264	849,509
%	24.43%	32.71%	38.60%	27.63%	25.83%	21.89%	36.95%	11.34%	19.10%	20.92%	9.48%	5.20%	17.48%
Contaminated Grease	134	1,591	447	695	53	384	679	535	752	154	331	191	5,946
Empty Oil Drums	913	1,073	1,313	1,527	770	799	1,248	1,133	1,340	1,332	1,508	674	13,630
Fluorescent Tubes	-	-	-	-	-	-	-	-	-	-	-	-	-
Hydraulic Hose	741	735	-	688	-	670	-	671	-	607	-	657	4,769
Oil Filters	1,600	1,747	1,985	2,428	1,552	1,974	2,051	2,918	1,548	1,895	2,749	858	23,305
Oily Water	-	500	-	-	-	600	-	-	-	-	-	-	1,100
Parts Washer	-	-	-	-	-	-	-	-	-	-	-	-	-
Hazardous Recycle / Reuse	3,388	5,646	3,745	5,338	2,375	4,427	3,978	5,257	3,640	3,988	4,588	2,380	48,750
Confidential Documents	126	163	139	125	69	52		95	110	58	126	54	1,117
E Recycle Electonic Waste	-	-	-	-	299	-	-	-	-	-	-	-	299
Comingled Recycling	2,630	2,640	2,630	3,070	2,440	1,970	2,200	2,160	3,228	2,563	1,887	3,186	30,604
Non-Hazardous Recycle / Reuse	2,756	2,803	2,769	3,195	2,808	2,022	2,200	2,255	3,338	2,621	2,013	3,240	32,020
E-Waste	-	-	-	-	-	-	-	-	-	-	-	-	-
Effluent	70,500	72,500	54,700	71,000	80,000	66,200	62,500	71,500	72,500	191,000	354,000	1,259,500	2,425,900
Recycle cartridges Planet Ark	-	-	-	-	-	-	-	-	-	-	-	-	-
Coolant	-	-	-	-	-	-	-	-	-	-	-	-	-
Hard Hats	-	-	-	-	-	-	112	-	-	-	-	-	112
Timber Recycling	-	-	-	-	-	-	-	-	-	-	-	-	-
Pallecons	3,235	3,414	3,052	667	121	254	1,323	189	689	61		378	13,383
Scrap Steel	53,530	61,180	16,660	18,899	23,410	18,940	54,730	6,720	29,030	38,440	5,080	27,380	353,999
Recycle Tyres	-	-	-	-	-	-	-	-	-	-	-	-	-
Waste Batteries	754	531	440	-	1,333	651	184	508	1,093	1,463	-	339	7,296
Waste Oil	31,600	43,200	37,500	37,500	34,150	41,500	41,900	35,500	51,200	31,400	32,300	42,700	460,450
Washbay	1,000	500	1,723	-	-	-	117,000	444,500	104,000	-	-	-	668,723
Fire Extinguishers	-	-	-	-	-	-	-	-	-	-	-	-	-
Other Recycle / Reuse	160,619	181,325	114,075	128,066	139,014	127,545	277,749	558,917	258,512	262,364	391,380	1,330,297	3,929,863
Total Recycle / Reuse	166,763	189,774	120,589	136,599	144,197	133,994	283,927	566,429	265,490	268,973	397,981	1,335,917	4,010,633
%	75.57%	67.29%	61.40%	72.37%	74.17%	78.11%	63.05%	88.66%	80.90%	79.08%	90.52%	94.80%	82.52%
Grand Total	220,685	282,023	196,399	188,750	194,402	171,546	450,351	638,875	328,169	340,107	439,654	1,409,181	4,860,142

4.14 CONTAMINATED LAND

4.14.1 Contaminated Land Management

The WMC complex minimises potential risk to the environment from contaminated land with the implementation of a set of comprehensive control strategies and policy procedures. The highest potential for land contamination at the WMC is from hydrocarbons. The main areas with the potential for land contamination are the hydrocarbon storage and refuelling areas. All hydrocarbon storage areas are routinely inspected as part of the Monthly Site Environmental Inspections undertaken as part of the WMC Environmental Management System (EMS). Other control measures include:

- waste management and recycling
- prompt spill response and remediation
- bunding and containment to isolate and prevent site contamination; and
- environmental education information during the course of inductions and tool box talks where appropriate

4.14.2 Contaminated Land Performance

During 2014, there were 8 reported hydrocarbon spills within the WMC. The appropriate control, containment and clean-up practices were applied at the time of each incident. During 2014 a comprehensive upgrade of the sites main hydrocarbon storage and refuelling area was undertaken. Significant improvements included;

- Pipe removal and replacement
- Video monitoring equipment installed
- Access for transport tankers relocated to prevent interaction with light and heavy vehicles
- Upgrade of metering equipment
- Upgrade of containment bunds
- Upgrade of metering alarm system

4.14.3 Contaminated Land Non-compliances

There were no contaminated land non-compliances reported in 2014.

4.15 FAUNA AND FLORA MANGEMENT

4.15.1 Flora and Fauna Management

The WMC has an approved Flora and Fauna Management Plan (FFMP) for the complex which was extensively reviewed in 2013 and approved in 2014. The FFMP documents management practices aimed at minimising the potential impacts on flora and fauna as a result of the WMC operations. This includes a Vegetation Clearance Protocol and Threatened Species Management Protocol which is managed through the sites Surface Disturbance Permit scheme. The FFMP for the mine also outlines the management actions for the Remnant Woodland Enhancement Program (RWEP) or Biodiversity Offsets Areas (BOA), the Rehabilitation Program and the annual Flora and Fauna Monitoring Program which includes rehabilitation monitoring of mine disturbed land.

4.15.2 Flora and Fauna Performance

4.15.2.1 Flora and Fauna Monitoring Program

A series of monitoring programs were conducted during 2014. Executive summaries are provided below. Full reports and data are available upon request should further investigation be required. A review of the Flora and Fauna Monitoring Program aims, objectives and methodologies was undertaken in late 2014. Due to the review being undertaken in late 2014, changes to current methodologies could not take place for the 2014 monitoring program. Current methodologies for the monitoring program are still valid. WMC is committed to see these reviews and recommendations being implemented in the second quarter of 2015 to ensure that the monitoring program aligns with the goals of the sites revised Rehabilitation Management Plan and new MOP.

4.15.2.2 Bird Survey

The broad aim of the monitoring program is to measure status and changes in the ecological condition of the forested lands surrounding the Wambo Coal Mine that were designated as habitat offsets to be managed primarily for biodiversity conservation.

Twenty-six sites that had been located and surveyed previously formed the basis for the 2014 bird surveys and this report. Each site was surveyed on three occasions during 21-24 October 2014. Observers spent 10 minutes recording all birds seen and heard within 50 m radius (0.8 ha) of a central point, followed by a further 10 minutes searching the balance of a 2 ha plot and recording the total numbers of birds observed during the 20 minute sampling period. The data from the three site-visits were aggregated and analysed using non-metric multi-dimensional scaling (NMDS) to characterise each site in relation to other sites in terms of their bird assemblages.

A total of 102 bird species was recorded across all 26 sites; a large increase compared to the numbers of diurnal bird species previously reported (median 74 species) during 2007-2012 and an increase from 96 species recorded in 2013. Five threatened species were detected this year, a fall from nine species detected in 2013. The two hectare plots recorded 94 species and there were 87 species within the 0.8 ha plot subset. Sites were broadly grouped, based on their bird species assemblages, into riverine or gully sites, general forest/woodland sites, three gum forest sites located near forest edges and two outlier sites that had low bird counts.

Observed variation between the 2013 and 2014 results is likely due to a slight variation in sampling period and weather conditions. The multivariate analysis indicates that the bird community within the BOA is not showing dramatic changes in composition within sample points.

A total of 86, 66, 84, 70, 78 and 64 diurnal bird species were recorded from the same survey sites in 2007, 2008, 2009, 2010, 2011 and 2012, respectively (median=74 species). In 2013, 96 bird species were recorded across all 26 sites and 102 species in 2014. Although sampling for all 26 sites did not begin until 2010 the increased site count did not increase species richness. However, for the reasons explained in more detail below, the 2013-2014 cannot be compared directly with earlier monitoring events as different observers, sampling methods and annual conditions, could easily explain these differences.

The pattern of distribution and abundance of all bird species in the BOAs appears to be similar across years. The ten most-widespread species recorded in 2010 included eight of the most-widespread species in 2013. In 2010, four threatened species were recorded (Speckled Warbler, Brown Treecreeper, Varied Sittella, Grey-crowned Babbler) compared to nine recorded in 2013 and five recorded in 2014.

The highest median counts of bird species during the period 2008-2012 were recorded, in decreasing order, at sites 9, 3, 17 and 8. In 2013 and 2014, all four of these sites averaged over 31 species each year which made them also the top 4 sites for species counts in our surveys. However, the total numbers of species recorded within the two-hectare plots at each site in 2013 and 2014 were much greater (1.6-2 times greater for these top-ranking sites). Site 12 had the lowest median count of species in 2008-2012 and the lowest total counts in 2013 and 2014 with just 14 and 13 species

respectively. Judging by these broad measures available to us, it seems that the general bird population has not varied dramatically over the monitoring period.

Many more birds were counted in 2014 compared with 2013. This may be for a number of reasons. Counting conditions were excellent in 2014 with low winds and moderate temperatures. The conditions in 2013 were characterised by higher winds, which are recognised as inhibiting bird counts. Counts in 2014 were held later in spring and there were increased numbers of migratory species such as cuckoos, kingfishers and flycatchers. However, some nomadic species recorded in 2013 were absent in 2014.

The two year ordination demonstrates that despite the increased numbers and species in 2014, the core of the bird population on most sites remained similar with most sites staying within the same groups. This was a positive sign that the level of sampling was close to adequate, despite other shortcomings of stratification and comparison sites.

Many factors, such as weather, influence the distribution and abundance of birds and other species. While limitations exist in the analysis of prior monitoring datasets, the data generally shows a stable pattern of indicator species within the BOA. There is no clear evidence in the data indicating that the Project objectives for the BOA are not being achieved. However, an improved monitoring design that takes into account the many factors that influence bird distribution and abundance is required to confidently validate this conclusion.

Surveys completed in September 2013 and October 2014 exhibit seasonal influence by a greater incidence of migrant species in the October survey period. Thus, consideration should be given to the timing of bird surveys such that the influence of migrant species can be appropriately managed.

4.15.2.3 Aquatic Monitoring

The aim of the aquatic monitoring program is to assess river health of drainages occurring within the North Wambo Underground mine lease area, Open Cut operations and associated infrastructure. The drainages include North Wambo Creek, South Wambo Creek, Waterfall Creek and Wollombi Brook.

Compared to the monitoring results of 2013 the aquatic conditions sampled in 2014 appear to show a reduction in stream health. The AUSRIVAS indices used to measure stream health have decreased from spring 2013 to spring 2014. The reductions in these indices imply movement away from reference condition, a relative decrease in pollution sensitive invertebrates, and reduction in the diversity of macroinvertebrate taxa in general.

Although impairment is implied by this reduction, this change appears to reflect habitat availability, and subsequent changes to water quality from a wetter to a drying flow regime; this is consistent with below average precipitation occurring in the catchment prior to sampling. This variation is considered natural for ephemeral streams and is the dominant factor controlling aquatic fauna in South Wambo Creek, North Wambo Creek and Waterfall Creek.

Although Wollombi Brook is a perennial stream, it too showed a reduction in stream health. While the mechanism for this is unclear, it is also likely to be related to a drier climate preceding the

sampling in spring 2014. Native fish such as Flathead Gudgeon and Firetail Gudgeon dominated fish assemblages in Wollombi Brook, and reaches of North Wambo and South Wambo creeks.

The AUSRIVAS results depict deterioration in stream health compared to sampling conducted in spring 2013. The principle reason for the observed change is related to drying climatic conditions rather than anthropogenic disturbance. Ephemeral streams (North Wambo, South Wambo and Waterfall creeks) are particularly susceptible to variations in water availability, which in turn affect the availability of aquatic habitat and lead to changes to water quality associated with a drying system. These changes ultimately result in changed aquatic faunal communities.

The following are recommendations to be considered for future management:

- Establish artificial habitat (e.g. log jam) to create in stream habitat in Stage 3 in line with Aquatic and Riparian Monitoring and Management Plan.
- Continue riparian revegetation, and bank stabilisation in accordance with the Aquatic and Riparian Management and Monitoring Plan (ARMMP);
- Continue wider riparian management involving the revegetation of the riparian zone (i.e. North Wambo and South Wambo Creeks) using industry standard techniques and guidelines, and restriction of cattle movement in the riparian zone and waterway.

Furthermore it is suggested that sampling above Longwall 10a (located at the confluence of Stony and South Wambo creeks) is impractical given the absence of aquatic habitat. Monitoring of its terrestrial values is more feasible in this instance; aquatic sampling may be reconsidered in a wetter climatic regime.

4.15.2.4 Vegetation Monitoring – Subsidence

The aim of the monitoring is to measure the current condition of vegetation with the BOA in terms of floristic and habitat complexity. The results will provide direction to management and future monitoring. Overall the BOA will provide a strategy that gives protection in perpetuity for BOA A and long-term protection of BOAs B, C and D. Monitoring is in accordance with the monitoring locations and methods specified in EMP010 and any amendments contained in subsequent annual monitoring reports (RPS 2011, 2012, 2013, 2014). The monitoring period was conducted on the 27 to the 31 of October 2014.

Vegetation structure was assessed using site attributes scores collected in accordance with BioMetric (Gibbons et al 2009) and each vegetation community has been aligned to a 'best fit' Revised BioMetric Vegetation Type (RBVT) (OEH 2012) for comparison with monitoring data from previous years. This approach largely follows that undertaken in the 2013 monitoring report. However, in addition, a number of multivariate and univariate analyses were undertaken so that vegetation patterns and trends could be further clarified.

A total of 218 plant species were recorded in the monitoring plots in 2014. Overall there has been no significant variation in the total number of species or the total number of native and introduced plant species across the analysed monitoring years (2006-14). However, 20 native species were recorded for the first time in plots in 2014. Analyses determined that in any given year approximately 76% of this total number of native species was observed (165 ± 3.3). Yet, no significant difference exists in the overall among year variation in native species richness for these years (ANOVA; $p = 0.41$). Species

richness was generally below benchmark values, but in some woodland vegetation types was close to benchmark. Riparian vegetation types were generally in low condition compared to benchmark. These patterns are consistent with previous years.

A total of 46 introduced species were recorded in 2014, broadly similar to numbers recorded in previous years. Analyses found that the assemblage of introduced species varied significantly among the riparian and woodland vegetation types. This difference in pattern implies a need to target management practices for introduced species for these different landscapes.

Structural analyses revealed no significant differences among the structural characteristics of plots among years. Tree hollows generally remain below benchmark. In contrast, for fallen logs some vegetation communities scored above the benchmark values, and most of those were significantly above their benchmark values. This year data has been collected for leaf litter, rock and bare earth cover. It is anticipated that in the future, comparisons can be made with this data to track among year variations in these attributes. In sum, no significant changes were detected in the flora values of the BOA in 2014 compared to previous years.

Overall the Wambo BOAs continue to provide moderate biodiversity values, with clear variations in values among some locations and vegetation types. Introduced species are a significant issue for riparian vegetation types in general and in derived grasslands, although the dominant introduced species vary among these types. This needs to be considered strategically in relation to potential benefits and costs associated with any proposed restoration since some locations are likely to respond better than others to treatment, but some locations are of higher significance. In general the principle of “work from good towards bad areas” is appropriate. Continued control of introduced species, stock exclusion, and control of feral animals and responding to erosion issues remain management priorities. There is clear evidence of lowered diversity in some woodland areas due to inappropriate fire regimes with *Allocasuarina* stands dominating some areas. Over time fire may occur in these areas and “unlock” the diversity of these locations, but this issue should be under watch. Other management opportunities could include the use of nest boxes to supplement tree hollows to increase nesting opportunities for fauna.

4.15.2.5 Riparian Vegetation Monitoring

This report aims to provide information on the riparian condition of North Wambo, South Wambo and Stoney Creeks. Monitoring methods and sites described in prior monitoring reports (RPS 2010; RPS 2011; RPS 2012; RPS 2013; Niche 2014) have been used to monitor the condition of North Wambo, South Wambo and Stoney Creeks for the 2014 monitoring period.

Riparian condition has not changed significantly since the 2013 monitoring period. There is no evidence of mining related deleterious impacts on these streams. Two sites at Stoney Creek (4C and 5C) have changed from good to moderate, as a result of soil disturbance from feral pigs. An increase in disturbance from feral pigs was noted during the current monitoring period at four other sites (North Wambo: 12A, 13A, 14A, and Stoney Creek: 3C), but this was not sufficient to alter the condition category of these sites.

Erosion observed in South Wambo Creek is evident for the majority of its length, in particular east of site 3B. The erosion observed appears to reflect the damage associated with the January/ February

2013 flood event, which was noted in the 2013 monitoring report (Niche 2014). Bank stability or lack thereof is, in part, linked to the limited incidence of mature trees growing in the banks of Wambo Creek east from site 3B.

Change at two sites in Stoney Creek was detected (i.e. sites 4C and 5C). Conditions have deteriorated from good to moderate condition, with soil disturbance from feral pig activity being the principal factor in the loss of riparian condition. Elevated feral pig activity was also noted at four other monitoring sites in Stoney Creek and North Wambo Creek, but was of insufficient magnitude to alter riparian condition (Plate 2). The increase in soil disturbance by feral pigs was identified particularly at sites 12A, 13A; 14A at North Wambo, with a large family of pigs (adult and young) observed foraging during the day at North Wambo Creek.

Management activity has been undertaken to address weed species incidence and extent, with weed management contractors observed on site during the current monitoring program. Subsequent site observations indicate success in the suppression of African Boxthorn (*Lycium ferocissimum*), a listed noxious weed that is particularly prevalent in the North Wambo Creek riparian environment. Sustained effort in weed management and native revegetation, where necessary, of the riparian environment is recommended with the focus being stream banks of limited native vegetation cover.

The main factors observed as being detrimental to the riparian corridors of North Wambo Creek, Wambo Creek and Stoney Creek are as follows:

- Occurrence and spread of weeds
- Occurrence and severity of erosion
- Soil disturbance arising from feral pig activity.

A passive and reactive management approach could be applied to remedy the main causal factors of declining riparian condition. In the case of these streams it is considered that both approaches be used to address weed occurrence and erosion. A targeted feral pig control program for Stoney Creek and North Wambo Creek is recommended together with:

- Intensive weed management program be applied to Stoney Creek in mid spring to address the high density of thistle growth observed in November 2013. The timing of this weed management is important as delayed action would potentially allow seed set to occur, thereby minimising the effectiveness of management effort. Weed management may be required on subsequent years at the same time to deal with the accumulated seed bank.
- Plant native trees and shrubs within and adjacent to the riparian corridors of North Wambo Creek and Wambo Creek. This action would help reduce the incidence of bank and channel erosion thereby improving riparian resilience.

4.15.2.6 Landscape Function Analysis Monitoring

This report aims to provide information on rehabilitation progress within areas of rehabilitation within the Wambo open cut area and North Wambo Creek diversion. Ecosystem Function Analysis (EFA) methods described by Tongway & Hindley (2004) were used to assess landform stability. Monitoring methods and sites specified in prior monitoring reports (RPS 2010; RPS 2011; RPS 2012; RPS 2013; Niche 2014) have been used as an adjunct to the Tongway & Hindley (2004) method.

Monitoring data show shown a general decline in LFA indices used to measure landscape function and stability. The greatest stability occurs within areas of woodland rehabilitation with grassland rehabilitation sites showing signs of instability. Instability appears to be promoted by low plant species richness, which inherently exhibits low resilience to changing conditions. Declines in perennial plant growth as a consequence of reducing soil fertility, organic matter cycling, erratic rainfall and dry /warm weather conditions appear to be leading factors in diminished landform stability.

The Wambo monitoring area is characterized by a mosaic of natural, agricultural and mining land uses controlled primarily by the latter (i.e. mining). Past and present land uses that have shaped or modified the monitoring area are:

- Livestock grazing
- Woodland enhancement
- Mine planning
- Rehabilitation of disturbed surfaces.

LFA provides an objective quantitative means for evaluating landform stability over time such as disturbed areas (i.e. open cut operations and North Wambo Creek diversion) and as such is ideally suited to monitoring programs with complex and/or influential land use histories. Quantitative measures in landscape function change is informative and can provide useful guidance in managing disturbed surfaces requiring restoration to a stable landform.

Apart from the woodland stability index it appears that a generalised negative trend in measured landscape function indices. The indications are that this trend is related to four principle factors as listed below:

- Weather.
- Time since ameliorant applications.
- Perennial vegetation cover and organic matter cycling.
- Plant species diversity and vegetation structure.

The weather conditions at Wambo between 2006 and 2013, which represents the extent of the LFA monitoring period, is largely comparable with mean monthly and annual records at Jerrys Plains. However, years 2006 and 2012 were notably dry (approximately 490 mm and 470 mm respectively), with 2011 nearing one of the wettest on record (~ 930 mm).

Conditions in 2014 were generally close to average, although like 2013 it was notably warmer than average with irregular lower than average rainfall. Total rainfall for the past 6 months was 138.8 mm (i.e. May – October 2014), which is significantly less than expected average rainfall for that period (i.e. ~ 250 mm). This extended period of uncharacteristically dry warm conditions is likely to have had an impact on plant growth and vigour (e.g. high evapotranspiration leading to declines in plant growth), especially for C3 grass species (i.e. cool season or yearlong growth periods with higher moisture demands than C4 grasses) such as Weeping Grass (*Microlaena stipoides*) and Common Wheat Grass (*Elymus scaber*).

The LFA site photographs provide visual indications that weather related decline in perennial vegetation grass cover (i.e. premature grass curing during growth period) despite there being a limited change in the infiltration index. Reduced perennial vegetation cover is likely to be directly linked with decreased erratic rainfall for the past 12 months combined with reduced effective rainfall events (i.e. much rainfall has fallen over a few large events in November 2013 and February-April 2014). Increased evapotranspiration is likely to have longer term implications for landscape stability by reduced nutrient cycling (i.e. loss of organic matter from the topsoil thereby degrading soil structure and infiltration rates).

Most rehabilitated surfaces were initially treated with topsoil and soil ameliorants (e.g. bio solids and fertilizer) to enhance vegetation growth. These treatments are likely to have been consumed by plant growth within the first few years post rehabilitation with ongoing nutrient supply shifting to other sources such as organic matter cycling, nitrogen fixation (e.g. *Acacia* spp.) and rainfall events. Most of the rehabilitated surfaces are now showing signs of low soil fertility, which is largely consistent with time since treatment.

Reduced nutrient availability for plant growth is likely to have ongoing negative effects on perennial plant cover. Reductions in organic matter cycling would also adversely influence soil nutrient availability, thus exacerbating further declines in soil structure, infiltration and above ground vegetation growth (e.g. rainsplash protection). Landform stability may decline as a consequence of reduced nutrient availability, which would be visually evident through increased erosion observations.

A decline in perennial vegetation cover was noted in the North Wambo Creek rehabilitated surfaces, with notable indicators for this decline being reduced infiltration and nutrient indices. Water retention in the solid surface is being progressively lost through the loss of organic matter cycling and associated degradation in soil health. Surfaces where perennial vegetation cover is lost or is significantly declining are now showing signs of hard setting, thereby giving rise to an increased incidence of the more severe forms of erosion being terrecetting and pedestalling. Such erosion types have the potential to adversely impact water quality (i.e. enhanced migration of fine particulates into the water column). The management implications are the introduction of additional plant species adapted to the prevailing conditions (i.e. low nutrient high water stress environments) that have the added benefit of providing rainsplash protection.

Conversely, all woodland rehabilitation sites are exhibiting perennial vegetation cover that exceeds the analogue sites. While this potentially promotes increased stability, there appears to be degradation in habitat values for native flora and fauna. For instance, there is limited evidence of groundcover vegetation in these rehabilitated surfaces due to increased tree crown shading and leaf litter accumulation. The management implications include the consideration of targeted tree thinning works to reduce the dominance of overstorey cover.

Much of the rehabilitated surface is characterised by Rhodes Grass (*Chloris gayana*) with, to a lesser extent, Galena (*Galena pubescens*) resulting in a landscape of very low species diversity. Such systems are vulnerable to environmental change and are likely to exhibit unfavourable, potentially extreme responses, to adverse environmental conditions (e.g. reduced water and nutrient availability).

Site observations indicate that Rhodes Grass cover and density is in decline, particularly on locally steeper slopes and within the North Wambo Creek diversion area. Rhodes grass decline is either matched with an increased occurrence of bare earth or increased coverage of Galena.

While Galena is very successful in covering the land surface such influence in the rehabilitated surface is likely to contribute to longer term landscape instability. The growth habitat of Galena results in a smothering of the land surface preventing the occurrence of other plant species and or propagation. Further, below surface organic matter cycling is not matched by the above surface vegetative cover, which is another important contribution to soil stability. While offering rainsplash protection, the above ground vegetative growth of Galena does not return substantive amounts of organic matter to the soil, which may potentially enhance erosion development and severity. Terecetting and pedestalling erosion types were observed more frequently in this monitoring period, especially in areas where substantial decline in Galena growth or death was observed (i.e. loss of rainsplash protection and soil carbon).

For grassland areas it appears the greatest challenge in achieving stable vegetated landforms is the establishment of a groundcover resilient to warm and dry conditions and declining soil fertility. Of particular concern are the erratic rainfall patterns in recent years with indications being that most rainfall is limited to only a few events and occurring only in summer and early autumn (e.g. thunderstorms). In this respect it is considered that a rehabilitation strategy focusing on the use of native grass and herb species adapted to these conditions would be a prudent response to the improvement of rehabilitation outcomes.

Conversely, plant and vegetation structural diversity in the woodland rehabilitation sites are stable and comparatively better than the grassland sites. These areas show improved landscape stability and appear resilient to recent adverse weather conditions. These rehabilitated surfaces are likely to require only limited ongoing management to maintain progression towards a stable landform.

Results from the 2014 LFA monitoring event indicate a mixed picture of landscape stability throughout rehabilitated surfaces of the Wambo Coal disturbance footprint. A decrease in LFA indices was observed for riparian rehabilitated surfaces, with the main reason likely to be declining perennial vegetation cover. Declines in perennial vegetation cover appear to be a result of declining nutrient availability and adverse weather conditions.

4.15.3 Bushfire Management

The Bushfire Management Plan (BFMP) was originally approved by the NSW Rural Fire Service (NSWRFS) and SSC in 2005. This plan incorporates both an identification of likely bushfire hazards on the site, and an assessment of the risks those hazards represent. In February 2008, the BMP was reviewed in consultation with the NSWRFS and subsequently approved on 1 July 2008. A full revision of the BMP was undertaken in 2013 and subsequently approved by DP&I and the NSWFRS.

Fire Warning billboards have been erected around the WCPL facility and are operated on a daily basis during the period of the designated bushfire season. No grassfires or bushfires were reported within the WMC during 2014. Wambo undertakes proactive grass slashing and maintenance around all site infrastructure and boundary fences where practical.

Plate 4: Wambo Coal Fire Danger Rating Boards

4.15.4 Weeds & Pest Control

The FFMP details the weed control measures used to minimise the potential for weed invasion. These include identification of weed infestations during pre-clearance surveys, removal of weeds or application of approved herbicides and follow-up inspections to assess effectiveness of the weed management measures implemented.

Only certified personnel who have completed the ChemCert Farm Chemicals User Course, the SMART Train Chemical User qualification or equivalent undertake weed control at WCPL. All activities are conducted in accordance with the Pesticides Amendment (Records) Regulation 2002.

Two scheduled weed surveys are now being implemented each year to target predominate weed species in the biodiversity offset areas and along NWCD to ensure that a targeted program can be scheduled.

4.15.4.1 Weed Management Performance

In 2014 weed control programs continued in selective areas within the boundaries of Wambo Coal. (**Appendix J**) displays the areas of weed spraying throughout 2014. The major weeds targeted for 2014;

- African Boxthorn (*Lycium ferrocissimum)*
- African Olive (*Olea europaea subspecies cuspidate)*
- Apple of Sodom *(Solanum linnaeanum)*
- Galenia *(Galenia pubescens)*
- Inkweed (*Phytolacca octandra*)
- Mother - of - Millions *(Byrophyllum delagoense)*
- Narrow Leaved Cotton Bush *(Gomphocarpus fructicosus)*
- Thistle Species
  - Scotch Thistle *(Onopordum acanthium)*
  - Saffron Thistle *(Carthamus lanatus)*
  - Variegated Thistle *(Silybum marianum*)

Table 39 below identified the approximate area in hectares of weeds targeted for 2014.

Table 39: Areas and Weeds Targeted 2014

Location	Weeds	Area (ha)
Creek Diversion Stage 3	Thistles, Cotton Bush, Inkweed, Apple of Sodom	48.72
North Wambo Creek	Thistles, African Boxthorn & African Olive	30.23
Remnant Woodlands A	Mother of Millions	21.47
Wambo Rail Corridor	African Boxthorn – cut & paint	9.50
Total		**109.92**

4.15.4.2 Vertebrate Pest Control

The FFMP details the feral animal control measures used to minimise the threat to native fauna and comply with the requirements of the Rural Lands Protection Act, 1998. Programs to assess the status of pest populations, implementation of pest control measures, implementation of mandatory pest control for any declared pests (i.e. rabbits, pigs and wild dogs) and follow-up inspections to assess effectiveness of the control measures implemented are carried out on an annual basis.

The vertebrate pest control programs were undertaken during the winter of 2014 throughout the North Western WCPL owned buffer lands.

