WHITEHAVEN COAL

Whitehaven Coal Mining Pty Ltd

ABN: 65 086 426 253

Annual Environmental Management Report & Annual Review

Rocglen Coal Mine

ML 1620, MPL 1662 & PA 10_0015

1 August 2011 – 31 July 2012

Whitehaven Coal Mining Pty Ltd

Annual Environmental Management Report and Annual Review

for the

Rocglen Coal Mine

(ML 1620, MPL 1662 and PA 10_0015)

MOP Commencement Date ***01-10-2011*** – MOP Completion Date ***30-07-2013***

AEMR Commencement Date ***01-08-2011*** – AEMR Completion Date ***31-07-2012***

Whitehaven Coal Mining Pty Ltd

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Reporting Officer: Danny Young

Title: Group Environmental Manager

Signature: _____

Date: _____

Distribution:

- Office of Environment and Heritage/Environment Protection Authority
- Department of Planning and Infrastructure
- NSW Trade and Investment, Regional Infrastructure & Services – Division of Resources and Energy
- NSW Trade and Investment, Regional Infrastructure & Services – Primary Industries, Food and Water
- NSW Office of Water
- Gunnedah Shire Council
- Rocglen Coal Mine Community Consultative Committee

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1 INTRODUCTION AND OBJECTIVES

1.1 Scope

1.1.1 Introduction and Period of Reporting

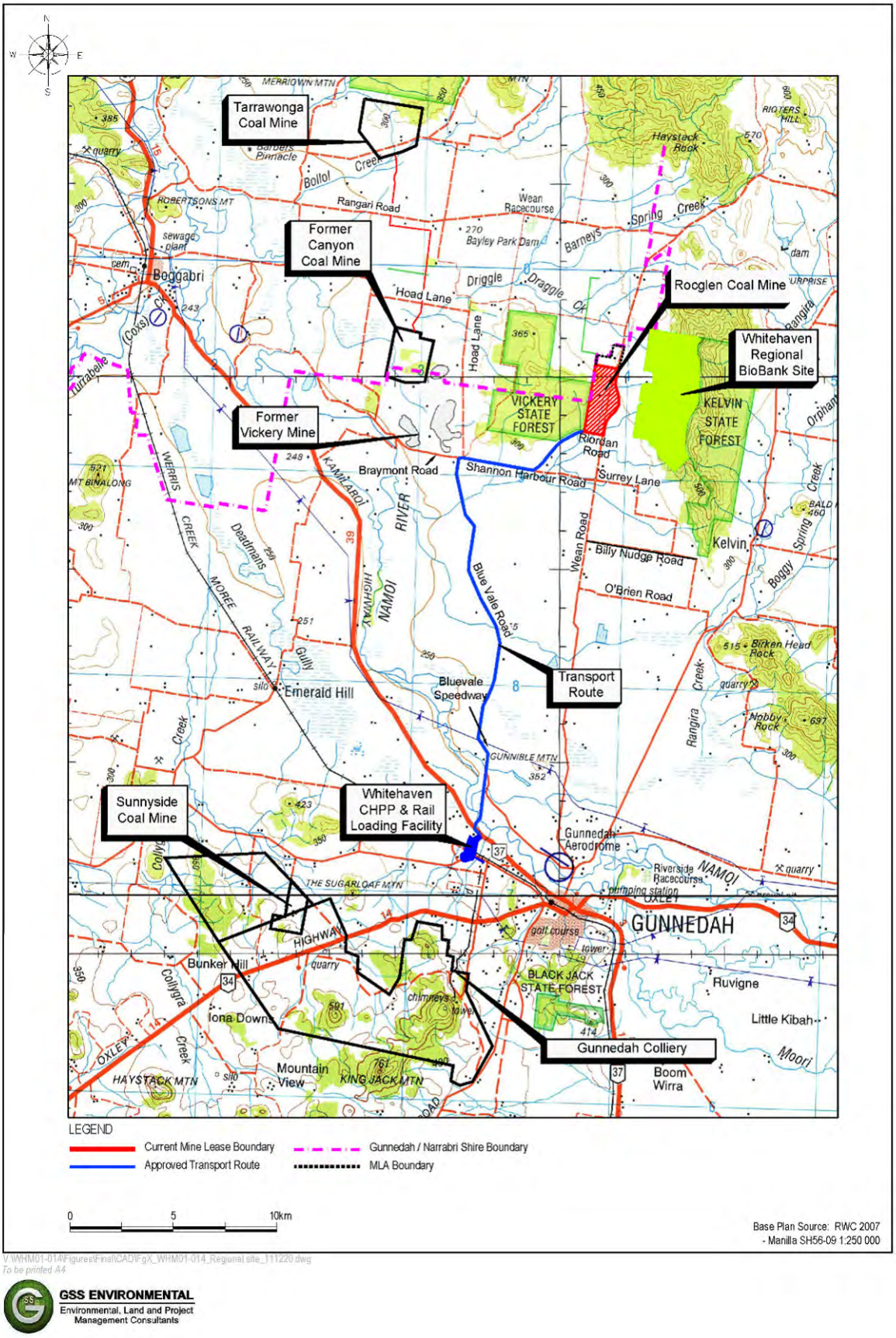
This is the fourth Annual Environmental Management Report (AEMR) produced for the Rocglen Coal Mine, and it has been prepared in accordance with Conditions 4 and 5 of Mining Lease (ML 1620) (Mining Act 1992), Condition 4 of Mining Lease Purposes (MPL 1662) and Clause (c) of Environmental Monitoring and Reporting in the Statement of Commitments within PA 10_0015. For the first two months of the reporting period, (1st August to 27th September 2011) Rocglen was operating under the former PA 06_0198 MOD 1. This report will in general address the requirements of PA 10_0015, with reference made to PA 06_0198 MOD 1 where applicable. The AEMR generally follows the format identified in the Department of Primary Industries Mineral Resources (DPI-MR) document entitled *"Guidelines to the Mining, Rehabilitation and Environmental Management Process"* Version 3, dated January 2006. It also addresses Condition 3 (Schedule 5) of PA 10_0015 which requires provision of an Annual Review and is herein referred to as an AEMR/Annual Review.

Though primarily covering the period from 1st August 2011 to 31st July 2012 (the reporting period), where relevant the AEMR/Annual Review provides information on historical aspects of the operations, longer term trends in environmental monitoring results and provides relevant information on activities to be undertaken during the ensuing period (i.e. from 1st August 2012 to 31st July 2013) or beyond.

The Rocglen Coal Mine (RCM) is located approximately 28km north of Gunnedah (Figure 1).

1.1.2 The Company

The Rocglen Coal Mine is owned by Whitehaven Coal Limited (WCL) and operated by Whitehaven Coal Mining Pty Ltd (WCMPL). WCMPL is a wholly owned subsidiary of WCL, a publicly listed company which has several coal mining interests in the Gunnedah Basin NSW.



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GSS ENVIRONMENTAL
Environmental, Land and Project Management Consultants

Figure 1 - Locality Plan

1.1.3 Background and History of the Rocglen Coal Mine

The Rocglen Coal Mine was initially approved on the 15th April 2008 under PA 06_0198 with a minor modification (PA 06_0198 MOD 1) granted in May 2010 to address highwall stability issues. Whitehaven submitted a Project Application, and accompanying Environmental Assessment, under Part 3A of the *Environmental Planning and Assessment Act 1979* in March 2010. PA 10_0015 was issued on the 27th September 2011 and allows for additional extraction of up to 5 million tonnes of coal at a maximum recovery rate of 1.5 million tonnes per annum (i.e. increased projected life of the operation for coal extraction by up to four years).

The external boundary of ML 1620 and MPL 1662 corresponds to the area referred to in PA 10_0015 (see Section 1.2.2 for details on the modification) and covers an area of approximately 460 hectares.

1.1.4 Products and Markets

Coal within the Rocglen coal deposit can be described as a high volatility coal which will produce a medium sulphur thermal/PCI coal with ash percentages currently ranging from <10% (low ash PCI) up to 25% (high ash thermal).

All coal produced at Rocglen (0-50mm, raw and washed) is exported for use in heating or power generation.

1.1.5 Operational and Environmental Management

1.1.5.1 Contacts

The management personnel responsible for operational and environmental performance at the Rocglen Coal Mine and their relevant contacts are as follows:

- Mr Mick Tucker, Manager Mining Engineering - retains statutory responsibility for mining activities at the site. Contact: (02) 6740 7000.
- Mr Peter Wilkinson, General Manager, Operations - oversees open cut operations for the Whitehaven Group. Contact: 0429 668 397.
- Mr Danny Young, Environmental Manager – oversees overall environmental and rehabilitation performance across the site. Contact: (02) 6741 9321, 0427 497 710.

- Mr Duncan McGregor, Environmental Officer – oversees day to day environmental performance across the site. Contact: (02) 6740 7000.

Mining operations are undertaken by Whitehaven Coal Mining Pty Ltd personnel. The day-to-day operational responsibilities are allocated to the Operations Manager, Mr Jason Conomos. Contact: (02) 6740 7000.

1.1.5.2 Support Personnel

In addition to the personnel identified in Section 1.1.5.1, Whitehaven utilises specialist assistance as and when required. Specialist environmentally-based or related companies or consultants involved in activities at the mine during the reporting period included:

- Countrywide Ecological Services;
- GSS Environmental Pty Ltd;
- Orica Blasting Limited;
- Greg Ward Earthmoving Solutions;
- Fields Tree Planting Services;
- Novecom Pty Ltd;
- Eco Logical Australia Pty Ltd;
- ALS Acirl; and
- Spectrum Acoustics Pty Ltd.

All mining and environmental management activities are undertaken generally in accordance with the MOP, management plans and procedures prepared in satisfaction of Rocglen's Mining Leases, Environment Protection Licence, Project Approval and the relevant legislation.

1.1.6 Corporate Occupational Health, Safety and Environmental Policy

Whitehaven Coal intends to conduct business in a way that maintains a safe and healthy workplace for its workers visitors and the surrounding community, and protect the environment in all stages of exploration, project development and construction, mining, processing and train loading.

Whitehaven Coal aims to:

- Achieve zero workplace injuries and illnesses.
- Achieve zero plant and equipment damage.
- Achieve zero environmental incidents.

Whitehaven Coal will strive to achieve these goals by:

- Considering health, safety, welfare and environmental matters when planning and completing work activities.
- Consulting and communicating in a fair and effective manner regarding health, safety, welfare and environment matters.
- Having in place processes for identifying hazards and eliminating or minimising health, safety, welfare and environmental risks and impacts.
- Having in place processes for receiving and considering information regarding incidents, hazards, and risks and impacts, and responding to that information in a timely way, including learning's applied and shared.
- Working to improve safety and environmental performance through continuous improvement.
- Providing an effective injury management and return to work program for employees. Complying with applicable health, safety and environmental legal and other requirements.
- Providing workers with necessary health, safety, welfare and environment information, instruction, training and supervision to allow for the safe performance of their work.
- Making available for use, and using, health, safety, welfare and environment resources and processes to implement and maintain the requirements of this Policy and associated health, safety, welfare and environment management systems.
- Verifying the availability and use of health, safety and welfare resources and processes.

Responsibilities of Workers:

- Workers have a responsibility to comply with the applicable legislation, this policy and associated health, safety and environment management systems. No work is to

be undertaken without a clear understanding of a safe method that minimises the risk of injury or illness, plant or equipment damage and environmental harm.

- Workers must take reasonable care for their own health and safety and have an obligation to take reasonable care that their acts or omissions don't adversely affect themselves or the health and safety of others at the operation.
- Workers must also comply with any reasonable instruction given by Whitehaven Coal and cooperate with any reasonable policy or procedure relating to health or safety notified to them.

This policy applies to all sites managed by Whitehaven Coal and its subsidiaries, and to all workers, visitors and clients of Whitehaven Coal.

1.2 Approval Status

1.2.1 Leases, Licences and Approvals

Table 1 identifies the leases, licences and approvals in place for the Rocglen Coal Mine at the end of the reporting period, the issuing / responsible Authority, dates of issue, duration (where limited) and relevant comments. The list is presented chronologically according to the date of issue.

Reviews of compliance/performance with the conditions identified in PA 10_0015 (Appendix 1), EPL 12870 (Appendix 2), ML 1620 and MPL 1662, are presented in Appendix 3, Tables A3-1, A3-2 and A3-3 respectively.

Table 1 - Tenements, Licences and Approvals

Issuing / Responsible Authority	Type of Lease, Licence, Approval	Date of Issue	Expiry	Comments
Department of Mineral Resources*[1]	Exploration Licence (EL 5831)	6th April 2001 (Renewed 15th August 2003 and 11th November 2008)	5th April 2013	Approval for exploration
Minister for Planning	Project Approval (PA) 06_0198	15th April 2008	10th June 2020	Original approval for the mine
Department of Environment and Climate Change*[2]	Environment Protection Licence No. 12870 (Appendix 2)	31st July 2008	Nil Anniversary date: 31st July	Approval granted for Mining for Coal and Coal Works to 2 Mtpa.
Department of Primary Industries*[1]	ML 1620	10th June 2008	9th June 2029	Approval of open cut
Department of Water and Energy (DWE)*[3]	Water Licence 90BL254855 90BL254856 90BL254857 90BL254858 90BL254859 90BL110883 90BL104367 90BL102845	Various	Nil	Used for groundwater monitoring purposes
	90BL254684	12th May 2009	11th May 2014	700ML aquifer interference
	90BL254758 90BL255249	18th Jan 2010 18th Jan 2010	17th Jan 2015 17th Jan 2015	120ML mining
Minister for Planning	Project Approval (PA) 06_0198 MOD 1	27th May 2010	10th June 2020	Notice of Modification for highwall stability works
Minister for Planning and Infrastructure	Project Approval (PA 10_0015) Extension (Appendix 1)	27th September 2011	31st December 2022	Extension Approval
Department of Trade and Investment, Regional Infrastructure and Services, Division of Resources and Energy (DTIRIS)	Mining Operations Plan (MOP)	1st October 2011	30th September 2013	Mining Operations Plan for Extension Approval
Department of Sustainability, Environment, Water, Population and Communities	Environmental Protection and Biodiversity Conservation Act (EPBC 2010/5502) Approval	21st December 2011	16th November 2025	Approval for subsequent disturbance of threatened and migratory species due to extension approval
Minister for Resources and Energy	MPL 1662	9th January 2012	9th January 2033	Mining Purposes Lease for extension approval

*[1] Now, Department of Trade and Investment, Regional Infrastructure and Services, Division of Resources and Energy (DTIRIS – DRE)
*[2] Now, Office of Environment and Heritage (OEH)/Environment Protection Authority (EPA)
*[3] Now, NSW Office of Water (NOW)

1.2.2 Amendments to Leases, Licences and Approvals

Amendments to leases, licences and approvals for the mine are as follows:

- Exploration Licence (EL 5831) – no changes were made during the reporting period as renewal is not required until 5th April 2013.
- Whitehaven prepared an application for a Project Approval under Part 3A of the EP&A Act to expand operations in order to maximise resource recovery and allow for improved mine progression. The Environmental Assessment (EA) was submitted on the 13th January 2011 and was placed on public exhibition during March/April 2011. Whitehaven received the Project Approval on 27th September 2011, less than two months into the reporting period.
- Environment Protection Licence (EPL No. 12870)
  - EPL 12870 was re-issued on 20th December 2011 to include the requirement for a site specific Best Management Practice determination to be conducted to identify the most practicable means to reduce particulate emissions. This investigation report has been issued to the EPA and is available on Whitehaven's website.
  - EPL 12870 was varied in June 2012 to include:
    - Removal of monitoring points located on project related properties, namely deposited dust and continuous PM_{10} monitoring points;
    - Relocation of the northern discharge point further north to allow for the expansion of the northern emplacement;
    - Relocation of the meteorological station from the "Glenroc" property to the "Costa Vale" property;
    - Inclusion of continuous PM_{10} monitoring;
    - Relocation of attended noise monitoring point to "Retreat" from the project related "Costa Vale" property; and
    - Inclusion of the portable real time noise monitoring unit.

  The varied licence also included more comprehensive requirements for undertaking attended noise monitoring and clearer definition of what constitutes unfavourable conditions (inversions) for noise monitoring.
- Mining Lease (ML 1620) – no changes were made during the reporting period. Mining Purposes Lease (MPL 1662), adjoining the northern boundary of ML 1620,

was granted in January 2013 upon receiving the extension approval to allow expansion of the northern emplacement.

- Water Licences – no changes were made during the reporting period.
- Following the grant of the extension approval in September 2011, a new MOP was submitted to DRE for review. Approval of the MOP was issued in October 2011. The MOP was subsequently amended in May 2012, to become consistent with blasting frequency in PA 10_0015, from two blasts per day to the approved one per day.

1.3 Actions Requested at Previous AEMR Review

1.3.1 Division of Resources and Energy

The report for the 2010/2011 AEMR for the Rocglen Coal Mine was reviewed initially by DRE with comments received on 12th December 2011. Commendations included:

- Planting of 1680 trees;
- Implementation of the environmental awareness program; and
- Trialling organic material on rehabilitation

The letter noted that the Landscape Management Plan and Rehabilitation and Offset Management Plan were still in development and requested continued consultation with the Department in development of management plans. Those particular plans are not required under PA 10_0015, however Whitehaven has maintained ongoing consultation with DRE where required in the development of new plans.

A site inspection was undertaken by DRE on the 24th April 2012 with the following commendations:

- General compliance with the relevant approval instruments including the AEMR and MOP.
- Hydrocarbon, chemical and water management in the workshop area.

The approval letter supported the use of a more active liquid/slurry flocculant and Whitehaven's commitment to further investigations in relation to water management.

Rocglen has used the more active Magnafloc LT425 flocculant with effect during this reporting period, along with the trial of gypsum based liquid flocculant.

1.3.2 Department of Planning and Infrastructure

The Department of Planning and Infrastructure also reviewed the 2010-11 AEMR and considered the report to be well presented with the explanations and photographs being clear and helpful in the Department's review of the operation. They did, however, raise a number of concerns and questions which were addressed by Whitehaven in a letter to the Department dated 20th June 2012. The issues and responses provided are summarised in Table 2.

Table 2 - Department of Planning and Infrastructure Review and Responses

Request/Recommendation	Whitehaven Response
The production figures in Table 2 and in Section 2.5.1 seem to differ. Please provide clarification as to this difference.	The ROM coal numbers are the same in both Table 2 and Section 2.5.1. If you minus washery output from washery input in Figure 2, you get 267,707 which matches Table 2. The only difference noted is Product in Table 2 (971,440) versus Coal Sales in Figure 2 (979,831). Product relates to product produced at the CHPP. Coal Sales relates to coal railed to port. It would be very unlikely that these numbers match exactly due to stockpile volumes either side of the reporting period. Product produced in the reporting period is not necessarily sold in the reporting period. Therefore the fact that we railed ~8,000 more tonnes than we produced indicates that there was product coal left over in stockpiles at the washery from the previous reporting period.
Table 4, and the text immediately preceding indicate that water from the CHPP tailings pond leachate with an electrical conductivity of 2770 uS/cm is considered to be "of a quality suitable for general agricultural uses". Water of this salinity level may be considered unsuitable for many agricultural purposes. Would you please check the criterion that is used to made this statement and confirm that it is correct?	According to Paper No. 4 Australian and New Zealand Guidelines for Fresh and Marine Water Quality, Volume 3, Primary Industries (irrigation and general water uses, stock drinking water, aquaculture and human consumers of aquatic foods). Table 9.2.5 classes the salinity rating as medium for this water and suitable for moderately tolerant crops. There is no rating of electrical conductivity for livestock drinking water.
Section 2.8.3 sets out the events that led to discharges of surface water that exceed the criterion for TSS in discharged water on at least 4 occasions. It is noted that the rainfall records do not support the contentions that the period up to December was particularly wet. Rainfall appears to have been either average or not particularly above average for most months (with the exception of November). The mine should be in a position to effectively manage surface water flow and quality on its site. The Department has over many years drawn the company's attention to the need to invest time and effort in managing surface waters (such as at the Tarrawonga Mine) and the need to investigate, and subsequently implement, the effective use of flocculants to control TSS levels in surface waters.	As displayed in section 2.8.3 Discharges occurred over the period of August 2010 to December 2010. The total Rainfall that fell from August 2010 to December 2010 at the Rocglen site was 355 mm. In comparison the total long term average rainfall for this period in the Gunnedah area is 268 mm. Although 68.7 mm of the 87 mm of additional rain fell during November 2010 and December 2010, the ability to use this excess water on site was constrained by actions to utilise water that was held in pit and was impacting on capacity for the site to continue production. Rocglen acknowledges that measures need to be in place to adequately cater for these events, however, trialling of alternate flocculants, has not proven as effective as required to achieve a faster control of sediment levels in site storages. As described in Section 2.8.3 flocculation was applied in advance of all discharge events and allowed controlled discharges to occur on the 2nd of November and 1st of December. Unfortunately the initial flocculation method ('Floc Blocks') was very slow to take effect and out of the 4 flocculation attempts between August 2010 and September 2010 only 1 was successful in reducing TSS levels below 50 mg/L. Subsequently Whitehaven began investigating alternative flocculation methods in October 2010. A new liquid flocculent (Magnafloc LT 425) that is faster acting was lab tested and used from October 2010 to December 2010. A low flow pump was also purchased specifically for the flocculation process. Between the period of October 2010 and December 2010 out of the 4 liquid flocculation attempts 3 were successful in reducing TSS levels below 50 mg/L. During later attempts outside the 2010-2011 reporting period, issues began to arise with the use of liquid flocculation due

Request/Recommendation	Whitehaven Response
	to it being difficult to floc 8 discharge dams at the same time (2 at Rocglen and 6 at Tarrawonga) during wet weather. For this reason Whitehaven engaged EnviroPacific Services in February 2012 to investigate improvements in flocculation methods. Trials are currently underway investigating application of new flocculants to the surface of dams via water cart cannons. The aim is to find a flocculent that can be applied quickly and reduce TSS levels of >400 mg/l to <50 mg/L within a 24hr period. In addition, with the approval of the Rocglen Extension Project new water management structures have been under construction since October 2011. Construction of clean water drains, dirty water drains and five new sediment basins has allowed for an additional 30 megalitres of storage to the north of the site. To the south, the western rehabilitation area has been redesigned with the specific objective to hold and slow water that eventually drains south into Licenced Discharge Point SD3. This has been achieved through the construction of four new contours (designed by GSS Environmental) and mounding/seeding on the western slope. New drainage systems slowly move water off the slope through a network of watercourses lined with American Green (reinforced erosion and sediment control matting), rock structures and hay bales acting as sediment filters. The water then follows a drain running south that consists of a long series of sediment sumps that provide further storage and settling before the water eventually enters SD3. From the information provided above it should be evident that Whitehaven has clearly been investigating the effective use of flocculants to control TSS levels in surface waters, and that time and effort has been invested into managing surface waters on the Rocglen site. Making improvements to flocculation is a gradual and continuous process of which Whitehaven will continue to refine in order to reduce the risk of discharging water exceeding the TSS limit.
It would also appear that the site has not established effective sampling points for the discharging waters to ensure that representative samples are obtained. If this is a problem, then the company should address this by engineering a sampling point to overcome the risk of disturbing sediments during the water sampling process.	With the approval of the Rocglen Extension Project new water management structures have been under construction since October 2011. This included construction of a new northern discharge point which was finalised in mid February 2012. Under the Extension Water Management Plan the upstream (DDCK) and downstream (UNDC) monitoring points have been moved to more appropriate locations.
Page 44 identifies the need for two of the groundwater monitoring bores to be deepened and the installation of additional bores to the south of the mine to monitor any impacts to the Namoi alluvium. Please ensure that this matter is addressed in the soon to be provided Water Management Plan.	This matter has been addressed in the Water Management Plan provided.

Request/Recommendation	Whitehaven Response
Overall, the Department is concerned about the difficulty the company has exhibited in the management of surface waters and the establishment of vegetation on the rehabilitation areas of the mine. However the Department considers the AEMR report itself is well-presented, and the explanations and photographs contained within the report are clear and helpful in the Department's review of the operation.	The management of surface waters is discussed above. Section 5.3 of the AEMR identifies the ongoing attempts by Whitehaven to establish vegetation on rehabilitation areas. This includes manure compost trials, humus compost trials, introducing mounding and tree planting/seeding. Whitehaven is continuing to work on improving vegetation establishment and outside the 2010-2011 AEMR period has introduced a new mounder and mounding methods, applied gypsum to improve topsoil structure and engaged Fields Environmental Solutions to continue tree planting and provide advice on the rehabilitation area.

2 SUMMARY OF OPERATIONS

2.1 Exploration, Resources / Reserves and Mine Life

2.1.1 Exploration

During the period between 11th June 2011 and 10th June 2012 (geology reporting period), 22 non-cored exploration boreholes totaling 2066m and 3 partially cored NGERS gas testing boreholes totaling 266.33m were drilled within ML 1620. Total drilling was 2332.33m.

2.1.2 Resources and Reserves

The mineable coal seams present within the open cut are listed below in increasing depth from the surface. Average thicknesses and thickness ranges have also been listed.

- Upper Glenroc: 0.8 – 5.95m, average 2.65m
- Lower Glenroc: 0.85 - 5.3m, average 2.0m
- Belmont: 4.22 – 12.0m, average 7.0m

All three seams tend to thicken on the eastern limb of the anticline, although many of the thicker intersections are artificially inflated by steeper dips.

The open cut coal resource for the project site totals 19.2Mt Recoverable open cut coal reserves total 13.0Mt.

2.1.3 Estimated Mine Life

Based on an average production rate of 1.5Mta, the mine life is approximately 11 years with closure anticipated in 2022, as specified in the current MOP (approved 1st October 2011).

2.2 Land Preparation

Land preparation activities undertaken at the mine during the reporting period were conducted in accordance with commitments identified in the current MOP and included:

- Vegetation removal in four different vegetation communities for mining and waste emplacement areas. All clearing works were undertaken following a pre-start fauna clearing check by Eco Logical Australia.

These communities are:

- White Cypress Pine – Narrow-leafed Ironbark woodland;
- Pilliga Box – Poplar Box – White Cypress Pine grassy open woodland;
- Poplar Box grassy woodland; and
- Cleared lands

- Stripping of topsoil, subsoil and friable overburden over an area of approximately 86.6ha. Soil stripped during the reporting period comprised soil types as identified in the MOP:
  - Soil Unit 1 - Brown Chromosol
  - Soil Unit 2 - Black Verosols
  - Soil Unit 3 - Brown Dermosols
- During the reporting period, a total of 269,275 m^3 topsoil and subsoil was stripped and stockpiled. The volume of soil stripped is higher than previous years due to expansion of the northern emplacement. Existing stockpile locations are shown on Plan 3.

Table 3, the "Production and Waste Summary", shows that at the end of the reporting period, 33,600 m^3 topsoil and subsoil had been replaced for rehabilitation purposes.

Table 3 - Production and Waste Summary

	Cumulative Production			
	Start of Reporting Period (up to 31/7/11)	**During Reporting Period (1/8/11 to 31/7/12)**	**Cumulative Total at End of Reporting Period**	**Cumulative Total at End of next Reporting Period (estimated)**
Soil Stripped (m^3)	96,990	269,275	366,265	384,265
Soil Used/Spread (m^3)	31,135	33,600	64,735	194,335
Waste Rock (m^3)	14,132,202	14,703,796	28,835,998	40,146,611
ROM Coal (t)*	2,206,324	1,280,345	3,486,669	4,736,669
Processing Waste (t)**	406,388	246,592	652,980	899,572
Product (t)	1,851,116	1,094,775	2,945,891	4,040,666

* ROM Coal is total production at the mine site. The difference between ROM Coal and final product is related to changes in stockpile volumes both at the mine and the CHPP during the reporting period.

** Rocglen waste produced at Whitehaven CHPP.

2.3 Construction

Construction activities over the last 12 months have generally been limited to water storage facilities, namely Dams A1, A2, B and the relocated void water dam.

2.4 Mining

2.4.1 Mining Method

All mining during the reporting period was undertaken by open cut methods using the techniques identified in the MOP, namely:

- Separate topsoil and subsoil removal by open bowl scraper;
- Friable overburden removal by scraper and/or truck and excavator;
- Drilling and blasting the underlying competent overburden;
- Overburden (and interburden) removal by bulldozers and/or excavator and dump trucks, with the overburden placed in waste emplacements; and
- Coal extraction by excavator loading into haul trucks for transport to the ROM stockpile.

All coal was assessed in pit and depending on the quality was classified into "high ash" and "low ash" for stockpiling. The in-pit classification determines the form of subsequent processing undertaken on-site or off-site. During the reporting period, a total of 11,310,613 Bulk Cubic Meters (BCM) (or 14,703,796 m^3, assuming a swell factor of 1.3) friable and competent overburden was removed to produce 1,280,345 tonnes of ROM coal at an average overburden:coal stripping ratio of 8.8:1 (See Table 3).

Plan 4 presents the status of mine and infrastructure development as of 31st July 2012. The plan also identifies the limit of mining at the commencement of the reporting period.

During the reporting period, the mine was developed as a series of approximately 100 m wide strips. The pit advanced approximately 200m in an easterly direction through previously cleared land, toward the re-aligned Wean Road and 200m in a north westerly direction into a vegetated area consisting of White Cypress Pine, Narrow-leafed Ironbark, Pilliga Box and Poplar Box. The pit is currently approximately 900m wide and 1,500m in length.

2.4.2 Mining Constraints

Day to day mining activities at the mine is primarily constrained by economic considerations which, in turn, are determined to a large extent by factors beyond Whitehaven's control (i.e. coal price and demand). Economic factors determine the viable overburden:coal stripping ratio and hence the lateral extent of mining undertaken.

Other constraints to mining operations at the mine have included or continue to include:

- Stability issues associated with the highwall in the north-eastern section of the pit;
- The depth of weathering of the coal seams which influences the volume of overburden requiring removal to access the coal;
- The potential presence of faulting within the seam structure which may influence the sequence and possibly the method of mining;
- The potential for an uneven coal seam floor which could potentially complicate vehicular access to the coal;
- The potential for thickening of stone bands within the coal seams;
- Final landform design to allow for re-establishment of class III capability land, with final slopes of the open cut area to be 18 degrees or less and slopes on the reshaped waste emplacement to be 10 degrees or less;
- Existence of Aboriginal sites within both Mining Leases.

Routine work procedures are in place for highwall stability management including regular inspections and advice from a geotechnical engineer.

2.4.3 Mining Equipment

Table 4 presents a list of mining equipment in use at the mine at the end of the reporting period, together with its principal function(s).

Table 4 - Mining Equipment

Item (or equivalent)	No. on site	Function
Excavator (Hitachi EX1900)	1	Overburden and coal loading
Excavator (Hitachi EX 3600-6)	1	Overburden excavation and loading
Excavator (Hitachi EX 2500)	1	Overburden excavation and loading
Excavator (CAT 330B)	1 (p/t)	Drainage, windrows etc
Rear Dump Truck (CAT 785C)	7	Overburden/coal haulage
Rear Dump Truck (CAT 777)	3	Overburden/coal haulage
Wheel Loader (CAT IT38)	1 (p/t)	Lifting, stemming etc
Dozer (CAT D10T)	2	Clearing; pit activities; dump maintenance
Dozer (CAT D9N)	1	Ripping and pushing for scrapers
Dozer (CAT D11R)	2	Overburden/rip/push
Grader (CAT 16M)	1	Road maintenance
Scraper (CAT 657)	2	Campaign topsoil/subsoil removal and replacement

Item (or equivalent)	No. on site	Function
Scraper (CAT 637)	3	Campaign topsoil/subsoil removal and replacement
Scraper (CAT 631)	2	Campaign topsoil/subsoil removal and replacement
Drill Rig Terex SKF50	1	Campaign blast hole drilling
Water Cart 30,000L	1	Dust suppression
Water Cart 15,000L	2	Dust suppression
Crushing Plant	1	Coal size reduction
Wheel Loader (CAT 988H)	1	Feeding/processing plant/product truck loading
Lighting Plant	8	Light for evening, night operations
Fuel/Service Truck	1	Equipment refuelling/servicing
Forklift/Tyre Handler	1	Equipment Handling
125 kVA diesel generator	1	Electricity generation for site services
820 kVA diesel generator	1	Coal processing

2.4.4 Hours of Operations

Rocglen is permitted to undertake mining operations 24 hours a day, Monday to Saturday, with the exception of public holidays. The mine has two production shifts on weekdays which are day shift (7:00am to 5:00pm) and afternoon shift (4:30pm to 2:30am), and generally an 8 hour overtime production shift on Saturday.

Maintenance crews work 24 hours per day Monday to Friday and 6:30am to 6:30pm on Saturday and Sunday, although they are permitted to work 24 hours per day, 7 days per week.

Coal transportation from the mine site is undertaken between the hours of 7:00am to 9:15pm Monday to Friday and 7:00am to 5:15pm on Saturdays. These times ensure that all coal trucks are off the public road network by 10:00pm Monday to Friday and 6:00pm Saturdays. Coal transportation is not permitted on Sundays and public holidays.

Blasting activities were carried out between 9:00am and 5:00pm Monday to Saturday.

The above hours of operation are consistent with the permitted hours of operation identified in the former PA 06_0198 MOD 1 and current PA 10_0015.

2.5 Processing

2.5.1 Outline of Processing Activities

With the exception of coal crushing to <200 mm, no coal processing was undertaken within the PA Area.

During the reporting period, all Rocglen coal was transported to the Whitehaven Siding CHPP with 68% washed and 32% bypassed (unwashed) for despatch to domestic and export markets. Figure 2 presents a schematic of coal movements and washery inputs, outputs and yields for the reporting period.

Figure 2 shows that during the reporting period 1,280,345 tonnes of coal was mined and 1,310,923 tonnes of coal was transported to the Whitehaven CHPP (including stockpile carry over), producing 422,366 tonnes bypass coal (i.e. crushed product coal not requiring washing) and 833,032 tonnes of coal requiring washing (at an average yield of 72% from the plant). Total coal sales were 1,094,775 tonnes.

2.5.2 Changes or Additions to the Process or Facilities

No changes or additions to the process or facilities occurred during the reporting period.

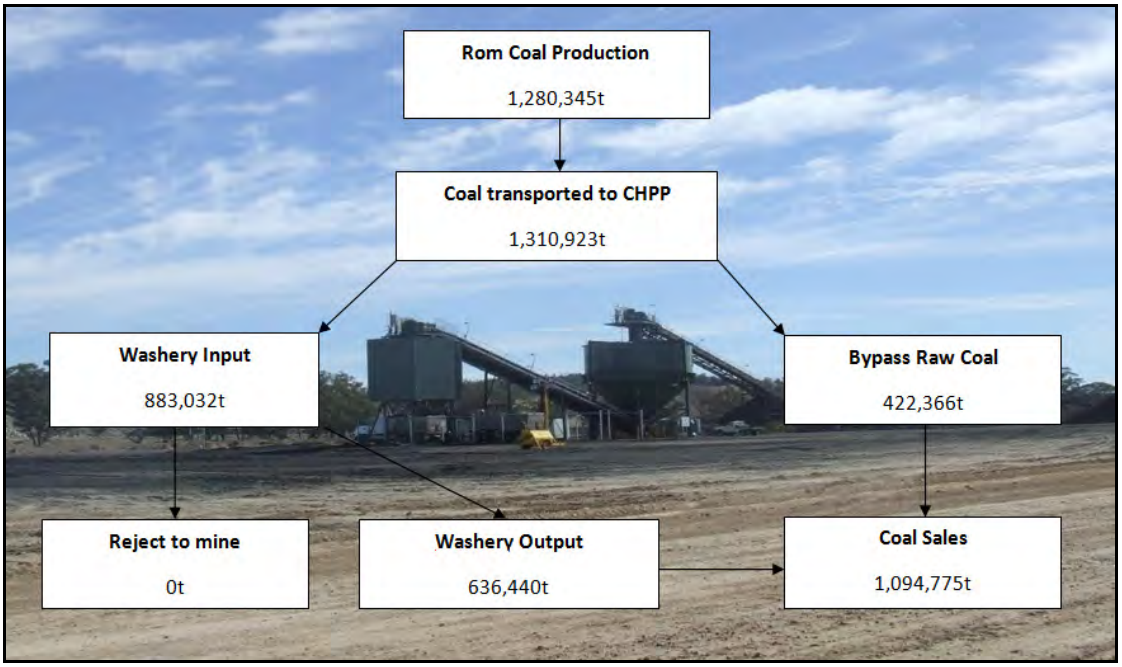

Figure 2 - Coal Movement and Production Summary

(2011/2012 Reporting Period)

2.6 Waste Management

2.6.1 Introduction

Wastes produced at the mine or CHPP during the reporting period remain unchanged from those identified in the last reporting period and are comprised of:

- General domestic-type wastes from on-site buildings and routine maintenance consumables;
- Oils and other hydrocarbons;
- Sewage;
- Overburden and interburden;
- Mine equipment tyres; and
- Coarse and fine coal rejects from any coal preparation undertaken.

The following sub-sections identify the management procedures adopted for each of these wastes throughout the reporting period.

2.6.2 Domestic Type Wastes

All general wastes were collected on-site and placed into large storage receptacles on a daily basis. A local industrial waste collector generally collects this waste on a fortnightly basis.

The mine maintains a recycling program for office and general recyclables (paper, cardboard, bottles, cans etc) at the site office and crib room and the program has continued to work effectively with collections occurring on a weekly basis.

2.6.3 Oil Containment and Disposal

Waste oils from maintenance activities were pumped from equipment to bulk storage tanks bunded in accordance with EPA requirements (also see Section 2.8.2). When breakdown maintenance was undertaken away from the workshop, oil was pumped from the equipment to a tank on the service truck from which it was subsequently transferred to the bulk storage tank.

Waste oil stored and filters at the maintenance workshop was collected and disposed of by a licensed contractor every two months.

Runoff from the concrete vehicle and equipment wash pad was directed to an oil separator and containment system for subsequent pump out and disposal.

2.6.4 Sewage Treatment and Disposal

Effluent from the sewage and ablutions facilities at the mine was managed through the Council-approved septic system, with pump outs undertaken by a licensed waste disposal contractor on an as-needs-basis.

2.6.5 Mine Equipment Tyres

Used mine equipment tyres are retained on site until disposal within the open cut void. During the reporting period 37 tyres have been disposed of in pit. Survey records are maintained on the disposal location of all tyres.

2.6.6 Overburden and Interburden

Overburden materials at the mine comprise weathered conglomerates with some fracturing. The overburden is cast into the mined-out areas by blasting or removed from above the coal seam by a combination of dozer pushing and excavator loading and hauling using dump trucks. Interburden removal to enable lower coal ply excavation is undertaken by excavator and dump truck. During the reporting period, all overburden and interburden was blasted / pushed / dumped within areas nominated in the previous and current MOP.

2.6.7 Processing Plant Residues

2.6.7.1 *Physical and Chemical Characteristics*

The coarse and fine rejects produced from washing Rocglen coal comprise a mixture of coal and non-coal materials, e.g. sedimentary rocks such as shale, mudstone or claystone, and sand, silts and clays which either occur naturally within the coal seam or represent overburden or interburden materials which dilute the coal during its extraction.

Analysis of the leachate emanating from the Whitehaven Siding CHPP fine reject ponds is presented in Table 5. The leachate analysis from the finishing pond indicates that the water is of a quality suitable for stock watering purposes, when compared with ANZECC guidelines.

Table 5 - Whitehaven CHPP Fine Reject Leachate Analysis

Parameter	Unit	Analysis
pH	pH	8.05
EC	µS/cm	2770
TSS	mg/L	4
Alkalinity – Bicarbonate	mg/L	218
Chloride	mg/L	342
Sulphates	mg/L	778
Calcium (tot)	mg/L	108
Magnesium (tot)	mg/L	88
Sodium	mg/L	399
Potassium	mg/L	22
Oil & Grease	mg/L	<5

2.6.7.2 Reject Handling and Disposal Procedures

Coarse Reject – As rehabilitation progresses at the mine, it is intended that coarse reject produced from the Whitehaven CHPP will be back loaded to the mine for placement in the open cut prior to reshaping and rehabilitation. An appropriate application will be made to the DRE for Section 100 approval under the Coal Mine Health and Safety Act 2002. Until this occurs, coarse reject from the CHPP will continue to be back loaded to the Tarrawonga Coal Mine emplacement area.

Fine Reject – Pumped to a series of seven fine reject ponds within the Whitehaven CHPP balloon loop and adjacent to the Whitehaven CHPP for consolidation. Reject produced throughout the reporting period was pumped to the reject ponds within the rail loop and those adjacent to the CHPP. The ponds are encircled by bunding and drains to contain fine reject in the event of a pond failure. Following consolidation, the fine rejects are excavated and transported to the former Gunnedah Colliery for use in final landform development and emplacement in the Melville and North Cut Void.

2.6.7.3 Monitoring and Management of Containment Facilities

Routine management and monitoring of reject material at the Whitehaven Siding is undertaken by Whitehaven Coal personnel under the direction of the Plant Manager. Inspections of the reject ponds at the Whitehaven CHPP are undertaken by officers of DRE, the statutorily responsible Authority.

2.7 Stockpile Capacity

All ROM coal produced at the mine is delivered to high ash or low ash ROM stockpiles. ROM stockpile capacity at the mine totals 150,000t. Average stockpile volume during the reporting period was 37,754t with volumes ranging from 0t in October 2011 to 79,734t in May 2012. Stockpile volumes are measured by survey on an end of month basis.

2.8 Water Management

2.8.1 Objectives

The mine lies within the catchment of the Namoi River. Locally, and within proximity of the mine site, Driggle Draggle Creek and the un-named drainage channel to the south of the mine site provide flows to the Namoi River during runoff events. The sediment detention basins within the disturbed area of the mine are designed to limit the opportunity for discharge of runoff from mine-disturbed area (i.e. after appropriate detention time to satisfy licensed discharge criteria). Two wet weather discharge points are nominated in the current EPL 12870. These are LDP-11 (EPL ID No. 11) and LDP-12 (EPL ID No. 12) as shown on Figure 3 and Plan 4. Three ambient monitoring points are also nominated in the EPL for water quality monitoring quarterly (in the event of flow during the quarter) at a time when there is flow and as soon as practicable after each wet weather discharge from points 11 and 12 commences. These are Driggle Draggle Creek (DDCK – EPL ID No. 13), Un-named Drainage Channel (UNDC – EPL ID No. 14) and Storage Dam 7 (SD-7 - EPL ID No. 15) again shown on Figure 3 and Plan 4.

The management of water at the mine is undertaken with the following procedures and objectives:

- Containment of runoff from open cut areas by directing this water into in-pit sumps;
- Pumping excess water from the in-pit sumps into the Void Water Dam;
- Directing sediment-laden runoff from disturbance areas and rehabilitated areas into designated sediment control dams;
- Installing temporary erosion and sediment control devices or structures as required to minimise the discharge of sediment laden water from newly disturbed areas;
- Diverting clean water runoff unaffected by the operations away from disturbed areas and off-site, where possible;

- Maintaining sediment control structures to ensure that the designed capacities are maintained for optimum settling of sediments;
- Implementing an effective revegetation and maintenance program for the site;
- Effective treatment of dirty water for controlled discharge from site; and
- Draw down of dirty water dams to prevent discharge from site.

A draft Water Management Plan (WMP) was submitted to DoPI in March 2012, with no comment received to date. DRE reviewed, and generally approved, the plan. The WMP was prepared by GSS Environmental (GSSE) to comply with Schedule 3, Condition 22 of PA 10_0015. The main purpose of the WMP is to guide the management of surface and groundwater resources throughout the operational life of the mine, address the relevant conditions of the Project Approval; address the relevant commitments made within the Environmental Assessment; and address legislative requirements and guidelines relevant to the WMP.

2.8.2 Surface Water Management

Water within the Project Approval area is nominally classified either as “clean”, “dirty”, or “contaminated” depending on the source of the flow and its potential for physical or chemical contamination.

All sediment basins, storage dams and associated banks and drains installed prior to this reporting period within the PA Area were designed and constructed by Department of Lands – Soil Services and Greg Ward Earthmoving Solutions personnel. During the reporting period additional storage dams and sediment basins to the north of the site were designed and constructed by Greg Ward Earthmoving Solutions in consultation with mine surveying personnel.

“Clean water” comprises surface runoff from catchments undisturbed or relatively undisturbed by mining or related activities and rehabilitated catchments. Within the Project Approval area, clean surface water flows either flow to natural drainage lines and hence off-site or are collected by diversion banks and directed to the storage dams for use on-site. All water flowing from sediment basins ultimately flows to storage dams to provide a final “polishing” storage prior to potential off-site discharge.

*"**Dirty water**"* comprises surface runoff from disturbed catchments such as the active mine area and overburden emplacement, ROM and product coal stockpiles, soil and subsoil stockpiles and rehabilitated areas (until stabilised), all of which could contain sediments.

Dirty water originating from surface runoff is collected by catch banks located down slope of the potential sources of pollution and directed to the sediment basins while water pumped from the open cut is piped to the Void Water Dam or retained in pit within managed sumps. Water collecting within the sediment basins and the Void Water Dam is used for dust suppression in addition to waters in the storage dams to avoid potential for off-site water discharge.

The sediment basins are either cleaned out once their capacity is reduced by 25% (when dry enough to allow access by earthmoving equipment) or supplementary structures are installed to provide the required storage volume. In the event of structure replacement, the contents of the former structure will be allowed to dry prior to being capped and rehabilitated. At the end of the reporting period, it was determined that the capacity of one sediment basin (SB-15 at the south of the site) had been reduced by more than 20%. SB-15 is to be replaced with a new sediment basin adjacent to the current basin in the coming reporting period. Sedges have been planted in the basin to create additional wetland habitat.

The principal components of the "clean" and "dirty" water management systems in place at the end of the reporting period are shown on Plan 4.

"***Contaminated Water Management***". Two 68,000 L (62,000 L safe fill) self bunded diesel fuel tanks are maintained adjacent to the Rocglen workshop area. This ensures that in the event of a leak from the tanks, there is sufficient capacity to adequately store the full complement of diesel from those tanks. An additional concrete bund has been installed adjacent to the fuel tanks to house other oils and lubricants in a safe and efficient manner. Any associated spills within the bund then report to an oil separating unit for disposal by an appropriately licensed contractor. Water potentially contaminated with hydrocarbons from the workshop area is also diverted to the oil separator, with clarified water reporting to surface storages and used for dust suppression purposes. Spill kits are also maintained on the mine site.

The likelihood of localised spills of fuel or oil external to bunded areas is kept to a minimum by the adoption of the above practice. In the event that localised spills do occur, immediate action would be undertaken to ensure appropriate clean-up and minimisation of harm.

2.8.3 Discharges

A total of 8 wet weather discharges occurred from the site during the reporting period between October 2011 and July 2012. Section 3.3.2 provides a detailed description of each wet weather discharge as well as the efforts made during the period to reduce TSS levels and minimise discharges.

2.8.4 Water Sources, Demand and Use

Within the Project Approval area and immediate vicinity of the mine, surface water resources are limited to a number of ephemeral drainage lines which flow for a short period after substantial rainfall, farm dams, water storage dams and a series of interlinked sediment basins as shown on Plans 3 and 4.

Water is required on the mine site primarily for dust suppression purposes, with minor quantities required for potable, toilet and ablutions purposes. Where practicable, water collected on-site is retained or reused, with water for dust suppression sourced from a combination of on-site water harvesting, inflows from the exposed coal seam, overburden and interburden, and groundwater extraction. Water for potable, toilet and ablutions purposes is trucked to the site from Gunnedah.

During the reporting period, a total of 100ML was used for mine site and processing facility dust suppression purposes, the majority of which was sourced within the Project Approval Area. The approximate volumes obtained from the various sources are as follows:

- 40 ML of void water (pumped to the void water dam)
- Nil water from the bore located on the Whitehaven-owned section of the “Roseberry” property; and
- 60 ML from both clean and dirty water surface storages.

No water was pumped from the production bore to the bore pump dam during the reporting period, due to the large amount of void water held during the second half of the reporting period and dirty water collection from sediment basins being prioritised for dust suppression purposes. The large volume of void water was produced through groundwater seepage and heavy rainfall inflow, mostly in February 2012 during regional flooding. This water was problematic to the sequence of mining, with water targeted for dust suppression and prolonged pumping campaigns to the void water dam.

The total water use of 100 ML is generally in accordance with the annual water use predicted in the Extension Environmental Assessment, which indicated a water requirement of approximately 90 ML per year for dust suppression and processing requirements. This slightly higher than predicted volume can be attributed to ongoing wet weather over the second half of the reporting period, resulting in the mine making a concentrated effort to reduce the volume of stored water in discharge and void water dams. This was achieved by increasing water cart runs on active and inactive mining areas in order to evaporate excess water. The water use is also generally consistent with water use over the prior reporting period, of 106.8ML.

2.8.5 Stored Water

Table 6 presents an estimate of the volume of stored water at the beginning and end of the reporting period.

Table 6 - Stored Water

	Volumes Held (m^3)		Storage Capacity at the end of the Reporting Period (m^3)
	Start of Reporting Period	**At end of Reporting Period**	
Clean Water (in Storage Dams)	34,900	16,000	16,000
Dirty Water (in Sediment Basins)	28,600	40,600	65,500
Pit Water	0	63,000*	133,000

*Within void water dam

The water held in storage dams at the start of the reporting period is greater than the capacity at the end of the reporting period because some clean water storage capacity was lost in the extension of the northern emplacement. Drainage was also installed to divert clean water around the northern end of the site on both the eastern and western boundaries.

2.8.6 Groundwater Management

Inflows into the open cut result from a combination of:

- Direct rainfall runoff and infiltration through the emplaced overburden which flows down-dip to the open cut sump(s); and

- Inflows from the exposed coal seam and fractured rock.

Any water produced in pit was pumped to the void water dam and was subsequently prioritised for dust suppression purposes to avoid discharge from the dam.

Contamination of groundwater is controlled by the management of chemical, oil and grease spills and storage, with:

- Vehicle maintenance carried out in designated areas;
- Any spills being cleaned up; and
- Fuels, oil and greases being stored within a bunded area, constructed in accordance with AS 1240-2004 (also see Section 2.8.2) and/or OEH requirements.

Groundwater from surrounding bores, as well as the mine production bore, is monitored on a regular basis to detect and assess any changes in groundwater quality or level that may be attributable to the mine (see Section 3.4.2).

2.9 Hazardous and Explosive Material Management

No explosive materials are retained at the site. Orica Mining Services has a storage facility located between the Tarrawonga and Canyon site, which removes the requirement for on-site storage. Mixing of nitropril with distillate to produce an explosive is undertaken on the day of each blast using a purpose built explosives mixer and in a quantity adequate only for that particular blast. Materials Safety Data Sheets (MSDS) are retained on-site for all hazardous materials, independent of the quantity. Additionally, all contractors are required to supply MSDS sheets for any hazardous goods they may bring onto the site.

2.10 Infrastructure Management

Management of infrastructure (e.g. buildings, roads, generators and pumps) and other facilities not specified elsewhere within this AEMR, is undertaken on an as-needs basis or in accordance with Statutory requirements in order to maintain them in an operationally efficient, safe, neat and tidy condition, and one which does not result in the direct or indirect generation of unacceptable environmental impacts.

2.11 Product Transport

During the reporting period, all sized (<200 mm) ROM coal from the mine was delivered directly to the Whitehaven CHPP by coal haulage contractors Toll and Daracon, with all product coal destined for the export market transported by train to the Port Waratah or NCIG ship loaders at the Port of Newcastle. 1,310,923 tonnes of coal was transported from the mine during the reporting period, which equated to an average of 122 truckloads of coal being transported per haulage day from the mine to the Whitehaven CHPP. This is 23 more truckloads per day compared to the last reporting period, which is due in part to the higher amount of ROM coal produced. It is also an actual measurement of truck trips (as provided by the haulage contractors) rather than previous estimates based on total coal transported and average loads per truck.

3 ENVIRONMENTAL MANAGEMENT AND PERFORMANCE

The following sub-sections document the implementation and effectiveness of the various control strategies adopted at the mine, together with monitoring data for the reporting period. Life of mine monitoring data is included in the relevant appendices, where relevant, to allow for discussion on longer-term trends. Monitoring locations are shown on Figure 3.

A risk identification matrix and the relevant environmental management procedures are identified in the Rocglen Coal Mine Mining Operations Plan (MOP) 2011.

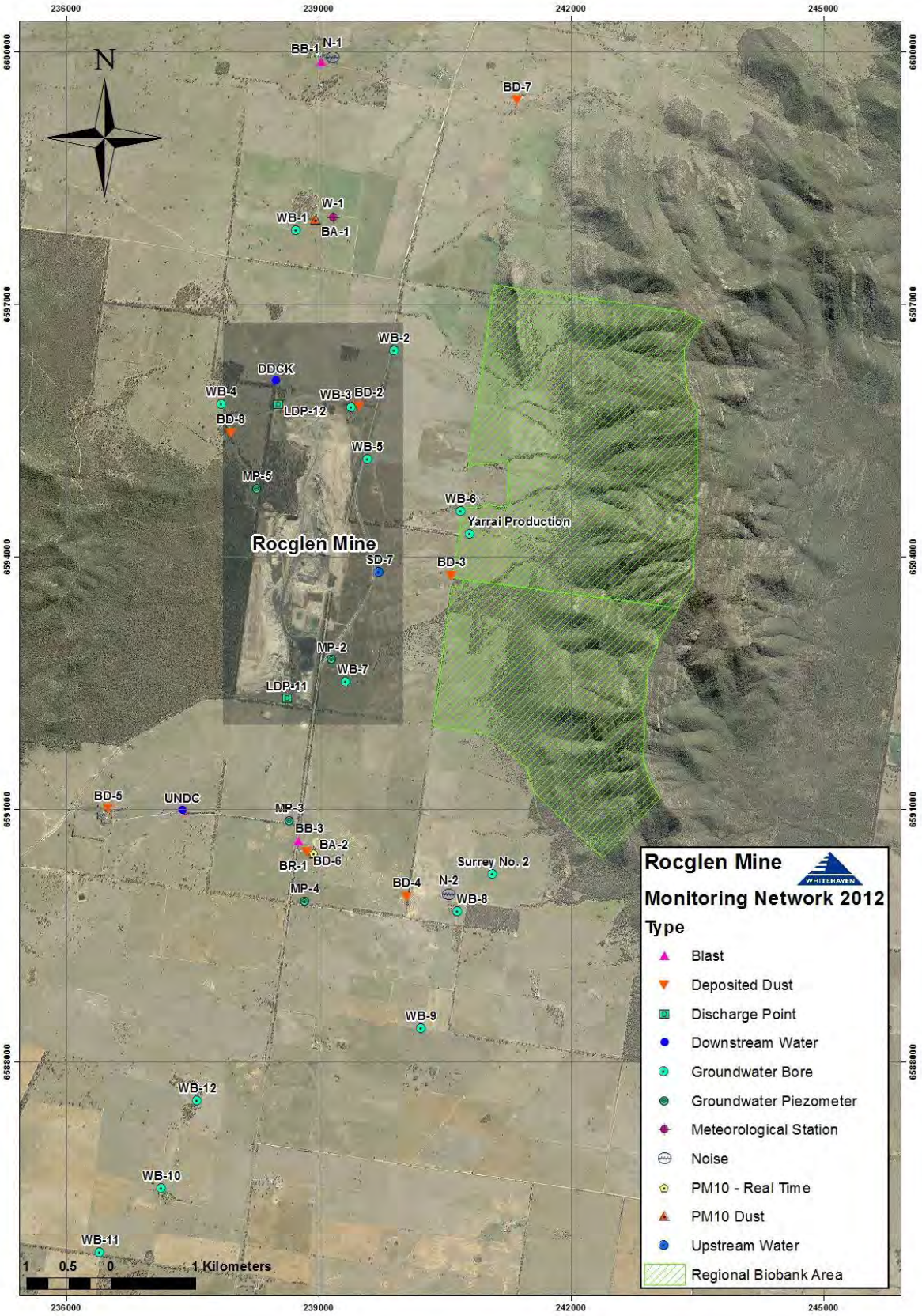

Figure 3 – Monitoring Locations

3.1 Air Pollution

3.1.1 Criteria

The air quality criteria applicable to the Rocglen Coal Mine are specified in PA 10_0015 Schedule 3, Tables 4, 5 & 6 (Appendix 1), which is summarised below.