Additional baiting was carried out on an as needs basis based on reported sightings within the WMC.

The aim of the program was to target wild dogs that had been reported in and surrounding the Warkworth area. Feral species control is an integral component of Wambo's long term flora and fauna enhancement program.

The vertebrate pest management program involved 1080 baiting, targeting wild dogs (Canis lupus familiaris) and foxes (Vulpes vulpes). The program was run in conjunction with the Livestock Health and Pest Authority and surrounding mining operations.

The results for the baiting program were highly successful with baits taken at least once from 78% of the baiting sites. The results show an increase from the previous Winter Program of 2013 of 73% take and 40% take in 2012.

Results from this program indicate that baits were taken at least once from 45 of the 58 baiting locations, with a total of 77 baits taken over the whole program. In the previous Winter Program 40 baits were taken at least once from 55 baiting locations, with a total of 59 baits taken over the whole program.

Based on footprint and track evidence results illustrate that 45 of the baits taken were consumed by dogs of various sizes and 31 baits were consumed by foxes.

Dog Foot Print – Wild Dog Baiting Program

4.15.5 Flora and Fauna Non-compliances

There were no non-compliances during the reporting period of 2014.

4.15.6 Flora and Fauna Improvements

2015 surveys highlighted deficiencies in the current monitoring program. A revision of the monitoring program is to be aligned and revised concurrently with the planned revision and submission of the Rehabilitation Management Plan and the two currently approved Mining Operations Plans which reside over the WMC. Other activities planned for 2015 include the reinstatement of nesting boxes and expansion from the Rail Loop offset area into other appropriate biodiversity offset areas across the complex. Remnant fence lines which can be readily removed without vegetation and ground disturbance will be investigated. Old internal tracks which exist but which are identified as not serving use shall be identified and closed off to allow natural and assisted remediation where appropriate within the Biodiversity Offset areas.

5. *STAEKHOLDER RELATIONS*

5.1 COMPLAINTS MANAGEMENT

WCPL received a total of 31 community complaints for the reporting period of 2014 compared to a total of 30 community complaints in 2013 received regarding mining related operations (**Table 40 and Figure 5**). Wambo Coal manages a 24hr Community Enquiry Line whereby community members are able to contact mine staff 24hrs +61 (0)2 6570 2245. Blast events at Wambo are also advertised via a Blasting Information line on +61 (0)2 8250 5205 and a SMS text messaging service to advise registered parties of scheduled blasting events at the WMC.

5.2 COMPLAINTS PERFORMANCE

Figure 5: 2014 Community Complaints Classification

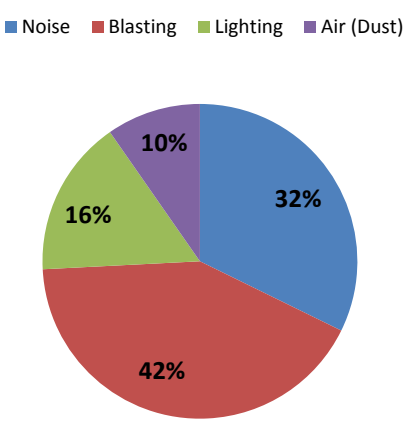


Table: 40 WCPL Historical Complaints

Reporting Period	Complaints Received
2014	31
2013	30
2012	106
2011 - 2012	82
2010 - 2011	35
2009 - 2010	18
2008 - 2009	3
2007 - 2008	26
2006 - 2007	29

5.3 COMMUNITY ENGAGEMENT

5.3.1 Community Consultation

During the reporting period WCPL held four Community Consultative Committee (CCC) meetings. These meetings were conducted on;

In 2014 CCC meetings were scheduled for and held on;

- Tuesday 25 February
- Tuesday 27 May
- Tuesday 26 August; and
- Tuesday 2 December

2015 meetings for the CCC are scheduled for;

- Tuesday 28 April
- Tuesday 25 August; and
- Tuesday 8 December

Community representatives act as the point of contact between the mine and the community. The committee is made up of residents from surrounding district, a representative of Singleton Council, management of the WMC and is chaired by an independent person.

Wambo Coal continues to support local community and charitable organisations. In 2014 Wambo continued its strong and developing relationship with such organisations as:

- Camp Quality
- Singleton Mayoral Scholarships
- Peabody Wambo Singleton Council Hall of Fame
- Jerrys Plains Public School
- Singleton Base Hospital
- Cancer Council of NSW
- Singleton Pony Club; and
- Cystic Fibrosis Association of NSW.

The WMC operates a 24hr Community Enquiry Line, a Blasting information Hotline, a SMS text messaging Blast notification service and a dedicated community email account to enable community members to contact and make enquiries or lodged complaints regarding the operation of the WMC.

5.3.2 Community Information Sessions

2014 saw Wambo Coal conduct open community information sessions in the village of Jerrys Plains. These were conducted on. These open forum sessions are an opportunity for local residents to meet senior mine personnel to discuss current and future operations where possible. In 2015, plans to conduct open information sessions are currently scheduled for

- Tuesday 28 April (3.30pm- 7.00pm)
- Saturday 2 May (8.00am-12.00pm)
- Tuesday 22 September (3.30pm – 7.00pm)

- Saturday 26 September (8.00am-12.00pm)

Advertisements are published in the Singleton Argus and flyers are delivered to the surrounding district to notify interested community stakeholders to attend.

6. *REHABILITATION AND LAND MANAGEMENT*

6.2.1 Rehabilitation Management

Wambo Coal operates under a Rehabilitation Management Plan (RMP) which is currently under departmental review at the time of report submission. In addition, Rehabilitation is managed at the WMC with the Mining Operations Plan for the Open Cut (MOP: 2010-2016) and for the NWU with the currently approved NWU MOP (2013-2015). At the time of submission of this AEMR, a revised MOP has been submitted for regulatory review which sees the merger of the two previous MOP's into a single MOP for the WMC.

6.2.2 Trials and Research

No rehabilitation trials and/or research were conducted during the reporting period of 2014. Wambo Coal will investigate during 2015 possible trails and research projects where feasible and where appropriate to the site and to the sites requirements.

6.2.3 Rehabilitation Performance

During the reporting period of 2014 rehabilitation works were undertaken at the RL140 at the WMC (**Plan 7 and Table 42**). Approximately 17.3ha of mining disturbed land (against a forecast of 20ha) was shaped, topsoiled with an application of Organic Growth Medium (OGM) to assist with soil construction and vegetative growth 2015 Rehabilitation consists of two main areas, the Homestead Backfill project (23.1ha) and an area above the Homestead of 10.4 ha.. Seed collection also commenced in 2014 within Wambo lands in an effort to produce local providence tube stock for planting along NWCD Stage 3 in 2015/2016. A list of species and quantity is provided below in **Table 41**. A further seed collection program was undertaken in January 2015 and shall continue throughout 2015.

Table 41: Seed Collection Program 2014

Genus Species	Common Name	Quantity (grams)
Acacia amblygona	Fan wattle / Fan-lef wattle	1
Acacia decora	Western Silver Wattle	26.5
Acacia implexa	Hickory Wattle	90
Acacia salicinia	Native Willow	39.5
Casuarina leuhmanii	Bulloak	3
Dodonaea sinuolata	Feathery hop bush	13
Eucalyptus molucanna	Grey Box	50.5
Eucalyptus tereticornis	Forest Red Gum	43
Melaleuca decora	White Feather Honeymyrtle	1.5

Table 42 Rehabilitation Summary 2014

	Actual 2012 (HA)	Actual 2013 (HA)	Actual2014 (HA)	Forecast 2015 (HA)
A: Mine Lease Area				
A1 Mine Lease(s) area	7050	7050	7050	7050
B: DISTURBED AREAS				
B1.Infrastructure Area	256.24	256.24	252.1	267.1
B2. Active Mining Area	208.54	157.09	121.00	159.6
B3. Waste Emplacements	456.44	583.49	604.7	563.2
B4. Tailings Emplacements	40.39	40.39	56.2	57.3
B5.Shaped Waste Emplacements	1008.21	1062.96	1092.56	1050.86
ALL DISTRUBED AREAS				
C1. Planned Rehabilitation Area	120	30	17.3	33.5
C2. Total Rehabilitated Area during reporting period	64.1	34.49	20	
D1. 10 to 18 degrees	4.3	4.3	4.3	4.3
E1. Pasture and grasses	270.41	304.9	322.2	355.70
E2. Native Forests/Ecosystems	49.43	49.43	49.43	49.43
E3. Plantations and Crops	0	0	0	0
E4. Other (non-vegetative outcomes)	0	0	0	0

6.2.4 Rehabilitation Monitoring and Performance

As reported in **Section 4.15.2.6** monitoring data show shown a general decline in LFA indices used to measure landscape function and stability. The greatest stability occurs within areas of woodland rehabilitation with grassland rehabilitation sites showing signs of instability. Instability appears to be promoted by low plant species richness, which inherently exhibits low resilience to changing conditions. Declines in perennial plant growth as a consequence of reducing soil fertility, organic matter cycling, erratic rainfall and dry /warm weather conditions appear to be leading factors in diminished landform stability.

Results from the 2014 LFA monitoring event indicate a mixed picture of landscape stability throughout rehabilitated surfaces of the Wambo Coal disturbance footprint. A decrease in LFA indices was observed for riparian rehabilitated surfaces, with the main reason likely to be declining perennial vegetation cover. Declines in perennial vegetation cover appear to be a result of declining nutrient availability and adverse weather conditions

6.2.5 North East Tailings Dam

The North East Tailing Dam (NETD) ongoing capping and remediation works is currently under care and maintenance whilst alternative capping strategies are investigated. Works were anticipated to commence once again during the 2014 reporting period. DuPont have been commissioned by Wambo to conduct trails on sample material from the NETD as part of a broader strategy to produce an acceptable tailings capping strategy for the NETD. Samples at the time of report submission have

been sent to the USA laboratory for testing and analysis. In the interim, Wambo continues to monitor the structural integrity and performance of the NETD in accordance with NSW Dam Safety Committee requirements.

6.2.6 Rehabilitation Non-compliances

Rehabilitation objectives for the approved Open Cut MOP (2010-2016) were not met during the reporting period. As reported in the 2013 AEMR and in the current AEMR, the sequence in mining progression and the change in operators from Downer EDI to Peabody Energy and the announcement of the Joint Venture between Peabody Energy and Glencore have required the thorough revision of rehabilitation targets which are contemporary and achievable for the WMC. The submission of the revised MOP in early 2015, details the future rehabilitation targets for the WMC given the above structural changes.

6.2.7 Rehabilitation further improvements

The revision of the sites two MOP's and merger of the two, coupled with the revision of the RMP to contemporary standards providing greater clarity around rehabilitation success criteria's will enable a more strategic focus on rehabilitation and rehabilitation remediation works to ensure that quality rehabilitation is the primary focus and goal for 2015 and beyond .

Rehabilitation remediation works are scheduled for the NWCD in 2915. This will include an autumn tree planting campaign along the upper level banks, review of any erosion and gully formations which may need further civil works and the continuation of the sprinkler reticulation system throughout Stage 3 to ensure vegetative growth is maintained. Weed praying and a focus on the eradication of galena will be a primary focus as well during 2015.

7. *PROPOSED ACTIVITIES 2015*

7.1 2015 MINE DEVELOPMENT AND PLANNING APPROVALS

2015 will see the submission of an Extraction Plan for the proposed three longwall panels for the South Bates Whybrow seam as described previously. The NWU continues to operate seven days a week. Subsequent panel sequence is currently scheduled at the time of report submission as follows;

- LW10 completed by June 2015
- LW10a start date June 2015, estimated completion date October 2015 (pending approval)
- LW08b start date November 2015, estimated completion date January 2016

Open Cut operations shall continue to progress mining activities in accordance with the WMC MOP (under review) in the Montrose Pit and South Bates extended open cut pit.

7.2 ACTION PLAN 2015

Late 2014 and early 2015 the 3 year Independent DA 305-7-2003 audit, the EPBC 2003/1138 & DA 305-7-2003 Biodiversity Offset audit and the DA 305-7-2003 Independent Subsidence Audit. At the time of report submission the final reports for the three independent audits have yet to be finalised with comments from DP&E on the DA305-7-2004 audit being currently addressed. Nevertheless,

2015 shall see the resolution of outstanding audit compliance recommendations and remediation of any non-compliance that may arise from the independent audits. **Table 43** below outlines these actions for 2015 and a suggestive timeline for completion.

Table 43: Action Plan 2015

Document / Plans	Action	Completion Date
Water Management Plan	Finalise reviews from NSW Government Departments	April 2015
Conservation Management Plan (European)	Revise and submit for Approval	July 2015
Extraction Plan – South Bates	Submit for Approval	2015
External Audit Recommendations & Actions	To be finalised	To be advised

Checklist – DRE & DP& Guidelines

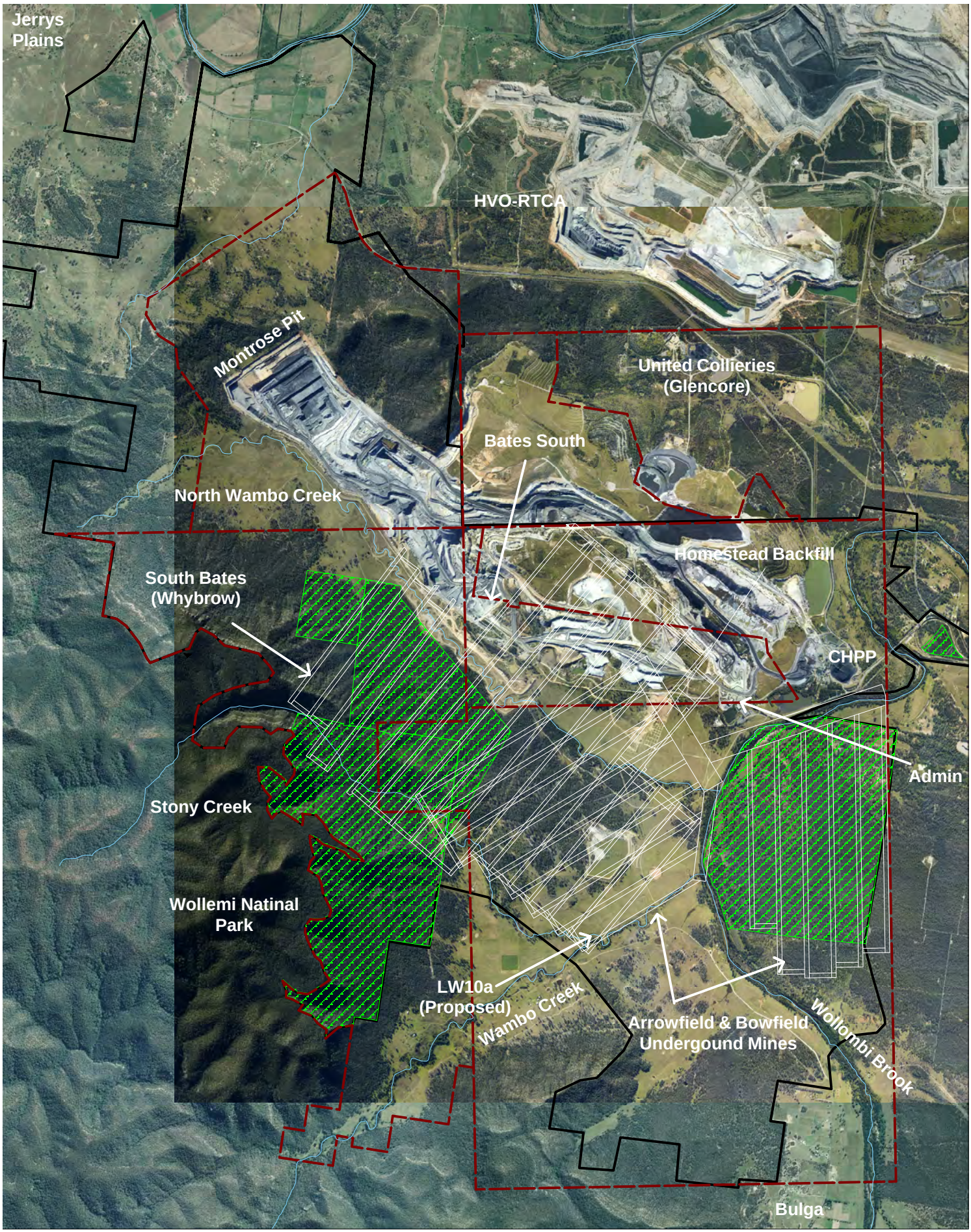
DRE – EDG GUIDELINES	DP&E - UNRELEASED DRAFT AEMR GUIDELINES	REFERENCE SECTION IN AEMR
1. Introduction Title block and contents page	1 Introduction Title block and contents page	Section 2
	4.2 Quick reference table	Table 2, section 2.2
1.1 Consents, lease and licences	4.3 Consents, lease and licences	Section 2.3
1.2 Mine contacts	4.4 Mine contacts	Section 2.6
1.3 Actions required at previous AEMR review Table 1. Actions required	4.5 Actions required at previous AEMR review Table 1. Actions required 6.7 Actions required from government agency's review of the last aemr	Section 2.7
Operations during the reporting period Table 2 production and waste summary Table 3: stored water	5.1 Operations summary 2012 reporting period Production statistics (related to approval limits) Summary of changes (developments, equipment upgrades) Mitigation, salvages, heritage works	Section 3 Section 3.1 Section 3 Section 4
3.0 Environmental management and performance	6.0 Environmental Performance	Section 4
3.1 Air pollution Environmental management Environmental performance Reportable incidents Further improvements	 6.1 Review of monitoring results 6.2 Monitoring & performance reports required by other dept 6.5 Outcome of any independent environmental audit 6.6 Outcomes of any independent review 6.8 Identify any trends in the monitoring data 6.9 Identify any discrepancies between the predicted and actual impacts	Section 4.4.2 Section 4.4.1 Section 4.4.3 Section 4.4.4 Section 4 Section 7.2 Section 4
3.2 Erosion and sediment Environmental management Environmental performance Reportable incidents Further improvements	Section 4.9 Section 4.9.1 Section 4.9.2 Section 4.9.3 Section 4.9.4	Section 4.9
3.3 surface water pollution Environmental management Environmental performance Reportable incidents		Section 4.6

Further improvements	6.1 Review of monitoring results 6.2 Monitoring & performance reports required by other dept 6.5 Outcome of any independent environmental audit 6.6 Outcomes of any independent review 6.8 Identify any trends in the monitoring data 6.9 Identify any discrepancies between the predicted and actual impacts	Section 7.2 Section 4.6
3.4 Ground water pollution Environmental management Environmental performance Reportable incidents Further improvements	6.1 Review of monitoring results 6.2 Monitoring & performance reports required by other dept 6.5 Outcome of any independent environmental audit 6.6 Outcomes of any independent review 6.8 Identify any trends in the monitoring data 6.9 Identify any discrepancies between the predicted and actual impacts	Section 4.7 Section 7.2 Section 4.7
3.5 Contaminated polluted land Environmental management Environmental performance Reportable incidents Further improvements	Section 4.14	Section 4.14
3.6 Threatened flora Environmental management Environmental performance Reportable incidents Further improvements	Section 4.15	Section 4.15
3.7 Threatened fauna Environmental management Environmental performance Reportable incidents Further improvements	Section 4.15	Section 4.15
3.8 Weeds		Section 4.15.4
3.9 Blasting Environmental management Environmental performance Reportable incidents Further improvements	6.1 Review of monitoring results 6.2 Monitoring & performance reports required by other dept 6.5 Outcome of any independent environmental	Section 4.3 Section 7.2

	audit 6.6 Outcomes of any independent review 6.8 Identify any trends in the monitoring data 6.9 Identify any discrepancies between the predicted and actual impacts	Section 4.3
3.10 Operational noise Environmental management Environmental performance Reportable incidents Further improvements	6.1 Review of monitoring results 6.2 Monitoring & performance reports required by other dept 6.5 Outcome of any independent environmental audit 6.6 Outcomes of any independent review 6.8 Identify any trends in the monitoring data 6.9 Identify any discrepancies between the predicted and actual impacts	Section 4.2 Section 7.2 Section 4.2
3.11 Visual, stray light Environmental management Environmental performance Reportable incidents Further improvements	Section 4.12 Section 4.12.1 Section 4.12.2 Section 4.12.3 Section 4.12.4	4.12
3.12 Aboriginal heritage Environmental management Environmental performance Reportable incidents Further improvements	Section 4.10 Section 4.10.1 Section 4.10.2 Section 4.10.3 Section 4.10.4	4.10 Aboriginal heritage
3.13 Non-aboriginal heritage Environmental management Environmental performance Reportable incidents Further improvements	Section 4.11 Section 4.11.1 Section 4.11.2 Section 4.11.3 Section 4.11.4	4.11 Non-Aboriginal Heritage
3.14 Spontaneous combustion Environmental management Environmental performance Reportable incidents Further improvements	Section 4.5 Section 4.5.1 Section 4.5.2 Section 4.5.3 N/A	4.5 Spontaneous combustion
3.15 bushfire		4.15.3
3.16 mine subsidence		4.8
3.17 hydrocarbon contamination		Section 4.14 (see contaminated land)
3.18 methane drainage/ventilation		N/A
3.19 public safety		N/A
3.20 other issues and risks		N/A
4.1 environmental complaints	6.10 environmental complaints	Appendix B Appendix C (Community)
4.2 community liaison	6.11 review of community engagement	Section 5.3
5 REHABILITATION THIS REVIEW PERIOD	7.0 REHABILITATION	Section 6
5.2 rehabilitation of disturbed land	7.1 summary of rehabilitation undertaken on site	Section 6 Section 6

	7.3 rehabilitation progression - in accordance with mop commitments	Section 7
5.3 other infrastructure		N/A
5.5 Further development of the final rehabilitation plan		N/A
6 Activities proposed in the next AEMR period	7.2.1 7(8) Proposed activities (next AEMR)	Section 7
Table 4 rehabilitation summary		Table 19

APPENDIX A



Creeks
Mining Leases
Biodiversity Offsets
Wambo Owned Land
Approved Underground Mines

N
W E
S

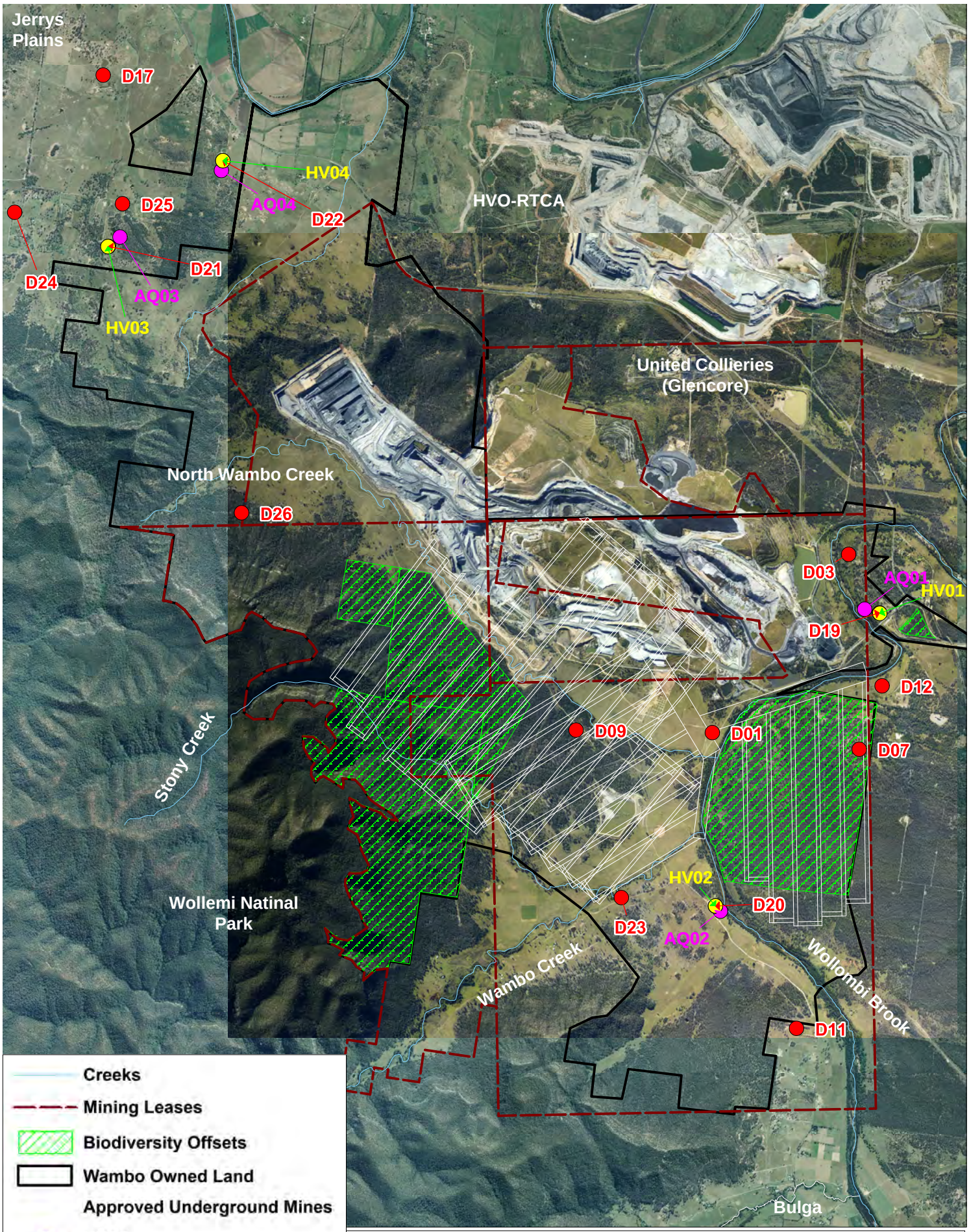
Wambo Coal Pty Ltd
Plan 1: Site Plan

Peabody ENERGY

Date: 20/02/2015

Drawn by: TF
Approved by: TF

Projection: MGA 94 - Zone 56



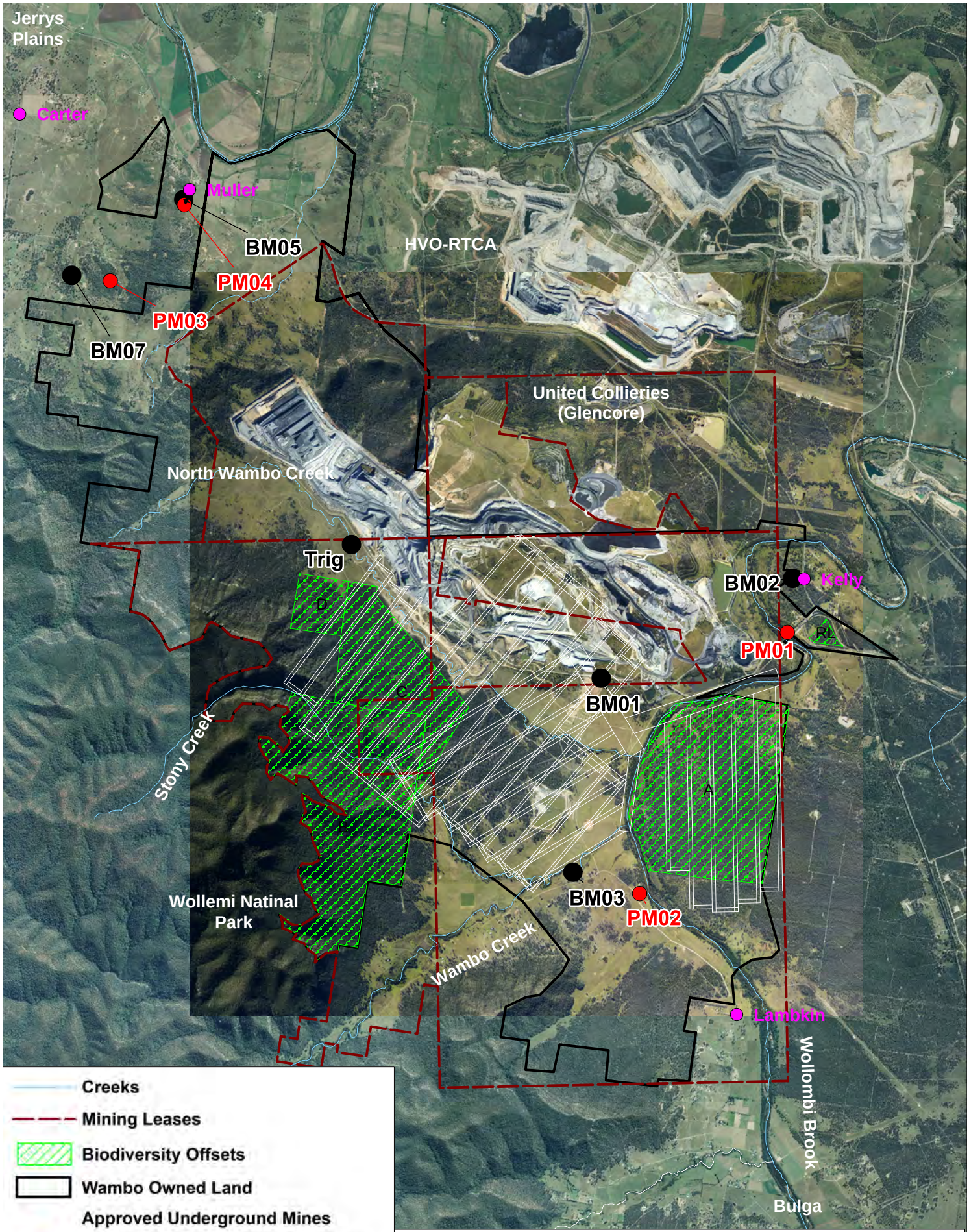
Wambo Coal Pty Ltd
Plan 2: Air Quality Monitoring Network