- Acceptable mean annual increase in deposited dust – 2g/m^2/month.
- Mean annual dust deposition (all sources) – 4g/m^2/month.
- Mean annual TSP (all sources) concentration – 90 μg/m^3. Although no specific TSP monitoring occurs, Whitehaven has received approval from DoPI to determine TSP air quality monitoring values by multiplying measured PM10 values by a factor of 2.
- Mean annual PM10 particulate level – 30 μg/m^3.
- 24 hour average PM10 particulate level – 50 μg/m^3.

Notwithstanding the diversity of the criteria identified above, routine air quality monitoring at the Rocglen Coal Mine is required for deposited dust and PM_{10} particulates. Compliance monitoring of deposited dust is undertaken on a monthly basis whilst PM_{10} levels are monitored every 6 days. A real time dust unit is utilised for the management of dust on a real time basis.

3.1.2 Control Procedures

In order to satisfy the criteria identified above, Whitehaven employs a range of air pollution control measures including:

Land Preparation

- Cleared trees and branches are retained. No burning of vegetation occurs on-site.
- Where practicable, soil stripping is undertaken when there is sufficient soil moisture to prevent significant dust lift-off and at a time that avoids periods of high winds.
- Land disturbance, including groundcover removal, is limited in advance of mining activities consistent with operational requirements. Under normal circumstances, a maximum of 100 metres is prepared in advance of mining.
- Groundcover is removed with the topsoil, as opposed to prior to topsoil removal.

- Soil stockpiles stored for greater than 3 months are seeded and fertilised as soon as possible.

Drilling and Blasting

- The drill rig utilises water injection and is fitted with dust aprons which are lowered during drilling.
- Coarse aggregates are used for blast hole stemming at all times.
- Where practicable, blasting is restricted during unfavourable weather conditions.

Overburden Removal and Placement

- Where practicable, ripping of softer overburden material is avoided during periods of high wind.
- Dumping at higher elevations is minimised during high winds where practicable, with preference given to lower dumps or in pit locations.

Coal Mining and Preparation

- When necessary, low moisture coal is sprayed with water prior to excavation.
- Water is applied to the coal at the feed hopper, crusher and at all conveyor transfer and discharge points.
- When necessary the cessation of coal processing activities occurs during periods of concurrent high winds and temperatures.
- Water carts apply water sprays around the ROM pad.

Transport

- Internal roads are watered, with emphasis on those subject to frequent trafficking.
- The speed of all on-site vehicles and equipment is restricted to a 60km/hr.
- All operators on site have the responsibility of reviewing the dust generation from their activities, and contact the water cart direct, or their supervisor for action on dust control.
- All trucks hauling product coal and coal rejects between Rocglen and the Whitehaven CHPP are fitted with roll-over tarpaulins.

Rehabilitation

- Rocglen has a progressive approach to the rehabilitation of disturbed areas within the mine site to ensure that, where practicable, completed mining and overburden emplacement areas are quickly shaped, top-soiled and vegetated.

3.1.3 Dust Monitoring

Deposited Dust

Table 7 presents a summary of the deposited dust monitoring data presented in Appendix 4. A graphical representation of the total insoluble solids and ash content data for each of the sites monitored during the reporting period is also included in Appendix 4. Figure 3 identifies the locations of the various deposited dust gauges maintained during the reporting period.

Table 7 - Deposited Dust Monitoring Data

(August 2011 - July 2012)

Site	Property Name	Mean Total Insoluble Solids*[1] (g/m^2/month)	Mean Ash*[1] (g/m^2/month)	Predicted Year 1 Rocglen plus 1.2 g/m^2/month Background
BD-2	Glenroc	1.4	1.1	Not predicted
BD-3	Belah	0.8	0.3	1.4
BD-4	Surrey*[2]	0.8	0.5	1.3
BD-5	Stratford	0.7	0.4	1.2
BD-6	Roseberry*[2]	1.5	0.8	1.3
BD-7	Roseglass*[2]	1.4	0.8	1.2
BD-8	Yarrawonga	0.8	0.6	1.9

*[1] At end of reporting period
*[2] Licensed under EPL 12870

A review of Table 7 and Appendix 4 shows that, as with the previous reporting period, the mean annual total insoluble solids (deposited dust) criterion of $4g/m^2$/month was satisfied at all monitoring locations over the last 12 months.

PM_{10} High Volume Air Sampling

Whitehaven had a High Volume Air Sampler (PM_{10}) located at the property "Glenroc", to the north of the mine site, which was relocated to the "Costa Vale" property in May 2012, in accordance with the new extension approval. The other licensed PM_{10} monitor is located on

the "Roseberry" property, to the south-east of the mine site. Each sampler runs for 24 hours every 6 days, with filter papers sent to an accredited laboratory for analysis.

PM_{10} monitoring identified an exceedance of the 24 hour criteria at "Glenroc" on the 2nd April 2012, with a result of 54.5µg/m^3. The "Glenroc" property is mine owned with no occupation of the "Glenroc" residence. A review of conditions on the run date identified a South-South Westerly wind was dominant at speeds averaging 3.2km/hr. Given the direction of wind, it was likely that overburden dumping operations contributed to this exceedance. It is also noteworthy that works were conducted in and around the PM_{10} monitor at the time of the exceedance, including dozer operations to construct a clean and dirty water diversion drain associated with water management for the Rocglen Extension Approval. Since the relocation of the monitor to "Costa Vale", results have shown a decrease up until the end of the reporting period. The annual average limit was within compliance levels at both monitoring locations throughout the reporting period, as displayed in Figure 4 and Figure 5. The long term PM_{10} levels and averages are provided in Figure 4 and Figure 5. Both figures indicate a steady annual average PM_{10} level during the reporting period. The full PM_{10} data set is provided in Appendix 4.

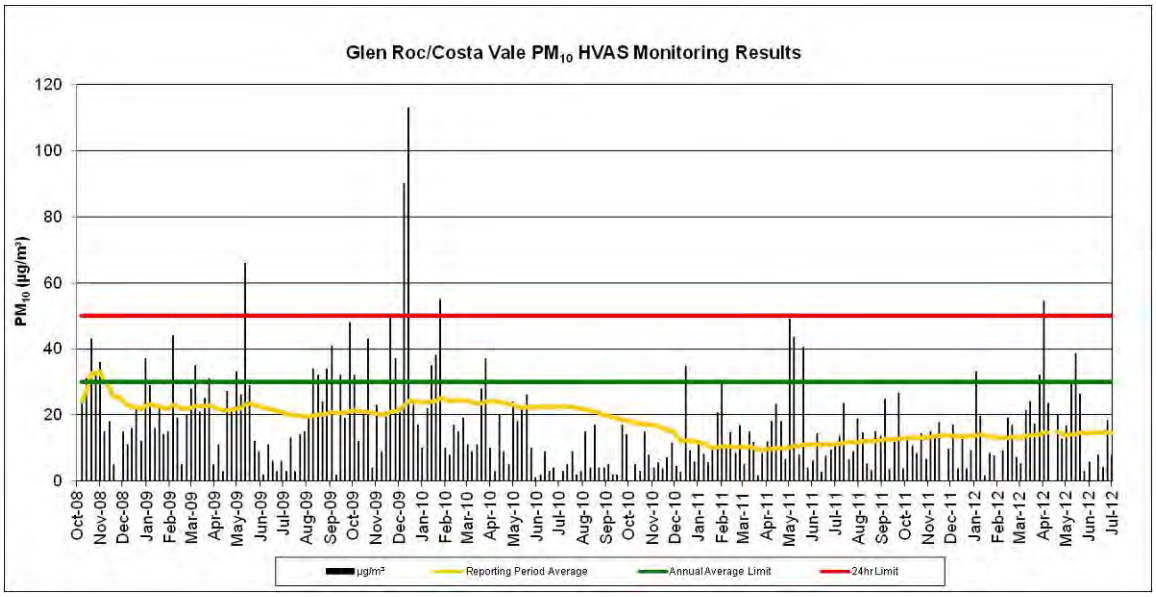

Figure 4 – Glenroc/Costa Vale HVAS PM_{10} Data

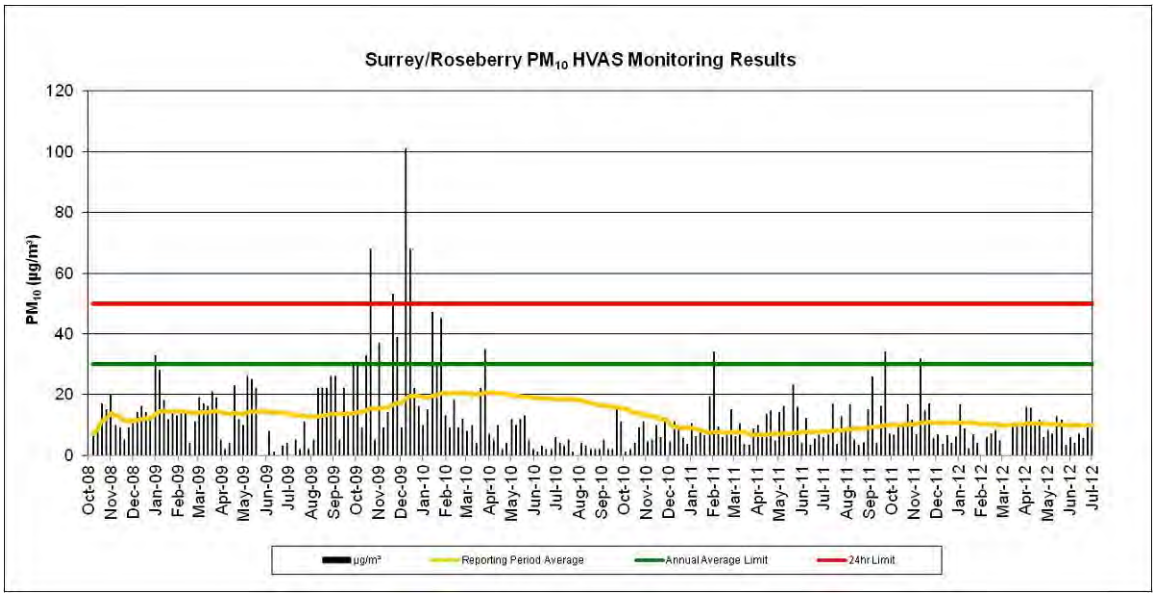

Figure 5 – Surrey/Roseberry HVAS PM_{10} Data

Continuous Real Time PM_{10}

In accordance with Condition 3(16) of PA 10_0015 a continuous real time dust monitor, or Tapered Element Oscillating Microbalance TEOM monitor (PM_{10}), was installed at the "Roseberry" property (Plate 1). The monitor was installed by Novecom Pty Ltd and collected data for the last 4 months of the reporting period. The monitor is an invaluable management tool for assessing dust levels on a real time basis, through its web based platform, where both environmental and operational staff at Rocglen monitor dust levels in conjunction with weather conditions. It is anticipated that during the next reporting period, a site based procedure will be developed regarding the use of an alarm system from the monitor when dust levels approach compliance limits. This will be carried out in accordance with Rocglen's draft Air Quality and Greenhouse Gas Management Plan (submitted and awaiting Department approval) and will assist in the management of dust on a real time basis.

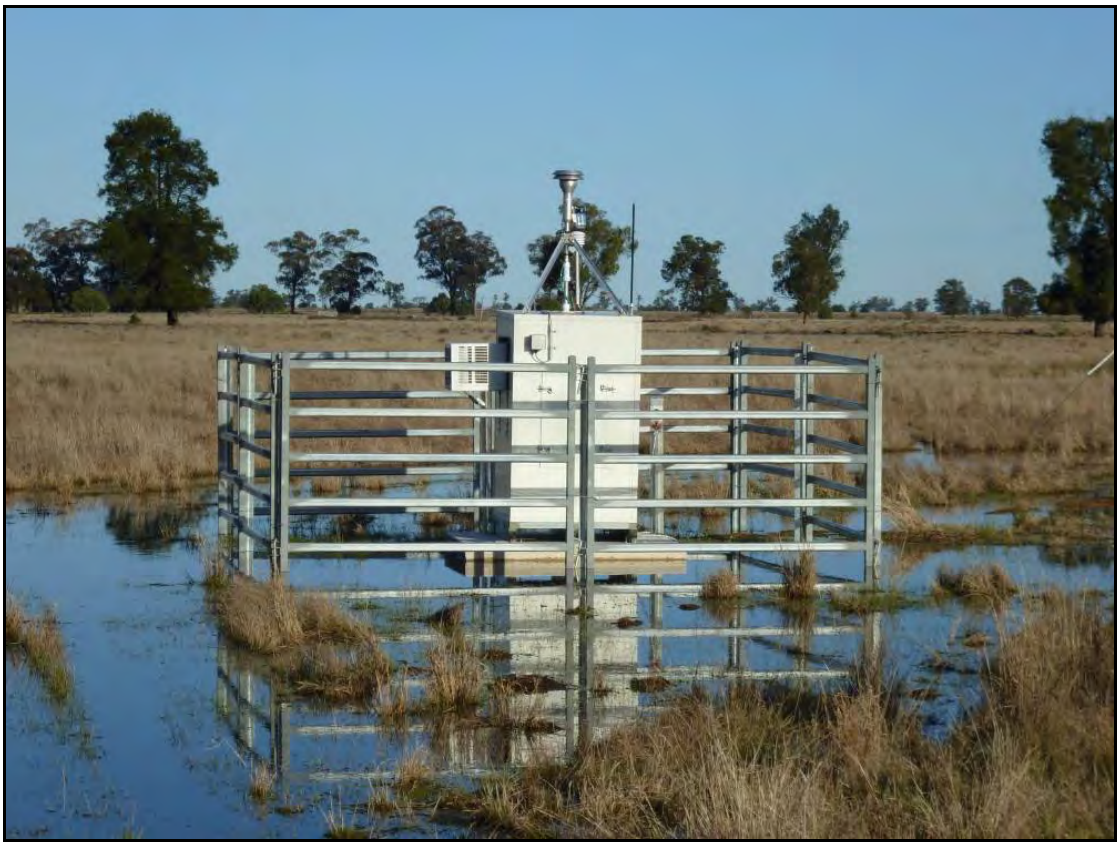

Plate 1 - Real Time Dust Monitor Installed in April 2012 at "Roseberry"

3.1.4 Comparison with EA Predictions

The Air Quality Impact Assessment (AQIA) for the Extension EA was undertaken by PAE Holmes Pty Ltd to determine predicted air quality impacts associated with the extended mining operation. The predicted levels and comparisons with actual monitoring data are included below for both dust deposition and PM_{10}.

Dust Deposition

The AQIA predicted that the annual average dust deposition levels at all receptors surrounding the extended mine would be well below the relevant criteria of 4g/m^2/month for cumulative dust deposition when using a background dust deposition level of 1.2g/m^2/month.

During the reporting period, all monitoring points except BD-7 “Roseglass” (recording an annual average of 1.5 g/m^2/month, where 1.2 g/m^2/month was predicted) were below predicted annual average deposited dust levels during year 1 of operation. BD-7 “Roseglass” recorded two spikes in deposited dust in March and April 2012. Sample contamination was identified during March (dead frog) and April (bird droppings, insects and plant material)

through chain of custody documentation. These two results have caused the slightly higher than predicted (1.5 g/m^2/month) annual average.

PM_{10}

The AQIA provided the following predictions for cumulative PM_{10} levels from the extended Rocglen Mine:

- Annual average PM_{10} limit, including a background level of 21 µg/m^3:
  - "Costa Vale" - 24 µg/m^3
  - "Roseberry" - 23 µg/m^3
- 24 hour average limit (Year 1), including a background level of 22 µg/m^3:
  - "Costa Vale" - 43 µg/m^3
  - "Roseberry" - 45 µg/m^3

The annual average compliance limit is 30 µg/m^3 and the 24 hour compliance limit is 50 µg/m^3.

Both monitoring locations did not exceed the predicted annual average or the annual average compliance limit. The annual averages were 13.65 µg/m^3 at "Costa Vale" and 10.05 µg/m^3 at "Roseberry".

The highest 24 hour PM_{10} result at "Roseberry" was 34.1 µg/m^3 which is below both the predicted and compliance limits. As discussed previously, there was an exceedance on the 2nd April 2012 at the "Glenroc" monitoring location before the monitor was relocated (54.5 µg/m^3). The "Glenroc" monitor was in very close proximity to the extended northern emplacement. "Glenroc" is project-related and the residence is vacant. Since relocation of the monitor in June 2012, the maximum 24 hour result has been 41.4 µg/m^3, which is less than the predicted and compliance limits.

3.2 Erosion and Sedimentation

3.2.1 Management

Methods for the management of erosion and sediment control at the mine are presented in the MOP, Rehabilitation Management Plan and Water Management Plan.

Control of erosion and sediment generation is achieved through a range of controls identified in Section 2.8, and additional measures which assist in the control of erosion and sedimentation at Rocglen which include:

- Installation of water management structures prior to any ground disturbance taking place;
- Minimal land disturbance by clearing the smallest practical area of land ahead of disturbance activities;
- Disturbance areas that are not actively utilised i.e. soil stockpiles or rehabilitation areas, are revegetated as soon as practical following completion of works in that area;
- Where practical, disturbance areas are shaped such as to provide a free draining surface to direct dirty water runoff into the relevant sediment dams;
- Where localised flooding or ponding occurs, access is restricted until such time as the ground is no longer waterlogged in order to reduce the potential for additional sediment mobilisation;
- If erosion is identified on the rehabilitating landform or in the operational area, it is remediated as quickly as practical to reduce the potential for significant erosion to develop. Areas previously rehabilitated is inspected regularly to ensure rehabilitation works are effective; and
- Where necessary, temporary erosion and sediment control measures are utilised to prevent and/or reduce the potential for adverse erosion developing. These include sediment fences, check dams, surface protection and revegetation methods such as mulching.

Additional sediment control structures and sediment basins were installed during late 2011 and early 2012. This included a series of velocity control/sediment control structures along the main western drainage line, which drains the western emplacement area (see Plate 2). The drainage line was lined with sediment control matting, which enhances vegetation growth with the aim to eliminate tunnel erosion. Contour banks and mounding were continued along the western emplacement to enhance the catchment of the installed structures and hold water on the slope for vegetation growth. Additional sediment basins were also installed at the north of the site, in accordance with the extension approval, for the capture of dirty water from the expanding northern emplacement.

3.2.2 Performance

The effectiveness of the procedures for erosion and sedimentation management are assessed visually as part of routine mine operations and supervision including monthly inspections undertaken by the site Environmental Officer, with any ameliorative works initiated as and when required.

During the reporting period, Whitehaven made every effort to control erosion and sedimentation where practical. Erosion events were identified in the western drainage line in May 2012, where extensive measures were undertaken to prevent tunnel erosion. Poor soil quality (sodic/dispersive) and limited vegetation growth within the drains failed to prevent tunnel erosion under installed matting. Repair work was delayed to allow the site to adequately dry, with these repairs undertaken during the next reporting period. Generally other control structures, such as contour banks and mounds worked well in slowing the velocity of water and limiting erosion. Hay bales proved to be a simple but highly effective control measure in drains and spillways of sediment basins (Plate 3). Sediment basins at the north of the site performed well in capturing dirty water, particularly in the second half of the reporting period. Rehabilitation in the second half of the reporting period showed good vegetation cover, especially on the continued western emplacement slope and northern plateau, as described in Section 5.

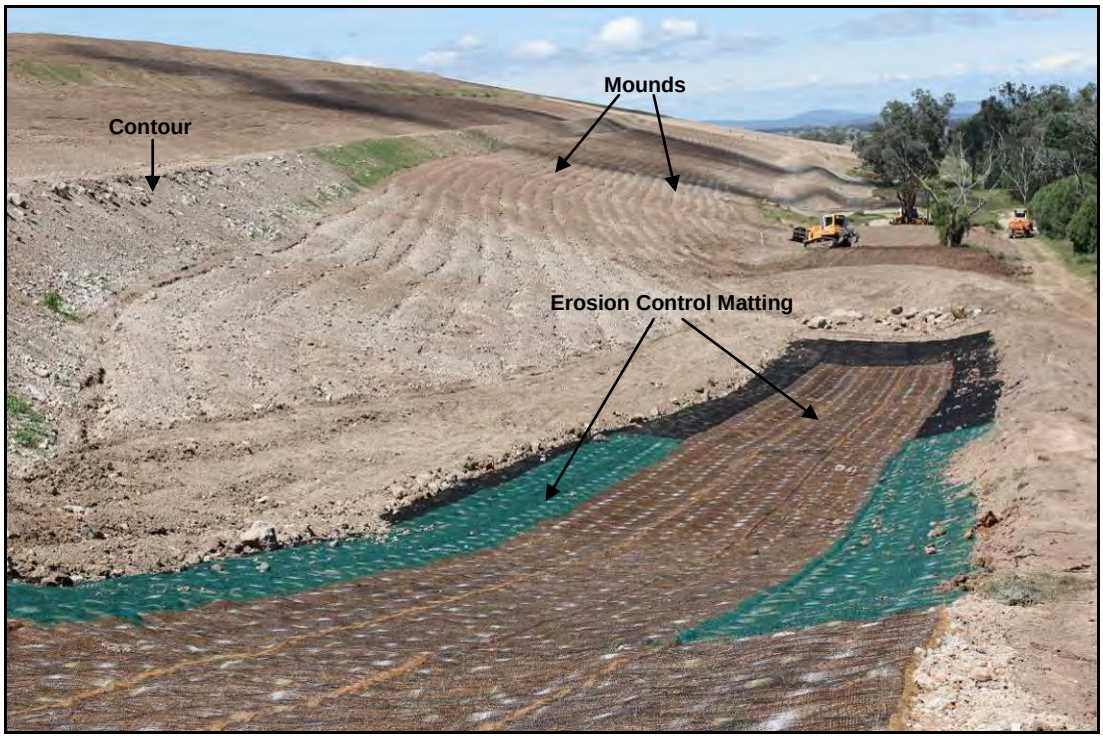

Plate 2 – Erosion and Sediment Control Construction - Western Emplacement, March 2012

Plate 3 – Hay Bales Used to Control Erosion and Sedimentation, March 2012

3.2.3 Comparison with EA Predictions

The soil assessment undertaken for the extension EA identified that the Brown Alluvial soil on the Rocglen Extension site has high potential for erosion when removed and placed for rehabilitation due to high sodicity levels at depth. This soil makes up 47% of the soils on site. The other two soils identified on site, Brown Duplex Fine Sandy Loam and Self Mulching Black Earths, require typical erosion control measures. All subsoils within the area were identified to have high potential for erosion due to sodicity levels. To address the potential for erosion on rehabilitation slopes, contour furrows/mounds and contour banks at intervals down the slope were installed progressively as recommended. Gypsum was added to Brown Alluvial Soils during rehabilitation to reduce the potential for rill erosion. Engineered drains using erosion matting and seeding for ground-cover vegetation were used within waterways with sediment control dams constructed at intervals as recommended in the assessment.

The extension EA recommended erosion and sedimentation is monitored monthly or following rainfall events greater than 25mm in a 24 hour period. This has been carried out by the site's Environmental Officer during the reporting period. As discussed previously, tunnel erosion occurred within the drain on the western boundary due to water moving under the synthetic matting installed. This can be attributed to the lack of sufficient vegetation, even

though seed was incorporated into the matting, which resulted from lower than average rainfall experienced during March and April 2012.

The Extension EA identified that all sediment basins would be cleaned of accumulated sediment once their capacity has been reduced by 20%. At the end of the reporting period Sediment Basin 15 (SB-15) was identified to have an accumulation of sediment reducing capacity by more than 20%. An additional basin will be constructed adjacent to SB-15 to increase capacity in the near future. SB-15 will be retained to provide for additional habitat value with sedges planted throughout to enhance its habitat value.

3.3 Surface Water Pollution

3.3.1 Management

The prevention of surface water pollution is achieved through the management of surface water as presented in Section 2.8.2.

3.3.2 Performance

Wet Weather Discharge

A total of 8 wet weather discharges occurred from the site during the reporting period between October 2011 and July 2012. The storage structures onsite have been built to the 90%ile 5 day event design criteria, with the design specification incorporated in the existing EPL 12870. Nevertheless, sampling has been undertaken during each discharge event to monitor the water quality parameters. Licensed Discharge Point 11 (LDP-11) is located on the site's southern boundary and Licensed Discharge Point 12 (LDP-12) at the northern boundary.

Water analysis results from each discharge, as well as any ambient monitoring upstream and downstream of the site, are included in Appendix 5 and a discussion of the results is provided below.

4th October 2011 – SD-3 (LDP-11)

A discharge occurred on the 4th October 2011 from SD-3 (LDP-11) following 50.0mm of rainfall in the previous 5 days. Analysis identified a Total Suspended Solids (TSS) level of 158mg/L however as the amount of rainfall exceeds the 5 day 90%ile rainfall depth, and all practical measures were taken to dewater the storage prior to discharge, the TSS criteria of

50mg/L does not apply to this discharge. All other results were compliant with relevant compliance limits, downstream sampling was also conducted.

24th and 28th November 2011 – SD-3 (LDP-11) and SB-18 (LDP-12)

Discharges occurred on the 24th November 2011 from SD-3 (LDP-11) and 28th November 2011 from SB-18 (LDP-12). Sample analysis identified elevated TSS levels from both discharges (360mg/L at SD-3 and 326mg/L at SB-18). All other parameters remained within compliance limits.

At the time, the Rocglen weather station malfunctioned and site data was not available. Records from Whitehaven's Tarrawonga site show 41.4mm of rain fell in the 48 hours prior to the discharge event on the 24th November whilst approximately 100mm of rainfall was received in the four days prior to the 28th November discharge. Assuming Rocglen received similar rainfall, the elevated TSS results are not considered a non compliance as the rainfall exceeded the 5 day 90%ile rainfall depth and all practical measures had been taken to dewater the storages prior to the rainfall event.

31st January 2012 – SD-3 (LDP-11)

Discharge occurred from SD-3 (LDP-11) on 31st January 2012 with analysis of the sample collected identifying compliance with all limits. The compliant water quality can be attributed to the considerable amount of effort made in the preceding weeks with flocculation of SD-3 using the flocculant Magnafloc LT425. Upstream sampling was also carried out.

1st February 2012 – SB-18 (LDP-12)

Discharge occurred at SB-18 (LDP 12) on 1st February 2012 recording an elevated Total Suspended Solids (TSS) level of 112mg/L, with 87.6 mm of rain in the five days preceding. The TSS level for this discharge is not considered an exceedance as rainfall measured at the premises exceeded 38.4 mm over the consecutive 5 day period immediately prior to the discharge and all practical measures had been taken to dewater the storage prior to the rainfall event. All other parameters remained within compliance limits.