Peabody ENERGY

Date: 20/02/2015

Drawn by: TF
Approved by: TF

Projection: MGA 94 - Zone 56

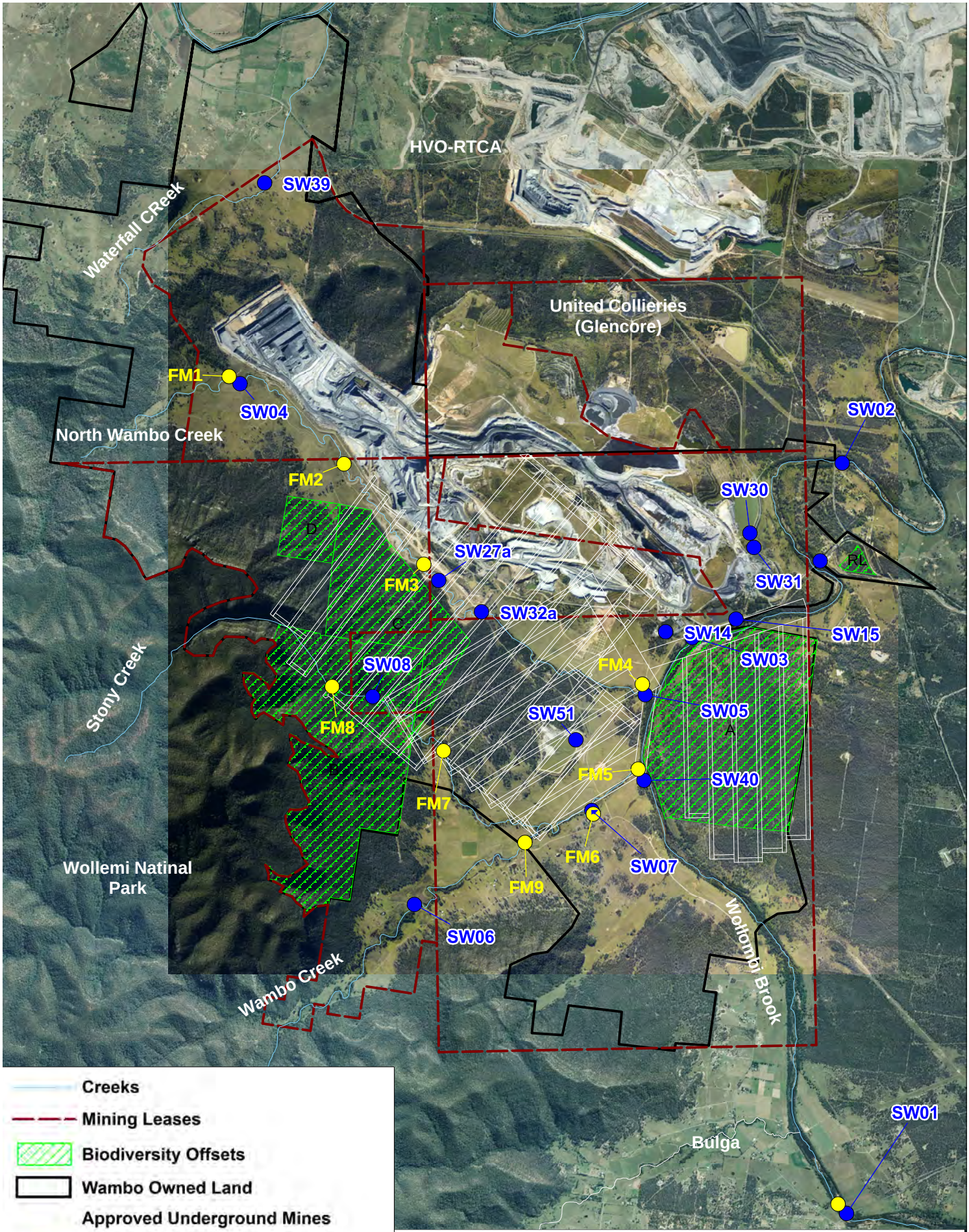


Wambo Coal Pty Ltd
Plan 3: Noise Monitoring Network

Date: 20/02/2015

Drawn by: TF
Approved by: TF

Projection: MGA 94 - Zone 56



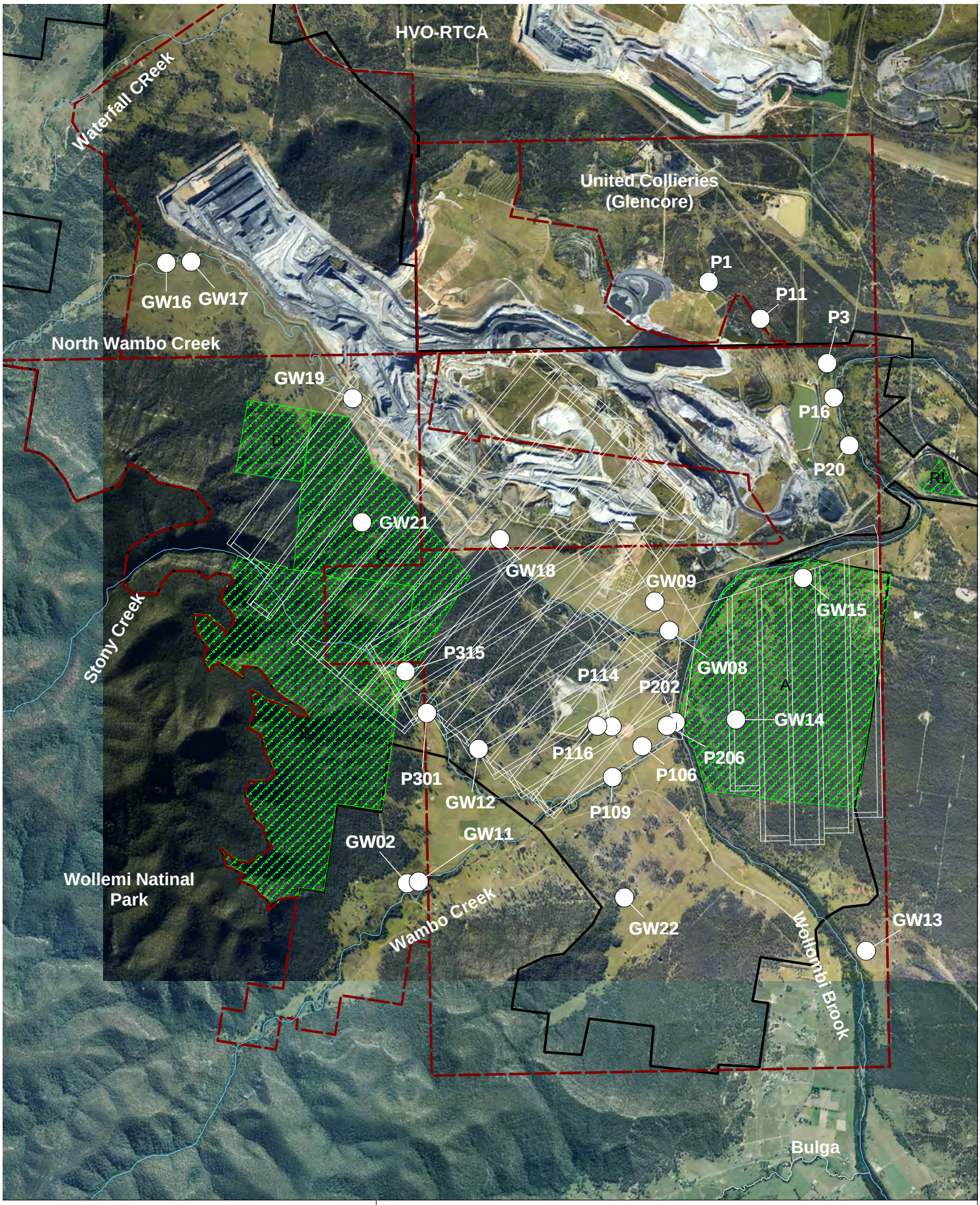
Wambo Coal Pty Ltd
Plan 4: Surface Water Monitoring Network

Peabody ENERGY

Date: 20/02/2015

Drawn by: TF
Approved by: TF

Projection: MGA 94 - Zone 56



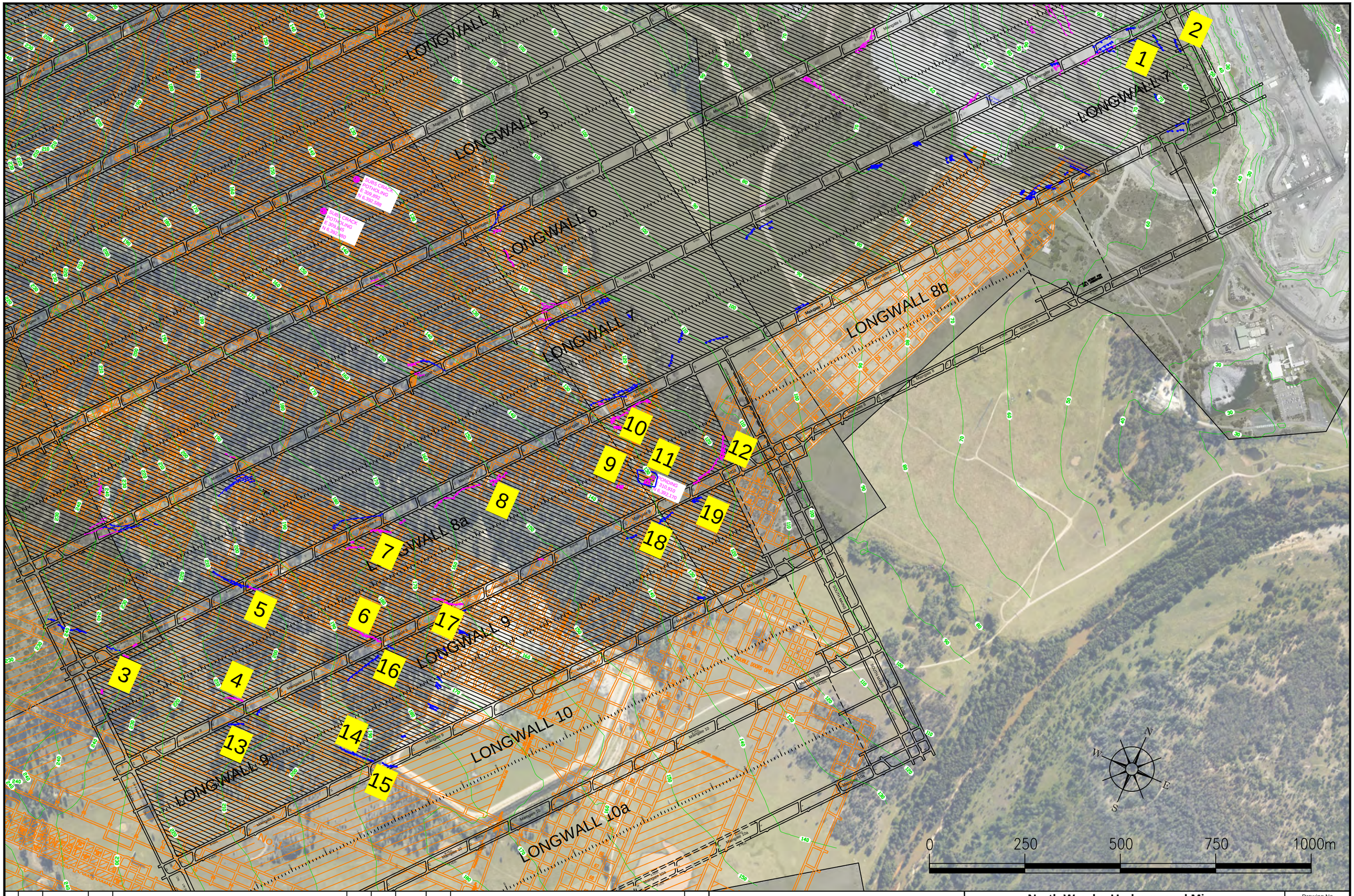
Wambo Coal Pty Ltd
Plan 5: Groundwater Monitoring Network

Peabody ENERGY

Date: 20/02/2015

Drawn by: TF
Approved by: TF

Projection: MGA 94 - Zone 56



REVISIONS									
REV.	DATE	BY	DESCRIPTION	CHK.	REV.	DATE	BY	DESCRIPTION	CHK.

WAMBO COAL PTY LIMITED
ABN 13 000 668 057
Jerry's Plains Rd, Warkworth
Via Singleton, NSW, 2330
Phone: 02 65 702200
Fax: 02 65 702290
Prepared by NWU Survey Ph: 02 65 702318

North Wambo Underground Mine
Subsidence Inspection Location Plan
AEMR 2014

Drawing No.	Revision No.	Date	Scale:	Drawn	Checked	Approved	Sheet Size
1485	A	26/2/2015	1:5,000	MJW	TF	TF	A3

2014 Site 2: Longwall 7 Active Face Cracking on old Opencut Rehab / Power line corridor (chainage 53)

2014 Site 4: Example of hard to find Longwall 8a start end minor Maingate cracking

2014 Site 5: Example of mid LW8a Maingate minor cracking

2014 Site 8: Example TG8a minor cracking on dewatering borehole access gravel road

2014 Site 9: Example TG8a minor compression hump on dewatering borehole access gravel road

2014 Site 10: Longwall 8a Tailgate cracking on North Wambo Creek access gravel road (chainage 340m).

2014 Site 11: MG8a Ponding at North Wambo Creek access gravel road

2014 Site 12: MG8a goaf edge cracking at PNWU06 near North Wambo Creek

2014 Site 14**: LW9 ch1200m – cracking observed at MG9 <80mm (on Old Homestead UG panel alignment)**

2014 Site 15**: LW9 ch1150m – minor MG9 cracking observed on South Dam SW Wall corner**

2014 Site 15**: LW9 ch1150m – view of dewatered South Dam SW Wall corner with minor cracking**

2014 Site 16**: TG9 ch1000 cracking aligned with old Homestead UG Goaf**

2014 Site 17**: TG7 cracking on South Dam Diversion bund**

2014 Site 18**: some minor TG9 cracking observed <20mm in gravel site road**

2014 Site 19**: some minor TG9 cracking observed <40mm in old power line easement**

Creeks

Mining Leases

Rehabilitation - 2014

Rehabilitation - 2015

N
W E
S

Wambo Coal Pty Ltd
Plan 7: Rehabilitation 2014 / 2015

Peabody ENERGY

Date: 20/02/2015

Drawn by: TF
Approved by: TF

Projection: MGA 94 - Zone 56

APPENDIX B

Summary of Environmental Incidents

NO	DATE RECEIVED	AREA RESPONSIBLE	CAT.	ISSUE	ACTION TAKEN
1	6/01/2014	CHPP / Rail	1	Hydrocarbon Spill - Rail loadout	• During night shift while loading JW980 an alarm input signal fault was identified on the hydraulic pack oil level. • On investigation it was found that there was quite a bit of oil near the cooling fan on the outside of the hydraulic room. It seems that the leak went into the fan throwing it around making it difficult to pinpoint the exact leak. • The feed valve to the fan was shut off and fan isolated. After adding some more oil to the tank, the pump was started to see if the leak had been isolated. There was no visible link around the area and the last 10 wagons were loaded while monitoring the area. • The spill had travelled down to the concrete below spill socks and dry sorb were used to stop any further travel. These were taken from the spill kit in the open store where the oil drums are kept. Hydraulic Pack has a capacity of 760 litres and low low alarm at approx. 18 per cent of the capacity (137L). Estimated loss of hydraulic oil in the range of 200 – 400 litres. • Fan isolated and technician to correct issue • Rail load out sump emptied with vacuum truck and transferred to tailings dam • Rail load out concrete area scraped and material take to open cut bioremediation area • Rail load out concrete area and pipes and baffles flushed and captured in sump – sump emptied with vacuum truck and transferred to tailings dam • Sump sludge and rail load out waste removed to open cut bioremediation. • Sediment trap fences replaced.
2	26/02/2014	Open Cut Workshop	1	Fuel Farm – Hydrocarbon Spill	• Pipes, gauges and valves feeding Waste Oil tank recently refurbished/replaced. New fittings placed into different locations, inadvertently removing breather valve • . It was estimated that 100L of waste oil spilled out of the tank. • Hydrocarbons contained in bunded area

NO	DATE RECEIVED	AREA RESPONSIBLE	CAT.	ISSUE	ACTION TAKEN
					• Training and tool box talk
3	10/03/2014	Technical Services (Water Infrastructure)	1	Drilling Sump overflow	• Water supply had been inadvertently restored. • This filled the storage tank, which then overflowed into the sump. • The sump then filled, overflowed, and water made its way down a drainage depression to the Catchment bund on the north-western edge of South Dam • Total water volumes approximated at 50000-70000L contained in catchment drain – no surface water flow • Sucker truck was assigned and water was removed from the drainage area and transferred to internal water storage dam.
4	8/04/2014	Technical Services (Water Infrastructure)	1	HRSTS Monitor Probe Failure	• Under the HRSTS/EPL 529, WCPL is required to monitor continuously throughout a discharge event, the pH and electrical conductivity (EC). • Wambo was not successful in obtaining continuous pH level readings at the discharge point as required under clause M2.3 of EPL 529 • A systems inspection procedure implemented to ensure that electrical and systems inspections are conducted on a regular basis and to ensure that calibration checks are performed as per manufacturer's recommendations.
5	25/04/2014	Wambo	2	Discharge of Surface Water during Rain Event	• On Friday 25 April 2014 a rain event was recorded at the Wambo Mine Complex (WMC). • A total of 24.41mm of rain fell on the WMC on the 25 April 2014. • Importantly, between the hours of 07:30am to 09:25am a total of 24.17mm was recorded and • between 07:55am to 08:20am a total of 19.58mm was received at the WMC which resulted in significant surface water catchment and run-off. • Hales Crossing Sump (HCS) is located adjacent to the Wollombi Brook along the main entrance road to the WMC (Appendix B). The HCS receives surface water runoff from the adjacent entrance road and from the Rail Loading Facility • The over flow event when detected, lasted for approximately 1 to 2 hours. • The volume of water discharge is estimated to have been of between 45,000 to 60,000 given the size of the catchment area and rainfall event experienced.

NO	DATE RECEIVED	AREA RESPONSIBLE	CAT.	ISSUE	ACTION TAKEN
					• WCPL, as holder of Environment Protection Licence No.529 (EPL 529) in accordance with Part 5.7A of the Protection of the Environment Operations Act 1997 (POEO Act) and Part 3A of the Protection of the Environment Operations (General) Regulation 2009 (Regulation) reported the event to the relevant authorities (Table 2) as required under the Pollution Incident Response Management Plan (PIRMP). • Sump capacity increase • Dedicated diesel pump installation with float switch
6	14/05/2014	Open Cut	2	Blast Event – Fume	• The Blast was located within the approved Open Cut mining complex of the Wambo Coal Mine • Wednesday 14 May 2014 at 3:32pm. • One shot was fired: M20WWA3 • Number of community complaints received • Ongoing investigation with the NSW EPA
7	12/06/2014	Open Cut Workshop	1	Workshop – Waster Oil Spill	• Remondis waste oil truck was removing waste oil from workshop when truck overfilled causing a spillage. • approximately 50 litres • Waste oil was contained by the use of absorbent and oil drainage sump adjacent to the pad • Spill kits were evident at the location as well on the Remondis truck. Area of spill approximately 20 square meters. The spill was contained within a self bunded area • Review Remondis procedure for waste oil pick-up transport. Know how much volume is being pump from waste oil tanks and if the capacity of the truck storage tank is adequate. • Re-stock spill kits at re-fuelling farm. Contaminated absorbent taken bioremediation area and spill area requires wash down.
8	7/08/2014	Open Cut	1	Spill - HT 467 haul road	• Engine oil leak causing approximately 200 litres of engine oil to be spilt along haul road • Truck was shut down and workshop notified. Workshop supervisor inspected area • Area affected garded and any contaminated material was taken to bioremediation area
9	5/09/2014	Open Cut	1	Spill - 459 Dam Haul Road Steering Hose Failure	• Truck #459 was traveling towards the ROM when he felt the steering become unresponsive and the steering alarm light activate

NO	DATE RECEIVED	AREA RESPONSIBLE	CAT.	ISSUE	ACTION TAKEN
					• Inspection revealed the steering hose had ruptured from rubbing through on the belly plate. The spiral wrap was also found to be in a deteriorated state. • 30-50 litres. • Drysorb was placed on the spill. Spill areas was scrapped and material taken to bioremediation pad in the OC.
10	9/09/2014		1	Hydrocarbon Spill - Rail Load out	• Hydraulic failure of cooling system, approximately 30L of coolant. The spill had travelled down to the concrete below spill socks; dry sorb and coal overspill were used to stop any further travel. • Rail load out sump emptied with vacuum truck and transferred to tailings dam • Rail load out concrete area scraped and material returned to CHPP • Rail load out concrete area and pipes and baffles flushed and captured in sump – sump • Restock spill kit. Adequacy of cooling system being investigated.
11	27/10/2014	Open Cut Workshop	1	Waste Oil Spill on Access Road	• Oil spill at entry to carpark and on main road where a vehicle has rounded corner • Unknown vehicle • Affected areas degreased and pressure washed.
12	31/10/2014	Technical Services – Exploration Program	1	Unauthorised Vegetation Clearance	• Exploration drill pad access route disturbed • a grader has cleared between the first 100-300mm of ground surface of an old access/fire trail • Area was not cleared under and approved SDP • Area is being remediated • Area has been fenced off with security fencing • Training and education provided
13	7/11/2014	Wambo	1	Workshop Fuel Farm	• 795 filling with Banlaw boom when system tripped out • Operator in fuel truck moved to allow another truck to refuel • Drove away with hose still connected • Unknown quantity – contaminated soil removed

APPENDIX C

Wambo Coal Pty Ltd
Complaint Register - 2014 YTD

Number	Date (d/m/yr)	Complainant ID#	Type - Primary	Receiving Officer	Action Taken
1	4/02/2014	4	Blasting - Dust	David Rankin	No exceedance of Blasting criteria - Community member contacted - Advised that wind speed and wind direction within blasting guidelines.
2	10/03/2014	12	Noise	Troy Favell	Commnity complaint received via 24hr community Hotline - Caller complained of mine noise. Audio files requested and reveiwed. Prevailing winds from the nearest real time noise monitor (Wind Rose) were from the S/SE at 1.56m/sec. Community member resides south of monitor and is located close to neighbouring mine - Unable to determine exact source of background mine noise. Wambo operational team notified in daily meeting.
3	15/03/2014	12	Noise	Troy Favell	Community complaint received via 24hr community Hotline - Caller complained of mine noise. Audio files requested and reveiwed. Prevailing winds from the nearest real time noise monitor (Wind Rose) were from the North West. Community member resides south of monitor and is located close to neighbouring mine - Unable to determine exact source of background mine noise. Wambo operational team notified in daily meeting.
4	17/03/2014	12	Noise	Troy Favell	Commnity complaint received via 24hr community Hotline - Caller complained of mine noise. Audio files requested and reveiwed, no mine noise was detected from audio files. Prevailing winds from the nearest real time noise monitor (Wind Rose) were from the North. Community member resides south of monitor and is located close to neighbouring mine - Unable to determine exact source of background mine noise. Wambo operational team notified in daily meeting.
5	08/004/2014	1	Noise	Troy Favell	Real Time Audio files reviewed at the time of the complaint – background mine noise was detected at the time – audio files dominated by background noise of wildlife – OCE (B Crew), Barry Short was contacted at the time of the complaint – Digger 15 operating in Montrose Pit, no coal hauling out of South Bates – Weather conditions, 24hr Avg – (Wind Speed: 1.21m/sec – Wind Direction: 132.5, East, South East 24hr. 2 hr Avg (0.00m/sec) - Real Time monitoring results reviewed the following morning – real time audio was reviewed prior and after the time of the compliant – dominated by wildlife noise, low level audible mining background noise

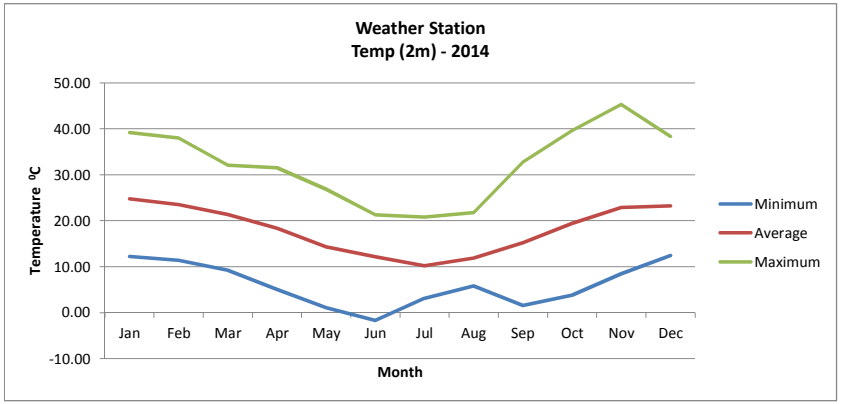
Number	Date (d/m/yr)	Complainant ID#	Type - Primary	Receiving Officer	Action Taken
6	21/04/2014	1	Noise	Troy Favell	Real Time Audio files reviewed at the time of the complaint – background mine noise was detected at the time – E &C Manager travelled to mine site to investigate noise complaint - arrived at Wambo mine at approx 19:30 on Monday 21 April 2014. confirmed mine noise emanating from Wambo Coal. Confirmation with OCE (Corey Arye– C Crew) confirmed that overburden dumping was taking place at an elevated position. Action was taken to move overburden dumping to a lower position in the pit.
7	23/04/2014	1	Lighting	Troy Favell	Lighting Plant complaint from community member - shining towards house - Contacted OCE on duty, requested that all lighting plant locations be reviwed and adjust accordingly so as lighting plant(s) are not focused towards the South / Sout West of mine operations - Commnutiy member contacted - review positions of lighting plants over the next week to ensure compliance
8	14/05/2014	6	Blast: Vibration	Troy Favell	Ongoing
9	14/05/2014	31	Blast: Fumes	Troy Favell	Ongoing
10	14/05/2014	3	Blast: Fumes	Troy Favell	Ongoing
11	14/05/2014	4	Blast: Fumes	Troy Favell	Ongoing
12	18/05/2014	1	Noise	Troy Favell	
13	20/05/2014	1	Lighting	Troy Favell	Contacted resident - called Open Cut operations and spoke with OCE - investigate and remove lighting source/plant
14	23/06/2014		Blast - Vibration	Troy Favell	Responded to caller - no exceedance of criteria limits - relayed to Blasting operations personnel
15	19/06/2014		Blast - Vibration	Troy Favell	Responded to caller - no exceedance of criteria limits - relayed to Blasting operations personnel
16	30/06/2014		Lighting	Troy Favell	Contacted resident - called Open Cut operations and spoke with OCE - investigate and remove lighting source/plant
17	27/06/2014		Lighting	Troy Favell	Contacted resident - called Open Cut operations and spoke with OCE - investigate and remove lighting source/plant - rasie issue of correct placement and procedure.
18	27/06/2014		Blast - Vibration	Troy Favell	Responded to caller - no exceedance of criteria limits - relayed to Blasting operations personnel
19	31/07/2014	1	Lighting	Troy Favell	Contacted resident directly - Called OCE, investigated and remove lighting plant
20	4/08/2014	32	Noise	Troy Favell - EPA Hotline	Noise complaint received through EPA Hotline - Responded to EPA Officer with details of noise results - Engaged additional Attended noise monitoring throughout August 2014

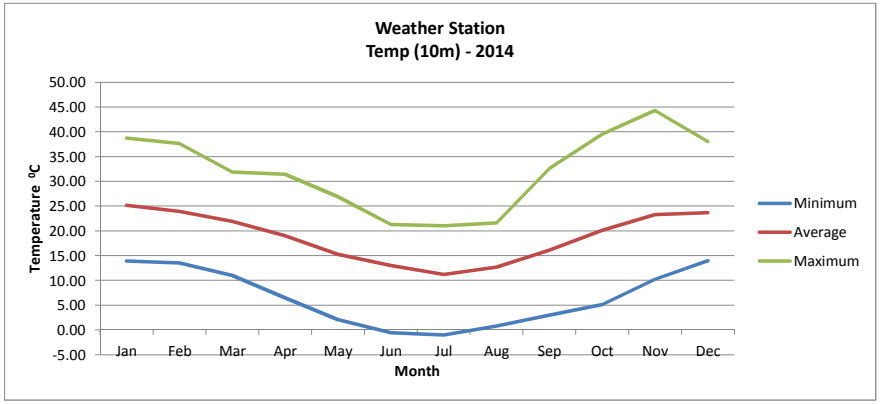
Number	Date (d/m/yr)	Complainant ID#	Type - Primary	Receiving Officer	Action Taken
21	16/08/2014	32	Noise	Troy Favell - EPA Hotline	Noise complaint received through EPA Hotline - Responded to EPA Officer with details of noise results
22	18/08/2014	32	Blast - Vibration	Troy Favell - EPA Hotline	Blast complaint received through EPA Hotline - vibraiton from blast event - forwarded Blast results to EPA - No exceedance to criteria limits
23	18/08/2014	28	Blast - Vibration	Troy Favell	Blast complaint received from Community -spoke with community member - vibraiton from blast event - forwarded Blast results to resident - No exceedance to criteria limits.
24	23/09/2012	1	Noise	Troy Favell	Noise complaint received through EPA Hotline. No exceedance to criteria limits. Complainant contacted.
25	29/09/2014	33	Blast - Vibration	Troy Favell	Blast complaint received from Community -spoke with community member - vibration from blast event - No exceedance to criteria limits - Relayed to blasting operation personnel.
26	1/10/2014	33	Dust	Troy Favell	Blast complaint received from community - spoke with community member - change in wind direction resulting in high dust levels. Relayed to operation personnel.
27	1/10/2014	18	Blast	Troy Favell	Community complaint regaridng blast event at Wambo Coal - loud noise - No exceedance to virbation/overpressure criteria - Blasting Superintendent notified of complaint
28	3/10/2014	33	Dust	Troy Favell	Community complaint regaridng perceived levels of dust eminatting from Wambo Coal
29	3/10/2014	33	Noise	Troy Favell	Community complaint regarding general mine noise - audio files reviwed - mining operations notified of complaint
30	11/10/2014	30	Dust	Troy Favell	Community complaint regarding dust from Wambo operations whilst driving along Golden Highway - OCE / Operations contacted, no machinery operating ontop of ridge line - mitigation measures are in place for ridge line operations
31	11/10/2014	32	Dust	Troy Favell	Community complaint via EPA Hotline regarding dust from Wambo operations whilst driving along Golden Highway - OCE / Operations contacted, no machinery operating ontop of ridge line - mitigation measures are in place for ridge line operations

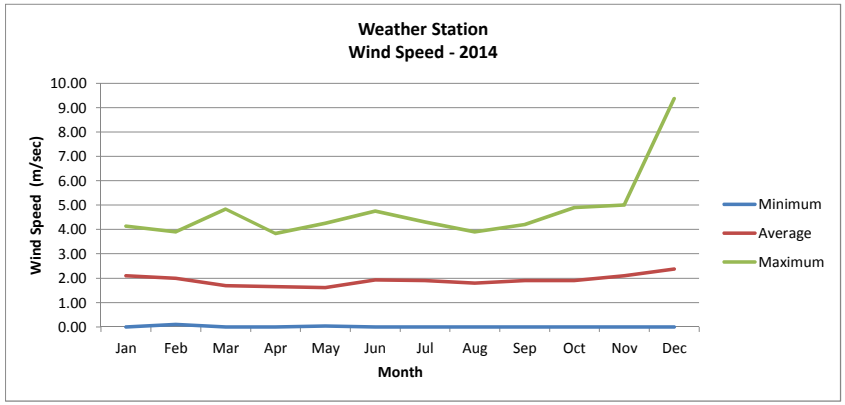
APPENDIX D

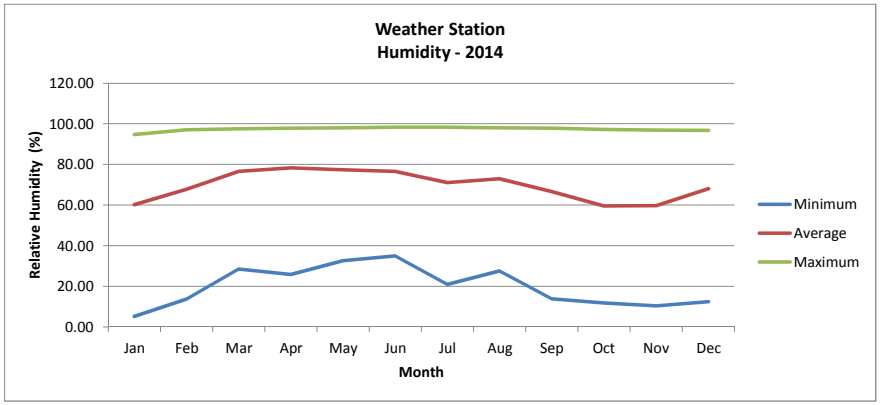
Wambo Coal Weather Summary - 2014

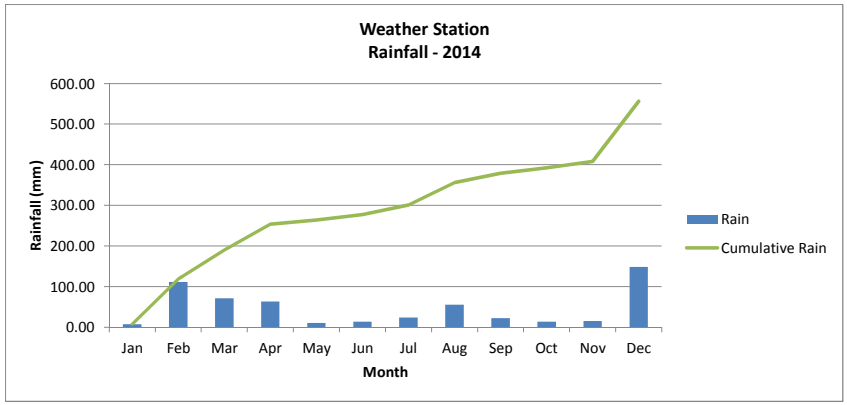
Month	Temperature (2m)			Temperature (10m)			Humidity			Wind Speed			Solar Radiation			Rain	Cumulative Rain	Evaporation	Cumulative Evaporation
	Minimum	Average	Maximum	Minimum	Average	Maximum	Minimum	Average	Maximum	Minimum	Average	Maximum	Minimum	Average	Maximum				
Jan	12.20	24.78	39.17	13.88	25.15	38.76	5.12	60.11	94.71	0.00	2.10	4.13	-1.64	259.16	1215.96	7.60	7.60	309.60	309.60
Feb	11.40	23.50	38.00	13.50	23.90	37.60	13.70	67.70	97.10	0.10	2.00	3.90	-1.66	209.52	1130.76	111.40	119.00	238.70	548.30
Mar	9.26	21.34	32.09	11.01	21.94	31.84	28.56	76.64	97.55	0.00	1.69	4.83	-1.70	169.16	1150.55	71.10	190.10	216.40	764.70
Apr	5.06	18.36	31.52	6.47	19.01	31.42	25.85	78.31	97.93	0.00	1.66	3.84	-3.08	142.26	888.71	63.50	253.60	182.80	947.50
May	1.07	14.34	26.87	2.11	15.28	26.90	32.67	77.40	98.02	0.03	1.61	4.25	-2.36	128.82	811.62	10.24	263.84	171.60	1119.10
Jun	-1.71	12.16	21.25	-0.60	12.98	21.31	34.89	76.61	98.38	0.00	1.93	4.75	-2.16	104.95	640.75	13.41	277.25	156.47	1275.57
Jul	3.10	10.20	20.80	-1.00	11.20	21.00	21.00	71.00	98.40	0.00	1.90	4.30	-2.60	117.40	721.80	24.00	301.25	145.10	1420.67
Aug	5.80	11.90	21.80	0.80	12.70	21.60	27.50	73.00	98.00	0.00	1.80	3.90	-2.70	131.60	903.20	55.20	356.45	175.10	1595.77
Sep	1.60	15.20	32.80	3.00	16.10	32.60	13.90	66.70	97.90	0.00	1.90	4.20	-3.20	194.20	1007.20	22.10	378.55	219.50	1815.27
Oct	3.80	19.40	39.60	5.10	20.10	39.50	11.80	59.60	97.20	0.00	1.90	4.90	-2.30	231.20	1116.70	13.90	392.45	265.40	2080.67
Nov	8.50	22.90	45.30	10.20	23.30	44.30	10.40	59.70	96.90	0.00	2.10	5.00	-2.00	257.00	1277.60	15.40	407.85	295.10	2375.77
Dec	12.47	23.22	38.34	13.95	23.65	37.99	12.47	68.08	96.71	0.00	2.37	9.36	-1.79	238.56	1169.60	148.59	556.44	298.04	2673.81
Yearly	-1.71	18.11	45.30	13.95	23.65	37.99	5.12	69.57	98.40	0.00	1.91	9.36	-3.20	181.99	1277.60	556.44	556.44	2673.81	3092.41

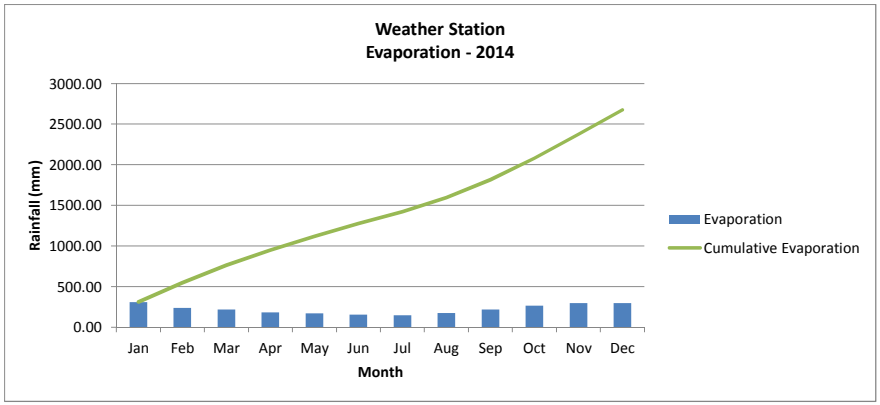


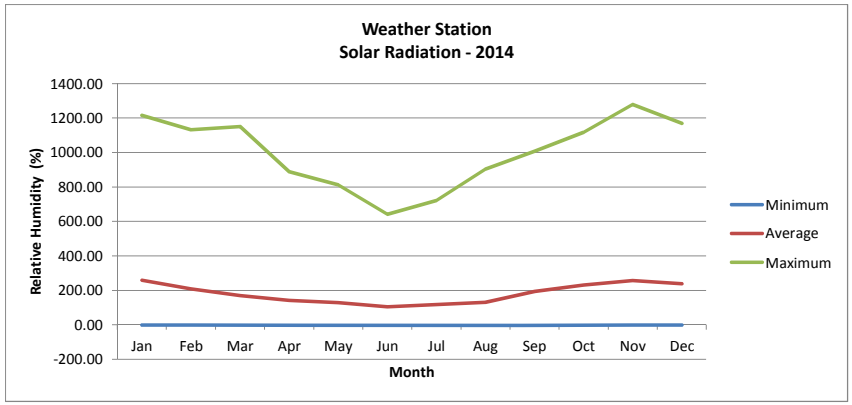


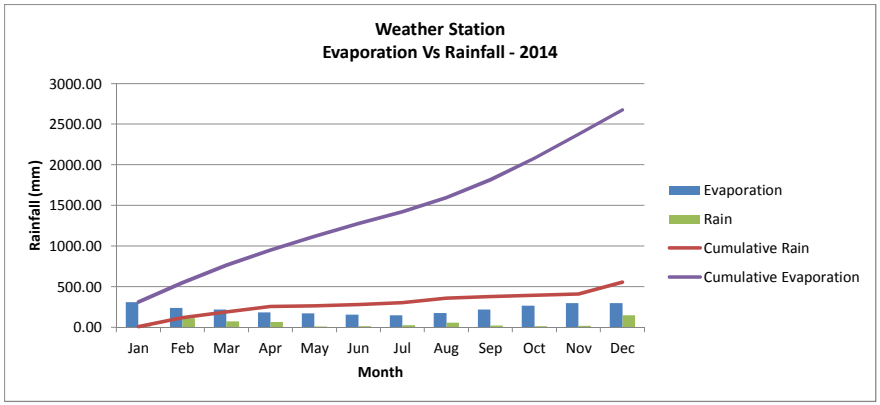





Weather Station
Rainfall - 2014
600.00
500.00
400.00
300.00
200.00
100.00
0.00
Rainfall (mm)
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month
Rain
Cumulative Rain


Weather Station
Evaporation - 2014
3000.00
2500.00
2000.00
1500.00
1000.00
500.00
0.00
Rainfall (mm)
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month
Evaporation
Cumulative Evaporation


Weather Station
Solar Radiation - 2014
1400.00
1200.00
1000.00
800.00
600.00
400.00
200.00
0.00
-200.00
Relative Humidity (%)
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month
Minimum
Average
Maximum


Weather Station
Evaporation Vs Rainfall - 2014
3000.00
2500.00
2000.00
1500.00
1000.00
500.00
0.00
Rainfall (mm)
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month
Evaporation
Rain
Cumulative Rain
Cumulative Evaporation

APPENDIX E

Wambo Coal Mine
Annual Report

Environmental Noise Monitoring

1 January 2014 to 31 December 2014

Prepared for

Wambo Coal Pty Limited

Global Acoustics

Noise and Vibration Analysis and Solutions

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ABN 94 094 985 734

Wambo Coal Mine – Annual Report

Environmental Noise Monitoring
1 January 2014 to 31 December 2014

Reference: 15071_R01
Report date: 27 February 2015

Prepared for
Wambo Coal Pty Limited
PMB 1
Singleton NSW 2330

Prepared by
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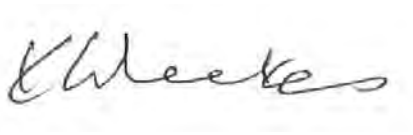

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Global Acoustics Pty Ltd ~ Environmental noise modelling and impact assessment ~ Sound power testing ~ Noise control advice ~ Noise and vibration monitoring ~ OHS noise monitoring and advice ~ Expert evidence in Land and Environment and Compensation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

EXECUTIVE SUMMARY

Global Acoustics was engaged by Wambo Coal Pty Ltd to provide a summary of the quarterly environmental noise surveys conducted around Wambo Coal Mine (WCM), and the Wambo Coal Rail Spur (WCRS) from 1 January 2014 to 31 December 2014. The mine and spur operate under separate development consents and have been monitored separately. Reporting, however, has been combined in this document.

WCM was granted consent (DA 305-7-2003) in February 2004, which enables the extension of current open cut and underground mining operations. The latest modification to this consent was approved in December 2012.

The WCRS consists of two Development Applications (DA's):

- The Wambo Rail Loop (DA 177-8-2004); and
- The Wambo Rail Line (DA 235/97).

The relevant sections of these consents are reproduced in Appendix A.

The *Wambo Coal Environmental Management System, Noise Monitoring Programme* (Document Draft, EMP008, September 2013) was prepared in accordance with Schedule 4 of both consents. The Noise Monitoring Programme indicates that monitoring will be conducted for WCM and WCRS activities, and the noise levels to be used for assessment.

Attended environmental noise monitoring described in this report was undertaken three nights per quarter at four sites during Quarters 1, 2, 3, and 4, 2014. The survey purpose is to quantify and describe the existing acoustic environment around WCM and WCRS and compare results with relevant development consent conditions.

Noise levels from WCM and WCRS complied with relevant criteria at all sites during the attended noise monitoring.

It is noted that wind speeds and/or temperature inversion conditions were at levels greater than which development consent conditions would apply for WCM and WCRS activities in some instances.

Global Acoustics Pty Ltd

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1 INTRODUCTION

1.1 Background

Global Acoustics was engaged by Wambo Coal Pty Ltd to provide a summary of the quarterly environmental noise surveys conducted around Wambo Coal Mine (WCM), and the Wambo Coal Rail Spur (WCRS) from 1 January 2014 to 31 December 2014. The mine and spur operate under separate development consents and have been monitored separately. Reporting, however, has been combined in this document.

Wambo Coal operates both open cut and underground mining operations from their mine at Warkworth, NSW. The open cut operations include use of heavy mobile equipment in open cut pits, on haul roads and on waste rock emplacements. The underground operations have surface facilities. Both operations utilise a coal handling and preparation plant (CHPP) including conveyors, bins and other material-handling infrastructure.

The WCRS is located between Mt Thorley and Warkworth Village, New South Wales (as shown in Figure 1) and includes the following components:

- a product coal stockpile and reclaim area, product coal conveyor, train loadout bin, rail loop and a rail spur from the Wambo Coal Mine to Mount Thorley; and
- rail transport of product coal to the market, an intermittent activity that can take place at any time; and
- a locomotive refuelling facility.

A noise survey around both the WCM and the WCRS is required quarterly as detailed in the Noise Management Plan (NMP).

Attended environmental noise monitoring described in this report was undertaken three nights per quarter at four sites. Figure 1 shows the monitoring locations.

The survey purpose is to quantify and describe the existing acoustic environment around WCM and WCRS and compare results with relevant limits.

1.2 Monitoring Locations & Frequency

Attended noise monitoring was conducted at a total of four locations for WCM and the WCRS. Table 1.1 outlines the monitor type and frequency for the noise monitoring locations shown in Figure 1.

Table 1.1: WAMBO COAL MONITORING LOCATIONS & FREQUENCY[1]

Site Reference	Site Location	Monitor Type	Consent Requirements	Frequency [1]
N01	*Lambkin Residence*	Attended	Mine Development Consents	Quarterly
N03	*Kelly Residence*	Real-time & Attended	Mine and Rail Spur Development Consent	Continuous & Quarterly
N16	*Muller Residence*	Real-time & Attended	Mine Development Consent	Continuous & Quarterly
N20	Thelander Residence	Real-time	Mine Development Consent	Continuous
N21	Wambo South Residence	Real-time	Mine Development Consent	Continuous
N23	*Redmanvale Road*	Attended	Mine Development Consent	Quarterly

Notes:

1. *Sourced from the Draft Wambo Coal Noise Monitoring Programme -EMP008, September 2013; and*
2. *Quarterly attended locations are shown in italics.*

While previous monitoring was undertaken on one day and night per quarter, it has been decided to adopt the new draft noise monitoring programme that specifies monitoring on three nights per quarter (once per month). This is a far more rigorous monitoring program than was previously undertaken.

Attended monitoring of the WCRS train refuelling facility is required at the nearest privately owned receptor (N03) one night per quarter as outlined in the draft noise monitoring programme, and the Wambo Rail Spur Development Consent (February 2012).

Sound power measurements were undertaken on the night of 26 February 2013 to ascertain refuelling noise levels. Calculations were then made which estimated a received noise level of 24 dB(A) at N03. This estimated received noise level is considered accurate regardless of meteorological conditions due to the refuelling facility's proximity to N03. Regular monitoring is not undertaken at N03, as it is unlikely that the received noise level will vary significantly. Should anything change with the procedure for refuelling, further monitoring will be undertaken to determine changes to received noise levels.

Wambo Coal attended noise monitoring locations
Source: Google Maps

Figure 1: Wambo Attended Noise Monitoring Sites

1.3 Terminology & Abbreviations

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

Table 1.2: TERMINOLOGY & ABBREVIATIONS

Descriptor	Definition
L_A	The A-weighted root mean squared (RMS) noise level at any instant
L_{A10}	The noise level which is exceeded for 10 percent of the time, which is approximately the average of the maximum noise levels
L_{A90}	The level exceeded for 90 percent of the time, which is approximately the average of the minimum noise levels. The L_{A90} level is often referred to as the "background" noise level and is commonly used to determine noise criteria for assessment purposes
L_{Aeq}	The average noise energy during a measurement period
dB(A)	Noise level measurement units are decibels (dB). The "A" weighting scale is used to describe human response to noise
SPL	Sound pressure level (SPL), fluctuations in pressure measured as 10 times a logarithmic scale, the reference pressure being 20 micropascals
SEL	Sound exposure level (SEL), the A-weighted noise energy during a measurement period normalised to one second
ABL	Assessment background level (ABL), the 10^{th} percentile background noise level for a single period (day, evening or night) of a 24 hour monitoring period
RBL	Rating background level (RBL), the background noise level for a period (day, evening or night) determined from ABL data
Hertz (Hz)	Cycles per second, the frequency of fluctuations in pressure, sound is usually a combination of many frequencies together
VTG	Vertical temperature gradient in degrees Celsius per 100 metres altitude. Estimated from wind speed and sigma theta data
SC	Stability Class. Estimated from wind speed and sigma theta data
Day	This is the period 7:00am to 6:00pm
Evening	This is the period 6:00pm to 10:00pm
Night	This is the period 10:00pm to 7:00am

2 DEVELOPMENT CONSENT

2.1 Wambo Coal Mine Development Consent

WCM was granted consent (DA 305-7-2003) in February 2004, which enables the extension of current open cut and underground mining operations. The latest modification to this consent was approved in December 2012. The relevant sections of this modification are reproduced in Appendix A.

The *Wambo Coal Environmental Management System, Noise Monitoring Programme* (Document Draft, EMP008, September 2013) was prepared in accordance with Schedule 4. The Noise Monitoring Programme indicates that monitoring will be conducted for WCM activities, and the noise levels to be used for assessment. Monitoring for noise from mining activities is undertaken at the properties numbered N01, N03, N16 and N23.

It should be noted that properties N01 and N03 are subject to acquisition upon request, as detailed in Schedule 4, Condition 1 of DA 305-7-2003. As such, there are no operational noise goals that apply directly to these properties.

Table 2.1 summarises relevant noise assessment criteria for WCM.

Table 2.1: WAMBO COAL MINE NOISE GOALS

Location	Day $L_{Aeq,15minute}$ dB	Evening / Night $L_{Aeq,15minute}$ dB	Night $L_{A1,1minute}$ dB
N01 [2]	NA	NA	NA
N03 [2]	NA	NA	NA
N16 [1]	35	40	50
N23 [1]	35	38	50

Notes:

1. *Criteria from Development Consent DA 305-7-2003; and*
2. *N01 and N03 are acquisition upon request and criteria are NA 'not applicable'.*

In accordance with the consent, the noise limits identified in Table 2.1 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 3ºC/100m, and wind speeds of up to 2 m/s at 10 metres above ground level.

2.2 Wambo Coal Rail Spur Development Consent

The WCRS consists of two Development Applications (DA's):

- The Wambo Rail Loop (DA 177-8-2004), modified in February 2012 to include a rail refuelling facility; and
- The Wambo Rail Line (DA 235/97).

The *Wambo Coal Environmental Management System, Noise Monitoring Programme* (Document Draft, EMP008, September 2013) was prepared in accordance with Schedule 4. The Noise Monitoring Programme indicates that monitoring will be conducted for WCRS activities, and the noise levels to be used for assessment. The relevant section of the consents is reproduced in Appendix A.

Monitoring for noise from rail activities has previously been undertaken at properties numbered N01, N22 and N24 each quarter and at N25 every fifth quarter for rail pass-by noise. An adjacent coal mine has purchased N22 and monitoring is no longer undertaken here. Locations N24 and N25 have been removed from the monitoring program following long-term demonstrated compliance. Monitoring is still undertaken at N01 as part of the mine consent, however, monitoring of the rail activities is no longer required. As detailed in the Draft NMP, monitoring at these locations will recommence following any complaints or if there is a change in rolling stock.

It should be noted that properties N01 are subject to acquisition upon request, as detailed in Schedule 4, Condition 1 of DA 305-7-2003. As such, there are no operational noise goals that apply directly to this property.

Following the modification to DA 177-8-2004 to include a rail refuelling facility, monitoring of this activity was assessed at the nearest privately owned residence (N03). Sound power measurements were undertaken on the night of 26 February 2013 to ascertain refuelling noise levels. Calculations were then made which estimate a received noise level of L_{Aeq} 24 dB at N03. This estimated received noise level is considered accurate regardless of meteorological conditions due to the refuelling facility's proximity to N03. Regular monitoring is no longer undertaken at N03, as it is unlikely that the received noise level will vary significantly. Should anything change with the procedure for refuelling, further monitoring will be undertaken to determine changes to received noise levels.

2.3 INP Modifying Factors

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

As detailed in L4.3 of the EPL:

> *The modification factors in Section 4 of the NSW Industrial Noise Policy shall also be applied to the measured noise levels where applicable.*

2.3.1 Tonality, Intermittent and Impulsive Noise

As defined in the Industrial Noise Policy:

> *Tonal noise contains a prominent frequency and is characterised by a definite pitch.*
>
> *Impulsive noise has high peaks of short duration and a sequence of such peaks.*
>
> *Intermittent noise is characterised by the level suddenly dropping to the background noise levels several times during a measurement, with a noticeable change in noise level of at least 5 dB. Intermittent noise applies to night-time only.*

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

2.3.2 Low Frequency Noise

INP Method

As defined in the Industrial Noise Policy:

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

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

Broner Method

Low frequency noise can also be assessed using the method specified in the paper *"A Simple Method for Low Frequency Noise Emission Assessment"* (Broner JLFNV Vol29-1 pp1-14 2010). If the total predicted C-weighted noise level (up to 250 Hz) at a receptor exceeds the relevant modifying factor trigger, a 5 dB penalty (modifying factor) is added to predicted levels. This method is included to provide a comparison with the INP method.

Low frequency assessment methods are detailed in Table 2.2.

Table 2.2: LOW FREQUENCY ASSESSMENT METHODS AND MODIFYING FACTOR TRIGGERS

Method	Calculation Method	Night Period Modifying Factor Trigger	Day Period Modifying Factor Trigger
Broner, 2010	L_{Ceq} to 250 Hz	>60	>65
INP, total	Total L_{Ceq} minus L_{Aeq}	>=15	>=15

The EPA is currently undertaking a review of the assessment of low frequency noise. While a practice note is not yet available, low frequency noise results from WCM have been compared to a range of assessment methods and criteria presented above above, when considering applicability of low frequency modifying factor corrections.

3 METHODOLOGY

3.1 Assessment Method

3.1.1 Overview

Noise monitoring was conducted at the nearest residences in accordance with the Environment Protection Authority (EPA) 'Industrial Noise Policy' (INP) guidelines and Australian Standard AS 1055 'Acoustics, Description and Measurement of Environmental Noise'. The mine was operating for all monitoring.

A measurement of $L_{A1,1minute}$ corresponds to the highest noise level generated for 0.6 second during one minute. In practical terms this is the highest noise level emitted from the Wambo Coal noise source during the entire measurement period (i.e. the highest level of the worst minute during the 15-minute measurement).

As indicated in the consent conditions, the $L_{A1,1minute}$ measurement should be undertaken at 1 metre from the dwelling façade and the $L_{Aeq,15minute}$ measurement within 30 metres of the dwelling. However, the direct measurement of noise at 1 metre from the façade is not practical during monitoring for this project. In most cases, monitoring near the residence is impractical due to barking dogs or issues with obtaining access. In all cases, measurements for this survey were undertaken at a suitable and representative location.

Meteorological data was obtained from the Wambo Coal Mine meteorological station. This allowed correlation of atmospheric parameters and measured noise levels. Ground level atmospheric condition measurement was also undertaken during attended monitoring.

3.1.2 Attended Noise Monitoring

Attended noise monitoring was conducted at all sites during night hours. Monitoring was not conducted in the evening period, as consent limits are the same for evening and night periods, and night time monitoring is considered a more suitable time to measure the source of interest. The duration of all measurements was 15 minutes.

Attended monitoring is preferred to the use of loggers when determining compliance with prescribed limits; it allows an accurate determination of the contribution, if any, to measured noise levels by the source of interest (in this case WCM and / or WCRS).

The terms "Inaudible" (IA) and "Not Measurable" (NM) are used in this report. When site noise is noted as IA then there was no site noise at the monitoring location.

However, if site noise is noted as NM, this means some noise was audible but could not be quantified. This means that noise from the site was either very low, or, being masked by other noise that was relatively loud. In the former case (very low site levels) we consider it not necessary to attempt to accurately quantify site noise as it would be significantly less than any criterion and most unlikely to cause annoyance (and in many cases, to be even noticed).

If site noise were NM due to masking then we would employ methods as per the Industrial Noise Policy (e.g. measure closer and back calculate) to determine a value for reporting if deemed necessary. All site NM in this report are due to low absolute values.

Weather conditions were recorded at each location during each noise level measurement. Although the consent is not specific as to where the meteorological data should be sourced, information from WCM has been used as it is measured with an elevated anemometer as is required by the consent. The anemometer at WCM is not overly distant from the monitoring locations and is considered to be representative of the general area. Wind speeds measured at 10 metres above ground are usually higher than those measured closer to ground level. In accordance with consent conditions, noise criteria only apply in wind speeds up to 3 metres per second.

4 RESULTS

There were a total of four monitoring locations during this survey as listed in Table 1.1 and shown on Figure 1. As detailed previously in Table 1.1.

4.1 Quarter 1, 2014

4.1.1 Total Noise Levels

Noise levels measured at each location during attended 15 minute surveys are provided in Table 4.1.

Table 4.1: MEASURED NOISE LEVELS – QUARTER 1, 2014

Location	Start Date and Time	L_{A1} dB	L_{A10} dB	L_{Aeq} dB	L_{A90} dB
N01	09/01/2014 23:46	43	41	37	31
N03	09/01/2014 23:16	54	43	42	35
N16	09/01/2014 22:47	59	44	45	37
N23	09/01/2014 22:18	49	46	43	39
N01	24/02/2014 00:35	41	33	32	29
N03	23/02/2014 23:44	42	40	37	35
N16	23/02/2014 23:00	45	38	37	33
N23	23/02/2014 22:20	44	42	39	36
N01	30/03/2014 22:04	48	46	45	44
N03	30/03/2014 22:37	50	47	46	44
N16	30/03/2014 23:07	49	48	45	42
N23	30/03/2014 23:38	48	42	40	37

Notes:

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

4.1.2 Wambo Coal Mine Noise

Noise levels generated by activity at Wambo mine are shown in Table 4.2 and Table 4.3, where comparison of measured $L_{Aeq,15}$ minute and $L_{A1,1}$ minute levels for WCM is made with relevant noise goals.