21st February 2012 – SD-3 (LDP-11)

The Rocglen weather station indicated that 25 mm of rain fell in the five days preceding discharge from SD-3 (LDP-11) on 21st February 2012. Sampling recorded an elevated Total Suspended Solids (TSS) level of 340mg/L. Both upstream and downstream sampling occurred, with UNDC downstream of SD-3 recording an elevated TSS of 236mg/L. February

was a particularly wet month, with 161.2mm of rainfall recorded prior to the discharge. This caused all sediment basins to be at full capacity, with much of the rainfall falling in heavy falls producing turbid water within sediment basins. All efforts were made during February to avoid discharge by pumping water up the chain of sediment basins at the south of the site, along with the use of water carts to target this water.

13th July 2012 – LDP-11 and LDP-12

Discharge occurred at both the LDP-11 and LDP-12 on the 13th July 2012. Discharge water at the southern licence discharge point (LDP-11) returned a TSS of 372mg/L, while the northern discharge point (LDP-12) returned a TSS of 274mg/L. These discharges are not considered an exceedance due to 45mm of rain falling in the preceding 5 days with all practical efforts made to dewater the storages prior to the rainfall event (as per the site's EPL 90%ile 5 day storm exceedance allowance for events greater than 38.4mm). All other EPL criteria were met for these discharges.

Summary

All non-compliant discharges of water from site have been reported to the Department of Planning and Infrastructure and the Environmental Protection Authority. A Penalty Infringement Notice was issued to Whitehaven from the EPA following the discharge from LDP-11 on 21st February 2012. Significant focus has been placed on water management at Rocglen since February 2012, with additional efforts relating to flocculation and release programs throughout the second half of the reporting period, using Magnafloc LT425 (agitation) and Hydragyp (surface application) for both the southern discharge dam SD-3/LDP-11 and numerous sediment basins at the north of the site. Additional capacity has also been established at the northern end of site, as well as a series of sediment detention basins established at the toe of the rehabilitated southern emplacement. This has improved capacity to capture sediment laden water during design storm events.

Surface Water

In addition to monitoring any water discharge events, Rocglen undertakes quarterly sampling of surface waters. The results of analysis are presented in Appendix 5. Whilst there are no criteria or concentration limits specified for the quarterly surface water samples, the results do provide an indication as to the quality of waters on-site. In general, the water

quality in each dam remained consistent throughout the reporting period. The Void Water Dam has consistently shown poorer water quality in terms of Electrical Conductivity (EC), although following the regional flooding in February 2012, EC levels dropped due to the accumulation of rainwater in the pit. Pit water is prioritised as a water source for dust suppression to prevent any contamination of other surface water. SD7, upstream of the site, displayed a neutral pH with EC levels below 200µS/cm. Fluctuations in total suspended solids in sediment basins have been recorded and are common due to ongoing treat and release programs. Oil and grease levels in all storages have been below 5mg/L throughout the reporting period, indicating no hydrocarbon contamination.

3.3.3 Comparison with EA Predictions

The surface water assessment carried out by GSS Environmental for the Extension EA predicted that there would be minimal impact on flow regimes downstream of the Project Site due to the Rocglen Mine. Soil and water assessments for the site suggested that Total Suspended Solids (TSS) is likely to be the key water quality parameter requiring management during the life of the Project to ensure the water quality in downstream watercourses is not impacted. As described in Section 3.3.2, TSS has been problematic in surface water at Rocglen. A number of surface water management recommendations were made in the surface water assessment for the Extension Project including the installation of sediment basins, targeting final discharge dams for water use and using flocculants to settle suspended solids. These measures have been implemented, although the use of flocculants was not completely successful during the first half of the reporting period. The use of more active flocculants during the second half of the period and beyond should ensure that, as predicted in EA investigations, downstream water courses are not adversely impacted by TSS.

EA investigations predicted 6 days (during a wet year) of discharge during the first year of operation on the assumption that controlled discharge of water is undertaken. Rocglen recorded 834 mm of rain for the period (which is considered to be a wet year) and had 8 discharges during the period, which could be attributed to higher than usual rainfall during the summer months.

It was also recommended that salinity and alkalinity be closely monitored in the runoff from overburden emplacements and subsoil stockpiles to ensure that there are no adverse effects on downstream waterways. During the reporting period these parameters were monitored,

showing typical alkaline pH (within EPL criteria) and fluctuating Electrical Conductivity levels in all surface water storages.

3.4 Groundwater Pollution

3.4.1 Management

With the exception of fuels and oils, no materials occur, or are retained on the mine sites which are likely to be a source of groundwater pollution.

The methods for management of potential pollutants are summarised in Section 2.8.6. Ongoing monitoring to assess trends in groundwater chemistry will enable assessment of potential contaminants to groundwater, with particular emphasis on heavy metals, and major cations and anions. Groundwater monitoring requirements are identified in Table 8.

3.4.2 Performance

Throughout the life of the mine to date, the mine's performance with respect to groundwater management, the prevention of pollution and the assessment of impacts on groundwater availability to other surrounding users, has been assessed through groundwater level and chemistry monitoring undertaken at a series of piezometers and bores within ML 1620 and MPL 1662 and extending to adjacent properties, where practicable, at the frequency and for the parameters identified in Table 8.

Table 8 - Groundwater Monitoring

Site (See Figure 3)	Registered Bore No. & Licence No	Property/ Location	Frequency		Purpose
			SWL*[2], EC*[3] and pH	Representative Metals and Ions*[4]	
MP-1	GW968533 90BL254855	"Glenroc"	Quarterly	Six monthly	To determine existing status and any impacts
MP-2	GW968534 90BL254856	Mine site	Quarterly	Six monthly	To determine existing status and any impacts
MP-3	GW968535 90BL254857	"Stratford"	Quarterly	Six monthly	To determine existing status and any impacts
MP-4*[1]	GW968536 90BL254858	Surrey Lane	Quarterly	Six monthly	To determine existing status and any impacts
MP-5	GW968537 90BL254859	"Yarrawonga"	Quarterly	Six monthly	To determine existing status and any impacts
WB-1*[1]	GW000743	"Costa Vale"	Quarterly	Six monthly	To determine existing status and any impacts
WB-2*[1]	GW050395 90BL111536	"Roseberry"	Quarterly	Six monthly	To determine existing status and any impacts
WB-3[1]	GW050166 90BL110883	"Glenroc"	Quarterly	Six monthly	To determine existing status and any impacts
WB-4	GW045621 90BL104367	"Yarrawonga"	Quarterly	Six monthly	To determine existing status and any impacts

Site (See Figure 3)	Registered Bore No. & Licence No	Property/ Location	Frequency		Purpose
			SWL*[2], EC*[3] and pH	Representative Metals and Ions*[4]	
WB-5*[1]	GW011066 90BL004169	"Roseberry"	Quarterly	Six monthly	To determine existing status and any impacts
WB-6*[6]	GW044068 90BL102845	"Yarrari"	Quarterly	Six monthly	To determine existing status and any impacts
WB-7*[1]	GW022319 90BL013922	"Roseberry"	Quarterly	Six monthly	To determine existing status and any impacts
WB-8*[1]	GW052958 90BL107181	"Surrey"	Quarterly	Six monthly	To determine existing status and any impacts
WB-9*[1]		"Carlton"	Quarterly	Six monthly	To determine existing status and any impacts
WB-10*[1]		"Brolga"	Quarterly	Six monthly	To determine existing status and any impacts
WB-11*[1]		"Brolga"	Quarterly	Six monthly	To determine existing status and any impacts
WB-12*[1]		"Brolga"	Quarterly	Six monthly	To determine existing status and any impacts
Yarrari		"Yarrari"	Quarterly	Six monthly	To determine existing status and any impacts
Surrey No.2		"Surrey"	Quarterly	Six monthly	To determine existing status and any impacts

*[1] Non-Company owned bore *[2] SWL – Standing Water Level *[3] EC = Electrical Conductivity
*[4] As specified in SWMP *[5] Company production bore

Appendix 6 presents the results of the groundwater monitoring undertaken since the commencement of the mine. Monitoring sites are shown on Figure 3. Groundwater sampling and analysis was conducted by ALS Acirl Pty Ltd during the reporting period.

Access for monitoring was restored to WB-8 and Surrey No. 2 bore (both on the privately-owned "Surrey" property) during the reporting period.

A review of the groundwater monitoring results presented in Appendix 6 shows the following trends:

Groundwater levels

Groundwater levels have remained relatively consistent at all monitoring locations shown in Appendix 6, with the exception of MP-2, WB-5, WB-7and WB-10 with discussion below:

- **MP-2** is located just south of the Wean Road diversion within Whitehaven owned land. It had a consistent SWL between September 2008 and September 2010 but has shown periods of recharge during times of wet weather and then a drop in SWL during drier times.
- **WB-5 and WB-7** are located adjacent to the north-eastern corner of the ML and at the "Roseberry" property to the east of the mine, respectively. Both monitoring locations have shown significant fluctuations since monitoring commenced which is

a result of the bores being equipped for stock and domestic purposes. Fluctuations are therefore not considered to be associated with mining operations at Rocglen.

- **WB-10** is located on the privately-owned "Brolga" property to the south of Rocglen. It has maintained a very consistent SWL since monitoring commenced in 2008 with the exception of one monitoring event in September 2011. The apparent drop in SWL was discussed with the landholder who indicated that he had not noticed any change in water levels. Given this, and subsequent SWL checks indicating a return to the usual depth, and the absence of a similar drop in SWL at another bore on the same property, this anomalous result is considered to be an error with the field records.

Groundwater quality

- The water in most bores generally has a neutral pH.
- The water in all bores can be described as fresh to brackish.
- Water quality has been compared to the Australian and New Zealand Guidelines for Fresh and Marine Water Quality (2000) (ANZECC) guidelines for drinking water (cattle). The quality of groundwater at each monitoring location remained relatively consistent throughout the reporting period with the exception of WB-7, which showed a spike in various total metals in August 2011 with concentrations orders of magnitude greater than all other monitoring events at WB-7 prior to and after that round of monitoring as well as other monitoring locations during the August 2011 monitoring event. It is assumed that the sample was contaminated and no further investigation is proposed in the absence of subsequent elevated results.

3.4.3 Comparison with EA Predictions

The hydrogeological assessment undertaken by Douglas Partners for the Extension EA concluded that drawdown on the surrounding groundwater system as a result of the expanded mining operation would be limited during the operation of the mine. This is due to many faults in the vicinity of the mine and generally low permeability of the Maules Creek Formation strata, with hydraulic connectivity within the alluvium at the north and south of the site considered to be limited. As found during the reporting period, standing water levels generally have not lowered at the monitored monitoring and groundwater bores

surrounding the mine. Some fluctuations in standing levels were recorded and are likely to be associated with stock and domestic watering purposes.

Douglas Partners also stated that up until the Extension EA investigations, the current operation had very little impact on surrounding groundwater levels. Douglas Partners recommended that current bores MP-4 and MP-5 be deepened below the water table, and additional monitoring bores are to be installed at the south of the pit. This is to occur in the next reporting period.

3.5 Contaminated or Polluted Land

Prior to mining, the Rocglen site was a greenfields site. Investigations during the original EIS and Extension EIS revealed that no environmentally harmful products had been used on their landholding nor had there been any disposal of potential environmental contaminants. This situation has remained unchanged throughout the life of the mine to-date and consequently there is no reason to expect that contaminated lands would be present within the current Project Approval area.

3.6 Threatened Flora

3.6.1 Original Environmental Assessment Investigations

As a part of the original EA for Rocglen, Geoff Cunningham Natural Resource Consultants (2007) described and mapped five vegetation communities within the Rocglen study area. These were:

- Narrow-leaf Ironbark – Pilliga Grey Box Community;
- Pilliga Grey Box – White Cypress Pine Community;
- Pilliga Grey Box – White Box - Yellow Box – White Cypress Pine Community;
- Brigalow Community; and
- Cleared Lands – used for grazing and / or cultivation.

3.6.2 Extension Environmental Assessment Investigations

For the Extension EA, RPS (2010) identified the following five vegetation communities within the Project Site and within the adjacent “Yarrawonga” and nearby “Greenwood” properties:

1. Narrow-leaved Ironbark (*E. crebra*), White Cypress (*Callitris glaucophylla*) Open Forest;
2. Narrow-leaved Grey Box (*E. pilligaensis*), White Cypress (*Callitris glaucophylla*), Narrow-leaved Ironbark (*E. crebra*) Forest;
3. Bimble Box (*E. populnea*), Yellow Box (*E. melliodora*) Inland Grey Box (*E. microcarpa*), Grassy Woodland (Endangered Ecological Community);
4. Brigalow (Endangered Ecological Community); and
5. Cleared land with scattered trees.

During the evaluation of the EA prepared for the Rocglen Extension, the Office of Environment and Heritage requested that vegetation communities 3 and 5 (above) be further investigated. Investigations were undertaken during the development of the Biodiversity Offset Strategy (Eco Logical Australia 2010) for the Project, with the two communities defined as:

3. Bimble Box (*E. populnea*), Yellow Box (*E. melliodora*) Inland Grey Box (*E. microcarpa*), Grassy Woodland -

   i. Poplar Box grassy woodland on alluvial heavy clay soils in the Brigalow Belt South Bioregion (Benson 101); and

   ii. White Box grassy woodland of the Nandewar and Brigalow Belt South Bioregions.

5. Cleared land with scattered trees -

   i. Poplar Box grassy woodland on alluvial heavy clay soils in the Brigalow Belt South Bioregion (Benson 101) – Derived native grassland; and

   ii. White Box grassy woodland

Whitehaven has prepared the required Rehabilitation Management Plan (RMP) in accordance with Schedule 3, Condition 36 of PA 10_0015 which was approved by the Division of Resources and Energy in April 2012. The plan includes requirements for flora monitoring on rehabilitated areas. These will be established during the next reporting period within rehabilitated bushland and pasture areas. These plots are to be monitored every 12 months after establishment then every 2 years thereafter. Prior to the extension, control plots were established by Geoff Cunningham Natural Resource Consultants within vegetation communities that replicate areas that have been cleared. These communities will

provide the basis for future rehabilitation efforts over that area of the mine site to be returned to bushland.

No flora monitoring was undertaken during the reporting period. Monitoring will be undertaken during the next reporting period, upon the establishment of rehabilitation area monitoring plots.

To address and offset vegetation impacts of the Rocglen Coal Mine, Eco Logical Australia prepared a Biodiversity Offset Strategy as part of the Rocglen Extension Project. The area of offset required was calculated using the NSW BioBanking Assessment Methodology, which calculates the number of "credits" required at the impact site based on the area and condition of each vegetation type impacted and the number of credits generated at a BioBank Site based on the improvement in biodiversity values via conservation management.

The Regional BioBank Site, as shown on Figure 3, will be protected on title by a BioBanking Agreement which has been entered into with the NSW Minister for the Environment under the Threatened Species Conservation Act 1995 (TSC Act) and will be managed in perpetuity in accordance with a BioBanking Management Plan, with management funds (calculated for in-perpetuity management) held in trust.

A BioBanking Management Plan has been prepared for the site with management actions to be implemented during the next reporting period on retirement of the required number of biodiversity credits. The plan includes management of access, weeds and feral animals across the entire BioBank Site, the enhancement of woodland areas and restoration of derived grassland areas by permanent exclusion of grazing, and targeted planting of tree, mid storey and ground cover species.

3.6.3 Comparison with EA Predictions

EA investigations by RPS Harper Somer O'Sullivan in 2010 for the Extension predicted that the two main impacts from the Rocglen Extension would be the removal of native vegetation, and invasion of native plant communities by exotic perennial grasses. The following recommendations were followed during the reporting period as directed by RPS:

- Clearing of approximately 22ha in clearly marked areas;
- Areas of clearing minimised, with trees retained as much as possible;

- Weeds and invasive grasses controlled on an ongoing basis;
- Dust generation minimised at all times,;
- Stockpiles of materials retained in cleared areas;
- Installation of erosion and sedimentation measures; and
- Maintenance of vehicles and machinery.

Perennial grasses are used on rehabilitated areas, but excluded from native vegetation areas to minimise competition for moisture.

3.7 Threatened Fauna

3.7.1 Original Environmental Assessment Investigations

In accordance with the original Rocglen EIS, Countrywide Ecological Service (2007) found or detected the following threatened species within and or in proximity to the Rocglen site:

- Grey Falcon (*Falco hypoleucos*);
- Gilbert's Whistler (*Pachycephala inornata*);
- Grey-crowned Babbler (*Pomatstomus temporalis*);
- Turquoise Parrot (*Neophema pulchella*);
- Hooded Robin (*Melanodryas cucullata*);
- Beccaris Mastiff-bat (*Mormopterus beccarii*); and
- Yellow-bellied Sheathtail-bat (*Saccolaimus flaviventris*).

These investigations identified that the proposed development was unlikely to significantly affect any of the threatened species, fauna populations or communities found or likely to occur in or around the mine site.

3.7.2 Extension Environmental Assessment Investigations

Whitehaven engaged RPS Harper Somers O'Sullivan to undertake a Flora and Fauna Assessment to support the application for the Extension Approval. Further to Country Wide Ecological Services investigations in 2007 RPS recorded a total of 100 fauna species,

including one additional threatened species, the Speckled Warbler *(Pyrrholaemus sagittatus),* present within the project area.

Whitehaven currently engages EcoLogical Australia Pty Ltd to conduct pre-clearing inspections for fauna impact mitigation, as required.

As discussed in Section 3.6, Whitehaven developed a Rehabilitation Management Plan (RMP) in accordance with Schedule 3, Condition 36 of PA 10_0015. The RMP includes detail on monitoring, where fauna monitoring will be undertaken biennially in both spring and autumn. Countrywide Ecological Service established fauna monitoring plots during spring 2009 in areas adjacent to the site, with rehabilitation monitoring plots to be established during the next reporting period.

3.7.3 Management

Pre clearance fauna inspections were carried out by EcoLogical Australia Pty Ltd in January and May 2012 for clearing areas in advance of mining at the east, heavier vegetation at the west and isolated smaller areas at the north of the site. During the May 2012 clearing of vegetation at the west of the site, a number of abandoned Grey Crowned Babbler nests were identified. These nests were retrieved once the tree was felled, and placed in the existing vegetation further west of the site for re-use by local Grey Crowned Babblers.

3.8 Weeds

3.8.1 Management

Weed management within the ML and MPL involves general observations during monthly inspections to determine levels of weed infestation. Weed control is undertaken by Whitehaven's environmental personnel. All persons involved with weed control hold ChemCert Australia accreditation. Whitehaven also works with the Gunnedah Shire Council Noxious Weed Inspector to identify target control areas surrounding the site and implement actions in accordance with the Noxious Weeds Act 1993 and the local Noxious Weed Management Plan.

3.8.2 Performance

Rocglen has not experienced any major weed issues during the reporting period. Minor ongoing weed management comprised spot spraying of weeds such as African Boxthorn *(Lycium ferocissimum)* and Bathurst Burr *(Xanthium spinosum)*. Boxthorns at the north of the site and Bathurst Burr near the office facilities were targeted during spraying campaigns in spring 2011 and winter 2012, which is the optimum time of year for control.

3.9 Blasting

3.9.1 Blast Criteria and Control Procedures

3.9.1.1 *Blast Criteria*

Blasting criteria for the mine are nominated in Project Approval PA 10_0015 (Appendix 1), and Condition L5 of Environment Protection Licence 12870 (Appendix 2) and specify that:

- Blasting must only be carried out between 9.00 am and 5.00 pm, Monday to Saturday, with a maximum of 1 blast per day, unless an additional blast is required due to a misfire.
- The overpressure level from blasting operations must not:
  (a) exceed 115dB (Lin Peak) for more than 5% of the total number of blasts over each Reporting Period; and
  (b) exceed 120dB (Lin Peak) at any time.

  at any residence on privately-owned land.
- Ground vibration peak particle velocity from the blasting operations must not:
  (a) exceed 5mm/s for more than 5% of the total number of blasts during each Reporting Period; and
  (b) exceed 10mm/s at any time,

  at any residence on privately-owned land.

3.9.1.2 *Control Procedures*

Flyrock, air vibration, ground vibration and dust from blasting are controlled using a combination of design and operational methods which are detailed in the MOP and the Blast

Management Plan. Road closures during blasting occurred for all blasts within 500 metres of Wean Road, with blast notice boards updated at least 24 hours prior to each blast, as per the Blast Management Plan.

3.9.2 Performance

During the reporting period, blasts were generally initiated every 2 weeks with a total of 23 blasts. All blasts were monitored using portable blast monitors and remained within the compliance criteria specified above. Orica was unable to provide results for "Costa Vale" for the shot on the 23rd December 2012 due to incomplete records but believe it did not trigger. It is anticipated that solar powered permanent blast monitors will be installed at the "Roseberry" and "Retreat" monitoring points during the next reporting period.

The maximum recorded ground vibration during the reporting period was 1.11 mm/s recorded at "Roseberry" on the 27th April 2012. The maximum recorded peak overpressure level during the reporting period was 114.9 dBL recorded at "Costa Vale" on the 22nd December 2011.

All blast monitoring results for the reporting period, including the time of initiation has been included in Appendix 7.

3.9.3 Comparison with EA Predictions

Spectrum Acoustics carried out a blasting and vibration assessment for the Extension EA and concluded that, based on historical measurement results for the Rocglen Mine, there are no anticipated exceedances of blasting criteria at any privately owned residence as a result of operations under the Extension Project. In accordance with this prediction, no exceedance of either overpressure or ground vibration was recorded during the reporting period. Spectrum Acoustics recommended that blast monitoring should continue to be conducted at the nearest privately owned residences to the north and south of the mine and this has been carried out during the reporting period with the exception of one blast where the monitor results for "Costa Vale" for the shot on the 23rd December 2012 were unable to be provided by Orica. Monitoring at the "Roseberry" property during this blast confirmed compliance of both overpressure and vibration criterion.

3.10 Operational Noise

3.10.1 Criteria

The noise criteria specified in PA 10_0015 and EPL 12870 is as follows:

Noise Criteria dB(A)

Location	***Day***	***Evening***	***Night***	
	$L_{Aeq\ (15\ min)}$	$L_{Aeq\ (15\ min)}$	$L_{Aeq\ (15\ min)}$	$L_{A1\ (1\ min)}$
All privately-owned land	*35*	*35*	*35*	*45*

Road Traffic Noise Criteria dB(A) $L_{Aeq\ (1\ hour)}$

Location	***Day***	***Evening***	***Night***
Any residence on privately-owned land	*55*	*55*	*50*

Operational noise criteria did not change upon issue of PA 10_0015 however road traffic noise criteria changed from 60 dB(A) during the day and evening to 55 dB(A). Night road traffic criteria did not change from 50 dB(A).

3.10.2 Control Procedures

Control of noise generation and propagation at the mine is by a combination of general source and propagation path methods including:

- Installation and maintenance of appropriate mufflers on plant and equipment;
- Where operationally feasible, scheduling activities to minimise operation of equipment in exposed locations when winds are blowing towards residences;
- Equipment removal or replacement;
- Changing operational procedures;
- Restricting hours of operations;
- Enclosure of fixed items of plant, e.g. generators;
- Bunding close to noise sources to create obstructions to the propagation path;
- On-going site road maintenance using the mine-based grader; and
- Regular equipment maintenance.

In accordance with the Condition 3 (c) of Schedule 3 of PA 10_0015 Rocglen is required to regularly assess real-time noise levels and meteorological forecasting data to ensure compliance with the operational noise criteria. Rocglen purchased a mobile real time noise monitor in April 2012 (Plate 4). During the next reporting period, the monitor will be used to actively monitor noise at surrounding properties which are likely to receive the greatest impact from operations. The unit monitors operational noise levels in comparison with compliance levels and when noise levels approach criteria an alarm system is triggered to operations personnel. Operations and environmental personnel will be able to log on to a web based platform where real time noise and weather data is viewable. The web based platform may also be used to live stream from the monitor to identify specific sources of noise which will be used to confirm if the source is mining related.

A range of controls are used in to mitigate noise on a real time basis, including:

- Relocation of dump position to reduce noise impacts;
- Changes in operator behaviour (speed of trucks, haul road used, speed of dozers);
- Use of predictive forecasts to determine suitable dumping locations (i.e. upper dumps during the day, and in-pit dumping at night where possible); and
- Stand down items of equipment to achieve noise compliance.

Relevant personnel comprising of the Environmental Officer, Open Cut Examiner and Operations Manager have been trained in the operation of the real time system, including alarms, live streaming of audio and reactive management to noise impacts.

Plate 4 – Rocglen's Real Time Noise Monitor in Operation

3.10.3 Operational Noise Monitoring

3.10.3.1 Introduction

Rocglen's draft Noise Management Plan (submitted and awaiting Department approval) details the requirements for attended and real time operational monitoring. Cumulative road haulage noise monitoring from Rocglen and Tarrawonga haulage is detailed in the draft Road Traffic Noise Management Plan. The noise monitoring sites are identified on Figure 3.

Attended noise monitoring was undertaken on a quarterly basis during the reporting period (September 2011, December 2011, March 2012 and July 2012).

Unattended noise monitoring generally occurs on a 3 monthly basis to establish background noise levels for the mine. Monitoring events occurred in September and December 2011 and March and June 2012. With the commencement of real time noise monitoring, and ongoing attended noise monitoring, Whitehaven has now ceased unattended noise monitoring as it provides no additional benefit to the monitoring regime in place.

Cumulative road noise monitoring occurred in September 2011 and May 2011, as required under the Road Noise Management Plan.

Additional noise monitoring was also undertaken during the reporting period to address any community concerns.

The following sub-sections present a summary of the outcomes of attended noise monitoring as well as cumulative road noise monitoring. Monitoring results for attended, unattended and cumulative road noise monitoring are present in Appendix 8.

ATTENDED NOISE MONITORING

3.10.3.2 September 2011 Attended Noise Monitoring

On the 13th September 2011, attended noise monitoring was undertaken at "Costa Vale" (EPL I.D. N1) and "Surrey" (N2). Spectrum Acoustics reported that noise emissions from the mine did not exceed the criterion of 35 dB(A) at either monitoring location.

In addition to operational noise, noise from the mine must not exceed 45 dB(A) $L1_{(1\ min)}$ between the hours of 10pm and 7am. This is to minimise the potential for sleep disturbance as a result of individual loud noises from the mine. During the night time measurement circuit the $L1_{(1\ min)}$ noise from mine did not exceed 45 dB(A) at the monitoring locations.

3.10.3.3 December 2011 Attended Noise Monitoring

On the 13th December 2011 attended noise monitoring was undertaken at "Costa Vale" (N1) and "Surrey" (N2). Spectrum Acoustics reported that noise from the mine remained below the 35 dB(A) criterion at "Surrey". The criterion was exceeded at the "Costa Vale" property recording 36 dB(A). "Costa Vale" is owned by Whitehaven, and as a consequence this result was not considered an exceedance of noise criteria.

Spectrum Acoustics also confirmed that during the night time measurement circuit the $L1_{(1\ min)}$ noise from the mine did not exceed 45 dB(A) the monitoring locations.

3.10.3.4 March 2012 Attended Noise Monitoring

Attended noise monitoring was conducted at the "Costa Vale" (N1) and "Surrey" (N2) properties on the 16th March 2012. Spectrum Acoustics reported that the mine did not exceed the criterion of 35 dB(A) at the time of monitoring. In addition, during the night time measurement circuit the $L1_{(1\ min)}$ noise from the mine did not exceed 45 dB(A) at the monitoring locations.