Table 4.2: $L_{Aeq,15minute}$ GENERATED BY WCM AGAINST NOISE CRITERIA – QUARTER 1, 2014

Location	Start Date and Time	Wind Speed m/s	VTG[7] ^{0}C/100m	Criterion $L_{Aeq,15min}$ dB[1]	Criterion Applies? [3]	WCM $L_{Aeq,15min}$ dB [4,5]	Exceedance [6,8]
N01[2]	09/01/2014 23:46	2.0	0.5	NA	NA	IA	NA
N03[2]	09/01/2014 23:16	2.1	0.5	NA	NA	<30	NA
N16	09/01/2014 22:47	2.6	-1.0	40	Yes	IA	Nil
N23	09/01/2014 22:18	2.7	-1.0	38	Yes	IA	Nil
N01[2]	24/02/2014 00:35	1.7	3.0	NA	NA	IA	NA
N03[2]	23/02/2014 23:44	1.4	0.5	NA	NA	37	NA
N16	23/02/2014 23:00	2.4	-1.0	40	Yes	IA	Nil
N23	23/02/2014 22:20	1.7	-1.0	38	Yes	IA	Nil
N01[2]	30/03/2014 22:04	1.0	-1.0	NA	NA	IA	NA
N03[2]	30/03/2014 22:37	1.3	-1.0	NA	NA	46	NA
N16	30/03/2014 23:07	1.1	0.5	40	Yes	IA	Nil
N23	30/03/2014 23:38	1.2	0.5	38	Yes	IA	Nil

Notes:

1. *Development consent criterion;*
2. *Monitoring location is within Zone of Affectation, criterion not applicable (NA);*
3. *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^{0}C/100m, and wind speeds of up to 2 m/s at 10 metres above ground level.*
4. *Estimated or measured $L_{Aeq,15minute}$ attributed to WCM;*
5. *NM denotes WCM audible but not measurable, IA denotes inaudible;*
6. *NA in exceedance column means atmospheric conditions outside conditions specified in development consent and so criterion is not applicable;*
7. *Vertical temperature gradient (VTG) calculated using sigma theta values according to INP procedures; and*
8. *Bold and red text indicate an exceedance of relevant criterion.*

Table 4.3: $L_{A1,1minute}$ GENERATED BY WCM AGAINST NOISE CRITERIA – QUARTER 1, 2014

Location	Start Date and Time	Wind Speed m/s	VTG[7] ^{0}C/100m	Criterion $L_{A1,1min}$ dB[1]	Criterion Applies? [3]	WCM $L_{A1,1min}$ dB [4,5]	Exceedance [6,8]
N01[2]	09/01/2014 23:46	2.0	0.5	NA	NA	IA	NA
N03[2]	09/01/2014 23:16	2.1	0.5	NA	NA	<30	NA
N16	09/01/2014 22:47	2.6	-1.0	50	Yes	IA	Nil
N23	09/01/2014 22:18	2.7	-1.0	50	Yes	30	Nil
N01[2]	24/02/2014 00:35	1.7	3.0	NA	NA	IA	NA
N03[2]	23/02/2014 23:44	1.4	0.5	NA	NA	43	NA
N16	23/02/2014 23:00	2.4	-1.0	50	Yes	IA	Nil
N23	23/02/2014 22:20	1.7	-1.0	50	Yes	IA	Nil
N01[2]	30/03/2014 22:04	1.0	-1.0	NA	NA	IA	NA
N03[2]	30/03/2014 22:37	1.3	-1.0	NA	NA	53	NA
N16	30/03/2014 23:07	1.1	0.5	50	Yes	IA	Nil
N23	30/03/2014 23:38	1.2	0.5	50	Yes	IA	Nil

Notes:

1. *Development consent criterion;*
2. *Monitoring location is within Zone of Affectation, criterion not applicable;*
3. *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^{0}C/100m, and wind speeds of up to 2 m/s at 10 metres above ground level.*
4. *Estimated or measured $L_{A1,1minute}$ attributed to WCM;*
5. *NM denotes WCM audible but not measurable, IA denotes inaudible "-" denotes no criterion;*
6. *NA in exceedance column means atmospheric conditions outside conditions specified in development consent and so criterion is not applicable, or, there is no applicable criterion;*
7. *Vertical temperature gradient (VTG) calculated using sigma theta values according to INP procedures; and*
8. *Bold and red text indicate an exceedance of relevant criterion.*

4.1.3 Low Frequency Assessment

Table 4.4 provides statistics for attended noise monitoring undertaken around WCM during Quarter 1, 2014.

Table 4.4: ATTENDED MEASUREMENT STATISTICS FOR WCM – QUARTER 1, 2014

Conditions	Total for Quarter 1, 2014
Number of measurements	12
Number of measurements where WCM was measurable and relevant criterion applied	0

None of the 12 measurements occurred during which WCM was measurable (not "inaudible" or "not measurable"), was within 5 dB of the relevant criterion and where meteorological conditions resulted in criteria applying (in accordance with the consent). No further assessment of low frequency noise is required.

4.2 Quarter 2, 2014

4.2.1 Total Noise Levels

Noise levels measured at each location during attended 15 minute surveys are provided in Table 4.5.

Table 4.5: MEASURED NOISE LEVELS – QUARTER 2, 2014

Location	Start Date and Time	L_{A1} dB	L_{A10} dB	L_{Aeq} dB	L_{A90} dB
N01	08/04/2014 23:40	49	48	47	46
N03	08/04/2014 23:00	45	41	39	36
N16	08/04/2014 22:29	45	43	41	39
N23	08/04/2014 22:00	41	40	39	37
N01	19/05/2014 23:50	37	36	34	33
N03	19/05/2014 23:10	69	54	60	44
N16	19/05/2014 22:32	61	48	47	21
N23	19/05/2014 22:00	38	31	27	18
N01	10/06/2014 23:50	48	44	41	37
N03	10/06/2014 23:13	52	51	50	49
N16	10/06/2014 22:37	46	41	38	35
N23	10/06/2014 22:07	50	47	43	38

Notes:

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

4.2.2 Wambo Coal Mine Noise

Noise levels generated by activity at Wambo mine are shown in Table 4.6 and Table 4.7, where comparison of measured $L_{Aeq,15minute}$ and $L_{A1,1minute}$ levels for WCM is made with relevant noise goals.

Table 4.6: $L_{Aeq,15minute}$ GENERATED BY WCM AGAINST NOISE CRITERIA – QUARTER 2, 2014

Location	Start Date and Time	Wind Speed m/s	VTG[7] ^{0}C/100m	Criterion $L_{Aeq,15min}$ dB[1]	Criterion Applies? [3]	WCM $L_{Aeq,15min}$ dB [4,5]	Exceedance [6,8]
N01[2]	08/04/2014 23:40	0.6	4.1	NA	NA	IA	NA
N03[2]	08/04/2014 23:00	0.4	4.1	NA	NA	31	NA
N16	08/04/2014 22:29	0.5	4.1	40	No	NM	NA
N23	08/04/2014 22:00	1.1	4.1	38	No	<30	NA
N01[2]	19/05/2014 23:50	0.9	4.1	NA	NA	<25	NA
N03[2]	19/05/2014 23:10	0.7	4.1	NA	NA	42	NA
N16	19/05/2014 22:32	1.0	4.1	40	No	IA	NA
N23	19/05/2014 22:00	0.0	4.1	38	No	IA	NA
N01[2]	10/06/2014 23:50	0.6	4.1	NA	NA	IA	NA
N03[2]	10/06/2014 23:13	0.1	4.1	NA	NA	50	NA
N16	10/06/2014 22:37	0.8	4.1	40	No	NM	NA
N23	10/06/2014 22:07	1.2	3.0	38	No	34	NA

Notes:

1. *Development consent criterion;*
2. *Monitoring location is within Zone of Affectation, criterion not applicable (NA);*
3. *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^{0}C/100m, and wind speeds of up to 2 m/s at 10 metres above ground level.*
4. *Estimated or measured $L_{Aeq,15minute}$ attributed to WCM;*
5. *NM denotes WCM audible but not measurable, IA denotes inaudible;*
6. *NA in exceedance column means atmospheric conditions outside conditions specified in development consent and so criterion is not applicable;*
7. *Vertical temperature gradient (VTG) calculated using sigma theta values according to INP procedures; and*
8. *Bold and red text indicate an exceedance of relevant criterion.*

Table 4.7: $L_{A1,1minute}$ GENERATED BY WCM AGAINST NOISE CRITERIA – QUARTER 2, 2014

Location	Start Date and Time	Wind Speed m/s	VTG[7] ^{0}C/100m	Criterion $L_{A1,1min}$ dB[1]	Criterion Applies? [3]	WCM $L_{A1,1min}$ dB [4,5]	Exceedance [6,8]
N01[2]	08/04/2014 23:40	0.6	4.1	NA	NA	IA	NA
N03[2]	08/04/2014 23:00	0.4	4.1	NA	NA	40	NA
N16	08/04/2014 22:29	0.5	4.1	50	No	NM	NA
N23	08/04/2014 22:00	1.1	4.1	50	No	30	NA
N01[2]	19/05/2014 23:50	0.9	4.1	NA	NA	32	NA
N03[2]	19/05/2014 23:10	0.7	4.1	NA	NA	45	NA
N16	19/05/2014 22:32	1.0	4.1	50	No	IA	NA
N23	19/05/2014 22:00	0.0	4.1	50	No	IA	NA
N01[2]	10/06/2014 23:50	0.6	4.1	NA	NA	IA	NA
N03[2]	10/06/2014 23:13	0.1	4.1	NA	NA	53	NA
N16	10/06/2014 22:37	0.8	4.1	50	No	NM	NA
N23	10/06/2014 22:07	1.2	3.0	50	No	38	NA

Notes:

1. *Development consent criterion;*
2. *Monitoring location is within Zone of Affectation, criterion not applicable;*
3. *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^{0}C/100m, and wind speeds of up to 2 m/s at 10 metres above ground level.*
4. *Estimated or measured $L_{A1,1minute}$ attributed to WCM;*
5. *NM denotes WCM audible but not measurable, IA denotes inaudible "-" denotes no criterion;*
6. *NA in exceedance column means atmospheric conditions outside conditions specified in development consent and so criterion is not applicable, or, there is no applicable criterion;*
7. *Vertical temperature gradient (VTG) calculated using sigma theta values according to INP procedures; and*
8. *Bold and red text indicate an exceedance of relevant criterion.*

4.2.3 Low Frequency Assessment

Table 4.8 provides statistics for attended noise monitoring undertaken around WCM during Quarter 2, 2014.

Table 4.8: ATTENDED MEASUREMENT STATISTICS FOR WCM – QUARTER 2, 2014

Conditions	Total for Quarter 2, 2014
Number of measurements	12
Number of measurements where WCM was measurable and relevant criterion applied	0

None of the 12 measurements occurred during which WCM was measurable (not "inaudible" or "not measurable"), was within 5 dB of the relevant criterion and where meteorological conditions resulted in criteria applying (in accordance with the consent). No further assessment of low frequency noise is required.

4.3 Quarter 3, 2014

4.3.1 Total Noise Levels

Noise levels measured at each location during attended 15 minute surveys are provided in Table 4.9.

Table 4.9: MEASURED NOISE LEVELS – QUARTER 3, 2014

Location	Start Date and Time	L_{A1} dB	L_{A10} dB	L_{Aeq} dB	L_{A90} dB
N01	02/07/2014 22:00	36	34	33	32
N03	02/07/2014 22:32	53	49	46	40
N16	02/07/2014 23:04	44	41	39	36
N23	02/07/2014 23:36	39	37	35	32
N01	20/08/2014 23:49	45	42	38	34
N03	20/08/2014 23:09	47	42	41	38
N16	20/08/2014 22:31	50	41	39	35
N23	20/08/2014 22:00	52	50	47	41
N01	10/09/2014 23:35	38	35	33	31
N03	10/09/2014 22:59	65	50	53	38
N16	10/09/2014 22:30	54	45	43	28
N23	10/09/2014 22:00	39	34	31	25

Notes:

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

4.3.2 Wambo Coal Mine Noise

Noise levels generated by activity at Wambo mine are shown in Table 4.10 and Table 4.11, where comparison of measured $L_{Aeq,15minute}$ and $L_{A1,1minute}$ levels for WCM is made with relevant noise goals.

Table 4.10: $L_{Aeq,15minute}$ GENERATED BY WCM AGAINST NOISE CRITERIA – QUARTER 3, 2014

Location	Start Date and Time	Wind Speed m/s	VTG[7] ^{0}C/100m	Criterion $L_{Aeq,15min}$ dB[1]	Criterion Applies? [3]	WCM $L_{Aeq,15min}$ dB [4,5]	Exceedance [6,8]
N01[2]	02/07/2014 22:00	0.0	4.1	NA	NA	32	NA
N03[2]	02/07/2014 22:32	0.0	4.1	NA	NA	40	NA
N16	02/07/2014 23:04	0.0	3.0	40	No	NM	NA
N23	02/07/2014 23:36	0.0	3.0	38	No	IA	NA
N01[2]	20/08/2014 23:49	1.4	-1.0	NA	NA	IA	NA
N03[2]	20/08/2014 23:09	1.2	0.5	NA	NA	40	NA
N16	20/08/2014 22:31	1.5	0.5	40	Yes	34	Nil
N23	20/08/2014 22:00	1.2	0.5	38	Yes	30	Nil
N01[2]	10/09/2014 23:35	0.2	4.1	NA	NA	<20	NA
N03[2]	10/09/2014 22:59	0.6	3.0	NA	NA	41	NA
N16	10/09/2014 22:30	1.2	0.5	40	Yes	<20	Nil
N23	10/09/2014 22:00	1.0	0.5	38	Yes	NM	Nil

Notes:

1. *Development consent criterion;*
2. *Monitoring location is within Zone of Affectation, criterion not applicable (NA);*
3. *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^{o}C/100m, and wind speeds of up to 2 m/s at 10 metres above ground level.*
4. *Estimated or measured $L_{Aeq,15minute}$ attributed to WCM;*
5. *NM denotes WCM audible but not measurable, IA denotes inaudible;*
6. *NA in exceedance column means atmospheric conditions outside conditions specified in development consent and so criterion is not applicable;*
7. *Vertical temperature gradient (VTG) calculated using sigma theta values according to INP procedures; and*
8. *Bold and red text indicate an exceedance of relevant criterion.*

Table 4.11: $L_{A1,1minute}$ GENERATED BY WCM AGAINST NOISE CRITERIA – QUARTER 3, 2014

Location	Start Date and Time	Wind Speed m/s	VTG[7] ^{0}C/100m	Criterion $L_{A1,1min}$ dB[1]	Criterion Applies? [3]	WCM $L_{A1,1min}$ dB [4,5]	Exceedance [6,8]
N01[2]	02/07/2014 22:00	0.0	4.1	NA	NA	32	NA
N03[2]	02/07/2014 22:32	0.0	4.1	NA	NA	40	NA
N16	02/07/2014 23:04	0.0	3.0	40	No	NM	NA
N23	02/07/2014 23:36	0.0	3.0	38	No	IA	NA
N01[2]	20/08/2014 23:49	1.4	-1.0	NA	NA	IA	NA
N03[2]	20/08/2014 23:09	1.2	0.5	NA	NA	40	NA
N16	20/08/2014 22:31	1.5	0.5	40	Yes	35	Nil
N23	20/08/2014 22:00	1.2	0.5	38	Yes	30	Nil
N01[2]	10/09/2014 23:35	0.2	4.1	NA	NA	<20	NA
N03[2]	10/09/2014 22:59	0.6	3.0	NA	NA	41	NA
N16	10/09/2014 22:30	1.2	0.5	40	Yes	<20	Nil
N23	10/09/2014 22:00	1.0	0.5	38	Yes	NM	Nil

Notes:

1. *Development consent criterion;*
2. *Monitoring location is within Zone of Affectation, criterion not applicable;*
3. *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^{0}C/100m, and wind speeds of up to 2 m/s at 10 metres above ground level.*
4. *Estimated or measured $L_{A1,1minute}$ attributed to WCM;*
5. *NM denotes WCM audible but not measurable, IA denotes inaudible "-" denotes no criterion;*
6. *NA in exceedance column means atmospheric conditions outside conditions specified in development consent and so criterion is not applicable, or, there is no applicable criterion;*
7. *Vertical temperature gradient (VTG) calculated using sigma theta values according to INP procedures; and*
8. *Bold and red text indicate an exceedance of relevant criterion.*

4.3.3 Low Frequency Assessment

Table 4.12 provides statistics for attended noise monitoring undertaken around WCM during Quarter 3, 2014.

Table 4.12: ATTENDED MEASUREMENT STATISTICS FOR WCM – QUARTER 3, 2014

Conditions	Total for Quarter 3, 2014
Number of measurements	12
Number of measurements where WCM was measurable and relevant criterion applied	0

None of the 12 measurements occurred during which WCM was measurable (not "inaudible" or "not measurable"), was within 5 dB of the relevant criterion and where meteorological conditions resulted in criteria applying (in accordance with the consent). No further assessment of low frequency noise is required.

4.4 Quarter 4, 2014

4.4.1 Total Noise Levels

Noise levels measured at each location during attended 15 minute surveys are provided in Table 4.13.

Table 4.13: MEASURED NOISE LEVELS – QUARTER 4, 2014

Location	Start Date and Time	L_{A1} dB	L_{A10} dB	L_{Aeq} dB	L_{A90} dB
N01	29/10/14 23:37	37	33	31	28
N03	29/10/14 23:00	51	47	45	41
N16	29/10/14 22:29	63	54	51	35
N23	29/10/14 22:00	41	39	36	32
N01	18/11/14 22:26	35	33	31	28
N03	18/11/14 23:03	48	43	41	36
N16	18/11/14 23:34	49	45	41	32
N23	19/11/14 00:08	37	31	31	27
N01	02/12/14 22:00	46	45	43	40
N03	02/12/14 22:32	50	45	44	41
N16	02/12/14 23:04	46	42	40	37
N23	02/12/14 23:30	47	42	40	38

Notes:

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

4.4.2 Wambo Coal Mine Noise

Noise levels generated by activity at Wambo mine are shown in Table 4.14 and Table 4.15, where comparison of measured $L_{Aeq,15minute}$ and $L_{A1,1minute}$ levels for WCM is made with relevant noise goals.

Table 4.14: $L_{Aeq,15minute}$ GENERATED BY WCM AGAINST NOISE CRITERIA – QUARTER 4, 2014

Location	Start Date and Time	Wind Speed m/s	VTG[7] ^{0}C/100m	Criterion $L_{Aeq,15min}$ dB[1]	Criterion Applies? [3]	WCM $L_{Aeq,15min}$ dB [4,5]	Exceedance [6,8]
N01[2]	29/10/14 23:37	3.0	-1.0	NA	NA	29	NA
N03[2]	29/10/14 23:00	2.9	0.5	NA	NA	44	NA
N16	29/10/14 22:29	3.8	-1.0	40	No	IA	NA
N23	29/10/14 22:00	4.5	-1.0	38	No	IA	NA
N01[2]	18/11/14 22:26	2.4	-1.0	NA	NA	IA	NA
N03[2]	18/11/14 23:03	1.0	-1.0	NA	NA	38	NA
N16	18/11/14 23:34	1.1	3.0	40	No	29	NA
N23	19/11/14 00:08	1.9	-1.0	38	Yes	25	Nil
N01[2]	02/12/14 22:00	1.7	0.5	NA	NA	IA	NA
N03[2]	02/12/14 22:32	1.7	0.5	NA	NA	43	NA
N16	02/12/14 23:04	1.1	0.5	40	Yes	IA	Nil
N23	02/12/14 23:30	1.5	0.5	38	Yes	IA	Nil

Notes:

1. *Development consent criterion;*
2. *Monitoring location is within Zone of Affectation, criterion not applicable (NA);*
3. *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^{o}C/100m, and wind speeds of up to 2 m/s at 10 metres above ground level.*
4. *Estimated or measured $L_{Aeq,15minute}$ attributed to WCM;*
5. *NM denotes WCM audible but not measurable, IA denotes inaudible;*
6. *NA in exceedance column means atmospheric conditions outside conditions specified in development consent and so criterion is not applicable;*
7. *Vertical temperature gradient (VTG) calculated using sigma theta values according to INP procedures; and*
8. *Bold and red text indicate an exceedance of relevant criterion.*

Table 4.15: $L_{A1,1minute}$ GENERATED BY WCM AGAINST NOISE CRITERIA – QUARTER 4, 2014

Location	Start Date and Time	Wind Speed m/s	VTG[7] ^{0}C/100m	Criterion $L_{A1,1min}$ dB[1]	Criterion Applies? [3]	WCM $L_{A1,1min}$ dB [4,5]	Exceedance [6,8]
N01[2]	29/10/14 23:37	3.0	-1.0	NA	NA	37	NA
N03[2]	29/10/14 23:00	2.9	0.5	NA	NA	56	NA
N16	29/10/14 22:29	3.8	-1.0	50	No	IA	NA
N23	29/10/14 22:00	4.5	-1.0	50	No	30	NA
N01[2]	18/11/14 22:26	2.4	-1.0	NA	NA	IA	NA
N03[2]	18/11/14 23:03	1.0	-1.0	NA	NA	44	NA
N16	18/11/14 23:34	1.1	3.0	50	No	40	NA
N23	19/11/14 00:08	1.9	-1.0	50	Yes	34	Nil
N01[2]	02/12/14 22:00	1.7	0.5	NA	NA	IA	NA
N03[2]	02/12/14 22:32	1.7	0.5	NA	NA	51	NA
N16	02/12/14 23:04	1.1	0.5	50	Yes	IA	Nil
N23	02/12/14 23:30	1.5	0.5	50	Yes	IA	Nil

Notes:

1. *Development consent criterion;*
2. *Monitoring location is within Zone of Affectation, criterion not applicable;*
3. *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^{0}C/100m, and wind speeds of up to 2 m/s at 10 metres above ground level.*
4. *Estimated or measured $L_{A1,1minute}$ attributed to WCM;*
5. *NM denotes WCM audible but not measurable, IA denotes inaudible "-" denotes no criterion;*
6. *NA in exceedance column means atmospheric conditions outside conditions specified in development consent and so criterion is not applicable, or, there is no applicable criterion;*
7. *Vertical temperature gradient (VTG) calculated using sigma theta values according to INP procedures; and*
8. *Bold and red text indicate an exceedance of relevant criterion.*

4.4.3 Low Frequency Assessment

Table 4.16 provides statistics for attended noise monitoring undertaken around WCM during Quarter 4, 2014.

Table 4.16: ATTENDED MEASUREMENT STATISTICS FOR WCM – QUARTER 4, 2014

Conditions	Total for Quarter 4, 2014
Number of measurements	12
Number of measurements where WCM was measurable and relevant criterion applied	0

None of the 12 measurements occurred during which WCM was measurable (not "inaudible" or "not measurable"), was within 5 dB of the relevant criterion and where meteorological conditions resulted in criteria applying (in accordance with the consent). No further assessment of low frequency noise is required.

4.5 Comparison with EIS

Predicted Year 9 operational noise levels from Table 5.4.1 of the EIS (June 2003) are reproduced for the monitoring locations during the night period only as shown in Table 4.17.

Table 4.17: WAMBO OPERATIONAL $L_{Aeq,15minute}$ dB EIS PREDICTIONS, YEAR 9

Location	Adverse SE Wind Summer, Autumn, Spring - Night	Adverse Inversion W Wind Winter - Night
N01, Lambkin	21	35
N03, Kelly	57 [3]	56 [3]
N16, Muller	37 [1]	25
N23, Redmanvale Road, Thelander	40 [2]	18

Source: Wambo EIS (June 2003)

Notes from Table 5.4.1 of EIS:

1. *Marginal Noise Management Zone 1 to 2 dBA above project specific criteria;*
2. *Moderate Noise Management Zone 3 to 5 dBA above project specific criteria; and*
3. *Noise Affectation Zone >5 dBA above project specific criteria.*

Table 3.2.3 of the EIS details applicable periods for predicted noise levels. This table has been reproduced below. It should be noted that data in Table 4.18 and Table 4.19 in this report detail the differences against predicted levels for the relevant seasons and periods. This comparison addresses wind speed, wind direction and temperature gradient. Air temperature and relative humidity have not been included in the comparison.

Table 3.2.3 Non-Adverse (Calm) and Adverse Noise Modelling Meteorological Parameters

Season	Period	Air Temp	Relative Humidity	Wind Velocity[1]	Temperature Gradient[1]
Non-Adverse Annual	Daytime	18°C	60%	0 m/s	0°C/100 m
Adverse Summer Autumn Spring	Evening and Night-time	12°C	75%	SE 3 m/s	0°C/100 m
Adverse Winter	Evening and Night-time	6°C	90%	W 2 m/s	3°C/100 m

Note 1: NSW INP (2000) default adverse wind speed 3 m/s and default inversion 3°C/100 m plus 2 m/s wind.

Source: Wambo EIS (June 2003)

4.5.1 Year 9 Comparison

Measured operational levels have been compared to the predicted levels for Year 9 in the EIS for the relevant meteorological conditions. In the tables below, a positive difference is where the measured level is greater than the predicted level and a negative difference is where the measured levels are less than the predicted level. Notation used in the tables to denote differences is irrespective of the integer value sign. For example, the notation >-17 means the values are more than 17 dB less than the predicted level.

Table 4.18 provides the difference between measured and predicted levels with 3 m/s winds from the SE during the night period in summer, autumn and spring.

Table 4.18: 2014 WAMBO OPERATIONAL $L_{Aeq,15minute}$ dB DIFFERENCE AGAINST PREDICTED SE WIND CONDITIONS – NIGHT, YEAR 9[4]

Location	Jan 14	Feb 14	Mar 14	Apr 14	May 14	Sep 14	Oct 14	Nov 14	Dec 14
N01, Lambkin	NR	NR	IA	NR	NR	NR	NR	IA	NR
N03, Kelly	NR	NR	NR	NR	NR	NR	NR	-19	NR
N16, Muller	IA	NR	NR	NR	NR	NR	IA [3]	NR	NR
N23, Redmanvale Road, Thelander	IA	NR	NR	NR	NR	NR	IA [3]	-15	NR

Notes:

1. *NR denotes met conditions not relevant, NA denotes not applicable, IA denotes conditions relevant but Wambo inaudible during monitoring, NM denotes conditions relevant but Wambo not measurable during monitoring;*
2. *SE wind conditions assumes winds at speeds between 0.1 and 3 m/s from a wind direction of 112.5 to 157.5 degrees during monitoring. Assumes no inversion conditions, ie the VTG is less than -0.5°C/100m (equivalent to stability categories A to D) during monitoring. All met data is taken from a height of 10 metres (meteorological station);*
3. *Conditions relevant, however, wind speeds (at 10 metres) greater than 3 metres per second during monitoring; and*
4. *Measurements during Summer, Autumn and Spring only.*

Table 4.19 provides the difference between measured and predicted levels with up to 2 m/s winds from the W and a 3 degree per 100 metre vertical temperature gradient (VTG) during the night period in winter.

Table 4.19: 2014 WAMBO OPERATIONAL $L_{Aeq,15minute}$ dB DIFFERENCE AGAINST PREDICTED SE WIND CONDITIONS - NIGHT, YEAR 9[4]

Location	June 14	July 14	August 14
N01, Lambkin	NR	-3	NR
N03, Kelly	NR	-16	NR
N16, Muller	NR	NM	NR
N23, Redmanvale Road, Thelander	NR	IA	NR

Notes:

1. *NR denotes met conditions not relevant, NA denotes not applicable, IA denotes conditions relevant but Wambo inaudible during monitoring, NM denotes conditions relevant but Wambo not measurable during monitoring;*
2. *W wind conditions assumes winds at speeds between 0.1 and 2 m/s from a wind direction of 247.5 to 292.5 degrees during monitoring. Inversion conditions assumes a 3°C/100m VTG during monitoring. All met data is taken from a height of 10 metres (meteorological station);*
3. *Conditions relevant, however, wind speeds (at 10 metres) greater than 3 metres per second during monitoring; and*
4. *Measurements during Winter only.*

As shown above, a comparison of predicted and measured levels from Wambo Year 9 operation varies greatly. This comparison does not take into account operational activities at the time of monitoring compared to predicted scenarios.

5 SUMMARY OF COMPLIANCE

Noise levels from WCM complied with the relevant criteria at all sites during 2014 attended monitoring.

There were no changes to train refuelling procedures so no monitoring for the WCRS was undertaken during 2014.

It is noted that wind speeds and/or temperature inversion conditions were at levels greater than which development consent conditions would apply for WCM activities in some instances.

Global Acoustics Pty Ltd

APPENDIX

A DEVELOPMENT CONSENT

A.1 WAMBO COAL MINE DEVELOPMENT CONSENT

A.1.1 Relevant Wambo Coal Mine Development Consent Conditions

The relevant sections of the December 2012 modified conditions are reproduced below:

SCHEDULE 4
SPECIFIC ENVIRONMENTAL CONDITIONS

ACQUISITION UPON REQUEST

1. Upon receiving a written request for acquisition from the landowner of the land listed in Table 1, the Applicant shall acquire the land in accordance with the procedures in conditions 9-11 of schedule 5:

2 – Lambkin	23A & B - Kannar
13C - Skinner	31A,B,C & D - Fisher
19A & B – Kelly	51 – Hawkes
22 – Henderson	56 - Haynes

Table 1: Land subject to acquisition upon request

Note: For more information on the numbering and identification of properties used in this consent, see Attachment 1 of the EIS for the Wambo Development Project.

[2]NOISE

Noise Impact Assessment Criteria

6. The Applicant shall ensure that the noise generated by the development does not exceed the noise impact assessment criteria presented in Table 9.

Day $L_{Aeq(15\ minute)}$	Evening/Night $L_{Aeq(15\ minute)}$	Night $L_{A1(1\ minute)}$	Land Number
35	41	50	94 – Curlewis
35	40	50	3 – Birrell 4B – Circosta 15B - McGowen/Caslick 16 – Cooper 23C – Kannar 25 – Fenwick 28A & B – Garland 33 -Thelander/O'Neill 39 – Northcote 40 – Muller 254A – Algie
35	39	50	5 – Strachan 6 - Merrick 7 - Maizey 37 - Lawry 48 - Ponder

35	38	50	1 - Brosi 17 - Carter 18 - Denney 38 - Williams 49 - Oliver 63 - Abrocuff 75 - Barnes 91 - Bailey
35	37	50	27 - Birralee 43 - Carmody 137 - Woodruff 163 - Rodger/Williams 246 - Bailey
35	36	50	13B - Skinner 178 - Smith 188 - Fuller 262A, B & C - Moses
35	35	50	All other residential or sensitive receptors, excluding the receptors listed in condition 1 above

Table 9: Noise impact assessment criteria dB(A))

Notes:

- *Noise generated by the Wambo Mining Complex is to be measured in accordance with the relevant requirements, and exemptions (including certain meteorological conditions), of the NSW Industrial Noise Policy*

Land Acquisition Criteria

7. If the noise generated by the Wambo Mining Complex exceeds the criteria in Table 10, the Applicant shall, upon receiving a written request for acquisition from the landowner, acquire the land in accordance with the procedures in conditions 9-11 of schedule 5.

Day/Evening/Night $L_{Aeq(15\ minute)}$	Property
43	94 - Curlewis 23C – Kannar 254A - Algie
40	All other residential or sensitive receptor, excluding the receptors listed in condition 1 above

Table 10: Land acquisition criteria dB(A)

Note: Noise generated by the Wambo Mining Complex is to be measured in accordance with the notes presented below Table 9 above.

Operating Conditions

8. The Applicant shall:
   (a) implement best management practice to minimise the operational, low frequency and traffic noise of the Wambo Mining Complex;
   (b) operate a comprehensive noise management system for the Wambo Mining Complex that uses a combination of predictive meteorological forecasting and real-time noise monitoring

data to guide the day to day planning of mining operations and the implementation of both proactive and reactive noise mitigation measures to ensure compliance with the relevant conditions of this consent;

(c) maintain the effectiveness of noise suppression equipment (if fitted) on plant at all times and ensure defective plant is not used operationally until fully repaired;

(d) ensure that noise attenuated plant (if used) is deployed preferentially in locations relevant to sensitive receivers;

(e) minimise the noise impacts of the Wambo Mining Complex during meteorological conditions when the noise limits in this consent do not apply;

(f) co-ordinate the noise management for the Wambo Mining Complex with the noise management at nearby mines (including HVO South, HVO North and Mt Thorley Warkworth mines) to minimise the cumulative noise impacts of these mines and the Wambo Mining Complex,

to the satisfaction of the Director-General.

Noise Management Plan

9. The Applicant shall prepare and implement a Noise Management Plan for the Wambo Mining Complex to the satisfaction of the Director-General. This plan must:

(a) be prepared in consultation with the EPA, and submitted to the Director-General for approval by the end of June 2013;

(b) describe the measures that would be implemented to ensure:

- best management practice is being employed;
- the noise impacts of the Wambo Mining Complex are minimised during meteorological conditions when the noise limits in this consent do not apply; and
- compliance with the relevant conditions of this consent;

(c) describe the proposed noise management system in detail;

(d) include a monitoring program that:

- uses a combination of real-time and supplementary attended monitoring measures to evaluate the performance of the Wambo Mining Complex;
- adequately supports the proactive and reactive noise management system for the Wambo Mining Complex;
- includes a protocol for determining exceedances of the relevant conditions in this consent;
- evaluates and reports on the effectiveness of the noise management system for the Wambo Mining Complex;
- provides for the annual validation of the noise model for the Wambo Mining Complex; and

(e) include a protocol that has been prepared in consultation with the owners of nearby mines (including HVO South, HVO North and Mount Thorley Warkworth mines) to minimise the cumulative noise impacts of these mines and the Wambo Mining Complex.

A.2 WAMBO RAIL SPUR DEVELOPMENT CONSENT

The relevant sections of the February 2012 modified conditions for the rail spur are reproduced below:

SCHEDULE 4
GENERAL ENVIRONMENTAL CONDITIONS

ACQUISITION UPON REQUEST

1. Upon receiving a written request for acquisition from the landowner of the land listed in Table 1, the Applicant shall acquire the land in accordance with the procedures in conditions 1-3 of schedule 5.

Table 1: Land subject to acquisition upon request

19 - L Kelly	55 - E & C Burley

Note: For more information on the numbering and identification of properties used in this consent, see Attachment 1A and Attachment 1B of the SEE for the Alterations to the Wambo Development Project – Rail and Train Loading Infrastructure.

2. While the land listed in Table 1 is privately owned, the Applicant shall implement all practicable measures to ensure that the impacts of the development comply with the predictions in the SEE, and the relevant conditions in this consent, at any residence on this land, to the satisfaction of the Director-General.

[1]NOISE

Noise Impact Assessment Criteria

3. The Applicant shall ensure that noise generated by the development, combined with noise generated by any development in the Wambo Mining Complex, does not exceed the noise criteria provided in Table 2, unless higher noise criteria are specified in the consent for the Wambo Coal Mine (DA 305-7-2003).

Table 2: Noise impact assessment criteria dB(A)

Day $L_{Aeq(15\ minute)}$	Evening/Night $L_{Aeq(15\ minute)}$	Night $L_{A1(1\ minute)}$	Land Number
35	35	50	All private residential or sensitive receptors, excluding the receptors listed in Table 1

Notes:
- *Noise generated by the project is to be measured in accordance with the relevant requirements, and exemptions (including certain meteorological conditions), of the NSW Industrial Noise Policy.*
- *For this condition to apply, the exceedance of the criteria must be systemic.*

Construction Hours

4. The Applicant shall ensure that all construction work is carried out from 7 am to 6 pm Monday to Saturday (inclusive) and 8 am to 6 pm Sundays and Public Holidays.

Operating Hours

5. The Applicant shall:
   (a) take all practicable measures to minimise train movements at the development on Friday evening (6 pm-9 pm) and Sunday morning (9 am-12 am);
   (b) report on the implementation and effectiveness of these measures,
   to the satisfaction of the Director-General.

Rail Noise

6. The Applicant shall seek to ensure that its rail spur is only accessed by locomotives that are approved to operate on the NSW rail network in accordance with noise limits L6.1 to L6.4 in RailCorp's EPL (No. 12208) and ARTC's EPL (No. 3142) or a Pollution Control Approval issued under the former *Pollution Control Act 1970*.

Noise Monitoring

7. The Applicant shall monitor the noise generated by the development, and noise generated by the Wambo Mine, in general accordance with the Noise Management Plan for the Wambo Mining Complex and the *NSW Industrial Noise Policy*.

7A. By 31 May 2012, the Applicant shall review and update the Noise Management Plan for the Wambo Mining Complex, including a noise monitoring protocol for evaluating compliance with the criteria in condition 3 above.

7B. During the first 12 months of operation of the Rail Refuelling Facility, the Applicant must conduct attended noise monitoring at the nearest private receptor during refuelling events, no less often than every three months.

A.3 WAMBO RAIL LINE DEVELOPMENT CONSENT

The relevant sections of the 1998 conditions for the rail line are reproduced below:

Operational Noise

8. The Applicant shall ensure noise emissions from the operations of the railway line when measured at any residence along the railway line corridor shall not exceed the following EPA criteria:

   (a) planning level of $L_{Aeq\ 24hr}$ 55dBA; and

   (b) maximum passby level of L_{Amax} 85dBA

   The noise criteria levels shall be measured under prevailing weather conditions in accordance with EPA requirements and to be consistent with EPA's requirements as applied to the New South Wales coal industry, or otherwise agreed to by the EPA.

9. Prior to the commencement of operations, the Applicant shall prepare in consultation with the EPA and Singleton Shire Council an Operational Noise Management Plan. The Operation Noise Management Plan shall demonstrate that all practical design and noise mitigation methods have been undertaken to achieve the noise levels specified in Condition 8.

APPENDIX F

7 Riverside Drive, Mayfield West NSW 2304 AUSTRALIA
Email mail@advitech.com.au Web www.advitech.com.au PO Box 207 Mayfield NSW 2304
Advitech Pty Limited t/a Advitech Environmental ABN 29 003 433 458 P 02 4924 5400 F 02 4967 3772

12 February, 2014

Wambo Coal Pty Ltd
PMB 1
Singleton, NSW 2330
AUSTRALIA

Attention: **Troy Favell**

Subject: **2014 AEMR Noise Summary**

Hi Troy,

Please find below a summary of continuous noise monitoring assessment for Wambo Coal Mine (WCM) for the period 1 January to 31 December, 2014.

January to March, 2014

Assessment of meteorological monitoring data for the January to March, 2014 monitoring period indicates that significant temperature inversions (F or G class) were observed in the receiving environment adjacent to WCM approximately 11% of the night monitoring period. Combinations of enhanced propagation through temperature inversion, and contributions from ambient environmental noise sources, led to measurement results above the criteria level at several monitoring locations.

The $L_{Aeq,period}$ results indicate that environmental noise (including road noise, frogs and gusting wind) dominate the night time noise environment. Mining noise impacts were observed at the N21 (WA) and N16 (Muller) monitoring locations; however, review of meteorological monitoring data indicates these results are likely to have been enhanced by temperature inversion. Environmental noise caused measured levels to exceed the criteria at the N20 (Thelander) monitoring location. No exceedence of the set criteria was measured at the N03 (Kelly) monitoring location during the assessment period.

April to June, 2014

Meteorological observations for the April to June, 2014 monitoring period were analysed to determine the occurrence of temperature inversions (F or G class stability). This analysis indicates that temperature inversions were found to occur in the receiving environment adjacent to WCM for approximately 30% of the night monitoring period. Enhanced noise propagation through temperature inversion, and contributions from ambient environmental noise sources lead to measurement results above the criteria level at several monitoring locations.

Analysis of recorded audio indicates that noise associated with mining operations typically contributed to background noise levels, rather than dominating the receiving noise environment. Seasonal environmental noise sources such as frog and insect activity in conjunction with road noise frequently contributed to noise levels above the criteria at the N16 (Muller) and N21 (WA) monitoring locations. Noise levels at the N20 (Thelander) and N03 (Kelly) monitoring locations did not exceed the performance criteria during the monitoring period. Where mining noise impacts were observed at the N21 (WA) and N16 (Muller) monitoring locations, a review of meteorological monitoring data indicates these results are likely to have been enhanced by temperature inversion.

July to September, 2014

To calculate the validity of recorded noise levels, meteorological monitoring data for the period July to September, 2014, was analysed for the occurrence of significant temperature inversions (F or G class). Results of this analysis indicate that significant temperature inversions were observed in the receiving environment adjacent to WCM for approximately 25% of the night monitoring period. Combinations of enhanced propagation through temperature inversions, and contributions from ambient environmental noise sources lead to measurement results above the criteria level at several monitoring locations.

Review of recorded audio indicated noise sources including gusting wind in conjunction with road noise contributed to results above the criteria level at the N16 (Muller), N20 (Thelander) and N21 (WA) monitoring locations. Noise levels at the N03 (Kelly) monitoring location did not exceed the performance criteria during the monitoring period. Mining noise was generally associated with background noise levels during this monitoring period.

The $L_{A1,1minute}$ results indicate that animal noise, transport and meteorological influences (gusting wind) dominate the L_{A1} noise environment. Mining activity was observed on 13 occasions during review of N21 (WA) $L_{A1,1minute}$ results. On 11 of these occasions, extraneous sources including frog calls contributed to the peak noise levels. Mining noise was observed on two occasions during review of N20 (Thelander) $L_{A1,1minute}$ results. The $L_{A1,1minute}$ noise environment at the N16 (Muller) is predominantly impacted by vehicles passing on the Golden Highway. Mine activities were not observed to contribute to measured $L_{A1,1minute}$ levels above the criteria at this lcoation. No $L_{A1,1minute}$ noise level was recorded above the sleep disturbance criteria at the N03 (Kelly) monitoring location as this property is within the zone of affectation.

October to December, 2014

Temperature inversions (F or G stability class) were observed to affect WCM for approximately 18% of the night monitoring period, between October to December, 2014. Enhanced noise propagation through temperature inversion, and contributions from ambient environmental noise sources led to measurement results above the criteria level on several monitoring occasions.

Analysis of audio recorded during October to December, 2014, indicates that noise associated with mining operations typically contributed to background noise levels, rather than dominating the receiving noise environment. Seasonal environmental noise sources such as gusting wind and livestock, and transportation sources such as road noise, frequently contributed to noise levels above the criteria at the N16 (Muller) and N21 (WA) monitoring locations. Mining noise impacts were observed at the N16 (Muller) and N21 (WA) monitoring locations on 14 December, 2014. A review of meteorological monitoring data indicates that these results are likely to have been enhanced by a temperature inversion. Noise levels at the N03 (Kelly) and N20 (Thelander) monitoring locations did not exceed the performance criteria during the monitoring period.

Please do not hesitate to contact me if you require any additional information

Yours faithfully,
Alex Knight

Environmental Scientist
Advitech Pty Limited

Enclosed:	AEMR (Noise) Summary, January – December 2014
Job No.:	J0140306
Folder No.:	F13639
Our Ref:	13639 WCM AEMR (Noise) Jan-Dec 2014 RevB.docx

APPENDIX G

Peabody Wambo Coal Blast Results
2014

				Homestead (BM01)		Kelly (BM02)		Muller (BM05)		Harris (BM03)		Thelander (BM07)	
Blast Number	Date	Time	Blast ID	Overpressure dB(L)	Vibration (mm/sec)	Overpressure dB(L)	Vibration (mm/sec)	Overpressure dB(L)	Vibration (mm/sec)	Overpressure dB(L)	Vibration (mm/sec)	Overpressure dB(L)	Vibration (mm/sec)
1	2/01/2014	11:07:00	M13WTA2	-	-	-	-	-	-	-	-	-	-
2	8/01/2014	11:09:00	BS2RCA1	106	1.72	98.7	0.31	103.7	0.14	105.6	0.6	105.8	0.16
3	10/01/2014	15:33:16	M13WTA3	97.3	0.19	92	0.22	100.9	0.33	96.4	0.17	102.4	0.39
4	15/01/2014	15:31:23	BS1WWD1	109.3	1.1	101	0.22	98.7	0.12	106.2	0.21	107.5	0.22
5	15/01/2014	14:40:21	M16WRA3	92.1	0.13	90.3	0.08	99.3	0.45	97.9	0.07	102.9	0.57
6	24/01/2014	13:09:00	M12WMA4	99.5	0.3	100	0.19	105.3	0.68	99.3	0.33	108	0.78
7	31/01/2014	11:07:00	M18WRA5	-	-	92	0.1	98.7	0.38	95.4	0.09	103.3	0.36
8	4/02/2014	11:07:00	BS5WWD1	105.3	2.44	102.5	0.34	99.3	0.17	102.4	0.58	103.7	0.2
9	6/02/2014	15:33:00	BS2WWD2	111	1.28	100.6	0.3	105.6	0.13	109.2	0.35	109.1	0.17
10	13/02/2014	15:45:00	BS5WWD3	114.3	0.91	106.1	0.18	99.3	0.1	109.2	0.33	102.9	0.18
11	13/02/2014	15:45:00	BS5WWA7	114.3	0.91	106.1	0.18	99.3	0.1	109.2	0.33	102.9	0.18
12	13/02/2014	16:06:00	M12WMA5	96.4	0.23	92.5	0.13	<115.0	<0.16	93.3	0.36	106.1	0.78
13	19/02/2014	15:32:19	M16WRA5	<115.0	<0.16	91.4	0.05	101.8	0.22	96.4	0.06	108.7	0.25
14	21/02/2014	11:03:47	BS2WWD3	103.2	0.62	96.3	0.23	98.1	0.1	102.8	0.2	97.7	0.12
15	5/03/2014	15:34:00	M16WRC1	<115.0	<0.16	97.2	0.13	100.4	0.91	105	0.17	100.9	0.72
16	7/03/2014	14:33:00	M16WRC1b	<115.0	<0.16	92.9	0.08	97.4	0.22	98.6	0.04	104.1	0.17
17	12/03/2014	15:39:45	BS5WWD4	107.4	1.73	105.3	0.31	98.7	0.21	108.6	0.63	99.1	0.24
18	12/03/2014	15:51:44	M14WTA1	<115.0	<0.16	89.6	0.06	96.6	0.29	97.9	0.06	98.4	0.21
19	20/03/2014	14:08:22	M13WTA4	93.9	0.32	92.9	0.18	104.1	0.53	99.3	0.16	105.1	0.36
20	25/03/2014	15:37:42	M19RCA1	<115.0	<0.16	97.2	0.05	103.4	0.26	99.3	0.16	107.5	0.24
21	2/04/2014	15:29:08	M13WTA4a	<115.0	<0.16	96.3	0.04	<115.0	<0.16	99.3	0.04	104.5	0.19
22	2/04/2014	15:36:11	M20WWA2	<115.0	<0.16	88.9	0.06	<115.0	<0.16	99.3	0.07	98.4	0.19
23	11/04/2014	15:31:44	M17WRA1	101.5	0.17	102	0.13	102	0.51	103	0.08	102	0.47
24	17/04/2014	11:04:14	BS5WWD5	110.4	1.23	102.6	0.24	96.3	0.12	<115.0	<0.16	96	0.15
25	24/04/2014	15:28:44	M17WRA2	97.9	0.05	96.4	0.1	100.8	0.31	102.7	0.08	100.4	0.26
26	29/04/2014	15:30:55	M19RCA2	<115.0	<0.16	0	0	94.7	0.25	99.7	0.05	93.9	0.19
27	1/05/2014	14:07:28	BS4WWA2	<115.0	<0.16	104.4	0.08	100.3	0.07	112.3	0.06	100.4	0.09
28	8/05/2014	11:03:56	M14WMA2	97.1	0.17	100.6	0.18	107.6	0.59	98.4	0.12	105.4	0.49
29	14/05/2014	15:31:37	M20WWA3	94	0.28	94.4	0.16	109.1	1.47	96.4	0.22	108.7	1.86
30	21/05/2014	11:05:00	B55WRA1	105.2	0.75	100.2	0.27	97	0.13	99.7	0.29	95.9	0.19
32	28/05/2014	15:30:00	M18WRA2	104	0.09	105.8	0.08	103	0.39	103.5	0.06	103.4	0.66
33	29/05/2014	15:29:00	BS5WW5a	121	0.61	105.5	0.11	<115.0	<0.16	112.7	0.13	100.9	0.43
34	6/06/2014	11:07:30	BS3WWD1	103.8	1.38	105.3	0.27	96.3	0.09	<115.0	<0.16	104.1	0.1
35	11/06/2014	14:14:59	BS3WWD1a	<115.0	<0.16	97.5	0.06	94.7	0.07	98.9	0.05	99.8	0.16
36	12/06/2014	14:03:00	M18WRA1	95.1	0.09	94.8	0.08	103	0.39	102.4	0.08	93.7	0.07
37	16/06/2014	14:06:00	M16WRC2	106.1	0.1	103.4	0.1	98.3	0.43	105.7	0.18	102.9	0.37
38	20/06/2014	13:58:00	M19WWA8, M20WWA4	107	0.18	106.1	0.53	111.7	0.61	114.5	0.12	99.8	0.36
39	27/06/2014	15:34:00	M15WTA1	110.2	0.14	100.2	0.14	102.7	0.88	103.8	0.14	108.5	0.56
40	4/07/2014	14:05:51	BS5WRA2	108.4	1.16	0	0	98.8	0.25	105.5	0.62	100.9	0.53
41	8/07/2014	14:37:32	M20WWAS	100	0.04	0	0	100.8	0.27	103	0.05	102.9	0.23

Peabody Wambo Coal Blast Results
2014

				Homestead (BM01)		Kelly (BM02)		Muller (BM05)		Harris (BM03)		Thelander (BM07)	
Blast Number	Date	Time	Blast ID	Overpressure dB(L)	Vibration (mm/sec)	Overpressure dB(L)	Vibration (mm/sec)	Overpressure dB(L)	Vibration (mm/sec)	Overpressure dB(L)	Vibration (mm/sec)	Overpressure dB(L)	Vibration (mm/sec)
42	11/07/2014	14:38:48	M14WTA2	112.9	0.1	97	0.11	104	0.48	105.7	0.09	100.4	0.23
43	16/07/2014	14:34:56	M16WMA1	110.3	0.17	113.1	0.19	102.4	1.121	109.4	0.14	106.4	0.43
44	25/07/2014	14:42:32	M17WRC1, M16WWA9	107.5	0.18	109	0.16	102	1	108.3	0.12	100.9	0.78
45	31/07/2014	15:30:44	M19WRA1	100.6	0.11	105	0.09	98.3	0.62	107.5	0.09	100.9	1.06
46	11/08/2014	14:40:19	BS5WRA3	103.4	1.72	101	0.65	100.8	0.25	100.8	0.6	110.8	0.59
47	18/08/2014	15:02:27	M17RCA3	106.6	0.1	102.7	0.14	106.8	0.3	106.5	0.12	101.9	0.23
48	25/08/2014	9:36:37	M14RDA3a	91	0.06	94	0.05	102.7	0.25	98	0.06	108.4	0.44
49	1/09/2014	9:45:05	M16WTA1	<115.0	<0.16	103.4	0.15	97	0.74	101.8	0.16	108	0.45
50	9/09/2014	11:35:53	M19RCA4	105.6	0.28	101.3	0.2	97	0.12	107.5	0.25	95.9	0.62
51	9/09/2014	11:41:52	BS5WMA1	95.8	0.14	99.6	0.1	97	0.51	<115.0	<0.16	98.4	0.13
52	11/09/2014	15:38:27	M20RCA1	96.5	0.08	100.6	0.06	100.3	0.16	100.5	0.05	96.8	0.34
53	15/09/2014	15:35:48	BS5WMA1a	102.2	0.32	97.3	0.19	98.3	0.08	104.2	0.21	100.9	0.2
54	15/09/2014	15:43:05	M20RCA1a	<115.0	<0.16	90.1	0.05	99.9	0.14	90.9	0.05	<115.0	<0.16
55	18/09/2014	15:29:08	M20RCA2	95.8	0.05	94.8	0.06	99.4	0.31	98	0.06	<115.0	<0.16
56	24/09/2014	15:48:42	M18WRC1	<115.0	<0.16	98.5	0.11	102.4	0.75	98.4	0.12	99.8	0.39
57	29/09/2014	15:37:32	M21WWA1	<115.0	<0.16	94.4	0.09	97	0.68	104.5	0.14	101.5	0.95
58	2/10/2014	14:41:47	M20RCA3	<115.0	<0.16	95.8	0.08	101.2	0.53	105.5	0.06	102.9	0.89
59	3/10/2014	14:05:31	BS5WMA2	<115.0	<0.16	104.9	0.13	99.4	0.08	108.3	0.13	101.9	0.41
60	8/10/2014	15:03:57	BS5WMA3	107.7	0.57	105.1	0.19	104	0.1	104.2	0.22	98.4	0.13
61	10/10/2014	13:01:10	M20RCA4	<115.0	<0.16	99.8	0.11	99.9	0.21	98	0.05	104.4	0.12
62	16/10/2014	14:03:29	M22WWA1	95.8	0.09	101.5	0.06	94.7	0.73	104.2	0.08	101.9	0.22
63	22/10/2014	14:38:50	BS5RA4	106.4	1.67	101.6	0.57	100.3	0.18	100.1	0.57	97.7	0.6
64	27/10/2014	15:09:06	M15WRA3	115.2	0.11	101	0.1	113	0.3	110.3	0.14	102.9	0.3
65	29/10/2014	14:44:02	BS5WRA4a	101.3	1.85	101.6	0.28	99.4	0.2	97	0.34	107.5	0.28
66	5/11/2014	15:20:44	M17WMA1, M20RCA5	104.8	0.19	107.6	0.18	104	0.6	106.1	0.17	93.7	0.23
67	12/11/2014	15:38:05	BS5WTA1	102.5	0.38	102	0.25	104.9	0.12	101.2	0.35	104.4	0.85
68	14/11/2014	11:34:36	BS5WTA211	<115.0	<0.16	99.2	0.18	94.7	0.07	104.2	0.14	98.4	0.15
69	14/11/2014	11:42:22	M20RCA6	<115.0	<0.16	101.6	0.06	95.6	0.46	108.9	0.06	100.9	0.08
70	24/11/2014	14:36:18	M15WRC4	101	0.18	97.3	0.09	97.7	0.42	100.5	0.25	99.8	0.53
71	1/12/2014	14:41:01	M21WWA2	<115.0	<0.16	105.6	0.06	103.4	0.57	108.1	0.09	99.8	0.36
72	11/12/2014	13:12:33	M15WRC5	97.1	0.26	102.7	0.13	108.4	0.21	103.5	0.3	106.9	0.58
73	16/12/2014	15:32:50	BS5WTA3	93.1	0.36	104.7	0.13	99.4	0.09	106.5	0.23	107.5	0.4
74	18/12/2014	15:33:15	M15WRCa	94	0.26	98.3	0.27	100.3	0.13	97.5	0.1	98.4	0.13
75	23/12/2014	14:34:11	M21WWA3	0	0	102.7	0.09	104.3	0.75	104	0.22	99.8	0.13

APPENDIX H

Wambo Coal Dust Monitoring Program
Particulate Matter (10 Micron) Monitoring Data
2014

Date of Run	PM01 - Coralie		PM02 - Wambo Road		PM03 - Thelander		PM04 - Muller	
	PM10 24 Hour Result (ug/m^3)	YTD Average	PM10 24 Hour Result (ug/m^3)	YTD Average	PM10 24 Hour Result (ug/m^3)	YTD Average	PM10 24 Hour Result (ug/m^3)	YTD Average
1/01/2014	29.2	29.2	25.9	25.9	24.9	24.9	28.6	28.6
2/01/2014	28.2	28.7	**32.2**	29.1	24.4	24.7	21.3	25.0
3/01/2014	**43.0**	33.5	**37.6**	31.9	**37.7**	29.0	**31.5**	27.1
4/01/2014	**42.7**	35.8	**42.3**	34.5	**36.4**	30.9	**33.6**	28.8
5/01/2014	27.8	34.2	**32.1**	34.0	27.4	30.2	28.8	28.8
6/01/2014	**35.0**	34.3	**33.3**	33.9	29.4	30.0	26.5	28.4
7/01/2014	**31.5**	33.9	26.9	32.9	**31.6**	30.3	26.0	28.0
8/01/2014	19.0	32.1	17.4	31.0	20.5	29.0	12.2	26.1
9/01/2014	16.6	30.3	19.6	29.7	17.7	27.8	18.5	25.2
10/01/2014	20.1	29.3	17.7	28.5	21.3	27.1	25.5	25.3
11/01/2014	28.9	29.3	27.4	28.4	**43.4**	28.6	**43.4**	26.9
12/01/2014	28.7	29.2	29.1	28.5	**35.3**	29.2	**31.0**	27.2
13/01/2014	27.2	29.1	24.5	28.2	26.4	29.0	22.4	26.9
14/01/2014	24.7	28.8	**32.8**	28.5	25.5	28.7	**31.0**	27.2
15/01/2014	**38.5**	29.4	**47.5**	29.8	**34.1**	29.1	**41.3**	28.1
16/01/2014	**55.2**	31.0	**50.9**	31.1	**50.5**	30.4	**55.5**	29.8
17/01/2014	**31.8**	31.1	26.3	30.8	**32.3**	30.5	**41.1**	30.5
18/01/2014	**30.3**	31.0	29.2	30.7	**32.1**	30.6	**44.3**	31.3
19/01/2014	**35.1**	31.2	26.8	30.5	**39.7**	31.1	**38.5**	31.6
20/01/2014	24.6	30.9	22.2	30.1	25.2	30.8	25.0	31.3
21/01/2014	15.7	30.2	16.3	29.4	12.2	29.9	18.3	30.7
22/01/2014	17.7	29.6	13.7	28.7	13.1	29.1	16.2	30.0
23/01/2014	24.9	29.4	16.6	28.2	18.7	28.7	22.7	29.7
24/01/2014	19.6	29.0	17.3	27.7	13.2	28.0	15.1	29.1
25/01/2014	20.9	28.7	15.2	27.2	18.7	27.7	15.7	28.6
26/01/2014	20.6	28.4	19.9	27.0	21.0	27.4	19.7	28.2
27/01/2014	18.5	28.0	16.3	26.6	18.8	27.1	25.6	28.1
28/01/2014	22.9	27.8	22.5	26.4	18.8	26.8	24.9	28.0
29/01/2014	**30.3**	27.9	24.6	26.3	22.0	26.6	**32.2**	28.2
30/01/2014	23.8	27.8	18.9	26.1	24.7	26.6	26.4	28.1
31/01/2014	23.3	27.6	25.3	26.1	**30.2**	26.7	**36.3**	28.4
1/02/2014	**32.7**	27.8	**30.4**	26.2	**35.2**	27.0	**43.6**	28.8
2/02/2014	**35.2**	28.0	**36.2**	26.5	29.6	27.0	28.6	28.8
3/02/2014	25.8	27.9	24.1	26.4	21.3	26.9	25.0	28.7
4/02/2014	28.9	28.0	18.1	26.2	17.1	26.6	**39.8**	29.0
5/02/2014	26.3	27.9	20.2	26.0	28.2	26.6	25.0	28.9
6/02/2014	15.3	27.6	18.0	25.8	20.8	26.5	22.6	28.7
7/02/2014	23.5	27.5	29.1	25.9	23.3	26.4	**34.1**	28.9
8/02/2014	26.0	27.4	**48.2**	26.5	28.0	26.4	**33.6**	29.0
9/02/2014	21.4	27.3	**31.1**	26.6	28.7	26.5	**35.6**	29.2
10/02/2014	**32.1**	27.4	26.9	26.6	**31.0**	26.6	**36.0**	29.3
11/02/2014	22.6	27.3	24.0	26.5	25.1	26.6	22.5	29.2