3.10.3.5 June 2012 Attended Noise Monitoring

On the 27th June 2012 attended monitoring was undertaken at the "Costa Vale" (N1) and "Surrey" (N2) properties. The report from Spectrum Acoustics noted that noise from the mine exceeded the 35 dB(A)$_{LAeq\ (15\ min)}$ at the "Costa Vale" property during the day and night monitoring periods, recording 36 and 37 dB(A) respectively. As mentioned above, "Costa Vale" is Whitehaven owned and as a consequence this was not considered an exceedance of noise criteria. No exceedances were recorded at the "Surrey" property during monitoring. Criterion of L1$_{(1\ min)}$ 45 dB(A) was not exceeded for the during the night time monitoring at both locations.

Upon agreement from the "Retreat" landholder, attended noise monitoring is to be carried out at "Retreat" as a replacement monitoring point for "Costa Vale" given "Costa Vale" is now Project related. This is due to occur in the next reporting period.

CUMULATIVE ROAD HAULAGE NOISE MONITORING

3.10.3.6 September 2011 Road Noise Monitoring

Road noise monitoring activities were conducted at "Brooklyn" (2 residences) and "Weroona" on Blue Vale Road. Simultaneous noise measurements were made at the front of both residences on "Brooklyn". Residence 1 is closest to Blue Vale Road (approximately 90m) and residence 2 is approximately 480m from road. Spectrum Acoustics reported that:

- Noise measurements were undertaken at both "Brooklyn" residences between 7:51am and 8:50am and "Weroona" between 7:25am and 8:25am.
- 37 coal truck movements were recorded during monitoring at the "Brooklyn" property. Based on the 30 minute measurement the calculated contribution from mine-related vehicles was 54 dB(A),$L_{eq\ (1\ hour)}$ at residence 1 and 49 dB(A),$L_{eq\ (1\ hour)}$ at residence 2. Both measurements are below the PA 06_0198 daytime criterion of 60 dB(A) $L_{eq\ (1\ hour)}$.
- Over the course of the measurement period at "Weroona" there were 34 coal truck movements. The total measured contribution from mine-related vehicles at "Weroona" was 50 dB(A) $L_{eq\ (1\ hour)}$. This is below the PA 06_0198 daytime criterion of 60 dB(A) $L_{eq\ (1\ hour)}$.

3.10.3.7 April 2012 Road Noise Monitoring

Road noise monitoring activities were conducted on 27th April at "Brooklyn" (2 residences) and "Weroona" on Blue Vale Road. Spectrum Acoustics reported that:

- Noise measurements were undertaken at both "Brooklyn" residence 1 between 11:14am and 12:14am and residence 2 between 12:21pm and 1:21pm. Monitoring at "Weroona" was conducted between 7:25am and 8:25am.
- 38 coal truck movements were recorded during monitoring at residence 1 of the "Brooklyn" property. Based on the 30 minute measurement the calculated contribution from mine-related vehicles was 52 dB(A) $L_{eq\ (1\ hour)}$ at residence 1. 43 coal truck movements were recorded at residence 2, recording 42 dB(A) $L_{eq\ (1\ hour)}$. Both measurements are below the PA 10_0015 daytime criterion of 55 dB(A) $L_{eq\ (1\ hour)}$.
- Over the course of the measurement period at "Weroona" there were 43 coal truck movements. The total measured contribution from mine-related vehicles at "Weroona" was 43 dB(A) $L_{eq\ (1\ hour)}$. This is below the PA 10_0015 daytime criterion of 55 dB(A) $L_{eq\ (1\ hour)}$.

3.10.3.8 Real Time Noise Monitoring

In accordance with Project Approval requirements, Whitehaven has used the new real time noise monitor to asses noise impacts at various locations, in particular the "Surrey" property during June and July 2012 of the reporting period. The monitoring provided Whitehaven with valuable results regarding noise impacts from Rocglen, which will be presented to the landholder in the next reporting period. The monitor will be located at properties with the greatest potential for impact or where landholder concern is present to assist Whitehaven in managing noise from Rocglen, as described in Section 3.10.2.

3.10.4 Comparisons with EA Predictions

The noise impact assessment carried out by Spectrum Acoustics for the Extension EA found that the Whitehaven owned "Costa Vale" property was likely to be impacted from noise associated with activities on the northern emplacement area. Since the assessment, three elevated noise results have been recorded at "Costa Vale" during two monitoring events

(December 2011 and June 2012). Since the monitoring in June 2012, the noise receiver monitoring point has been relocated to the "Retreat" property, to the north of "Costa Vale", with agreement by the landholder and in accordance with the extension approval. All attended noise monitoring at "Surrey" during this reporting period was compliant with criteria, as predicted in the EA.

Spectrum Acoustics predicted that road traffic noise levels would remain compliant with the traffic noise criterion. Traffic noise monitoring has continued to be conducted at the "Brooklyn" and "Weroona" residences on Blue Vale Road, where noise levels from coal haulage were within compliance levels during all monitoring events.

3.11 Visual, Light

3.11.1 Management

The mine is generally well positioned with respect to visual aspects, with views of the mining operations and/or areas of mine-related disturbance initially limited to those from the project related residences "Costa Vale" located adjacent to the northern boundary of the mine site, "Stratford" to the south of the mine site, "Yarrari" and "Belah" to the east and Vickery State Forest to the west. Wean Road is adjacent to the eastern boundary of the mine site, however amenity bunds have been installed to reduce visual impacts for the public which utilise this road.

As mining has progressed, the western emplacement has developed to maximum height which has resulted in the site being visible from locations further to the south and east. Reshaping and rehabilitation of the western emplacement has continued during the period which continues to reduce visible impact. The northern emplacement has extended north in accordance with the extension approval, with initial reshaping works on the lower batters of the emplacement now underway. It is intended that rehabilitation of the outer batter of the northern emplacement be completed during the next reporting period. Management / minimisation of local and more distant visual impacts are achieved by:

- Undertaking activities in accordance with the various management plans applicable to the mine, all of which incorporate safeguards which indirectly reduce visual impact;
- Minimising the extent of land disturbance / clearing in advance of mining;
- Progressive rehabilitation of disturbed areas;

- Sympathetic positioning and direction of lights, when possible, to avoid impacting on local residences; and
- Communication between environmental and operation staff regarding surrounding residences that may receive lighting impact.

3.11.2 Performance

Whitehaven received 3 complaints during the reporting period in regards to lighting impacts at properties to the north of the mine site. It has been identified that the progression of the northern emplacement and the use of lighting plants on top of the emplacement was the main cause of concern. The Operations Manager and Environmental Officer reiterated to the Open Cut Examiners (OCEs) the need to ensure placement of lighting is appropriate to minimise impacts on surrounding residences where practical and safe to do so. During the next reporting period the northern emplacement will be targeted for shaping and rehabilitation. This will reduce the exposure and visibility of the area to properties north of the mine.

3.11.3 Comparison with EA Predictions

GSS Environmental (GSSE) undertook a visual amenity assessment considering the post-mining outlooks from five residences (both privately owned and project-related) in close proximity to the mine. The purpose was to assess the visual amenity of the local setting, particularly of privately owned residences, with the addition of the key elements associated with the Rocglen Extension Project and residual impacts following implementation of mitigation measures and site rehabilitation. GSSE predicted the impact of the Rocglen Extension on the visual amenity of the local area to be low and acceptable. GSSE identified sympathetic positioning of lights and progressive rehabilitation to be the main initiatives to reduce visual impact. As mentioned in Section 3.11.2, the matter of sympathetic lighting placement is continuously considered by operations personnel. Progressive rehabilitation has occurred on the western emplacement, and rehabilitation on the northern emplacement will occur as described in Section 5.

3.12 Aboriginal Heritage Management

3.12.1 Sites Management and Performance

Original Environmental Assessment PA 06_0198

In 2002, an assessment of the cultural heritage of the mine site was conducted by Archaeological Surveys and Reports Pty Ltd (ASR). Red Chief Local Aboriginal Land Council (LALC) were consulted and assisted in the field work. In 2007, representatives of Red Chief LALC were consulted again along with representatives of the Bigundi Biame Gunnedarr Traditional People to confirm the previous investigations. The assessment was used in the preparation of the original Environmental Assessment for the mine, undertaken by R.W. Corkery & Co. Pty Ltd.

Three artefact sites were recorded within the survey area, with two scarred trees in the Wean Road easement recorded as sites at the request of the Red Chief LALC Sites Officers. In addition, two scarred trees were recorded in the Shannon Harbour Road easement to the east of its proposed junction with Riordan Road. These are described, along with their current status in Table 8.

Extension Environmental Assessment PA 10_0015

In 2010, RPS archaeologists conducted an assessment and field survey of the potential impact of the Rocglen Extension on Aboriginal heritage. The archaeological field survey, which covered the area proposed to be disturbed by the expansion of the Northern Emplacement Area, was undertaken with members of four local Aboriginal Stakeholder groups. In summary, three stone artefact sites were located comprising of one isolated find (IF1) and two artefacts scatters (AS 1 and AS2). Descriptions and their current status are shown in Table 8.

Table 9 - Identified Aboriginal Artefacts and Scarred Trees

Initial Environmental Assessment PA 06_0198			
Site Name	**Site Type**	**Site Description/Comments**	**Current Status**
B1	Isolated Artefact	8 negative flake scars partly exposed in a dust/sand erosion feature along a fence line, 10m from the central drainage line.	Artefacts salvaged due to being within area of disturbance, held at the Cumbo Gunerrah keeping place.
B2	Artefact Scatter	8 small trimming flakes were scattered on and around a large ant mound on the crest of a contour bank. Perhaps the remains of a knapping or a tool manufacturing site.	Artefacts salvaged due to being within area of disturbance, held at the Cumbo Gunerrah keeping place.
B3	Extended Artefact	Artefact scatter extending approximately 800m along the western bank of the central drainage line	Artefacts salvaged due to being within area of disturbance, held at the Cumbo Gunerrah keeping

Initial Environmental Assessment PA 06_0198			
Site Name	**Site Type**	**Site Description/Comments**	**Current Status**
	Scatter	containing >40 artefacts.	place.
Btree 1	Scarred Tree	The scar is 160cm long, 40cm wide and 295cm from the ground on a large box gum located on the eastern side of the Wean Road Easement.	Scar tree fenced with signage, undisturbed within current project area.
Btree 2	Scarred Tree	The scar is 57cm long, 15cm wide and 146cm from the ground on a large box gum located on the eastern side of the Wean Road Easement	Scar tree fenced with signage, undisturbed within current project area.
Stratford ST1	Scarred Tree	The scar is 223cm long, 70cm wide and 18cm from the ground on a large box gum located in a closed road on the "Stratford" property	Scar tree undisturbed on neighbouring Whitehaven Property.
Stratford ST2	Scarred Tree	The scar is 140cm long, 42cm wide and 14cm from the ground on a large box gum located north-south oriented closed road easement on the "Stratford" property	Scar tree undisturbed on neighbouring Whitehaven Property.
Extension Environmental Assessment PA 10_0015			
AS1	Artefact Scatter	Artefact scatter containing flake pieces comprising mudstone, chert and grey silcrete located in an area of exposed soil.	Artefacts salvaged 17th May 2012. Currently securely held on site, awaiting OEH approval for transfer to Cumbo Gunerrah keeping place.
AS2	Artefact Scatter	Artefact scatter containing flaked pieces of greenstone and chert located in an area of exposed soil.	Artefacts salvaged 17th May 2012. Currently securely held on site, awaiting OEH approval for transfer to Cumbo Gunerrah keeping place.
IF1	Isolated Find	An isolated chalcedony flake with a banded quartz vein located within an area of eucalypt trees.	Could not be located during salvage 17th May 2012, hence left in-situ.

3.12.2 Consultation

Whitehaven, through the soil stripping contractor, regularly consults with representatives of the local Aboriginal community. In accordance with the agreement with the representative Aboriginal groups, being Gunida Gunyah and Min Min, notification of planned topsoil stripping is provided by the soil stripping contractor directly to the nominated Aboriginal site monitors approximately 2 to 3 days in advance of planned activities.

Given that pre-stripping (separate stripping of topsoil, subsoil and friable overburden) is undertaken well in advance of mining and the soil stripping contractor is also engaged in other activities on the mine site, the flexibility exists to delay topsoil stripping activities should the situation ever arise in the future where monitors are temporarily unavailable.

During the reporting period, no cultural material of significance was identified during soil stripping activity. To date, the measures in place to protect Aboriginal Cultural Heritage are considered satisfactory, with all measures identified in the EA and consent criteria in place.

The most recent sites AS1, AS2 and IF1 that were identified during the Extension EA investigations were fenced off to prevent disturbance, until salvage could take place. Salvage was undertaken on the 17th May 2012, by an RPS archaeologist and members of the Gunida

Gunyah Aboriginal Corporation and Red Chief Local Aboriginal Land Council. Both artefact scatters AS1 and AS2 were salvaged, but the isolated artefact IF1 could not be located and hence was left in-situ. All artefacts were considered of low significance. The artefacts are securely kept on site until care and control documentation is signed off by the OEH. The artefacts will be transferred to the Cumbo Gunerrah Traditional Keeping Place once sign off is provided by OEH. It is expected that this will occur in the next reporting period.

3.12.3 Comparison with EA Predictions

Management measures for Aboriginal Heritage items are detailed by RPS in the Extension EA. All measures recommended by RPS have been implemented during the reporting period. These include consultation with community groups, the salvage of artefacts at the north of the site, the protection of scarred trees on Wean Road and the invitation of representative monitors for all soil stripping campaigns.

3.13 European Heritage

No features of European heritage were discovered within the Project Approval Area and hence, no specific management procedures are required.

3.13.1 Comparison with EA Predictions

RPS undertook an assessment of the "Glenroc" homestead and farm sheds for the extension EA and deemed the buildings to have no historic significance. RPS recommended that in the event that significant European cultural heritage material is uncovered, work should cease in that area immediately. An archaeologist should be contacted to assess the significance of the remains and works are only to recommence when an appropriate and approved management strategy is instigated. No material has been uncovered to date.

3.14 Spontaneous Combustion

3.14.1 Management

The coal has a low percentage of inorganic sulphur and hence a low potential for exothermic oxidation reactions. The short residence time of ROM coal stockpiles at the mine also minimises the potential for spontaneous combustion incidents.

In the event of spontaneous combustion, Whitehaven personnel are present within the area of the ROM coal stockpiles during work hours and are trained to watch for indications of spontaneous combustion. Any incident would be followed by excavation to identify the source and extinguishment through water saturation with the sites water cart or fire tender.

3.14.2 Performance

There were no incidents of spontaneous combustion during the reporting period.

3.15 Bushfire Management

3.15.1 Management

The mine maintains firebreaks around both its landholding and the mine area and maintains fire fighting equipment as well as earthmoving equipment, a water truck and fire tender which would be used in the control of fires. Rocglen personnel also liaise with the local (Nandewar) Rural Fire Service and the Regional Fire Control, as required.

3.15.2 Performance

There have been no bushfire incidents within the mine leases since commencement.

3.16 Hydrocarbon Contamination

3.16.1 Management

It is Whitehaven's objective that:

- All bulk hydrocarbons, i.e. fuel, oils and grease (both new and waste) retained at the Rocglen Coal Mine be contained within bunded areas within the contained water management system as described in Section 2.8.2;
- All fixed or portable equipment incorporate self-contained bunding;
- Hydrocarbon-contaminated materials be disposed of appropriately; and
- Minor spillages, if occurring, are cleaned up and the contaminated soil either bio-remediated or transferred off-site to an appropriately licensed waste disposal area.

Major spillages, if occurring, would be treated in accordance with the three-phase system identified in the relevant management plan required under the Consent.

3.16.2 Performance

Whitehaven's procedures for hydrocarbon management have been effective throughout the reporting period with:

- No groundwater contamination evident or reported by landowners; and
- No requirement for off-site disposal of contaminated materials.
- No reportable incidents of hydrocarbon spills or contamination.

3.16.3 Greenhouse Gas Emissions

Diesel Consumption

During the reporting period, a total of 8,748,454 litres of diesel fuel was used on site for mining related activity. Assuming an energy content of Automotive Diesel Oil of 38.6 GJ/kL and using Table 3 of the *National Greenhouse Accounts (NGA) Factors – July 2011*, the estimated direct – Scope 1 Greenhouse Gas emissions including all CO_2 and non CO_2 gases are shown in Table 10.

Table 10 - GHG Emissions - Diesel Fuel

	Diesel Fuel Usage kL	Emission Factor T CO2-e/kL	Equivalent Tonnes
GHG 2008/09	5,852	2.7	15,803
GHG 2009/10	6,697	2.7	18,082
GHG 2010/11	8,551	2.7	23,088
GHG 2011/12	8,748	2.7	23,620

The site does not utilise electricity from the power grid, but via a number of diesel powered generators. The emissions associated with diesel consumption by the generators are included in the table above.

Explosives

During the reporting period, a total of 4,072 t of explosives was used at the mine. Assuming a conversion factor of 0.1778, it is estimated that blasting at the mine yielded 724 equivalent tonnes of CO_2.

Fugitive Emissions

ROM coal production is used to estimate fugitive emission factors. Based on 1,280,345 tonnes of ROM coal production during the reporting period and a conversion factor of 0.045 (from Table 7 of the "*National Greenhouse Accounts (NGA) Factors – July 2011*), it is estimated that 57,615 tonnes of CO_2 were emitted during the reporting period. During the reporting period, Whitehaven undertook specific drilling to quantify the actual gas composition of coal from the Rocglen mine site in order to provide more robust data for the purposes of defining methane emissions. The data from this program was not available for this report, but will be used in subsequent reporting of fugitive emissions.

Summary

A summary of calculated total CO_2 equivalent tonnes/year for the reporting period is provided in Table 11.

Table 11 - GHG Emissions Summary

Source	Calculated Total CO_2 Equivalent (t/year)
Diesel	23,620
Explosives	724
Fugitive Emissions	57,615
TOTAL	**81,959**

The potential for reducing greenhouse gas emissions at Rocglen is related predominantly to consumption of diesel use by plant and equipment. Methods are in place at site to maximise efficiency from the mining fleet through regular maintenance scheduling and, where possible, minimising the gradient and length of loaded haul runs for the operating dump trucks.

Whitehaven is committed to a reduction in emission levels as a result of operations at the mine site. As part of this process, the mine operates a fleet of new Caterpillar rear dump trucks which burn less diesel fuel as compared to older trucks with the same capacity. Fuel burn during the reporting period was 6.83 litres/tonne ROM coal. This is slightly lower than the last reporting period which had a fuel burn of 6.84 litres/tonne ROM coal.

In addition to this, the coal haulage contractors, Toll Resources and Daracon Group utilise a fleet of purpose built B-Doubles with the prime movers specifically engineered to comply with emission and noise criteria. This includes being speed limited to approximately 93km/hr which has been determined as the optimum operating speed in terms of operational and fuel efficiency.

Whitehaven reported greenhouse gas emissions for the Whitehaven Group (including Rocglen) for the 2010/2011 financial year via the Federal Government's National Greenhouse and Energy Reporting Scheme (NGERS). Reporting was undertaken in October 2011 and will continue in subsequent years.

As part of Whitehaven's participation in the Commonwealth government's Energy Efficiency Opportunities (EEO) Program, the Rocglen site is subject to review and assessment of energy use performance and potential energy savings mechanisms. The Assessment and Reporting Schedule (ARS) was approved by the Department of Resources, Energy and Tourism in March 2011 and the first public and government reports were submitted in December 2011, with the public report available on the Whitehaven website. EEO meetings are held with the Tarrawonga, Rocglen and Werris Creek Operations Managers, Open Cut Maintenance Manager, Open Cut Electrical Supervisor and environmental staff on a monthly basis to discuss progress of commitments in the ASR, public and government reports and to identify any new energy efficiency opportunities. Actions for the Whitehaven Group included:

- Use of dust suppressant during dry times to reduce water truck usage;
- Trialling and, where appropriate, implementation of energy efficient lighting and timers;
- Use of high efficiency AC motors; and
- Replacement of specific equipment with more efficient equipment.

3.16.4 Comparison with Predictions

Greenhouse gas emissions associated with the mine were assessed by PAE Holmes for the Extension EA. The total direct (Scope 1) greenhouse gas emissions were estimated to be approximately 85,789 tonnes of carbon-dioxide equivalent (CO_2-e) per annum. Scope 1 emissions are the release of greenhouse gases into the atmosphere as a direct result of diesel burn, explosives and fugitive methane. Actual emissions for the reporting period

totalled approximately 81,959 tonnes, which is slightly lower than the predicted emissions. This will largely be as a result of the mine not reaching maximum predicted production of 1.5 million tonnes per annum during the reporting period.

3.17 Public Safety

3.17.1 Management

The mine is located wholly on Whitehaven owned land in a rural area, with a private access road entering the site on the south-western boundary and the Wean Road positioned adjacent to the eastern side of the mine boundary. The site is fenced with lockable access gates and visible signs installed.

Visitors to the mine are required to report to the mine office and unauthorised personnel are not permitted to move around the mine area unaccompanied. Procedures are in place with respect to blasting to ensure the area around each blast site (exclusion zone) is clear of personnel and that all surrounding residents are advised in advance of proposed blasts.

3.17.2 Performance

The procedures in place have been effective throughout the reporting period. There have been no issues of public safety or theft at Rocglen.

3.18 Feral Animal Control

Feral animals are not a significant land management issue on Whitehaven's landholding and are limited to isolated occurrences of foxes, hares and rabbits.

In view of the low frequency of occurrence, and in the absence of an extensive program by all surrounding landowners, no broad scale feral animal control program was considered warranted during the reporting period. Whitehaven will continue to monitor feral animal occurrences and implement necessary control programmes if and when necessary.

3.19 Land Capability

All land currently disturbed by mining within ML 1620 and MPL 1662 is classified as Land Capability Class III, V and VI with the remaining areas to be disturbed over the life of the approved mine primarily comprising the same classes.

On completion of all mining activities, the successful rehabilitation of areas of disturbance and the relinquishment of the mining lease, the land affected by mining within the Project Approval area will, in the main, be returned to a classification similar to that prior to mining, being both pasture and bushland.

3.20 Meteorological Monitoring

3.20.1 Introduction

A new meteorological station for the Rocglen Mine was installed in April 2012 at the "Costa Vale" property north of the mine site (Plate 5), in accordance with the Extension approval. The previous weather station was located at "Glenroc" (installed 2009) and was decommissioned in July 2012. Whitehaven encountered some minor start-up issues associated with the new station, with data collected from the former "Glenroc" weather station until continuous data collection was achieved (May 2012). The new weather station is accessible via an online web platform in association with the real time noise and dust monitors and is serviced by Novecom Pty Ltd. The station has been operating continuously since April 2012 recording 15 minute wind speed, wind direction, temperatures, humidity and rainfall. Daily meteorological data is presented in Appendix 9.

Plate 5 – New Weather Station at "Costa Vale", April 2012

3.20.2 Rainfall

Rainfall data from the previous 12 months is presented in Table 12 and Figure 6. Full station data is presented in Appendix 9.

Table 12 - Rainfall Data (1 Aug 2011 – 31 July 2012)

Month	Monthly Rainfall Reporting Period	Long Term Average Rainfall*[1]	Rain days Reporting Period	Long Term Average Rain days*[1]
August 2011	30.0	41.3	6	4.8
September 2011	88.6	40.3	6	4.5
October 2011	52.4	55.5	6	5.4
November 2011	104.2	62.6	7	5.7
December 2011	107.0	70.1	11	6.0
January 2012	63.6	71.3	8	5.5
February 2012	175.0	67.3	7	5.1
March 2012	21.6	47.7	3	3.9
April 2012	27.2	37.5	4	3.4
May 2012	42.6	42.5	3	4.1
June 2012	40.6	43.6	8	4.8
July 2012	81.6	42.7	7	4.8
TOTAL	**834.4**	**622.4**	**76**	**58**

*[1] Gunnedah Pool (Station 055 023) averages from 1876-2012.

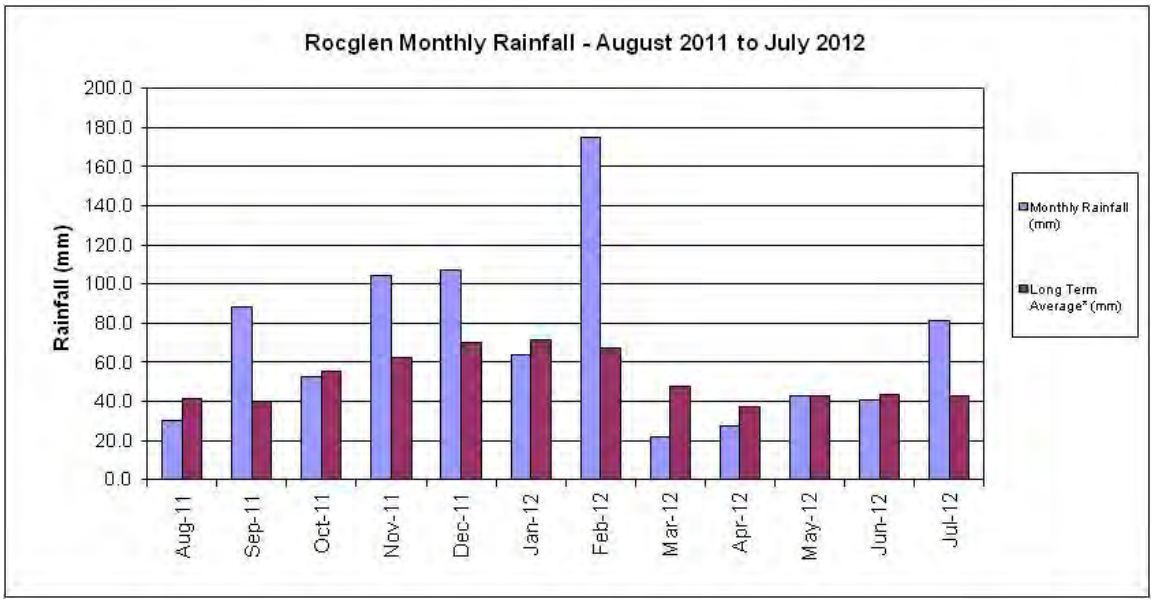

Figure 6 – Monthly Rainfall Data

A review of Table 12 and Figure 6 shows that the total rainfall at the mine during the reporting period was 834.4mm. This is considered a wet year when compared to the long term average of 622.4mm at Gunnedah and 501.0mm recorded in the previous reporting period. Figure 6 also depicts the higher rainfall events received over the warmer months as compared to the cooler months from March 2012. February recorded more than double the average rainfall for the month with 175 mm recorded, triggering regional flooding.

3.20.3 Temperature

Average maximum and minimum temperatures for the reporting period are presented in Table 13 together with long-term monthly averages for Gunnedah Pool (Bureau of Meteorology Station 055023).

Table 13 - Average Monthly Temperatures

(August 2011 – July 2012)

Month	Average Daily Temperature			
	Reporting Period (°C)		Station 055023 (Gunnedah Pool)* (°C)	
	Min	Max	Min	Max
August 2011	6.2	20.0	4.2	18.9
September 2011	7.3	23.2	7.0	22.8
October 2011	11.2	24.2	10.7	26.7
November 2011	16.6	30.5	14.2	30.3
December 2011	18.8	27.5	16.8	32.9
January 2012	19.6	29.7	18.4	34.0
February 2012	17.7	29.3	18.1	32.9
March 2012	15.4	28.6	15.8	30.7
April 2012	11.4	25.7	11.4	26.4
May 2012	4.0	21.7	7.1	21.3
June 2012	5.3	17.5	4.3	17.6
July 2012	3.4	16.5	3.0	16.9

* Gunnedah Pool (Station 055 023) averages from 1876-2012

Table 13 shows that:

- Average minimum temperatures at the mine site were above the Gunnedah average for the majority of the reporting year, apart from February, March and May 2012; and
- Average maximum temperatures were generally consistent with the Gunnedah average apart from the summer months, where cooler maximums were experienced.
- Warmer than average minimums and cooler than average maximums over a number of months are indicative of the mild temperatures associated with the wet year experienced.