12/02/2014	28.9	27.3	22.1	26.4	25.8	26.5	22.3	29.0
13/02/2014	**34.8**	27.5	29.6	26.5	**34.4**	26.7	**32.5**	29.1
14/02/2014	16.0	27.2	15.4	26.3	16.5	26.5	18.7	28.9
15/02/2014	16.0	27.0	13.2	26.0	15.7	26.3	16.2	28.6
16/02/2014	21.4	26.9	13.3	25.7	12.7	26.0	17.9	28.4
17/02/2014	16.1	26.7	13.7	25.5	14.7	25.7	14.2	28.1
18/02/2014	21.8	26.6	16.9	25.3	20.5	25.6	20.8	27.9
19/02/2014	17.7	26.4	14.8	25.1	13.9	25.4	16.0	27.7
20/02/2014	15.4	26.2	16.8	24.9	12.9	25.1	12.5	27.4
21/02/2014	FUSE	26.2	21.7	24.8	24.1	25.1	22.7	27.3
22/02/2014	FUSE	26.2	24.0	24.8	27.1	25.2	25.2	27.3
23/02/2014	FUSE	26.2	19.5	24.7	22.5	25.1	21.7	27.2
24/02/2014	FUSE	26.2	14.0	24.5	18.2	25.0	18.4	27.0
25/02/2014	13.5	25.9	17.4	24.4	17.1	24.9	21.2	26.9
26/02/2014	15.0	25.7	22.5	24.4	12.6	24.6	21.0	26.8
27/02/2014	17.1	25.6	13.9	24.2	17.4	24.5	19.6	26.7
28/02/2014	5.7	25.2	5.5	23.9	5.8	24.2	6.1	26.3
1/03/2014	10.6	24.9	10.1	23.7	10.0	24.0	10.2	26.0
2/03/2014	9.8	24.7	7.7	23.4	8.1	23.7	8.1	25.8
3/03/2014	9.0	24.4	7.1	23.1	8.1	23.4	9.8	25.5
4/03/2014	11.3	24.2	8.5	22.9	10.7	23.2	11.9	25.3
5/03/2014	13.4	24.0	11.7	22.7	8.6	23.0	10.0	25.0
6/03/2014	19.1	23.9	17.3	22.6	17.7	22.9	17.7	24.9
7/03/2014	20.5	23.9	18.0	22.6	POWER	22.9	29.5	25.0
8/03/2014	15.2	23.7	10.1	22.4	POWER	22.9	16.9	24.9
9/03/2014	16.9	23.6	11.4	22.2	POWER	22.9	17.3	24.8
10/03/2014	14.7	23.5	12.2	22.1	13.1	22.8	14.6	24.6
11/03/2014	15.9	23.4	11.4	21.9	13.5	22.6	17.0	24.5
12/03/2014	18.7	23.3	18.7	21.9	15.5	22.5	16.9	24.4
13/03/2014	19.6	23.2	20.0	21.8	17.5	22.5	20.3	24.3
14/03/2014	19.0	23.2	16.2	21.8	13.5	22.3	24.0	24.3
15/03/2014	10.0	23.0	11.3	21.6	9.6	22.2	8.7	24.1
16/03/2014	16.9	22.9	14.1	21.5	10.3	22.0	12.2	24.0
17/03/2014	13.2	22.8	11.0	21.4	8.6	21.8	8.8	23.8
18/03/2014	21.4	22.7	23.2	21.4	20.4	21.8	25.1	23.8
19/03/2014	**31.9**	22.9	23.3	21.4	25.1	21.8	24.8	23.8
20/03/2014	18.1	22.8	23.6	21.5	17.0	21.8	18.6	23.7
21/03/2014	15.3	22.7	14.4	21.4	18.3	21.7	17.4	23.7
22/03/2014	16.4	22.6	12.3	21.3	7.8	21.5	9.6	23.5
23/03/2014	21.6	22.6	18.5	21.2	19.5	21.5	21.7	23.5
24/03/2014	12.6	22.5	12.7	21.1	10.5	21.4	13.6	23.3
25/03/2014	14.7	22.4	12.0	21.0	14.4	21.3	16.7	23.3
26/03/2014	11.5	22.3	9.4	20.9	11.2	21.2	13.4	23.1
27/03/2014	7.3	22.1	6.6	20.7	6.8	21.0	7.5	23.0
28/03/2014	9.7	21.9	7.0	20.6	7.6	20.8	8.1	22.8
29/03/2014	11.6	21.8	11.7	20.5	9.7	20.7	9.6	22.6
30/03/2014	14.8	21.7	12.4	20.4	15.8	20.7	17.0	22.6
31/03/2014	14.4	21.6	12.3	20.3	16.1	20.6	16.4	22.5
1/04/2014	13.0	21.5	13.7	20.2	13.1	20.5	17.9	22.5
2/04/2014	19.9	21.5	17.1	20.2	16.8	20.5	26.1	22.5

3/04/2014	23.0	21.5	23.0	20.2	17.9	20.4	25.1	22.5
4/04/2014	16.2	21.5	14.9	20.1	21.5	20.5	17.9	22.5
5/04/2014	12.7	21.4	8.9	20.0	11.7	20.4	11.3	22.4
6/04/2014	7.3	21.2	5.6	19.9	7.2	20.2	8.2	22.2
7/04/2014	12.3	21.1	8.1	19.8	10.3	20.1	12.2	22.1
8/04/2014	14.0	21.1	4.4	19.6	14.9	20.1	17.3	22.1
9/04/2014	3.5	20.9	12.2	19.5	8.0	19.9	7.9	21.9
10/04/2014	20.2	20.9	18.5	19.5	11.5	19.8	19.3	21.9
11/04/2014	11.4	20.8	11.9	19.4	8.3	19.7	9.8	21.8
12/04/2014	14.1	20.7	7.3	19.3	6.4	19.6	9.0	21.6
13/04/2014	12.6	20.6	8.2	19.2	9.4	19.5	12.2	21.6
14/04/2014	12.5	20.5	9.7	19.1	11.2	19.4	12.9	21.5
15/04/2014	10.6	20.4	9.2	19.0	11.5	19.3	13.4	21.4
16/04/2014	20.3	20.4	12.8	19.0	12.7	19.3	17.1	21.4
17/04/2014	15.4	20.4	18.1	19.0	11.8	19.2	15.5	21.3
18/04/2014	16.8	20.4	18.6	19.0	11.4	19.1	12.1	21.2
19/04/2014	19.9	20.3	19.5	19.0	15.6	19.1	18.2	21.2
20/04/2014	16.4	20.3	19.5	19.0	12.2	19.0	13.6	21.1
21/04/2014	11.9	20.2	23.1	19.0	11.8	19.0	12.8	21.0
22/04/2014	13.5	20.2	**34.2**	19.1	12.7	18.9	11.9	21.0
23/04/2014	13.5	20.1	24.4	19.2	13.5	18.9	19.0	20.9
24/04/2014	14.9	20.1	**36.1**	19.3	15.9	18.8	15.1	20.9
25/04/2014	10.7	20.0	9.7	19.3	10.6	18.8	13.7	20.8
26/04/2014	11.8	19.9	12.8	19.2	8.7	18.7	9.1	20.7
27/04/2014	13.6	19.8	11.5	19.1	11.9	18.6	14.9	20.7
28/04/2014	9.2	19.8	8.2	19.0	9.4	18.5	12.7	20.6
29/04/2014	11.1	19.7	10.1	19.0	6.8	18.4	8.2	20.5
30/04/2014	9.0	19.6	9.4	18.9	6.8	18.3	7.0	20.4
1/05/2014	14.9	19.5	13.7	18.8	13.5	18.3	15.7	20.4
2/05/2014	10.2	19.5	20.3	18.9	8.8	18.2	9.7	20.3
3/05/2014	8.9	19.4	13.2	18.8	7.7	18.1	7.7	20.2
4/05/2014	8.3	19.3	13.1	18.8	7.7	18.0	7.7	20.1
5/05/2014	7.3	19.2	21.8	18.8	6.6	17.9	6.5	20.0
6/05/2014	9.0	19.1	22.9	18.8	6.9	17.8	6.9	19.9
7/05/2014	24.2	19.1	**35.0**	18.9	13.2	17.8	19.0	19.8
8/05/2014	15.9	19.1	20.7	19.0	16.8	17.8	20.5	19.9
9/05/2014	14.4	19.1	29.6	19.0	15.2	17.8	17.4	19.8
10/05/2014	11.6	19.0	29.9	19.1	8.9	17.7	9.8	19.8
11/05/2014	10.0	18.9	10.9	19.1	8.6	17.6	10.5	19.7
12/05/2014	20.9	19.0	9.9	19.0	12.1	17.6	16.1	19.7
13/05/2014	8.5	18.9	7.8	18.9	12.1	17.6	15.4	19.6
14/05/2014	12.5	18.8	10.1	18.8	10.8	17.5	16.2	19.6
15/05/2014	15.1	18.8	12.6	18.8	8.1	17.4	10.2	19.5
16/05/2014	12.0	18.8	14.5	18.8	10.4	17.4	14.1	19.5
17/05/2014	10.9	18.7	17.6	18.8	8.5	17.3	8.9	19.4
18/05/2014	11.1	18.6	26.2	18.8	9.2	17.3	9.3	19.3
19/05/2014	13.2	18.6	22.9	18.8	10.0	17.2	9.9	19.3
20/05/2014	14.2	18.6	**31.6**	18.9	11.1	17.2	10.6	19.2
21/05/2014	20.7	18.6	26.9	19.0	15.7	17.1	18.8	19.2
22/05/2014	13.5	18.5	27.9	19.0	11.1	17.1	10.2	19.1

23/05/2014	15.2	18.5	26.1	19.1	12.1	17.1	11.0	19.1
24/05/2014	17.3	18.5	**49.3**	19.3	13.0	17.0	11.6	19.0
25/05/2014	19.7	18.5	21.3	19.3	12.3	17.0	11.0	19.0
26/05/2014	14.5	18.5	21.6	19.3	12.4	17.0	17.8	19.0
27/05/2014	26.2	18.5	**32.9**	19.4	15.9	17.0	15.9	19.0
28/05/2014	FUSE	-	25.8	19.5	8.1	16.9	7.5	18.9
29/05/2014	16.9	18.5	25.2	19.5	18.1	16.9	17.0	18.9
30/05/2014	10.5	18.5	8.6	19.4	11.2	16.9	21.0	18.9
31/05/2014	15.0	18.5	10.2	19.4	11.9	16.8	21.4	18.9
1/06/2014	8.8	18.4	5.6	19.3	8.2	16.8	10.6	18.8
2/06/2014	6.7	18.3	5.7	19.2	4.4	16.7	4.6	18.7
3/06/2014	5.1	18.2	8.5	19.1	4.8	16.6	4.6	18.7
4/06/2014	10.3	18.2	10.2	19.1	8.1	16.6	9.0	18.6
5/06/2014	13.2	18.1	16.8	19.1	9.7	16.5	10.8	18.5
6/06/2014	6.2	18.1	6.8	19.0	6.0	16.4	10.6	18.5
7/06/2014	6.9	18.0	7.3	18.9	8.2	16.4	9.5	18.4
8/06/2014	10.6	17.9	12.8	18.9	8.2	16.3	12.0	18.4
9/06/2014	9.7	17.9	9.6	18.8	10.8	16.3	12.5	18.4
10/06/2014	8.5	17.8	8.6	18.7	12.1	16.3	18.5	18.4
11/06/2014	12.1	17.8	11.4	18.7	8.6	16.2	15.5	18.3
12/06/2014	9.8	17.7	18.7	18.7	8.3	16.2	10.7	18.3
13/06/2014	17.0	17.7	22.9	18.7	12.8	16.2	13.7	18.3
14/06/2014	6.0	17.7	9.5	18.7	5.3	16.1	5.2	18.2
15/06/2014	7.2	17.6	15.0	18.6	6.1	16.0	7.0	18.1
16/06/2014	7.7	17.5	13.2	18.6	7.2	16.0	6.8	18.0
17/06/2014	6.2	17.5	13.8	18.6	4.9	15.9	5.1	18.0
18/06/2014	8.7	17.4	15.4	18.6	8.0	15.9	10.1	17.9
19/06/2014	10.4	17.4	17.2	18.6	6.8	15.8	8.9	17.9
20/06/2014	9.8	17.3	12.6	18.5	7.2	15.8	6.8	17.8
21/06/2014	8.9	17.3	8.1	18.5	6.5	15.7	9.8	17.8
22/06/2014	12.2	17.2	13.3	18.4	12.1	15.7	12.4	17.7
23/06/2014	8.5	17.2	14.2	18.4	5.9	15.6	6.1	17.7
24/06/2014	13.8	17.2	27.7	18.5	12.1	15.6	13.0	17.6
25/06/2014	8.9	17.1	20.7	18.5	8.1	15.6	8.1	17.6
26/06/2014	10.0	17.1	16.5	18.5	9.8	15.5	9.3	17.5
27/06/2014	9.7	17.0	23.1	18.5	7.7	15.5	7.4	17.5
28/06/2014	13.7	17.0	15.5	18.5	10.2	15.5	12.1	17.4
29/06/2014	8.6	17.0	10.0	18.4	8.3	15.4	7.9	17.4
30/06/2014	8.1	16.9	13.6	18.4	5.3	15.4	5.2	17.3
1/07/2014	7.0	16.9	16.4	18.4	6.1	15.3	5.8	17.3
2/07/2014	8.9	16.8	17.6	18.4	5.7	15.3	6.2	17.2
3/07/2014	11.0	16.8	18.2	18.4	8.8	15.2	8.0	17.2
4/07/2014	11.8	16.8	19.6	18.4	9.4	15.2	8.6	17.1
5/07/2014	9.4	16.7	15.9	18.4	9.2	15.2	7.6	17.1
6/07/2014	5.7	16.7	14.8	18.4	5.9	15.1	5.3	17.0
7/07/2014	6.8	16.6	15.3	18.3	5.3	15.0	4.9	16.9
8/07/2014	5.9	16.5	24.2	18.4	5.3	15.0	5.2	16.9
9/07/2014	22.7	16.6	27.4	18.4	10.0	15.0	9.6	16.8
10/07/2014	12.1	16.6	26.3	18.5	12.7	15.0	11.3	16.8
11/07/2014	7.0	16.5	19.6	18.5	7.8	14.9	7.6	16.8

12/07/2014	9.5	16.5	21.8	18.5	7.6	14.9	7.1	16.7
13/07/2014	10.0	16.4	16.1	18.5	8.4	14.8	16.4	16.7
14/07/2014	21.2	16.5	**38.6**	18.6	17.8	14.9	27.9	16.8
15/07/2014	25.7	16.5	**31.1**	18.6	22.8	14.9	29.1	16.8
16/07/2014	11.1	16.5	9.2	18.6	7.3	14.9	10.1	16.8
17/07/2014	5.8	16.4	6.1	18.5	3.9	14.8	3.9	16.7
18/07/2014	5.6	16.4	7.7	18.5	4.1	14.8	4.0	16.7
19/07/2014	8.5	16.3	17.6	18.5	6.8	14.7	8.5	16.6
20/07/2014	16.2	16.3	15.1	18.5	16.6	14.7	23.5	16.7
21/07/2014	25.9	16.4	17.2	18.4	16.8	14.7	19.3	16.7
22/07/2014	19.6	16.4	11.7	18.4	19.7	14.8	29.3	16.7
23/07/2014	12.4	16.4	22.6	18.4	9.8	14.7	23.6	16.8
24/07/2014	21.4	16.4	22.1	18.5	9.8	14.7	20.0	16.8
25/07/2014	13.5	16.4	16.1	18.4	8.2	14.7	8.5	16.7
26/07/2014	5.1	16.3	5.1	18.4	4.1	14.6	4.0	16.7
27/07/2014	5.5	16.3	5.5	18.3	4.1	14.6	4.0	16.6
28/07/2014	6.9	16.2	11.6	18.3	5.1	14.5	4.9	16.6
29/07/2014	8.3	16.2	11.0	18.2	5.5	14.5	5.5	16.5
30/07/2014	9.7	16.2	19.4	18.3	7.3	14.4	7.1	16.5
31/07/2014	11.4	16.1	18.6	18.3	7.5	14.4	8.2	16.4
1/08/2014	11.2	16.1	26.9	18.3	8.8	14.4	8.4	16.4
2/08/2014	11.1	16.1	16.0	18.3	10.2	14.4	11.4	16.4
3/08/2014	20.9	16.1	18.5	18.3	18.6	14.4	19.3	16.4
4/08/2014	14.1	16.1	18.7	18.3	13.2	14.4	18.8	16.4
5/08/2014	17.3	16.1	23.7	18.3	11.6	14.4	16.2	16.4
6/08/2014	14.5	16.1	19.9	18.3	12.8	14.4	14.5	16.4
7/08/2014	15.2	16.1	23.0	18.3	14.1	14.4	16.1	16.4
8/08/2014	15.1	16.1	24.5	18.4	14.5	14.4	18.5	16.4
9/08/2014	11.7	16.1	17.7	18.4	9.3	14.3	10.0	16.4
10/08/2014	14.6	16.1	25.4	18.4	8.5	14.3	8.6	16.3
11/08/2014	20.1	16.1	16.4	18.4	12.7	14.3	15.3	16.3
12/08/2014	15.8	16.1	11.1	18.4	13.4	14.3	19.7	16.3
13/08/2014	14.0	16.1	13.1	18.3	17.5	14.3	16.8	16.3
14/08/2014	20.6	16.1	16.4	18.3	20.1	14.3	17.6	16.3
15/08/2014	21.4	16.1	16.2	18.3	15.2	14.3	23.1	16.4
16/08/2014	11.0	16.1	11.3	18.3	15.3	14.4	17.8	16.4
17/08/2014	4.9	16.0	7.5	18.2	3.8	14.3	3.9	16.3
18/08/2014	5.7	16.0	9.7	18.2	4.3	14.3	4.1	16.3
19/08/2014	8.5	16.0	7.6	18.2	7.4	14.2	8.3	16.2
20/08/2014	11.4	15.9	9.7	18.1	9.8	14.2	14.2	16.2
21/08/2014	9.3	15.9	7.5	18.1	9.2	14.2	10.7	16.2
22/08/2014	9.7	15.9	5.6	18.0	8.3	14.2	12.3	16.2
23/08/2014	8.6	15.9	7.1	18.0	10.0	14.1	13.3	16.2
24/08/2014	11.5	15.8	8.1	17.9	12.5	14.1	13.9	16.2
25/08/2014	12.4	15.8	10.8	17.9	8.8	14.1	11.9	16.1
26/08/2014	7.0	15.8	6.1	17.8	7.3	14.1	9.5	16.1
27/08/2014	7.6	15.7	7.2	17.8	8.1	14.1	7.6	16.1
28/08/2014	9.1	15.7	9.8	17.8	10.1	14.0	12.1	16.1
29/08/2014	11.0	15.7	9.2	17.7	9.3	14.0	10.6	16.0
30/08/2014	6.9	15.7	7.0	17.7	6.4	14.0	8.1	16.0

31/08/2014	9.7	15.6	8.7	17.7	8.5	14.0	12.4	16.0
1/09/2014	11.7	15.6	14.5	17.6	6.6	13.9	8.4	16.0
2/09/2014	10.3	15.6	9.9	17.6	6.2	13.9	6.5	15.9
3/09/2014	7.7	15.6	8.7	17.6	4.5	13.9	5.1	15.9
4/09/2014	10.8	15.5	11.7	17.6	7.9	13.8	9.8	15.9
5/09/2014	10.4	15.5	13.5	17.5	9.8	13.8	14.0	15.8
6/09/2014	7.9	15.5	7.6	17.5	8.4	13.8	12.4	15.8
7/09/2014	11.6	15.5	8.5	17.5	9.5	13.8	12.3	15.8
8/09/2014	12.4	15.5	6.6	17.4	10.0	13.8	11.6	15.8
9/09/2014	13.4	15.5	13.8	17.4	7.0	13.7	10.0	15.8
10/09/2014	14.1	15.5	8.8	17.4	8.3	13.7	9.7	15.8
11/09/2014	16.4	15.5	15.8	17.4	8.7	13.7	9.0	15.7
12/09/2014	18.7	15.5	14.7	17.3	17.0	13.7	19.5	15.7
13/09/2014	14.6	15.5	12.3	17.3	14.0	13.7	21.4	15.8
14/09/2014	11.7	15.4	15.2	17.3	9.1	13.7	9.5	15.7
15/09/2014	21.6	15.5	19.0	17.3	16.0	13.7	17.8	15.7
16/09/2014	20.1	15.5	20.7	17.3	17.1	13.7	18.6	15.8
17/09/2014	19.4	15.5	25.1	17.4	10.6	13.7	8.8	15.7
18/09/2014	17.4	15.5	22.3	17.4	9.2	13.7	12.8	15.7
19/09/2014	16.1	15.5	18.8	17.4	14.2	13.7	12.3	15.7
20/09/2014	20.2	15.5	23.8	17.4	19.0	13.7	18.2	15.7
21/09/2014	14.5	15.5	13.4	17.4	17.8	13.7	19.5	15.7
22/09/2014	14.5	15.5	16.2	17.4	16.9	13.7	20.5	15.8
23/09/2014	18.2	15.5	18.9	17.4	16.2	13.8	19.3	15.8
24/09/2014	15.6	15.5	22.3	17.4	13.3	13.7	16.2	15.8
25/09/2014	12.3	15.5	13.1	17.4	9.0	13.7	10.2	15.7
26/09/2014	16.2	15.5	12.4	17.4	11.6	13.7	13.5	15.7
27/09/2014	16.8	15.5	13.6	17.4	15.0	13.7	16.4	15.7
28/09/2014	13.2	15.5	13.2	17.4	9.9	13.7	12.3	15.7
29/09/2014	21.9	15.5	**31.5**	17.4	14.5	13.7	16.9	15.7
30/09/2014	23.1	15.6	**35.8**	17.5	15.2	13.7	16.8	15.7
1/10/2014	13.3	15.6	28.3	17.5	14.8	13.7	16.5	15.7
2/10/2014	15.2	15.6	**34.7**	17.6	15.2	13.7	17.7	15.7
3/10/2014	**33.6**	15.6	25.0	17.6	21.4	13.8	23.4	15.8
4/10/2014	**31.7**	15.7	27.6	17.6	24.2	13.8	29.5	15.8
5/10/2014	25.4	15.7	23.9	17.7	14.6	13.8	14.4	15.8
6/10/2014	**40.2**	15.8	**36.6**	17.7	29.3	13.9	**42.6**	15.9
7/10/2014	25.4	15.9	**30.9**	17.8	27.0	13.9	29.2	16.0
8/10/2014	14.8	15.8	14.5	17.8	20.5	13.9	25.5	16.0
9/10/2014	16.5	15.8	17.9	17.8	16.5	13.9	21.5	16.0
10/10/2014	20.6	15.9	18.4	17.8	14.6	13.9	23.0	16.0
11/10/2014	21.5	15.9	26.3	17.8	21.6	14.0	27.7	16.1
12/10/2014	**32.7**	15.9	29.3	17.8	19.9	14.0	**30.1**	16.1
13/10/2014	23.4	16.0	29.9	17.9	20.3	14.0	21.7	16.1
14/10/2014	9.4	15.9	7.3	17.8	7.5	14.0	7.5	16.1
15/10/2014	4.9	15.9	4.6	17.8	4.1	14.0	4.9	16.1
16/10/2014	14.4	15.9	12.6	17.8	11.1	13.9	14.8	16.1
17/10/2014	18.9	15.9	16.5	17.8	16.1	14.0	17.3	16.1
18/10/2014	15.4	15.9	16.6	17.8	17.5	14.0	17.8	16.1
19/10/2014	24.0	15.9	19.2	17.8	13.5	14.0	23.0	16.1

20/10/2014	23.2	16.0	19.0	17.8	21.3	14.0	23.1	16.1
21/10/2014	25.3	16.0	16.2	17.8	17.2	14.0	16.5	16.1
22/10/2014	0.0	0.0	25.7	17.8	16.1	14.0	26.8	16.2
23/10/2014	0.0	0.0	26.1	17.8	23.3	14.0	**31.0**	16.2
24/10/2014	**32.3**	15.9	**30.4**	17.9	29.2	14.1	**40.2**	16.3
25/10/2014	19.7	16.0	19.1	17.9	15.9	14.1	14.7	16.3
26/10/2014	26.2	16.0	26.2	17.9	22.5	14.1	23.8	16.3
27/10/2014	**36.5**	16.1	**32.7**	18.0	25.8	14.2	26.6	16.4
28/10/2014	27.1	16.1	25.3	18.0	17.5	14.2	20.2	16.4
29/10/2014	24.6	16.1	24.6	18.0	19.2	14.2	23.8	16.4
30/10/2014	23.5	16.2	26.6	18.0	21.0	14.2	**33.8**	16.4
31/10/2014	**35.0**	16.2	**49.6**	18.1	25.4	14.2	**38.2**	16.5
1/11/2014	**35.5**	16.3	**41.3**	18.2	28.6	14.3	**32.3**	16.6
2/11/2014	18.5	16.3	18.3	18.2	16.1	14.3	19.3	16.6
3/11/2014	**31.5**	16.3	28.2	18.2	**32.9**	14.4	**42.3**	16.7
4/11/2014	**44.6**	16.4	**45.0**	18.3	**40.8**	14.5	**48.9**	16.8
5/11/2014	25.1	16.5	28.2	18.4	18.9	14.5	24.2	16.8
6/11/2014	23.2	16.5	22.2	18.4	19.6	14.5	19.2	16.8
7/11/2014	24.0	16.5	24.1	18.4	23.7	14.5	27.7	16.8
8/11/2014	16.1	16.5	20.8	18.4	23.8	14.5	27.5	16.9
9/11/2014	**34.1**	16.6	**35.0**	18.5	30.0	14.6	29.3	16.9
10/11/2014	**32.9**	16.6	**33.0**	18.5	**37.1**	14.7	**35.6**	17.0
11/11/2014	22.6	16.6	21.3	18.5	23.7	14.7	20.4	17.0
12/11/2014	26.5	16.7	27.8	18.5	24.9	14.7	26.6	17.0
13/11/2014	21.2	16.7	29.0	18.6	23.6	14.8	**32.7**	17.1
14/11/2014	26.4	16.7	**33.8**	18.6	17.9	14.8	23.0	17.1
15/11/2014	**42.7**	16.8	**40.0**	18.7	**44.8**	14.9	**45.2**	17.2
16/11/2014	17.8	16.8	18.2	18.7	15.2	14.9	18.4	17.2
17/11/2014	15.9	16.8	16.0	18.7	11.2	14.8	14.8	17.2
18/11/2014	22.6	16.8	20.5	18.7	20.9	14.9	21.7	17.2
19/11/2014	22.7	16.8	24.1	18.7	25.8	14.9	26.9	17.2
20/11/2014	24.0	16.9	**30.7**	18.7	18.4	14.9	29.0	17.2
21/11/2014	**34.5**	16.9	**36.8**	18.8	22.0	14.9	**35.0**	17.3
22/11/2014	**37.1**	17.0	**31.5**	18.8	**33.6**	15.0	**42.3**	17.4
23/11/2014	**38.9**	17.0	**31.1**	18.9	**33.6**	15.1	**32.5**	17.4
24/11/2014	**44.3**	17.1	**70.2**	19.0	**33.9**	15.1	**41.2**	17.5
25/11/2014	24.3	17.1	21.3	19.0	0.0	0.0	17.9	17.5
26/11/2014	**38.1**	17.2	26.8	19.1	24.9	15.1	**31.3**	17.5
27/11/2014	**34.2**	17.3	19.5	19.1	20.2	15.1	25.9	17.6
28/11/2014	**32.8**	17.3	20.0	19.1	19.0	15.1	22.4	17.6
29/11/2014	**34.4**	17.4	24.7	19.1	17.2	15.1	26.4	17.6
30/11/2014	24.1	17.4	23.4	19.1	14.3	15.1	25.0	17.6
1/12/2014	12.4	17.4	11.4	19.1	8.7	15.1	10.2	17.6
2/12/2014	18.8	17.4	16.1	19.1	12.0	15.1	18.4	17.6
3/12/2014	19.2	17.4	17.3	19.1	14.2	15.1	22.1	17.6
4/12/2014	14.6	17.4	12.9	19.0	9.1	15.1	10.7	17.6
5/12/2014	12.5	17.4	14.1	19.0	8.9	15.1	9.9	17.6
6/12/2014	11.7	17.3	10.3	19.0	8.5	15.0	9.6	17.6
7/12/2014	11.8	17.3	9.4	19.0	7.2	15.0	10.3	17.5
8/12/2014	17.8	17.3	11.7	18.9	9.2	15.0	12.0	17.5

9/12/2014	**31.3**	17.4	21.7	19.0	23.2	15.0	21.3	17.5
10/12/2014	**30.1**	17.4	19.1	19.0	20.2	15.0	20.6	17.5
11/12/2014	7.6	17.4	6.4	18.9	5.6	15.0	4.8	17.5
12/12/2014	20.3	17.4	12.5	18.9	12.8	15.0	16.2	17.5
13/12/2014	24.8	17.4	14.1	18.9	15.8	15.0	15.5	17.5
14/12/2014	24.2	17.4	19.1	18.9	20.2	15.0	26.0	17.5
15/12/2014	**32.9**	17.5	19.8	18.9	19.5	15.0	28.1	17.5
16/12/2014	25.0	17.5	**33.7**	18.9	22.0	15.1	29.8	17.6
17/12/2014	**50.2**	17.6	**46.4**	19.0	**37.9**	15.1	**35.6**	17.6
18/12/2014	**37.0**	17.6	**34.7**	19.1	**30.8**	15.2	**31.6**	17.7
19/12/2014	**33.6**	17.7	27.8	19.1	25.8	15.2	25.5	17.7
20/12/2014	21.7	17.7	**32.3**	19.1	20.5	15.2	23.5	17.7
21/12/2014	23.7	17.7	18.0	19.1	19.2	15.2	24.1	17.7
22/12/2014	26.7	17.7	19.5	19.1	21.3	15.2	28.2	17.8
23/12/2014	20.0	17.7	14.0	19.1	13.2	15.2	14.2	17.7
24/12/2014	21.7	17.8	16.6	19.1	13.9	15.2	16.9	17.7
25/12/2014	11.8	17.7	11.8	19.1	12.1	15.2	13.3	17.7
26/12/2014	25.5	17.8	11.8	19.1	10.0	15.2	11.3	17.7
27/12/2014	27.0	17.8	20.1	19.1	19.7	15.2	19.8	17.7
28/12/2014	16.7	17.8	8.8	19.0	8.8	15.2	9.5	17.7
29/12/2014	17.6	17.8	7.4	19.0	5.7	15.2	6.9	17.7
30/12/2014	**39.9**	17.8	25.8	19.0	18.4	15.2	19.1	17.7
31/12/2014	**46.3**	17.9	27.4	19.0	25.8	15.2	27.6	17.7

APPENDIX I

AEMR Surface Water Monitoring Results
2014

Month	SW01 - Wollombi Brook Up				SW03 - Wollombi Brook Pump Out					SW02 - Wollombi Brook Down				
	pH	EC (uS/cm)	TSS (mg/L)	TDS (mg/L)	pH	EC (uS/cm)	TSS (mg/L)	TDS (mg/L)	O&G (mg/L)	pH	EC (uS/cm)	TSS (mg/L)	TDS (mg/L)	O&G (mg/L)
Criteria	6.0-9.5	3,269	120	N/A	6.0-9.5	3,269	120	N/A	N/A	6.0-9.5	3,269	120	N/A	N/A
Jan-14	7.70	724	6	369	7.50	1,539	13	815	<5	7.70	1,007	1	502	<5
Feb-14	7.80	754	5	335	7.30	1,562	24	797	<2	8.30	961	3	474	<2
Mar-14	7.80	837	4	482	7.70	864	35	516	<2	7.70	988	2	526	<2
Apr-14	7.60	514	4	261	7.50	500	5	244	<2	7.80	534	3	272	<2
May-14	8.40	621	3	378	9.10	605	7	323	<2	8.10	655	6	387	<2
Jun-14	7.60	831	2	426	7.60	767	2	402	<2	7.70	825	3	468	<2
Jul-14	7.20	828	3	442	7.00	797	7	446	<2	7.20	936	1	552	<2
Aug-14	7.50	822	6	390	7.40	734	11	378	<2	7.30	1,095	1	547	<2
Sep-14	7.50	552	3	259	7.40	539	5	287	<2	7.60	590	2	293	<2
Oct-14	7.70	696	4	333	7.10	683	5	331	<2	7.80	825	7	416	<5
Nov-14	7.80	683	8	354	7.70	953	8	501	<2	7.80	1,011	9	524	<2
Dec-14	7.50	638	10	270	7.20	975	13	481	<2	7.50	995	6	470	<2
Average	**7.68**	**708**	**5**	**358**	**7.54**	**877**	**11**	**460**		**7.71**	**869**	**4**	**453**	

Month	SW40 - Wollombi Brook Upstream of SWC				SW04 - North Wambo Creek Up				SW39 - Waterfall Creek				Coal Loader Sump - Hales Crossing			
	pH	EC (uS/cm)	TSS (mg/L)	TDS (mg/L)	pH	EC (uS/cm)	TSS (mg/L)	TDS (mg/L)	pH	EC (uS/cm)	TSS (mg/L)	TDS (mg/L)	pH	EC (uS/cm)	TSS (mg/L)	TDS (mg/L
Criteria	6.0-9.5	3,269	120	N/A	6.0-9.5	2,140	120	N/A	6.0-9.5	492	120	N/A	6.0-9.5	492	120	N/A
Jan-14	7.80	796	8	437	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY
Feb-14	7.80	759	5	363	DRY	DRY	DRY	DRY	7.60	433	326	276	8.80	874	612	658
Mar-14	7.60	835	3	467	DRY	DRY	DRY	DRY	7.90	181	134	958	7.70	520	168	626
Apr-14	7.50	482	1	251	DRY	DRY	DRY	DRY	7.30	259	1,540	470	8.10	678	278	620
May-14	8.10	519	4	470	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	8.80	2,510	49	1,780
Jun-14	7.40	643	2	392	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY
Jul-14	7.20	682	6	321	DRY	DRY	DRY	DRY	7.00	336	118	465	8.40	500	176	768
Aug-14	7.10	584	23	296	DRY	DRY	DRY	DRY	6.60	127	370	480	8.50	425	385	358
Sep-14	7.80	527	1	248	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY
Oct-14	7.90	600	<1	295	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY
Nov-14	7.90	660	10	341	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY
Dec-14	7.60	641	4	342	DRY	DRY	DRY	DRY	7.50	201	925	605	8.20	535	244	616
Average	**7.64**	**644**	**6**	**352**					**7.32**	**256**	**569**	**542**	**8.36**	**863**	**273**	**775**

Month	SW15 - Eagles Nest Dam					SW49 - Bates Pit Pump out		SW51 - South Dam	
	pH	EC (uS/cm)	TSS (mg/L)	TDS (mg/L)	O&G (mg/L)	pH	EC (uS/cm)	pH	EC (uS/cm)
Jan-14	9.10	7,680	34.00	5,330	<5	8.10	4,830	9.10	8690
Feb-14	9.10	7,750	25.00	5,160	<2	8.00	2,670	8.90	9490
Mar-14	9.00	6,160	28.00	3,620	<2	7.90	3,890	9.00	8390
Apr-14	8.90	6,070	22.00	3,800	<2	8.00	3,760	8.8	6,890
May-14	8.80	6,780	26.00	4,230	<2	8.00	6,330	8.8	7,620
Jun-14	9.00	7,590	43.00	4,850	<2	8.00	3,780	9.00	7,690
Jul-14	8.80	7,870	41.00	4,440	<2	7.50	3,460	8.7	8500
Aug-14	9.00	7,030	31.00	4,160	<2	8.00	3,470	8.6	8310
Sep-14	9.00	7,740	39.00	5,020	3	8.00	3,520	INACCESSIBLE	
Oct-14	9.00	7,930	15.00	5,130	2	DRY	DRY		
Nov-14	9.10	8,970	29.00	5,780	<2	DRY	DRY		
Dec-14	8.90	7,220	84.00	4,750	<2	DRY	DRY		
Average	**8.98**	**7,399**	**35**	**4,689**		**7.94**	**3,968**	**8.86**	**8,198**

Month	SW30 - Turkeys Nest Dam		SW31 - Gordon Below Franklin		SW38 - Homestead Open Cut	
	pH	EC (uS/cm)	pH	EC (uS/cm)	pH	EC (uS/cm)
Jan-14	9.20	7,280	9.20	7,730	8.80	9,450
Feb-14	9.20	7,710	9.30	8,590	8.70	8,640
Mar-14	9.30	7,500	9.40	4,700	8.80	7,480
Apr-14	9.10	7,350	9.10	4,160	8.60	7,350
May-14	9.20	7,260	9.10	5,700	8.60	7,250
Jun-14	9.30	7,190	9.10	6,740	8.50	7,480
Jul-14	9.10	7,400	9.10	7,480	8.40	8,000
Aug-14	9.20	7,370	9.10	6,880	8.70	7,280
Sep-14	9.10	7,210	9.10	5,940	8.70	7,700
Oct-14	9.00	7,730	9.10	7,710	8.80	8,880
Nov-14	INACCESSIBLE		9.20	9,190	8.80	9,630
Dec-14			9.30	4,570	8.70	6,220
Average	**9.17**	**7,400**	**9.18**	**6,616**	**8.68**	**7,947**

AEMR Surface Water Monitoring Results
2014

Month	SW27/SW27a - North Wambo Creek Middle Lower				SW32/SW32a- North Wambo Creek Pump				SW05 - North Wambo Creek Down			
	pH	EC (uS/cm)	TSS (mg/L)	TDS (mg/L)	pH	EC (uS/cm)	TSS (mg/L)	TDS (mg/L)	pH	EC (uS/cm)	TSS (mg/L)	TDS (mg/L)
Criteria	6.0-9.5	2,140	120	N/A	6.0-9.5	2,140	120	N/A	6.0-9.5	2,140	120	N/A
Jan-14	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	7.30	1,772	86	957
Feb-14	8.50	662	1,490	1,850	9.20	609	2,140	640	7.70	1,020	77	513
Mar-14	8.40	453	234	792	8.40	350	224	676	7.80	343	412	988
Apr-14	7.90	435	170	675	7.80	502	408	601	7.30	600	48	356
May-14	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	8.50	892	30	597
Jun-14	8.60	1,669	89	1,130	8.80	1,659	88	947	7.30	1,512	8	904
Jul-14	DRY	DRY	DRY	DRY	7.50	607	103	980	7.20	1,070	13	660
Aug-14	8.00	553	520	710	7.90	353	585	515	7.50	298	11	378
Sep-14	9.00	1,663	58	1,070	9.00	1,002	9	560	7.40	802	12	474
Oct-14	DRY	DRY	DRY	DRY	8.80	1,429	32	902	7.30	1,273	6	744
Nov-14	8.40	1,322	48	804	DRY	DRY	DRY	DRY	7.60	1,721	45	1,040
Dec-14	7.90	394	860	1,090	7.80	454	2,940	1,050	7.20	516	266	510
Average	**8.34**	**894**	**434**	**1,015**	**8.36**	**774**	**725**	**763**	**7.51**	**985**	**85**	**677**

Month	SW06 - South Wambo Creek				SW07 - South Wambo/Stony Creeks				SW08 - Stony Creek			
	pH	EC (uS/cm)	TSS (mg/L)	TDS (mg/L)	pH	EC (uS/cm)	TSS (mg/L)	TDS (mg/L)	pH	EC (uS/cm)	TSS (mg/L)	TDS (mg/L)
Criteria	6.0-9.5	581	120	N/A	6.0-9.5	581	120	N/A	6.0-9.5	581	120	N/A
Jan-14	7.60	710	14	373	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY
Feb-14	8.10	658	193	285	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY
Mar-14	DRY	DRY	DRY	DRY	7.80	349	70	278	DRY	DRY	DRY	DRY
Apr-14	7.30	363	3	178	DRY	DRY	DRY	DRY	7.40	298	8	168
May-14	8.30	423	2	258	8.20	572	20	309	DRY	DRY	DRY	DRY
Jun-14	7.30	515	1	335	7.60	724	15	376	DRY	DRY	DRY	DRY
Jul-14	7.00	480	3	277	7.80	647	31	330	DRY	DRY	DRY	DRY
Aug-14	7.30	414	5	236	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY
Sep-14	7.20	454	17	239	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY
Oct-14	7.90	505	<1	272	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY
Nov-14	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY
Dec-14	7.40	514	17	239	7.30	394	122	214	DRY	DRY	DRY	DRY
Average	**7.54**	**504**	**28**	**269**	**7.74**	**537**	**52**	**301**	**7.40**	**298**	**8**	**168**

Month	SW03 - Wollombi Brook Pump Out					SW02 - Wollombi Brook Down				
	pH	EC (uS/cm)	TSS (mg/L)	TDS (mg/L)	O&G (mg/L)	pH	EC (uS/cm)	TSS (mg/L)	TDS (mg/L)	O&G (mg/L)
Jan-14	7.50	1,539	13	815	<5	7.70	1,007	1	502	<5
Feb-14	7.30	1,562	24	797	<5	8.30	961	3	474	<5
Mar-14	7.70	864	35	516	<5	7.70	988	2	526	<5
Apr-14	7.50	500	5	244	<2	7.80	534	3	272	<2
May-14	9.10	605	7	323	<2	8.10	655	6	387	<5
Jun-14	7.60	767	2	402	<2	7.70	825	3	468	<2
Jul-14	7.00	797	7	446	<2	7.20	936	1	552	<2
Aug-14	7.40	734	11	378	<2	7.30	1,095	1	547	<2
Sep-14	7.40	539	5	287	<2	7.60	590	2	293	<2
Oct-14	7.10	683	5	331	<2	7.80	825	7	416	<5
Nov-14	7.70	953	8	501	<2	7.80	1,011	9	524	<2
Dec-14	7.20	975	13	481	<2	7.50	995	6	470	<2
Average	**7.54**	**877**	**11**	**460**		**7.71**	**869**	**4**	**453**	

Month	SW43 - Longford Creek Up					SW44 - Longford Creek Down				
	pH	EC (uS/cm)	TSS (mg/L)	TDS (mg/L)	O&G (mg/L)	pH	EC (uS/cm)	TSS (mg/L)	TDS (mg/L)	O&G (mg/L)
Jan-14	7.80	495	30	280	<5	DRY	DRY	DRY	DRY	DRY
Feb-14	7.90	716	104	248	<5	DRY	DRY	DRY	DRY	DRY
Mar-14	7.70	461	150	730	<2	7.80	178	132	450	<2
Apr-14	7.60	379	212	911	<2	7.50	758	82	598	<2
May-14	8.30	369	87	532	<2	7.90	748	41	547	<2
Jun-14	7.60	455	112	484	<2	7.50	773	17	487	<2
Jul-14	7.70	541	22	435	<2	7.60	742	25	436	<2
Aug-14	7.00	125	32	125	<2	7.30	262	1,080	1,100	<2
Sep-14	7.50	350	9	283	<5	7.50	531	10	698	<2
Oct-14	8.40	8,490	15	183	<2	8.00	7,010	161	617	<2
Nov-14	7.80	463	235	414	<2					
Dec-14	7.30	344	1,100	1,110	<2	7.20	868	545	1,750	2.0
Average	**7.72**	**1,099**	**176**	**478**		**7.59**	**1,319**	**233**	**743**	

Month	SW46 - Doctors Creek Up					SW45 - Doctors Creek Down				
	pH	EC (uS/cm)	TSS (mg/L)	TDS (mg/L)	O&G (mg/L)	pH	EC (uS/cm)	TSS (mg/L)	TDS (mg/L)	O&G (mg/L)
Jan-14	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY
Feb-14	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY
Mar-14	7.50	623	25	420	<2	7.50	550	36	378	<2
Apr-14	7.60	965	59	578	<2	7.50	976	48	579	<2
May-14	8.40	3,900	4	2,460	<2	8.60	1,549	7	977	<2
Jun-14	8.70	10,560	12	6,630	<2	8.60	3,890	4	2,140	<2
Jul-14	8.70	11,460	8	7,010	<2	8.40	500	6	2,680	<2
Aug-14	8.00	542	142	351	<2	8.00	684	106	426	<2
Sep-14	8.50	2,750	26	1,580	<2	8.60	3,540	8	2,010	<2
Oct-14	DRY	DRY	DRY	DRY	DRY	8.90	5,240	55	2,880	2.0
Nov-14	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY
Dec-14	7.70	1,124	68	677	<2	7.60	770	58	518	<2
Average	**8.14**	**3,991**	**43**	**2,463**		**8.19**	**1,967**	**36**	**1,399**	

APPENDIX J

AEMR 2014
Groundwater Monitoring Results

	GW02 - Max's New Well				GW11 - Max's Extra Well			
Month	**pH**	**EC (uS/cm)**	**Depth to Water (m)**	**Temp (°C)**	**pH**	**EC (uS/cm)**	**Depth to Water (m)**	**Temp (°C)**
Criteria	**6.2-7.4**	**355-734**	**5.39-9.36**	**N/A**	**6.5-7.8**	**356-649**	**3.99-7.68**	**N/A**
Jan-14								
Feb-14	7.20	491	7.32	20.6	7.40	535	5.08	20.5
Mar-14								
Apr-14	7.00	461	6.66	20.0	7.20	526	4.26	20.0
May-14								
Jun-14	7.00	439	6.50	18.5	7.00	447	4.89	17.9
Jul-14								
Aug-14	7.30	444	6.82	18.0	7.30	483	5.18	17.1
Sep-14								
Oct-14	6.80	481	7.19	19.4	6.90	529	5.46	18.2
Nov-14								
Dec-14	7.00	494	7.40	19.5	7.10	550	5.61	18.9
Average	**7.05**	**468.33**	**6.98**	**19.33**	**7.15**	**511.67**	**5.08**	**18.77**

	GW08 - Old Well No. 1 (United Well 1)				GW09 - New Well No. 2 (United Well 2)			
Month	**pH**	**EC (uS/cm)**	**Depth to Water (m)**	**Temp (°C)**	**pH**	**EC (uS/cm)**	**Depth to Water (m)**	**Temp (°C)**
Criteria	**6.5-7.6**	**1660-2158**	**2.32-3.55**	**N/A**	**6.6-7.9**	**1215-2047**	**1.92-3.88**	**N/A**
Jan-14								
Feb-14	8.19	1,811	5.40		8.49	427	6.36	
Mar-14								
Apr-14	7.19	1,720	5.14		7.58	422	6.59	
May-14								
Jun-14	8.44	1,838	5.49		8.62	502	6.70	
Jul-14								
Aug-14	7.96	2,248	5.73		7.91	779	6.83	
Sep-14								
Oct-14								
Nov-14								
Dec-14								
Average	7.11	1,725	4.53		8.23	441	5.48	

	P106				P109				P110			
Month	pH	EC (uS/cm)	Depth to Water (m)	Temp (°C)	pH	EC (uS/cm)	Depth to Water (m)	Temp (°C)	pH	EC (uS/cm)	Depth to Water (m)	Temp (°C)
Criteria	6.1-8.1	292-1069	6.21-13.21	N/A	6.0-7.9	367-768	5.09-7.38	N/A	6.0-9.5	250-1,300	2.31-10.86	N/A
Jan-14												
Feb-14	DRY				6.70	693	5.49	20.0	7.10	676	5.19	19.3
Mar-14												
Apr-14	DRY				6.70	680	5.51	18.4	6.80	653	5.11	18.8
May-14												
Jun-14	DRY				6.80	692	5.54	18.2	6.90	704	5.20	18.6
Jul-14												
Aug-14	DRY				6.80	729	5.62	17.4	6.50	749	5.30	17.60
Sep-14												
Oct-14	DRY				6.50	697	5.69	17.7	6.00	763	5.42	17.7
Nov-14												
Dec-14	DRY				6.70	694	5.79	17.4	6.40	780	5.55	17.9
Average					6.70	697.50	5.61	18.18	6.62	720.83	5.30	18.32

	P111				P114 (South Dam)				P116 (South Dam)			
Month	pH	EC (uS/cm)	Depth to Water (m)	Temp (°C)	pH	EC (uS/cm)	Depth to Water (m)	Temp (°C)	pH	EC (uS/cm)	Depth to Water (m)	Temp (°C)
Criteria	6.0-9.5	300-715	5.54-9.20	N/A	6.3-8.2	458-715	6.02-7.79	N/A	6.3-7.8	181-8035	4.80-8.53	N/A
Jan-14												
Feb-14	8.10	777	6.75	17.3	6.50	6,600	5.69	20.2	7.10	1,002	5.61	20.7
Mar-14												
Apr-14	6.50	711	6.75	18.3	6.40	6,920	5.77	20.2	7.20	982	5.65	20.1
May-14												
Jun-14	6.90	709	6.79	18.5	6.60	6,970	5.80	19.9	7.40	1,012	6.03	20.0
Jul-14												
Aug-14	6.80	733	6.84	18.8	6.60	7,180	5.84	18.3	7.40	1,113	6.17	18.5
Sep-14												
Oct-14	6.70	699	6.89	18.2	6.50	6,730	5.94	18.8	7.10	1,290	6.27	19.3
Nov-14												
Dec-14	7.00	720	6.94	18.7	6.50	6,640	6.00	19.0	7.30	1,486	6.33	19.1
Average	7.00	724.83	6.83	18.30	6.52	6840.00	5.84	19.40	7.25	1147.50	6.01	19.62

	P202				P206			
Month	pH	EC (uS/cm)	Depth to Water (m)	Temp (°C)	pH	EC (uS/cm)	Depth to Water (m)	Temp (°C)
Criteria	6.4-7.9	2519-7616	6.81-11.35	N/A	7.1-8.5	1848-3175	18.34-22.72	N/A
Jan-14								
Feb-14	7.10	5,880	8.93	19.7	7.40	2,180	16.12	20.6
Mar-14								
Apr-14	7.20	5,950	8.07	19.1	7.30	2,190	16.37	19.1
May-14								
Jun-14	7.40	6,610	8.36	19.1	7.40	2,190	16.48	18.9
Jul-14								
Aug-14	7.30	8,900	8.31	18.7	7.30	2,180	16.49	19.0
Sep-14								
Oct-14	7.30	9,690	8.44	19.1	7.30	2,170	16.80	19.3
Nov-14								
Dec-14	6.90	10,520	8.80	18.9	7.40	2,150	16.98	19.7
Average	7.20	7925.00	8.49	19.10	7.35	2176.67	16.54	19.43

	P301				P315			
Month	pH	EC (uS/cm)	Depth to Water (m)	Temp (°C)	pH	EC (uS/cm)	Depth to Water (m)	Temp (°C)
Criteria	5.7-7.4	3045-12735	10.62-14.59	N/A	5.6-7.2	291-522	4.90-10.42	N/A
Jan-14								
Feb-14	6.70	6,600	15.79	20.9	6.90	417	8.31	21.0
Mar-14								
Apr-14	6.60	6,520	16.15	19.8	6.80	307	4.14	31.4
May-14								
Jun-14	6.80	5,170	15.29	19.5	6.40	387	5.99	20.3
Jul-14								
Aug-14	6.80	6,090	14.93	19.1	6.70	344	7.00	19.2
Sep-14								
Oct-14	6.80	5,770	15.14	20.2	6.30	327	7.33	19.7
Nov-14								
Dec-14	6.50	5,360	15.33	19.8	6.30	320	7.63	19.4
Average	6.70	5918.33	15.44	19.88	6.57	350.33	6.73	21.83

	GW 12				GW 13				GW14			
Month	pH	EC (uS/cm)	Depth to Water (m)	Temp (°C)	pH	EC (uS/cm)	Depth to Water (m)	Temp (°C)	pH	EC (uS/cm)	Depth to Water (m)	Temp (°C)
Criteria				N/A				N/A				N/A
Jan-14												
Feb-14	DRY				6.90	3,500	5.36	20.9	DRY			
Mar-14												
Apr-14	DRY				6.90	3,270	5.24	21.0	DRY			
May-14												
Jun-14	DRY				7.00	3,210	5.31	20.0	DRY			
Jul-14												
Aug-14	DRY				7.00	3,380	5.36	18.8	DRY			
Sep-14												
Oct-14	DRY				7.00	4,290	5.37	19.8	DRY			
Nov-14												
Dec-14	DRY				7.00	3,740	5.51	19.3	DRY			
Average					6.97	3565.00	5.36	19.97				

	GW15	GW16	GW17

Month	pH	EC (uS/cm)	Depth to Water (m)	Temp (°C)	pH	EC (uS/cm)	Depth to Water (m)	Temp (°C)	pH	EC (uS/cm)	Depth to Water (m)	Temp (°C)
Criteria												
Jan-14												
Feb-14	7.20	671	10.91	20.5	7.80	666	8.52	20.3	7.50	5,080	11.17	21.1
Mar-14												
Apr-14	6.80	606	10.91	20.3	7.50	688	8.69	18.9	7.10	5,160	11.31	19.5
May-14												
Jun-14	7.00	627	10.88	19.4	7.40	705	8.68	18.8	7.10	5,160	11.43	19.1
Jul-14												
Aug-14	6.70	609	10.92	20.1	7.30	719	8.78	18.8	7.20	5,250	11.39	19.2
Sep-14												
Oct-14	6.80	617	10.96	21.1	7.50	823	9.01	19.1	7.20	5,270	11.46	19.8
Nov-14												
Dec-14	6.90	610	11.10	20.5	7.40	824	9.40	18.9	7.00	5,300	11.58	19.6
Average	**6.90**	**623.33**	**10.95**	**20.32**	**7.48**	**737.50**	**8.85**	**19.13**	**7.18**	**5203.33**	**11.39**	**19.72**

	GW18				GW19			
Month	**pH**	**EC (uS/cm)**	**Depth to Water (m)**	**Temp (°C)**	**pH**	**EC (uS/cm)**	**Depth to Water (m)**	**Temp (°C)**
Criteria								
Jan-14								
Feb-14	DRY				DRY			
Mar-14								
Apr-14	DRY				DRY			
May-14								
Jun-14	DRY				DRY			
Jul-14								
Aug-14	DRY				DRY			
Sep-14								
Oct-14	DRY				DRY			
Nov-14								
Dec-14	DRY				DRY			
Average								

	GW21				GW22			
Month	**pH**	**EC (uS/cm)**	**Depth to Water (m)**	**Temp (°C)**	**pH**	**EC (uS/cm)**	**Depth to Water (m)**	**Temp (°C)**
Criteria								
Jan-14								
Feb-14	DRY				8.30	6,700	35.68	21.8
Mar-14								
Apr-14	DRY				8.30	6,730	35.76	21.2
May-14								
Jun-14	DRY				8.50	6,780	35.82	20.8
Jul-14								
Aug-14	DRY				8.40	6,880	35.81	21.2
Sep-14								
Oct-14	DRY				8.30	6,910	35.74	21.5
Nov-14								
Dec-14	DRY				8.30	6,780	35.74	22.0
Average					**8.35**	**6796.67**	**35.76**	**21.42**

Month	P1			P5		
	pH	EC (uS/cm)	Depth to Water (m)	pH	EC (uS/cm)	Depth to Water (m)
Criteria	6.5-7.3	6,924-10,053	20.12-30.18	7.0-7.9	1,638-5,107	3.56-8.35
Jan-14						
Feb-14	6.86	8390	26.20	7.6	858	10.87
Mar-14						
Apr-14	7.77	7480	26.03	REMOVED FROM MONITORING		
May-14						
Jun-14	8.02	7950	26.07			
Jul-14						
Aug-14	6.91	9,780	25.80			
Sep-14						
Oct-14	6.98	7,990	25.51			
Nov-14						
Dec-14	6.71	7,420	25.47			
Average	**7.21**	**8168.33**	**25.85**			

Month	P11			P12		
	pH	EC (uS/cm)	Depth to Water (m)	pH	EC (uS/cm)	Depth to Water (m)
Criteria	6.4-7.6	13035-20646	4.60-36.27	6.0-9.5	2,800-8,820	5.75-7.77
Jan-14						
Feb-14	DRY	-		7.9	523	7.40
Mar-14						
Apr-14	DRY	-		7.35	1393	7.23
May-14						
Jun-14	DRY	-		7.61	684	7.12
Jul-14						
Aug-14	DRY			6.83	847	7.03
Sep-14						
Oct-14	DRY	-		7.01	754	6.96
Nov-14						
Dec-14	DRY	-		7.24	868	7.18
Average				**7.32**	**844.83**	**7.15**

Month	P13			P15			P16		
	pH	EC (uS/cm)	Depth to Water (m)	pH	EC (uS/cm)	Depth to Water (m)	pH	EC (uS/cm)	Depth to Water (m)
Criteria	6.0-9.5	1,000-3,200	5.96-7.98	6.0-9.5	2,900-22,000	5.46-6.42	6.0-9.5	3,800-22,700	6.47-7.37
Jan-14									
Feb-14	7.16	1015	7.54	7.68	7,160	6.55	7.43	8,580	7.77
Mar-14									
Apr-14	6.87	1,068	7.37	7.48	6,540	6.38	7.43	7760	7.49
May-14									
Jun-14	7.11	1086	7.32	8.24	6900	6.28	8.13	8080	7.46
Jul-14									
Aug-14	6.00	1,341	7.37	7.25	8,570	6.38	7.19	10,000	7.37
Sep-14									
Oct-14	6.38	1,133	7.27	7.95	7,170	6.39	7.39	8,250	7.34
Nov-14									
Dec-14	6.28	1,115	7.48	7.77	6,640	6.69	7.28	7,510	7.62
Average	**6.63**	**1126.33**	**7.39**	**7.73**	**7163.33**	**6.45**	**7.48**	**8363.33**	**7.51**

Month	P17			P18			P20		
	pH	EC (uS/cm)	Depth to Water (m)	pH	EC (uS/cm)	Depth to Water (m)	pH	EC (uS/cm)	Depth to Water (m)
Criteria	6.0-9.5	8,900-17,000	5.25-6.21	6.0-9.5	4,450-22,000	6.48-7.53	6.0-9.5	4,750-22,800	6.83-7.86
Jan-14									
Feb-14	7.49	10450	6.56	7.48	8580	7.99	7.40	10840	8.33
Mar-14									
Apr-14	7.66	9040	6.51	7.64	7960	7.75	7.51	10140	7.94
May-14									
Jun-14	8.29	9120	6.31	8.22	7970	7.73	8.09	10100	7.08
Jul-14									
Aug-14	7.53	11,310	6.15	7.20	9,940	7.51	7.04	12,390	7.91
Sep-14									
Oct-14	7.57	9,490	9.19	7.42	8,100	7.42	7.39	9,890	7.81
Nov-14									
Dec-14	7.42	8,470	9.51	7.36	7,460	7.66	7.27	9,150	8.01
Average	**7.66**	**9646.67**	**7.37**	**7.55**	**8335.00**	**7.68**	**7.45**	**10418.33**	**7.85**