3.20.4 Wind Speed and Direction

Fifteen minute average wind speed and direction data is collected from the Rocglen meteorological station, as it, together with operational records and environmental monitoring results, can be used to assess the environmental effects or consequences of specific activities undertaken at the mine or in surrounding areas. Wind roses for the reporting period, are presented in Appendix 9, and show the following:

- Predominant wind directions throughout the period were dominant south to south westerlies during winter months, south easterlies during summer months with the predominant wind direction for the reporting period being from the south. September 2011 experienced dominant north westerlies. The distinct trend of southerlies is a result of the local topography, with the mine located in a depression bordered by the Kelvin Range to the east and the Vickery State Forest to the west.
- Throughout the year wind speeds predominately fell within the 3-5 m/s range. From spring 2011 to winter 2012 the majority of wind reaching speeds of >10m/s were from an easterly direction. Occasional wind speeds of >10m/s from the south west can be noted in spring 2011.

3.20.5 Inversions

The new meteorological station at "Costa Vale" is fitted with temperature sensors at 2m and 10m intervals to assist in the determination of inversion conditions. As the noise results obtained over the reporting period were generally in compliance, no specific investigation into temperature inversion impacts on noise propagation was undertaken during the reporting period.

4 COMMUNITY RELATIONS

4.1 Environmental Complaints

Whitehaven maintains a designated complaints line, with messages checked on a daily basis (seven days/week) by the Environmental Manager. In the event of a complaint, details pertaining to the complainant, complaint and action taken are recorded on a "Complaints Form".

During the reporting period, eight complaints have been received in relation to operations at the mine. The nature of the complaints, details and responses to each complaint are presented in Table 14. Table 15 compares the number and nature of complaints registered during the previous and current reporting periods.

Table 14 - Complaints Summary

Method	Date/ Time	Nature of Complaint	Investigation	Action Taken / Follow-up
Anonymous complainant via Department of Planning and Infrastructure	9/8/2011 1:30pm	Extent of rubbish being deposited on Wean Road, empty coal trucks travelling to the mine for loading and excessive speed by mine related vehicles on Wean Road.	It was explained to the Department that Rocglen toolbox talks have included the issue of rubbish being thrown from vehicles and also, in consultation with Council, "Do Not Litter" signage has been installed along the road to discourage littering. A Whitehaven field officer also regularly undertakes inspections of the roadsides to determine if additional rubbish collection is necessary. With regard to speeding vehicles, this is also tool boxed but is really a matter for the Police to patrol as the mine cannot enforce any additional speed restrictions. The claims of empty coal trucks using Wean road was rejected on the basis that the trucking depot for Toll is located in close proximity to the haul road off Bluevale Road and it would make no sense for Coal haul trucks to be travelling to Rocglen via Wean Road.	No further action required.
Phone call to Environmental Manager from OEH on behalf of complainants	13/9/2011	Complaint in relation to smoke, dust and noise from around the Rocglen Mine.	The issue relating to smoke was not associated with Rocglen, but from woody weed control works on the Vickery site. The details of this work were provided to OEH including confirmation of approvals from Council and the RFS as well as notifications to surrounding landholders. In terms of dust and noise, it was explained to OEH that our dust monitoring results confirm compliance at all monitoring locations, in closer proximity to site as compared to the complainant's property. It was also explained that recent noise monitoring had confirmed compliance at monitoring locations in closer proximity to site as compared to the complainant's property. Copies of current air quality and noise monitoring results were referred to OEH for their records.	Not required.
Phone call to Environmental Manager	14/9/2011 8:15am	Complaint in relation to noise from the Rocglen Mine over the last few mornings. Complainant described the noise as the worst it has been in a long time and was dissatisfied that the noise was getting worse.	The complainant was advised that the matter of noise would be raised with the Operations Manager to confirm the activities occurring that may be contributing to the noise issue and verify what measures may be able to be taken to reduce noise impacts.	Discussions ongoing with complainant.

Method	Date/ Time	Nature of Complaint	Investigation	Action Taken / Follow-up
Phone call to Community Liaison Officer	18/02/2012 ~12:00pm	Complaint in relation to the blasting on Saturdays following the blast on the 18th February 2012. The complainant said he was advised by the former Whitehaven Community Liaison Officer that blasting would not be undertaken on Saturdays. The complainant is concerned that Rocglen will start mining 24 hours a day, 7 days a week.	The Community Liaison Officer advised the complainant that there was no proposal to mine on Sundays. The Community Liaison Officer also contacted the Rocglen Site Clerk who advised that the complainant had been notified of the intention to undertake this blast on Saturday and that other blasts had occurred on Saturdays in the past. Blasting on Saturdays is minimised.	The complainant was contacted on the morning of the 20th February 2012 by the Community Liaison Officer and advised that the consent allows blasting on Saturdays and that he was given prior notification of the blast. No further action required.
Email to Environmental Manager	1/03/2012 9:32am	Complaint in relation to lights and noise from the Rocglen mine impacting the complainant's property. Lights and noise causing sleep disturbance impacting on his quality of life and wishes to have actions undertaken to resolve the matter.	Environmental Field Officer has been asked to observe lighting conditions north of Rocglen and report on findings. Sympathetic direction of lighting has been an issue raised with the Operations Manager previously and will continue to reinforce this matter with site to minimize impacts wherever possible. The matter of noise has also been discussed with the complainant and it has been agreed to position the real time noise monitor at his property upon delivery. Whitehaven is also in the process of investigating the property for potential offset requirements and will continue to consult with the landholder in this regard.	Ongoing contact occurring in relation to investigation works for offset requirements. Noise monitor may be positioned at the property in consultation with the landholder.
Phone call to Environmental Officer	27/03/2012 8:10am	Complaint in relation light from Rocglen.	The Rocglen Operations Manager was made aware of the complaint in relation to light impacts. It was identified that whilst site personnel are aware of the need for sympathetic positioning of light, often it is very difficult to position the lights in such a way that allow for safe operations whilst not affected neighbouring landholders. The complainant's property is approximately 15km from the mine site.	Lighting impacts continue to be discussed with operations.
Phone call to Environmental Manager – left message	22/04/2012 7:30am	Complaint in relation to two separate issues. The first was in relation to sheep entering the complainant's property through "Belah" on Friday at 5.30 p.m. The sheep are owned by	The issue involving sheep entering the complainant's property was discussed with Whitehaven's Environmental Field Officer on the 23rd April 2012. It was advised that the sheep enter "Belah" from the "Roseberry" property and then move into the complainant's property. Considerable time spent by the Field Officer patching fences and moving sheep out of "Belah". Amongst other duties he cannot keep them out all the time.	No further action required.

Method	Date/ Time	Nature of Complaint	Investigation	Action Taken / Follow-up
		another neighbour ("Roseberry"). The second was in relation to noise from Rocglen that sounded like scrapers running on Sunday morning at 7.30am.	The sheep are ultimately the responsibility of the "Roseberry" landholder however upgraded fencing of the offset area boundary will be required in due course. Investigation into the claim that noise on a Sunday morning sounded like scrapers were running was undertaken on the 23rd April 2012. A phone call was made to the Whitehaven Field Environmental Officer who lives directly east of the scraper park up area. He suggested that there were no scrapers running on the Sunday as he could see them parked, he did note that maintenance activities were being undertaken on a truck in the workshop that may have been mistaken for scraper noise. Further confirmation was made via a phone call to the Rocglen Operations Manager who confirmed that no scrapers were running on a Sunday and that the noise would have been associated with engine revs during maintenance activities in the workshop.	
Email to Environmental Manager	25/04/2012 9:29am	Complaint in relation to lights from the Rocglen Mine impacting on the complainant's property.	The matter of lighting impacts to the north was discussed with the Rocglen Operations Manager. The complainant's property is located approximately 15km from the mine site and on this basis is considered unlikely that lights from Rocglen would be causing a direct impact at that property. Nevertheless, a night inspection will be undertaken to verify the extent of impact in proximity to the property and if additional measures are required at site to reduce impact.	Lights are continually discussed with operations, with night inspections carried out.

Table 15 - Complaints Comparison

AEMR period	Issue										Total
	Driver behaviour	Dust/Noise /speed/ Rubbish from Wean Rd	Lack of consultation	Blasting	Noise/Light/ Rubbish	Mine Noise/Dust	Noise	Lights/ Noise	Lights	Fencing/ Noise	
2008-09	1	1	1	4							7
2009-10					2						2
2010-11		2			1	5					8
2011-12				1	1	1	1	1	2	1	8

The majority of complaints have been associated with mine noise and lighting impacts. Issues with noise have been investigated using additional attended noise monitoring and also real-time noise monitoring (Section 3.10.3). Lighting impacts have been communicated with operations, with surrounding properties made known to staff to minimise impacts from lights. In regards to air quality, data for the period shows that both deposited dust and PM_{10} levels remain below the specified criteria at all monitoring locations and with the addition of the real time PM_{10} monitor, dust may now be monitored on a real time basis. Concerns in regards to rubbish on Wean Road have been expressed to employees and contractors through tool box talks. 'Do Not Litter' signage is also maintained on Wean Road. It should be noted however that these issues can be difficult to manage with Wean Road being a public road.

Any complaints that are made are reported to the Community Consultative Committee (CCC), updated on Whitehaven's website and documented in the AEMR.

4.2 Employment Status, Demography and Socio-Economic Contributions

4.2.1 Employment Status and Demography

During the reporting period the mine had an average of 86 personnel with additional personnel employed by contractors (Toll Global Resources) in the haulage of coal from the mine site back to the Whitehaven CHPP and Jackson Earthmoving who undertake overburden and topsoil/subsoil removal. Approximately 90% of mine related employees reside in the Gunnedah area with the remainder residing in the surrounding districts.

4.2.2 Social and Economic Contributions

In addition to direct and indirect employment, and the purchase of goods and services from local suppliers, the Whitehaven Group continues to support the local community. Whitehaven also provides cadetships to local university students in a variety of fields. Work experience is also provided to both High School and University students in the Gunnedah Region.

As members of the Gunnedah / Boggabri area community, mine-related employees also contribute socially and economically through their involvement in community sporting, educational and social organisations and expenditure of a component of their disposable income.

4.3 Community Liaison

In accordance with Condition 9 of Schedule 5 of the former PA 06_0198 MOD 1 and Condition 5 of Schedule 5 of the current PA 10_0015, a Community Consultative Committee (CCC) continues to be operated. The committee comprises representatives of Gunnedah Shire Council, Rocglen Coal Mine and the community and is chaired by Mr John Sturgess.

Since its inception, the CCC has met on a regular basis, meeting 4 times per year. During the reporting period meetings were held on the 10th August 2011, 7th December 2011, 15th February 2012 and 23rd May 2012.

Rocglen Mine representatives and Whitehaven's Manager Community Relations continue to maintain regular personal contact with the neighbours in the vicinity of the mine. These contacts not only provide a means of information dissemination, but also enable Whitehaven to ascertain and address any potential issues which may arise from time to time.

Community organisations and other local business and institutions regularly identify an interest with activities occurring at the mine site. In this regard, and to maintain links with those business and community members, information is provided as required, and on occasion, guided tours of the facility have been undertaken. Rocglen has provided tours of the operation for CCC representatives during the reporting period.

5 REHABILITATION

5.1 Buildings

No rehabilitation of buildings occurred during the reporting period. It is anticipated that the "Glenroc" homestead at the north of the site will be re-located off site during the next reporting period.

5.2 Rehabilitation of Disturbed Land

5.2.1 Objectives

Areas disturbed by mining activities at Rocglen are rehabilitated to a stable landform with a self-sustaining vegetation cover. This is achieved by the early establishment of a ground cover and appropriately positioned tree and shrub plantings.

Short term rehabilitation objectives include:

- Minimise clearing/vegetation disturbance consistent with operational requirements;
- Schedule operations including overburden/interburden emplacement and shaping and revegetation to minimise visual exposure;
- Rehabilitate areas of disturbance no longer required for mining-related operations;
- Apply appropriate soil material (topsoil/subsoil) to the final landform based on material availability and post-mining land use;
- Stabilise all earthworks, drainage lines and disturbed areas in order to minimise erosion and sedimentation; and
- Control vermin, feral animals and noxious weeds.

The overall long-term mine rehabilitation objective is to provide a low maintenance, geotechnically stable and safe landform that blends in with the surrounding topography and provides a mixture of rehabilitated bushland and grazing areas that are generally consistent to pre-mining conditions.

Long term rehabilitation objectives include:

- Re-establish land to either pasture or bushland over the areas disturbed by the mine;

- Increase the area of land allocated to bushland/woodland through the revegetation of those areas disturbed by the mine and the long-term conservation of remnant and degraded native vegetation and/or habitat corridors on the mine site;
- Provide habitat for fauna and corridors for fauna movement within the final landform;
- Monitor rehabilitation success in terms of physical and biological parameters.

5.2.2 Achievements during the Reporting Period

Table 16 and Table 17 presents a Rehabilitation Summary and listing of maintenance activities as required in the DMR Guidelines. Rehabilitation of disturbed land undertaken during the reporting period comprised of reshaping and topsoiling approximately 11.2ha of the western emplacement.

Seed collection programmes were undertaken through Bilby Blooms who supplied Whitehaven with significant quantities of understorey and overstorey species. Fields Tree Planting Services are also propagating tubestock for subsequent planting on rehabilitation areas.

Table 16 - Rehabilitation Summary

		Area Affected (hectares)			
		This Report Period (as of 31.07.12)	**Last Report Period (as of 31.07.11)**	**Cumulative Next Report Period (estimated)**	
A:	**MINE LEASE AREA**				
A1	**Mine Lease(s)**	458.3			
B:	**DISTURBED AREAS**				
B1	**Infrastructure area** (other disturbed areas to be rehabilitated at closure including facilities, roads)	17.4	17	17.4	
B2:	**Active Mining Area** (excluding items B3 - B5 below)	66.8	28	78.8	
B3	**Waste emplacements**, (active/unshaped/in or out-of-pit)	124.2	110	162	
B4	**Tailings emplacements,** (active/unshaped/uncapped)	N/A	N/A	N/A	
B5	**Shaped waste emplacement** (awaits final vegetation)	9.8	5	9.8	
ALL DISTURBED AREAS		218.2	160	268	F1
C	**REHABILITATION PROGRESS**				
C1	**Total Rehabilitated area*** (except for maintenance)	18.4	5	61.6	F2
D:	**REHABILITATION ON SLOPES**				
D1	**10 to 18 degrees**	15.2	5	58.4	
D2	**Greater than 18 degrees**	0	0	0	
E:	**SURFACE OF REHABILITATED LAND**				
E1	**Pasture and grasses**	18.4	5	46.8	
E2	**Native forest/ecosystems***	0	0	14.8	
E3	**Plantations and crops**	0	0	0	
E4	**Other** (include non vegetative outcomes)	N/A	N/A	N/A	

* Areas with established tube stock are considered to be “native forest/ecosystem”. “Pasture and Grasses” also includes areas with recently planted tube stock that are not yet established. C1 – Total Rehabilitated Area includes all rehabilitation regardless of progress.

Table 17 - Maintenance Activities on Rehabilitated Land

NATURE OF TREATMENT	Area Treated (ha)		
	Report period	**Next period**	**Comment/control strategies/ treatment detail**
Additional erosion control works (drains re-contouring, rock protection**)**	2	2	Repair and maintenance of drainage line running from existing contours on the western emplacement. The 2 ha for this report period and next refers to the same 2 ha with progressive works occurring.
Re-covering (detail - further topsoil, subsoil sealing etc)	Nil	Nil	Will only take place in the event of major soil loss.
Soil treatment (detail - fertilizer, lime, gypsum etc)	Nil	Nil	Only treatment planned is during initial rehabilitation works.
Treatment/Management (detail - grazing, cropping, slashing etc)	Nil	Nil	None to occur.
Re-seeding/Replanting (detail - species density, season etc)	Nil	Nil	Only planting planned is during initial rehabilitation works.
Adversely Affected by Weeds (detail - type and treatment)	5	5	General spot spraying of Boxthorn at the north of the site.
Feral animal control (detail - additional fencing, trapping, baiting etc)	Nil	Nil	

5.3 Rehabilitation Monitoring and Performance

Monitoring of rehabilitation areas is undertaken on a monthly basis by the site's Environmental Officer. Aspects which are monitored include:

- Evidence of any erosion or sedimentation from areas with establishing vegetation cover;
- Success of initial grass cover establishment;
- Success of tree and shrub plantings;
- Adequacy of drainage controls;
- Presence/absence of weeds; and
- General stability of the rehabilitation site.

Monitoring of existing rehabilitation areas during the reporting period found that minor rill erosion took place on slopes and within drainage structures. These erosion areas were controlled with the use of hay bales to slow and filter water. Small areas identified as comprising limited vegetation growth had mulch hay applied to them to hold moisture and add organic matter.

The lower batters of the northern emplacement were still being constructed at the end of the reporting period. This area was not constructed earlier in the reporting period due to the

large body of water which accumulated in the pit due to February 2012 flooding. This water disrupted the sequence of mining, delaying the construction of the lower batters of the northern emplacement. As a consequence, rehabilitation was continued on the western emplacement.

The western emplacement rehabilitation has been challenging due to poor soil quality but good results have been achieved through soil improvement and sufficient rainfall. The area of topsoiled rehabilitation was improved during March 2012 with the use of gypsum to address soil sodicity, fertiliser to add essential nutrients for fertility and chicken manure to add nitrogen and organic matter. Through this improvement, excellent vegetation cover and growth was experienced during the winter months of the end of the reporting period, as shown in Plate 6, Plate 7 and Plate 8. The seed mix that was used for the rehabilitation areas consisted of fast growing annual cover crops (Rye Corn and Japanese Millet) to reduce the chance of erosion and perennial grasses (Green Panic, Bambatsi Panic and Premier Digit) to develop once the annual cover crop dies off.

Plate 6 – Rehabilitation on the Northern Section of the Western Emplacement, 29th December 2011

Plate 7 – Rehabilitation on the Western Emplacement, 25th June 2012

Plate 8 – Rehabilitation on the Western Emplacement, 31st July 2012

Prior to the gypsum/fertiliser/seed application, mounds were installed in order to stabilise and create smaller inter-contours on the slope. The mounds proved successful in holding water on the rehabilitated slope, further reducing runoff and erosion and providing an earthen medium for planting trees. The method has proved effective with excellent tree survival rates, high growth rates of cover crop and minimal erosion.

Tree and Shrub Establishment

A total of 7,270 trees were planted over two planting campaigns on the western rehabilitation area in May and June 2012. The planting was undertaken following rainfall during May and June providing sufficient soil moisture. During the first campaign, 4,280 tubestock were sourced from Bilby Blooms Nursery and planted by Fields Tree Planting Services using conventional hand planting techniques. During the second campaign, 2,990 'Hiko' seedlings were sourced from Fields Native Nursery and hand planted. The smaller 'Hiko' seedlings were used to promote root establishment during the winter months. Those trees should have higher growth rates during warmer months due to an established root system. A variety of overstorey (trees) and understorey (shrubs) species were planted and are recorded in Table 18. The trees sourced are endemic to the region. All trees were planted within the areas of mounds created by Greg Ward Earthmoving which proved beneficial for holding moisture. Recent inspections indicate that the trees have established well in the mounds as shown in Plate 9. A further 620 trees were planted along the Wean Road diversion for screening purposes in June and July 2012.

Plate 9 – Eucalypt Tubestock Planted on the Western Emplacement, 31st July 2012

Table 18 - Planting Campaigns Species

Number, Location & Campaign	Type	Scientific Name	Common Name
4,280 - Western Rehabilitation May 2012 620 - Wean Road June 2012	Tubestock Tree	*Allocasuarina luehmannii*	Bull-oak
	Tubestock Tree	*Brachychiton populneus*	Kurrajong
	Tubestock Tree	*Eucalyptus albens*	White box
	Tubestock Tree	*Eucalyptus crebra*	Narrow leaf Iron Bark
	Tubestock Tree	*Eucalyptus clauroclada*	Baradine Red Gum
	Tubestock Tree	*Eucalyptus melanophlioa*	Silver leafed Iron bark
	Tubestock Tree	*Eucalyptus melliodora*	Yellow box
	Tubestock Tree	*Eucalyptus pilliganensis*	Pilliga box
	Tubestock Tree	*Eucalyptus populneus*	Poplar Box
	Tubestock Tree	*Eucalyptus beyeri*	Beyeris Iron bark
	Tubestock Shrub	*Dodonea viscosaa*	Sticky Hop bush
	Tubestock Shrub	*Pittosporum angustifolium*	Budda Bush
	Tubestock Shrub	*Acacia implexa*	Light Wood
	Tubestock Shrub	*Acacia deanei*	Deans Wattle
	Tubestock Shrub	*Acacia decorai*	Western Silver Wattle
	Tubestock Shrub	*Senna artemisioides*	Silver Cassia
	Tubestock Shrub	*Indigofera Australis*	Native Indigo
	Tubestock Shrub	*Jacksonia scoparia*	Dogwood
	Tubestock Shrub	*Hardenbergia violacea*	Happy Wanderer
2,990 - Western Rehabilitation June 2012	Hiko Tree	*Eucalyptus albens*	White Box
	Hiko Tree	*Eucalyptus crebra*	Narrow leaf Iron Bark
	Hiko Tree	*Eucalyptus melanophlioa*	Silver leafed Iron bark
	Hiko Tree	*Eucalyptus pilliganensis*	Pilliga Box
	Hiko Tree	*Eucalyptus populneus*	Poplar Box

6 CONTINUOUS IMPROVEMENT AND TARGET INITIATIVES

6.1 Objectives

Whitehaven Coal has an ongoing commitment to environmental management and aims to minimise any adverse impacts on the physical, biological, cultural and socio-economic environment in the area of the mine and in surrounding areas.

Improvements in environmental management will be achieved through the effective implementation of the operational and monitoring aspects of the Mining Operations Plan, which in turn, will incorporate relevant aspects of various management plans and monitoring programs prepared in accordance with the Mine's Project Approval.

6.2 Achievements to Date

Achievements at the mine during the reporting period have included:

- The maintenance of a working environmental management program and the establishment of culture of environmental awareness / responsibility within all levels of the workforce, through on site toolbox and information sessions;
- Routine implementation of all relevant aspects of approved management plans;
- Continued commitment to a recycling program maintained by Whitehaven personnel;
- The establishment and maintenance of an open and honest relationship with the neighbours, community in general, regulatory authorities, Local Government and other groups such as the local Aboriginal community;
- Commissioning of a permanent real time noise monitor to reduce impacts and address community concerns;
- The implementation of various outstanding commitments from the previous reporting periods that were identified by the Independent Environmental Audit undertaken by Umwelt Environmental Consultants in July 2011;
- Continuing rehabilitation of the western emplacement and use of composts and mounding to boost vegetation growth.
- Planting of 7,590 trees during the reporting period;

- Effective control of sediment levels in dams during design storm events, including the use of Magnafloc LT425 and HydraGyp flocculants. These are more active liquid flocculants that have been used successfully within various sediment basins;
- Installation of new sediment basins and final discharge dam at the north of the site. The new dams allow for the capture of dirty water from disturbed areas.
- Installation of clean water diversion drains to eliminate inflow of surface water to the site;
- The placement of a full time Environmental Officer at the Rocglen Site, who oversees day to day environmental performance and communicates with operations regarding environmental requirements and practices to achieve effective environmental management.

6.3 Targets and Goals

Targets and goals for the 2012 / 2013 reporting period include:

- The commencement of rehabilitation on the northern emplacement, including tree planting;
- The extension of active rehabilitation on the western waste emplacement over the next 12 months, including establishment of trees, shrubs and understorey species by planting and possible trial program of direct seeding techniques;
- Continued community liaison, support and involvement / education in the mines activities;
- Implementation of management objectives for the Whitehaven Regional Biodiversity Offset Area, as identified in the offset area management plan;
- Establishment of real time dust and noise monitoring procedures on site to actively manage impacts on surrounding properties;
- Continued improvement of surface water quality and reduction of sediment loads in discharge waters through the implementation of additional storage and settling capacities, improved inflow and discharge conditions to minimise sediment entrainment, and the flocculation of dirty water where possible;
- Given the variability of soils available, continue investigations into further rehabilitation technologies to improve vegetation establishment within the area;

- Continued monitoring of feral animal populations, and appropriate controls when required in conjunction with adjoining landholders;.
- Finalisation of actions required by the Independent Audit Action Plan, which was developed by Whitehaven following Umwelt's Independent Environmental Audit; and
- Finalisation and implementation of management plans required by PA 10_0015.

E237500 E238000 E238500 E239000 E239500 E240000 E240500

N6596000 N6595500 N6595000 N6594500 N6594000 N6593500 N6593000 N6592500

N W E S

Northern Discharge Point (LDP-12)

ML 1662

DAM B DAM A1 DAM A2 DAM C

SB18 SB 17 SB 16 SB 14 SB 15 SB 5 SB 6 SB 20 SB 19 SB 7 SB 4 SB 8 SB 3

TS

Clean Water Drain

ML 1620

SMU 1 SMU 2 SMU 3 SMU 4

11kV POWER LINE

CB13

WEAN ROAD

VICKERY

QUARRY

STATE FOREST

Sediment Sump

RELOCATED VOID WATER DAM

BORE PUMP DAM

BORE PUMP

ROM PAD

Btree 2 Btree 1

WORKSHOP

OFFICE

RIORDAN ROAD

Southern Discharge Point (LDP-11)

PLAN 3
LAND PREPARATION
ROCGLEN MINE

LEGEND

- Proposed Soil Stripping Areas (2012/2013)
- Soil Stripping Area (To 31/07/12)
- Soil Stripping Area (To 31/07/11)
- Soil Stripping Area (To 31/07/10)
- Soil Stripping Area (To 31/07/09)
- Topsoil Stockpile Areas
- Infrastructure Areas
- Sediment Basin (Dirty)
- Sediment Sumps (Dirty)
- Storage Dam (Clean)
- Pit & Bore Pump Dam
- Flow (Dirty)
- Flow (Clean)
- Mining Lease
- Soil Mapping Unit Boundary
- SMU 2 — Soil Mapping Unit
- TS^2 — Topsoil (SMU 2)
- Aboriginal Site

File Ref:	4205
Surveyor:	
Date:	31/07/2012

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E237500 E238000 E238500 E239000 E239500 E240000 E240500

N6596000 N6595500 N6595000 N6594500 N6594000 N6593500 N6593000 N6592500

N W E S

ML 1662

ML 1662

ML 1662
ML 1620

ML 1620

ML 1620

ML 1620

Northern Discharge Point
(LDP-12)

DAM B

DAM A1

SB18

DAM A2

DAM C

CB13

Clean Water Drain

Clean Water Drain

11Kv POWER LINE

SB 17

SB 16

QUARRY

VICKERY

STATE

FOREST

Sediment Sump

Sediment Sump

Sediment Sump

Sediment Sump

Sediment Sump

Sediment Sump

Sediment Sump

Sediment Sump

RELOCATED
VOID WATER DAM

BORE PUMP

BORE
PUMP DAM

ROM PAD

SB 7

SB 4

SB 19

SB 14

SB 15

SB 5

SB 6

SB 20

WORKSHOP

OFFICE

SD 9

SB 8

RIORDAN ROAD

WEAN ROAD

Southern Discharge Point
(LDP-11)

PLAN 4
MINING & REHABILITATION
ROCGLEN MINE

LEGEND

- Proposed Rehab Areas (2012/2013)
- Active Rehab Areas 31/07/2012
- Proposed Extent Of Mining (2012/2013)
- Proposed Waste Emplacement (2012/2013)
- Infrastructure Areas
- Sediment Basin (Dirty)
- Sediment Sumps (Dirty)
- Storage Dam (Clean)
- Topsoil Stockpile
- Void & Bore Pump Dam
- Flow (Dirty)
- Flow (Clean)
- Mining Lease
- Extent Of Mining To 31/07/12
- Extent Of Mining To 31/07/11
- Extent Of Mining To 31/07/10
- Extent Of Mining To 31/07/09
- Waste Emplacement To 31/07/12
- Dams Installed During Report Period
- 5m Contour Interval

File Ref:	4205
Surveyor:	
Date:	31/07/2012

STEWART SURVEYS PTY LTD - Ph. 0267 422966

Appendix 1

PA 10_0015

Project Approval

Section 75J of the *Environmental Planning & Assessment Act 1979*

As delegate of the Minister for Planning and Infrastructure, I approve the project application referred to in schedule 1, subject to the conditions in schedules 2 to 5.

These conditions are required to:

- prevent, minimise, and/or offset adverse environmental impacts;
- set standards and performance measures for acceptable environmental performance;
- require regular monitoring and reporting; and
- provide for the ongoing environmental management of the project.

Richard Pearson
Deputy Director-General
Development Assessment and Systems Performance

Sydney 27th September 2011

SCHEDULE 1

Application Number:	10_0015
Proponent:	Whitehaven Coal Mining Limited
Approval Authority:	Minister for Planning and Infrastructure
Land:	See Appendix 1
Project:	Rocglen Extension Project

TABLE OF CONTENTS

DEFINITIONS

Annual review	The review required by condition 3 of schedule 5
BCA	Building Code of Australia
BOS	Biodiversity offset strategy
CCC	Community Consultative Committee
Conditions of this approval	Conditions contained in schedules 2 to 5 inclusive
Council	Gunnedah Shire Council
Day	The period from 7am to 6pm on Monday to Saturday, and 8am to 6pm on Sundays and Public Holidays
Department	Department of Planning and Infrastructure
Director-General	Director-General of the Department, or delegate
DRE	Division of Resources and Energy (within the Department of Trade and Investment, Regional Infrastructure and Services)
EA	Environmental assessment titled *Whitehaven Coal Limited Rocglen Coal Mine Extension Project Environmental Assessment*, dated February 2011, and associated response to submissions titled *Whitehaven Coal Limited Rocglen Coal Mine Extension Project - Response to Submissions,* dated June 2011
EEC	Endangered Ecological Community as defined under the *Threatened Species Conservation Act 1995*
EP&A Act	*Environmental Planning and Assessment Act 1979*
EP&A Regulation	*Environmental Planning and Assessment Regulation 2000*
EPL	Environment Protection Licence issued under *POEO Act*
Evening	The period from 6pm to 10pm
Feasible	Feasible relates to engineering considerations and what is practical to build or carry out
Incident	A set of circumstances that causes or threatens to cause material harm to the environment, and/or breaches or exceeds the limits or performance measures/criteria in this approval
Land	In general, the definition of land is consistent with the definition in the EP&A Act. However, in relation to the noise and air quality conditions in Schedules 3 and 4, it means the whole of a lot, or contiguous lots owned by the same landowner, in a current plan registered at the Land Titles Office at the date of this approval
Material harm to the environment	Actual or potential harm to the health or safety of human beings or to ecosystems that is not trivial
Mining operations	Includes the removal of overburden and the extraction, processing, handling, storage and transportation of coal
Minister	Minister for Planning and Infrastructure, or delegate
Minor	Small in quantity, size and degree
Mitigation	Activities associated with reducing the impacts of the project
Negligible	Small and unimportant, such as to be not worth considering
Night	The period from 10pm to 7am on Monday to Saturday, and 10pm to 8am on Sundays and Public Holidays
NOW	NSW Office of Water (within the Department of Primary Industries)
OEH	Office of Environment and Heritage (within the Department of Premier and Cabinet)
Offset strategy	The biodiversity conservation and enhancement program described in the EA, and depicted generally in Appendix 4
POEO Act	*Protection of the Environment Operations Act 1997*
Privately-owned land	Land that is not owned by a public agency or a mining company (or its subsidiary)
Project	The development described in the EA
Proponent	Whitehaven Coal Mining Limited, or its successors
Reasonable	Reasonable relates to the application of judgement in arriving at a decision, taking into account: mitigation benefits, cost of mitigation versus benefits provided, community views and the nature and extent of potential improvements
Rehabilitation	The treatment or management of land disturbed by the project for the purpose of establishing a safe, stable and non-polluting environment, and includes remediation
ROM	Run-of-mine
RTA	Roads and Traffic Authority
Site	The land listed in Appendix 1
Statement of commitments	The Proponent's commitments in Appendix 7
Whitehaven Regional Biobank Site	The Proponent's offset site off Wean Road, Gunnedah on Lot 36 DP 754950, Lot 1 DP 247949, Lot A DP 405391 and Lot 2 DP 728391 and located as shown in Figure 1 of Appendix 2 and Figure 1 of Appendix 4

SCHEDULE 2
ADMINISTRATIVE CONDITIONS

OBLIGATION TO MINIMISE HARM TO THE ENVIRONMENT

1. The Proponent shall implement all reasonable and feasible measures to prevent and/or minimise any material harm to the environment that may result from the construction, operation or rehabilitation of the project.

TERMS OF APPROVAL

2. The Proponent shall carry out the project in accordance with the:
   (a) EA;
   (b) statement of commitments; and
   (c) conditions of this approval.

   Notes:
   - *The general layout of the project is shown in Appendix 2; and*
   - *The statement of commitments is reproduced in Appendix 7.*

3. If there is any inconsistency between the above documents, the most recent document shall prevail to the extent of the inconsistency. However, the conditions of this approval shall prevail to the extent of any inconsistency.

4. The Proponent shall comply with any reasonable requirement/s of the Director-General arising from the Department's assessment of:
   (a) any reports, strategies, plans, programs, reviews, audits or correspondence that are submitted in accordance with this approval; and
   (b) the implementation of any actions or measures contained in these documents.

LIMITS ON APPROVAL

Mining Operations

5. The Proponent may carry out mining operations on the site until the end of December 2022.

   Note: Under this approval, the Proponent is required to rehabilitate the site and carry out additional undertakings to the satisfaction of both the Director-General and the Executive Director, Mineral Resources in DRE. Consequently, this approval will continue to apply in all other respects - other than the right to conduct mining operations - until the rehabilitation of the site and these additional undertakings have been carried out satisfactorily.

Coal Extraction

6. The Proponent shall not extract more than 1.5 million tonnes of ROM coal from the site in a calendar year.

SURRENDER OF EXISTING PROJECT APPROVAL

7. By the end of September 2012, or as otherwise agreed by the Director-General, the Proponent shall surrender the existing project approval for the Rocglen Coal Mine (06_0198) in accordance with section 75YA of the EP&A Act.

8. Prior to the surrender of project approval 06_0198, the conditions of this approval shall prevail to the extent of any inconsistency between the two approvals.

STRUCTURAL ADEQUACY

9. The Proponent shall ensure that all new buildings and structures, and any alterations or additions to existing buildings and structures, are constructed in accordance with the relevant requirements of the BCA.

   Notes:
   - *Under Part 4A of the EP&A Act, the Proponent is required to obtain construction and occupation certificates (where necessary) for the proposed building works; and*
   - *Part 8 of the EP&A Regulation sets out the requirements for the certification of the project.*

DEMOLITION

10. The Proponent shall ensure that all demolition work on site is carried out in accordance with *Australian Standard AS 2601-2001: The Demolition of Structures,* or its latest version.

OPERATION OF PLANT AND EQUIPMENT

11. The Proponent shall ensure that all the plant and equipment used on site, or to transport coal from the site, is:
    (a) maintained in a proper and efficient condition; and
    (b) operated in a proper and efficient manner.

STAGED SUBMISSION OF ANY STRATEGY, PLAN OR PROGRAM

12. With the approval of the Director-General, the Proponent may submit any strategy, plan or program required by this approval on a progressive basis.

    Note: While any strategy, plan or program may be submitted on a progressive basis, the Proponent will need to ensure that the existing operations at the site are covered by suitable strategies, plans or programs at all times. In addition, if any strategy, plan or program is prepared for only part of a project, then it must clearly describe which part of the project it applies to, and give an indication when the strategy, plan or program will need to be updated to include the other parts of the project.

13. The Proponent shall continue to implement the existing strategies, plans or programs that apply to any development on site under project approval 06_0198 until they are replaced by an equivalent strategy, plan or program approved under this approval.

SCHEDULE 3
ENVIRONMENTAL PERFORMANCE CONDITIONS

NOISE

Noise Criteria

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

Table 1: Noise criteria dB(A)

Location	***Day***	***Evening***	***Night***	
	$L_{Aeq\ (15\ min)}$	$L_{Aeq\ (15\ min)}$	$L_{Aeq\ (15\ min)}$	$L_{A1\ (1\ min)}$
All privately-owned land	35	35	35	45

Note: Noise generated by the project is to be measured in accordance with the relevant procedures and exemptions (including certain meteorological conditions) of the NSW Industrial Noise Policy.

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

Road Traffic Noise Criteria

2. The Proponent shall ensure that the road traffic noise generated by the project and the Tarrawonga coal mine does not exceed the criteria in Table 2.

Table 2: Road traffic noise impact criteria dB(A) $L_{Aeq\ (1\ hour)}$

Location	***Day***	***Evening***	***Night***
Any residence on privately-owned land	55	55	50

Note: Road traffic noise is to be measured in accordance with the relevant procedures and exemptions (including certain meteorological conditions) of the NSW Road Traffic Noise Policy.

Operating Conditions

3. The Proponent shall:
   (a) implement best practice noise management to minimise the operational, low frequency, and road traffic noise generated by the project;
   (b) minimise the noise impacts of the project during temperature inversions; and
   (c) regularly assess the real-time noise monitoring and meteorological forecasting data and relocate, modify, and/or stop operations on site to ensure compliance with the relevant conditions of this approval,

   to the satisfaction of the Director-General.

Noise Management Plan

4. The Proponent shall prepare and implement a Noise Management Plan for the project to the satisfaction of the Director-General. This plan must:
   (a) be prepared in consultation with OEH, and submitted to the Director-General for approval by the end of December 2011;
   (b) describe the noise mitigation measures that would be implemented to ensure compliance with the relevant conditions of this approval;
   (c) include a Road Traffic Noise Management Plan that has been prepared in consultation with the operators of the Tarrawonga coal mine; and
   (d) include a noise monitoring program that:
      - uses a combination of real-time and supplementary attended monitoring to evaluate the performance of the project; and
      - includes a protocol for determining exceedances of the relevant conditions of this approval.

BLASTING

Blasting Criteria

5. The Proponent shall ensure that the blasting on site does not cause exceedances of the criteria in Table 3.

Table 3: Blasting criteria

Location	*Airblast overpressure (dB(Lin Peak))*	*Ground vibration (mm/s)*	*Allowable exceedance*
Residence on privately-owned land	115	5	5% of the total number of blasts over a period of 12 months
	120	10	0%

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

Blasting Hours

6. The Proponent shall only carry out blasting on site between 9am and 5pm Monday to Saturday inclusive. No blasting is allowed on Sundays, public holidays, or at any other time without the written approval of the Director-General.

Blasting Frequency

7. The Proponent shall not carry out more than one blast a day on site, unless an additional blast is required following a blast misfire.

Note: A blast may involve a number of explosions within a short period, typically less than two minutes.

Property Inspections

8. If the Proponent receives a written request from the owner of any privately-owned land within 2 kilometres of the approved open cut mining pit on site, or other landowner nominated by the Director-General, for a property inspection to establish the baseline condition of any buildings and/or structures on their land, or to have a previous property inspection report updated, then within 2 months of receiving this request the Proponent shall:
   (a) commission a suitably qualified, experienced and independent person, whose appointment has been approved by the Director-General, to:
      - establish the baseline condition of the buildings and/or structures on the land or update the previous property inspection report; and
      - identify any measures that should be implemented to minimise the potential blasting impacts of the project on these buildings and/or structures; and
   (b) give the landowner a copy of the new or updated property inspection report.

Property Investigations

9. If the owner of any privately-owned land claims that the buildings and/or structures on their land have been damaged as a result of blasting on site, then within 2 months of receiving this claim the Proponent shall:
   (a) commission a suitably qualified, experienced and independent person, whose appointment has been approved by the Director-General, to investigate the claim; and
   (b) give the landowner a copy of the property investigation report.

If this independent property investigation confirms the landowner's claim, and both parties agree with these findings, then the Proponent shall repair the damages to the satisfaction of the Director-General.

If the Proponent or landowner disagrees with the findings of the independent property investigation, then either party may refer the matter to the Director-General for resolution.

Operating Conditions

10. The Proponent shall
   (a) implement best blasting management practice on site to:
      - protect the safety of people and livestock in the surrounding area;
      - protect public or private property in the surrounding area; and
      - minimise the dust and fume emissions of the blasting; and

(b) operate a suitable system to enable the public to get up-to-date information on the proposed blasting schedule on site,

to the satisfaction of the Director-General.

11. The Proponent shall not carry out any blasting on site that is within 500 metres of:
    (a) a public road without the approval of Council; and
    (b) any land outside the site that is not owned by the Proponent, unless:
        - the Proponent has a written agreement with the relevant landowner to allow blasting to be carried out closer to the land, and the Proponent has advised the Director-General in writing of the terms of this agreement; or
        - the Proponent has:
            - demonstrated to the satisfaction of the Director-General that the blasting can be carried out closer to the land, without compromising the safety of people or livestock, or damaging the buildings and/or structures on the land; and
            - updated the Blast Management Plan to include the specific measures that would be implemented while blasting is being carried out within 500 metres of the land.

Blast Management Plan

12. The Proponent shall prepare and implement a Blast Management Plan for the project to the satisfaction of the Director-General. This plan must:
    (a) be prepared in consultation with OEH, and submitted to the Director-General for approval by the end of December 2011;
    (b) describe the measures that would be implemented to ensure compliance with the relevant conditions of this approval; and
    (c) include a blast monitoring program to evaluate the performance of the project.

AIR QUALITY & GREENHOUSE GAS

Odour

13. The Proponent shall ensure that no offensive odours, as defined under the POEO Act, are emitted from the site.

Greenhouse Gas Emissions

14. The Proponent shall implement all reasonable and feasible measures to minimise the release of greenhouse gas emissions from the site.

Air Quality Criteria

15. The Proponent shall ensure that all reasonable and feasible avoidance and mitigation measures are employed so that the particulate emissions generated by the project do not exceed the criteria listed in Tables 4, 5 and 6 at any residence on privately-owned land or on more than 25 percent of any privately-owned land.

Table 4: Long-term criteria for particulate matter

Pollutant	***Averaging period***	***[d]Criterion***
Total suspended particulate (TSP) matter	Annual	[a]90 µg/m^3
Particulate matter < 10 µm (PM_{10})	Annual	[a]30 µg/m^3

Table 5: Short-term criterion for particulate matter

Pollutant	***Averaging period***	***[d] Criterion***
Particulate matter < 10 µm (PM_{10})	24 hour	[a] 50 µg/m^3

Table 6: Long-term criteria for deposited dust

Pollutant	***Averaging period***	***Maximum increase in deposited dust level***	***Maximum total[1] deposited dust level***
[c]Deposited dust	Annual	[b]2 g/m^2/month	[a]4 g/m^2/month

Notes:

- *[a] Total impact (i.e. incremental increase in concentrations due to the project plus background concentrations due to other sources);*
- *[b] Incremental impact (i.e. incremental increase in concentrations due to the project on its own);*

- [c] *Deposited dust is to be assessed as insoluble solids as defined by Standards Australia, AS/NZS 3580.10.1:2003: Methods for Sampling and Analysis of Ambient Air - Determination of Particulate Matter - Deposited Matter - Gravimetric Method*; *and*
- [d] *Excludes extraordinary events such as bushfires, prescribed burning, dust storms, sea fog, fire incidents, illegal activities or any other activity agreed to by the Director-General in consultation with OEH.*

Operating Conditions

16. The Proponent shall:
    (a) implement best practice air quality management on site, including all reasonable and feasible measures to minimise the off-site odour, fume and dust emissions generated by the project, including those generated by any spontaneous combustion on site,
    (b) minimise any visible air pollution generated by the project;
    (c) minimise the surface disturbance on site; and
    (d) regularly assess the real-time air quality monitoring and meteorological forecasting data, and relocate, modify and/or stop operations on site to ensure compliance with the relevant conditions of this approval,
    to the satisfaction of the Director-General.

Air Quality & Greenhouse Gas Management Plan

17. The Proponent shall prepare and implement an Air Quality & Greenhouse Gas Management Plan for the project to the satisfaction of the Director-General. This plan must:
    (a) be prepared in consultation with OEH, and submitted to the Director-General for approval by the end of December 2011;
    (b) describe the measures that would be implemented to ensure compliance with the relevant conditions of this approval, including a real-time air quality management system that employs reactive and proactive mitigation measures; and
    (c) include an air quality monitoring program that:
        - uses a combination of real-time monitors, high volume samplers and dust deposition gauges to evaluate the performance of the project; and
        - includes a protocol for determining exceedances of the relevant conditions of this approval.

METEOROLOGICAL MONITORING

18. During the life of the project, the Proponent shall ensure that there is a meteorological station operating in the vicinity of the site that:
    (a) complies with the requirements in the *Approved Methods for Sampling of Air Pollutants in New South Wales* guideline; and
    (b) is capable of continuous real-time measurement of temperature lapse rate in accordance with the *NSW Industrial Noise Policy*, or as otherwise agreed by OEH.

AUGER MINING

19. The Proponent shall ensure that the auger mining carried out on site:
    (a) is restricted to the areas approved for auger mining;
    (b) is designed to remain safe and stable in the long term; and
    (c) does not result in vertical subsidence of greater than 20 mm.

SOIL & WATER

Under the Water Act 1912 and/or the Water Management Act 2000, the Proponent is required to obtain water licences for the project.

Water Supply

20. The Proponent shall ensure that it has sufficient water for all stages of the project, and if necessary, adjust the scale of mining operations on site to match its available water supply to the satisfaction of the Director-General.

Surface Water Discharges

21. The Proponent shall ensure that all surface water discharges from the site comply with the discharge limits (both volume and quality) set for the project in any EPL.

Water Management Plan

22. The Proponent shall prepare and implement a Water Management Plan for the project to the satisfaction of the Director-General. This plan must be prepared in consultation with OEH, NOW and DRE by suitably qualified and experienced persons whose appointment has been approved by the Director-General, and

submitted to the Director-General for approval by the end of February 2012. In addition to the standard requirements for management plans (see condition 2 of schedule 5), this plan must include:

(a) a Site Water Balance that:
- includes details of:
  - sources and security of water supply;
  - water use on site;
  - water management on site;
  - any off-site water transfers;
- describes what measures would be implemented to minimise water use on site; and
- is to be updated each year during the annual review;

(b) a Surface Water Management Plan, that includes:
- a detailed description of the water management system on site, including the:
  - clean water diversion systems;
  - erosion and sediment controls; and
  - water storages;
- detailed plans, including design objectives and performance criteria, for:
  - design and management of the final void;
  - reinstatement of drainage lines on the rehabilitated areas of the site; and
  - control of any potential water pollution from the rehabilitated areas of the site;
- performance criteria for the following, including trigger levels for investigating any potentially adverse impacts:
  - the water management system;
  - surface water quality in Driggle Draggle Creek or the unnamed creek to the south of the site;
  - the health of any riparian vegetation in Driggle Draggle Creek or the unnamed creek to the south of the site;
- a program to monitor:
  - the effectiveness of the water management system;
  - surface water flows and quality in Driggle Draggle Creek and the unnamed creek to the south of the site;
  - the health of any riparian vegetation in Driggle Draggle Creek or the unnamed creek to the south of the site; and
- a plan to respond to any exceedances of the performance criteria, and mitigate and/or offset any adverse surface water impacts of the project;

(c) a Groundwater Management Plan, which includes:
- performance criteria, including trigger levels for investigating any potentially adverse groundwater impacts;
- a program to monitor:
  - groundwater inflows to the mining operations;
  - the impacts of the project on any alluvial aquifers;
  - the seepage/leachate from water storages, backfilled voids, and the final void on site;
- a program to validate the groundwater model for the project, and calibrate it to site specific conditions; and
- a plan to respond to any exceedances of the performance criteria, and mitigate and/or offset any adverse groundwater impacts.

BIODIVERSITY

Biodiversity Offset

23. By the end of June 2012, unless the Director-General agrees otherwise, the Proponent shall enter into a Biobanking agreement with the Minister for Environment and Heritage, in accordance with Part 7A of the *Threatened Species Conservation Act 1995*, to implement the Biodiversity Offset Strategy described in the EA (for the Whitehaven Regional Biobank Site), and summarised in Table 7;

Table 7: Biodiversity Offset Strategy to be implemented at the Whitehaven Regional Biobank Site

Total Vegetation Clearing	***Minimum Offset to be provided***
Total of 95.44 ha of vegetation to be cleared	• Retirement of 4,859 Ecosystem Credits (including 478 Ecosystem Credits for the clearing of 47.9 ha of the BOS area approved under 06_0198); • Conservation of the residual BOS area approved under 06_0198 (60 ha), at the existing location within the Whitehaven Regional Biobank Site; • Conservation of 0.62 ha of White box Grassy Woodland; • Conservation of 231.42 ha of suitable foraging habitat for the Regent Honeyeater and Swift Parrot; and • Restoration of 118.33 ha of derived grassland to woodland.

Note: The Whitehaven Regional Biobank Site is shown in Figure 1 in Appendix 4.

HERITAGE

Heritage Management Plan

24. The Proponent shall prepare and implement a Heritage Management Plan for the project to the satisfaction of the Director-General. This plan must:
    (a) be prepared in consultation with OEH and Aboriginal stakeholders;
    (b) be submitted to the Director-General for approval by the end of December 2011;
    (c) describe the measures that would be implemented:
        - record and salvage the Aboriginal sites within the project disturbance area, including RPS Rocglen IF1, RPS Rocglen AS1 and RPS Rocglen AS2 at locations as shown in Appendix 6 and any potential archaeological deposits;
        - store the Aboriginal objects salvaged, both during construction and in the long term;
        - protect, monitor and/or manage the Aboriginal sites on site that are outside the project disturbance area on site, including measures to protect scarred trees (NPWS # 20-4-0194 and # 20-4-0195 at locations as shown in Appendix 6);
        - manage the discovery of any human remains or previously unidentified Aboriginal objects;
        - enable Aboriginal stakeholders to get reasonable access to the site during the project;
        - ensure Aboriginal stakeholders are consulted about the conservation and management of Aboriginal cultural heritage on site; and
        - ensure workers on site receive suitable heritage inductions, and that suitable records are kept of these inductions.

TRANSPORT

Road Works

25. By the end of December 2012, unless the Director-General agrees otherwise, the proponent shall upgrade and tar seal Wean Road to the satisfaction of Council from the northern end of the existing tar seal to the point of the Gunnedah/Narrabri Shire Council boundary, in general accordance with Council's Rural Local Roads Standard.

Road Maintenance

26. During the project, the Proponent shall contribute towards the maintenance of the public roads used by the project, in accordance with the existing road maintenance agreement between the Proponent and Council.

Operating Conditions

28. The Proponent shall transport all coal from the site to the Whitehaven Siding coal handling and preparation plant by road, using only the designated transport route shown in Figure 1 of Appendix 2.

29. The Proponent shall only dispatch coal from the site by road between the hours of:
    (a) 7 am to 9.15 pm, Monday to Friday;
    (b) 7 am to 5.15 pm Saturday; and
    (c) at no time on Sundays and public holidays.

Monitoring of Coal Transport

30. The Proponent shall:
    (a) keep accurate records of the amount of coal transported (on a monthly basis) from the site, as well as the number of coal truck movements generated by the project; and
    (b) make these records publicly available on its website at the end of each calendar year.

VISUAL

Visual Amenity and Lighting

31. The Proponent shall:
    (a) implement all reasonable and feasible measures to minimise the visual and off-site lighting impacts of the project;
    (b) establish and maintain an effective vegetative screen along the boundary of the site that adjoins public roads;
    (c) ensure that no outdoor lights shine above the horizontal; and
    (d) ensure that all external lighting associated with the project complies with *Australian Standard AS4282 (INT) 1995 - Control of Obtrusive Effects of Outdoor Lighting*, or its latest version.

WASTE

32. The Proponent shall:
    (a) minimise the waste generated by the project; and
    (b) ensure that the waste generated by the project is appropriately stored, handled and disposed of in a lawful manner.

BUSHFIRE MANAGEMENT

33. The Proponent shall:
    (a) ensure that the project is suitably equipped to respond to any fires on site; and
    (b) assist the Rural Fire Service and emergency services as much as possible if there is a fire in the surrounding area.

REHABILITATION

Rehabilitation Objectives

34. The Proponent shall rehabilitate the site to the satisfaction of the Executive Director, Mineral Resources in DRE. This rehabilitation must be generally consistent with the proposed rehabilitation strategy described in the EA (and depicted conceptually in Figure 1 in Appendix 5), and comply with the objectives in Table 8.

Table 8: Rehabilitation Objectives

Feature	***Objective***
Mine site (as a whole)	Safe, stable and non-polluting
Final void	• Minimise the size and depth of the final void as far as is reasonable and feasible; and • The final void is to be safe, stable and non-polluting
Surface infrastructure	To be decommissioned and removed, unless the Director-General agrees otherwise
Other land affected by the project	Restore ecosystem function, including maintaining or establishing self-sustaining eco-systems comprised of: • local native plant species; • at least 206 hectares of woodland (see Figure 1 in Appendix 5); and • a landform consistent with the surrounding environment
Community	Minimise the adverse socio-economic effects associated with mine closure

Progressive Rehabilitation

35. The Proponent shall carry out the rehabilitation of the site progressively, that is, as soon as reasonably practicable following disturbance.

Rehabilitation Management Plan

36. The Proponent shall prepare and implement a Rehabilitation Management Plan to the satisfaction of the Executive Director, Mineral Resources in DRE. This plan must:
    (a) be prepared in consultation with the Department, NOW, OEH, Council and the CCC;
    (b) be submitted to the Executive Director, Mineral Resources in DRE by the end of February 2012;
    (c) be prepared in accordance with any relevant DRE guideline;
    (d) describe the measures that would be implemented to ensure compliance with the relevant conditions of this approval;
    (e) address all aspects of rehabilitation including mine closure, final landform, and final land use; and
    (f) build to the maximum extent practicable on the other management plans required under this approval.

SCHEDULE 4
ADDITIONAL PROCEDURES

NOTIFICATION OF LANDOWNERS

1. By the end of December 2011, the Proponent shall notify in writing the owners of "Brolga", "Surrey" and any privately-owned land within 2 kilometres of the proposed footprint of the open-cut pit that they are entitled to ask for an inspection to establish the baseline condition of any buildings or structures on their land, or to have a previous property inspection report updated.

2. As soon as practicable after obtaining monitoring results showing:
   (a) an exceedance of the relevant criteria in Schedule 3, the Proponent shall notify the affected landowner and/or tenants in writing of the exceedance, and provide regular monitoring results to each of these parties until the project is complying with the relevant criteria again; and
   (b) an exceedance of the relevant air quality criteria in Schedule 3, the Proponent shall send a copy of the NSW Health fact sheet entitled *"Mine Dust and You"* (as may be updated from time to time) to the affected landowners and/or existing tenants of the land (including tenants of any mine-owned land).

INDEPENDENT REVIEW

3. If an owner of privately-owned land considers the project to be exceeding the relevant criteria in Schedule 3, then they may ask the Director-General in writing for an independent review of the impacts of the project on their land.

   If the Director-General is satisfied that an independent review is warranted, then within 2 months of the Director-General's decision the Proponent shall:
   (a) commission a suitably qualified, experienced and independent person, whose appointment has been approved by the Director-General, to:
      - consult with the landowner to determine his/her concerns;
      - conduct monitoring to determine whether the project is complying with the relevant criteria in Schedule 3; and
      - if the project is not complying with these criteria then identify the measures that could be implemented to ensure compliance with the relevant criteria; and
   (b) give the Director-General and landowner a copy of the independent review.

4. If the independent review determines that the project is complying with the relevant criteria in Schedule 3, then the Proponent may discontinue the independent review with the approval of the Director-General.

   If the independent review determines that the project is not complying with the relevant impact assessment criteria in Schedule 3, then the Proponent shall:
   (a) implement all reasonable and feasible mitigation measures, in consultation with the landowner and appointed independent person, and conduct further monitoring until the project complies with the relevant criteria; or
   (b) secure a written agreement with the landowner to allow exceedances of the relevant criteria,

   to the satisfaction of the Director-General.

SCHEDULE 5
ENVIRONMENTAL MANAGEMENT, REPORTING AND AUDITING

ENVIRONMENTAL MANAGEMENT

Environmental Management Strategy

1. The Proponent shall prepare and implement an Environmental Management Strategy for the project to the satisfaction of the Director-General. This strategy must:
   (a) be submitted to the Director-General for approval by the end of December 2011;
   (b) provide the strategic framework for environmental management of the project;
   (c) identify the statutory approvals that apply to the project;
   (d) describe the role, responsibility, authority and accountability of all key personnel involved in the environmental management of the project;
   (e) describe the procedures that would be implemented to:
      - keep the local community and relevant agencies informed about the operation and environmental performance of the project;
      - receive, handle, respond to, and record complaints;
      - resolve any disputes that may arise during the course of the project;
      - respond to any non-compliance;
      - respond to emergencies; and
   (f) include:
      - copies of any strategies, plans and programs approved under the conditions of this approval; and
      - a clear plan depicting all the monitoring required to be carried out under the conditions of this approval.

Management Plan Requirements

2. The Proponent shall ensure that the management plans required under this approval are prepared in accordance with any relevant guidelines, and include:
   (a) detailed baseline data;
   (b) a description of:
      - the relevant statutory requirements (including any relevant approval, licence or lease conditions);
      - any relevant limits or performance measures/criteria;
      - the specific performance indicators that are proposed to be used to judge the performance of, or guide the implementation of, the project or any management measures;
   (c) a description of the measures that would be implemented to comply with the relevant statutory requirements, limits, or performance measures/criteria;
   (d) a program to monitor and report on the:
      - impacts and environmental performance of the project;
      - effectiveness of any management measures (see (c) above);
   (e) a contingency plan to manage any unpredicted impacts and their consequences;
   (f) a program to investigate and implement ways to improve the environmental performance of the project over time;
   (g) a protocol for managing and reporting any:
      - incidents;
      - complaints;
      - non-compliances with statutory requirements; and
      - exceedances of the impact assessment criteria and/or performance criteria; and
   (h) a protocol for periodic review of the plan.

   Note: The Director-General may waive any of these requirements if they are unnecessary or unwarranted for particular management plans.

Annual Review

3. By the end of each December, the Proponent shall review the environmental performance of the project to the satisfaction of the Director-General. This review must:
   (a) describe the development (including any rehabilitation) that was carried out in the past year, and the development that is proposed to be carried out over the next year;
   (b) include a comprehensive review of the monitoring results and complaints records of the project over the past year, which includes a comparison of these results against the
      - relevant statutory requirements, limits or performance measures/criteria;
      - monitoring results of previous years; and
      - relevant predictions in the EA;
   (c) identify any non-compliance over the past year, and describe what actions were (or are being) taken to ensure compliance;
   (d) identify any trends in the monitoring data over the life of the project;

(e) identify any discrepancies between the predicted and actual impacts of the project, and analyse the potential cause of any significant discrepancies; and
(f) describe what measures will be implemented over the next year to improve the environmental performance of the project.

Revision of Strategies, Plans and Programs

4. Within 3 months of:
(a) the submission of an annual review under condition 3 above;
(b) the submission of an incident report under condition 6 below;
(c) the submission of an audit report under condition 8 below; and
(d) any modification to the conditions of this approval (unless the conditions require otherwise),
the Proponent shall review, and if necessary revise, the strategies, plans, and programs required under this approval to the satisfaction of the Director-General.

Note: This is to ensure the strategies, plans and programs are updated on a regular basis, and incorporate any recommended measures to improve the environmental performance of the project.

Community Consultative Committee

5. The Proponent shall operate a Community Consultative Committee (CCC) for the project in general accordance with the *Guidelines for Establishing and Operating Community Consultative Committees for Mining Projects* (Department of Planning, 2007, or its latest version), and to the satisfaction of the Director-General.

Notes:
- *The CCC is an advisory committee. The Department and other relevant agencies are responsible for ensuring that the Proponent complies with this approval; and*
- *In accordance with the guideline, the Committee should be comprised of an independent chair and appropriate representation from the Proponent, Council and the local community.*

REPORTING

Incident Reporting

6. As soon as is practicable after the Proponent becomes aware of any incident associated with the project, the Proponent shall notify the Director-General and any other relevant agencies of the incident. Within 7 days of the date of the incident, the Proponent shall provide the Director-General and any relevant agencies with a detailed report on the incident.

Regular Reporting

7. The Proponent shall provide regular reporting on the environmental performance of the project on its website, in accordance with the reporting arrangements in any plans or programs approved under the conditions of this approval.

INDEPENDENT ENVIRONMENTAL AUDIT

8. By the end of March 2013, and every 3 years thereafter, unless the Director-General directs otherwise, the Proponent shall commission and pay the full cost of an Independent Environmental Audit of the project. This audit must:
(a) be conducted by a suitably qualified, experienced and independent team of experts whose appointment has been endorsed by the Director-General;
(b) include consultation with the relevant agencies;
(c) assess the environmental performance of the project and assess whether it is complying with the requirements in this approval and any relevant EPL or Mining Lease (including any assessment, plan or program required under these approvals);
(d) review the adequacy of strategies, plans or programs required under the abovementioned approvals; and
(e) recommend appropriate measures or actions to improve the environmental performance of the project, and/or any assessment, plan or program required under the abovementioned approvals.

Note: This audit team must be led by a suitably qualified auditor and include experts in any field specified by the Director-General.

9. Within six weeks of the completion of this audit, or as otherwise agreed by the Director-General, the Proponent shall submit a copy of the audit report to the Director-General, together with its response to any recommendations contained in the audit report.

ACCESS TO INFORMATION

10. The Proponent shall:

(a) make copies of the following publicly available on its website:

- the documents referred to in Condition 2 of Schedule 2;
- all current statutory approvals for the project;
- all approved strategies, plans and programs required under the conditions of this approval;
- a comprehensive summary of the monitoring results of the project, which have been reported in accordance with the conditions of this approval, or any approved plans and programs;
- a complaints register, updated on a monthly basis;
- minutes of CCC meetings;
- the annual reviews of the project;
- any independent environmental audit of the project, and the Proponent's response to the recommendations in any audit;
- any other matter required by the Director-General; and

(b) keep this information up-to-date,

to the satisfaction of the Director-General.

APPENDIX 1
SCHEDULE OF LAND

Area	***Land Title Reference***
Mine Site Area including the proposed Wean Road diversion	*Lots 1 and 4 DP 1120601* *Lot 1 DP 787417*
Coal Haulage Route	*Lots 23 and 28 DP 754929* *Council roads and road reserve, including:* • *Shannon Harbour road (SR 93);* • *Hoad Lane (SR 95);* • *Blue Vale Road (SR 7); and* • *Kamilaroi Highway (SH 29).*
Wean Road	*Wean Road (SR 6)*

APPENDIX 2
PROJECT LAYOUT PLANS

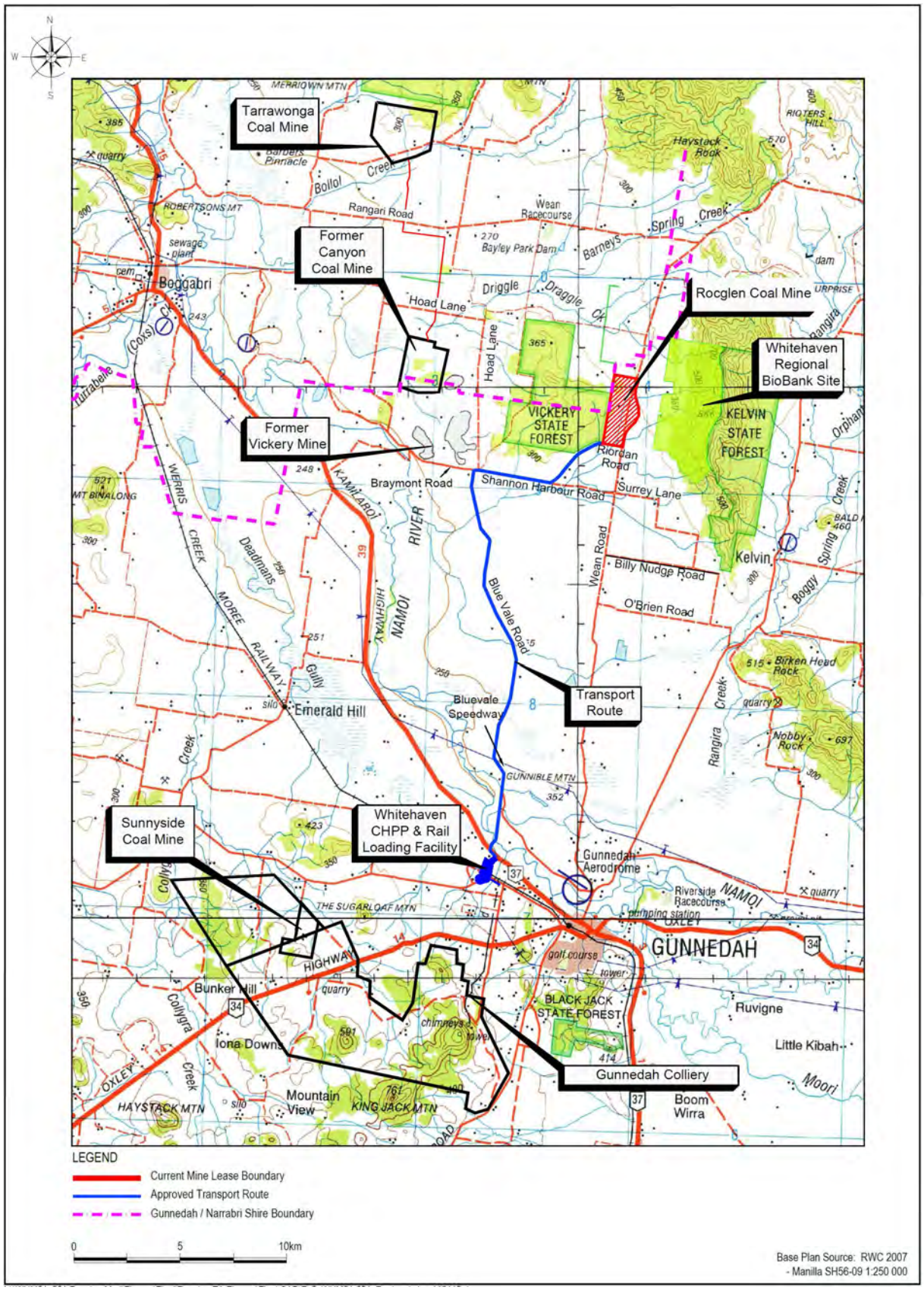

Figure 1: *Regional setting of Rocglen Extension and Whitehaven Regional Biobank Site*

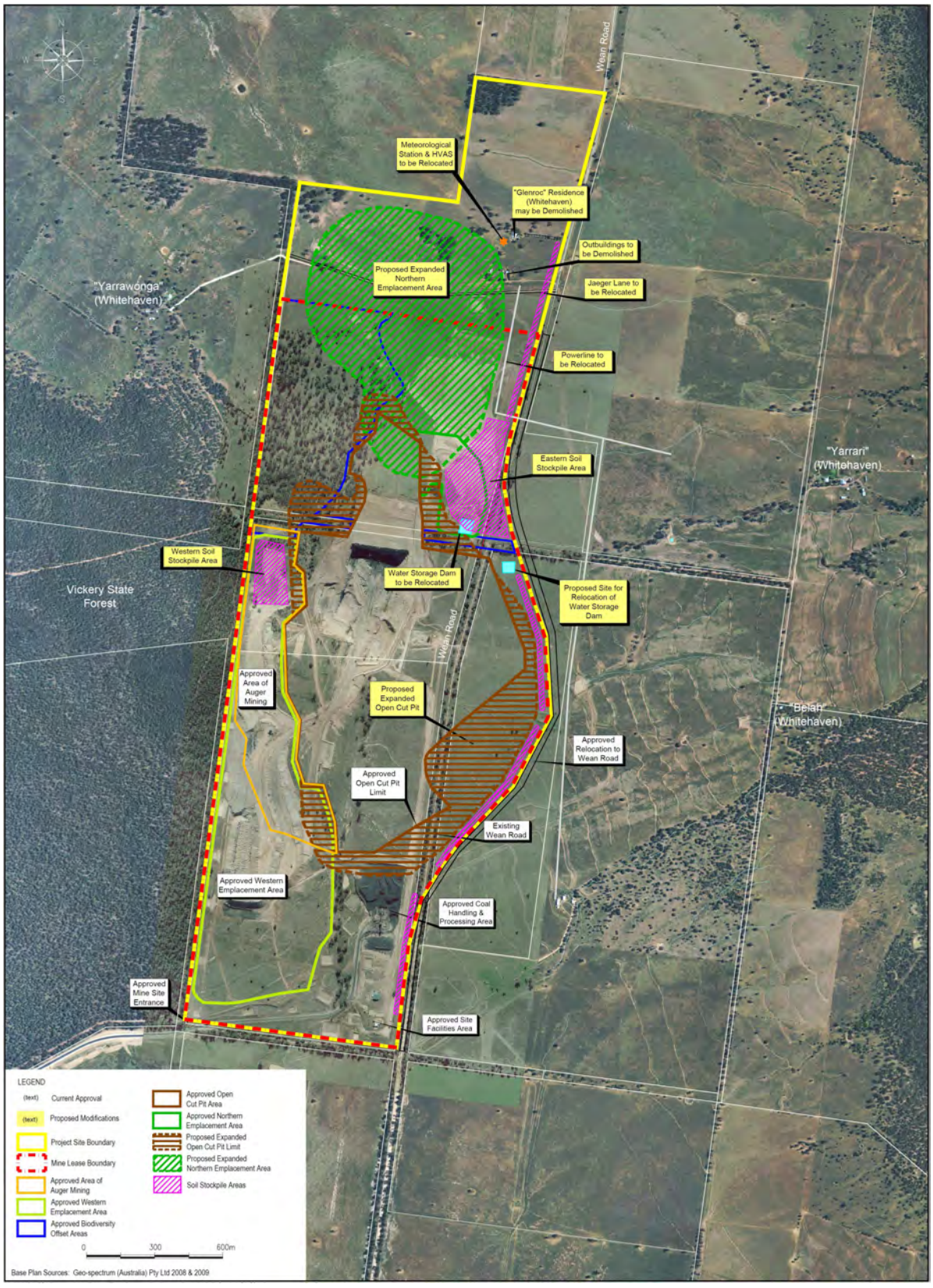

Figure 2: *Rocglen Extension Project Layout*

APPENDIX 3
LAND OWNERSHIP PLAN

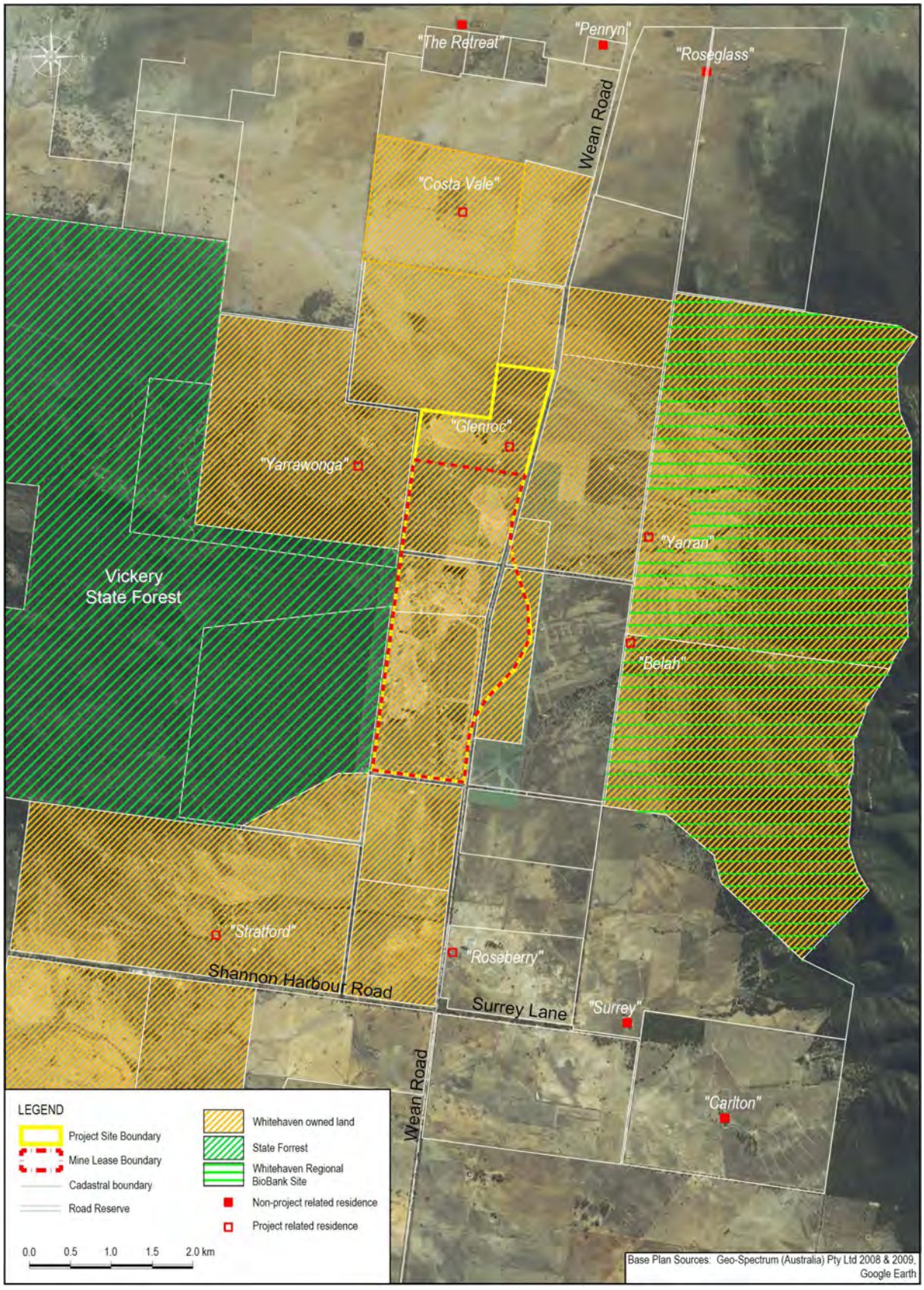

Figure 1: *Land ownership and neighbouring residences*

APPENDIX 4
WHITEHAVEN REGIONAL BIOBANK SITE

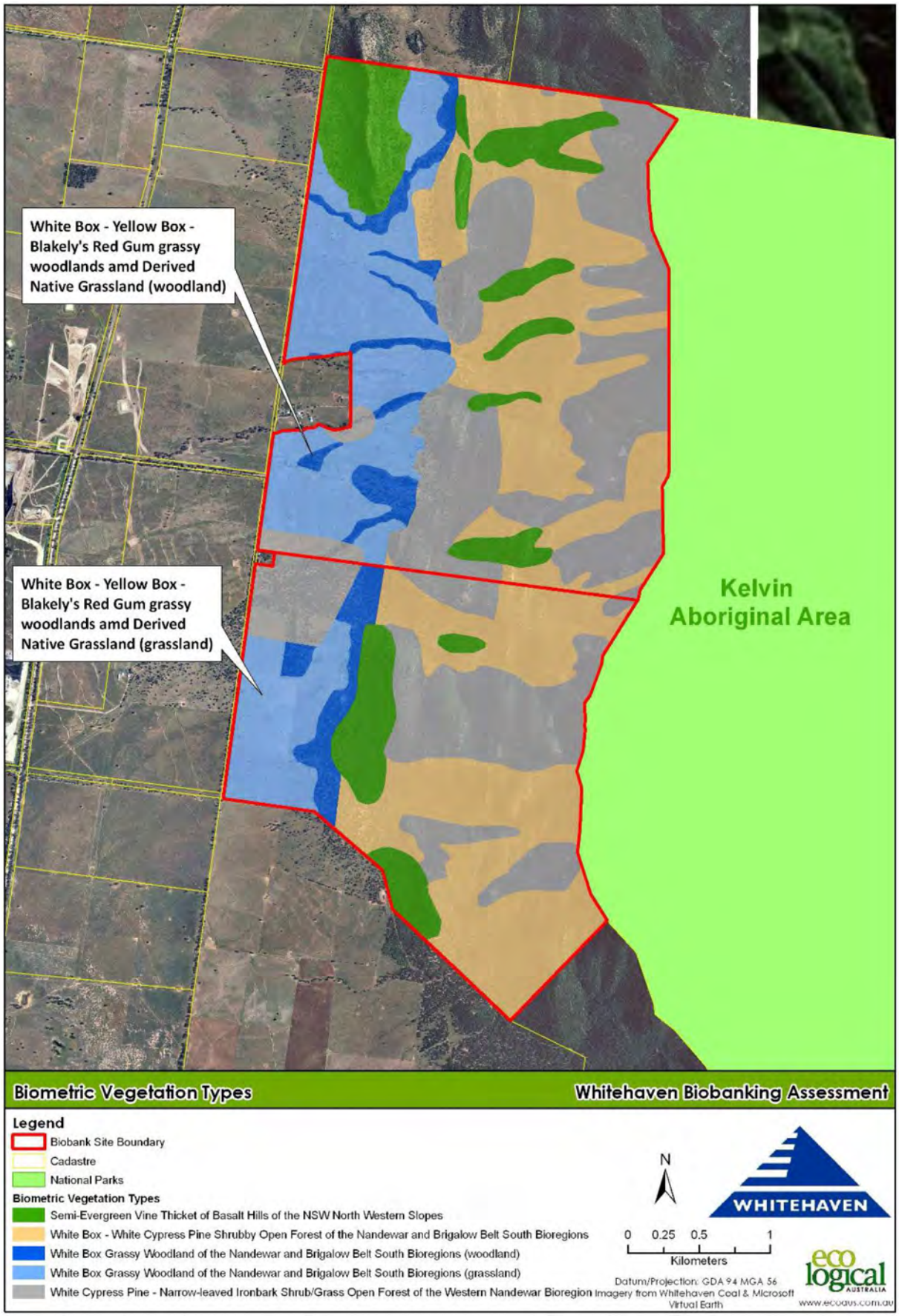

Figure 2: *Whitehaven Regional Biobank Site (showing locations of EPBC Act listed ecological communities to be utilised as offsets for the Rocglen Extension Project)*

APPENDIX 5
CONCEPTUAL REHABILITATION PLAN

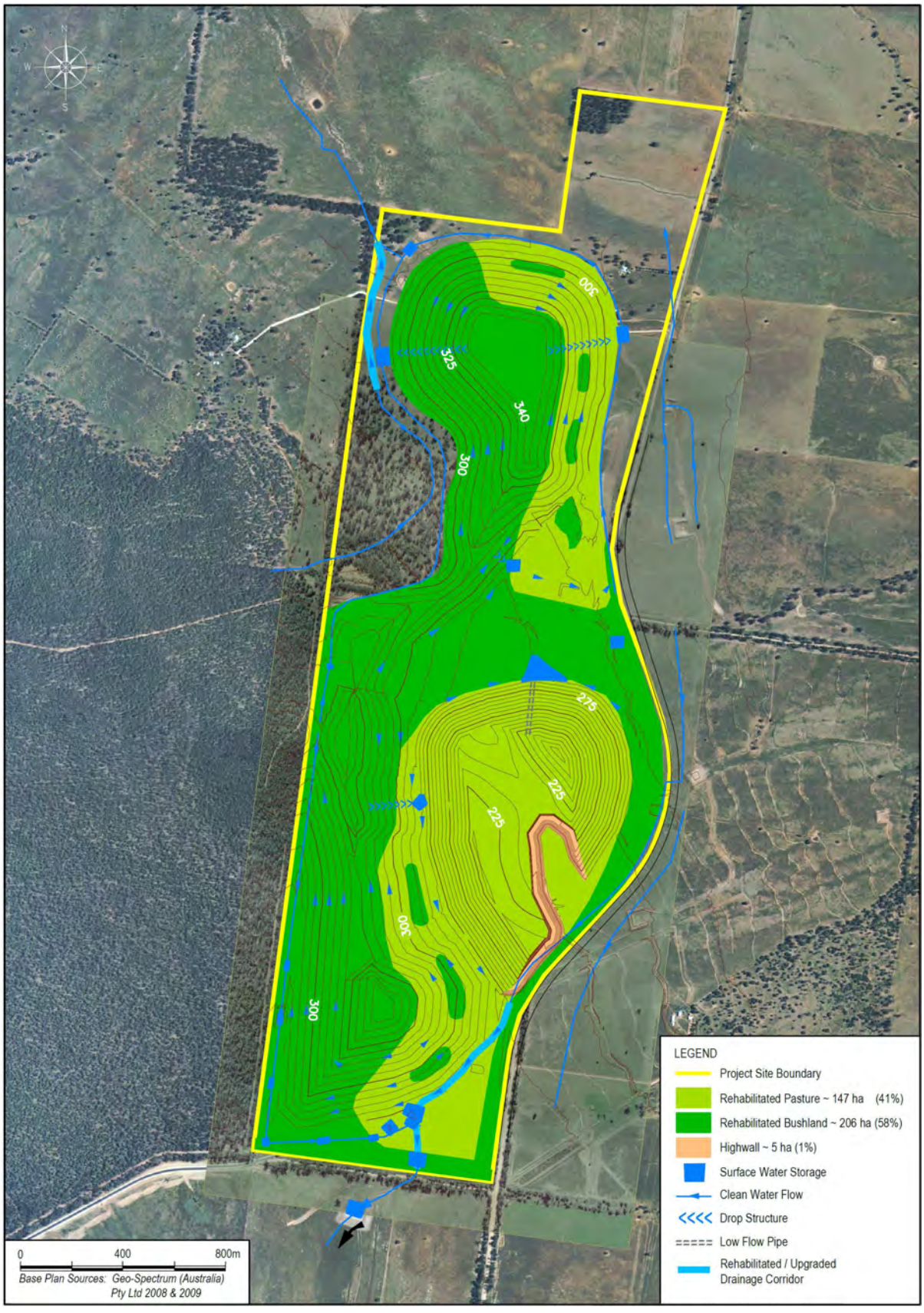

Figure 1: *Conceptual Rehabilitation Plan (note that configuration of the final void must be consistent with the Rehabilitation Management Plan)*

APPENDIX 6
ABORIGINAL HERITAGE SITES

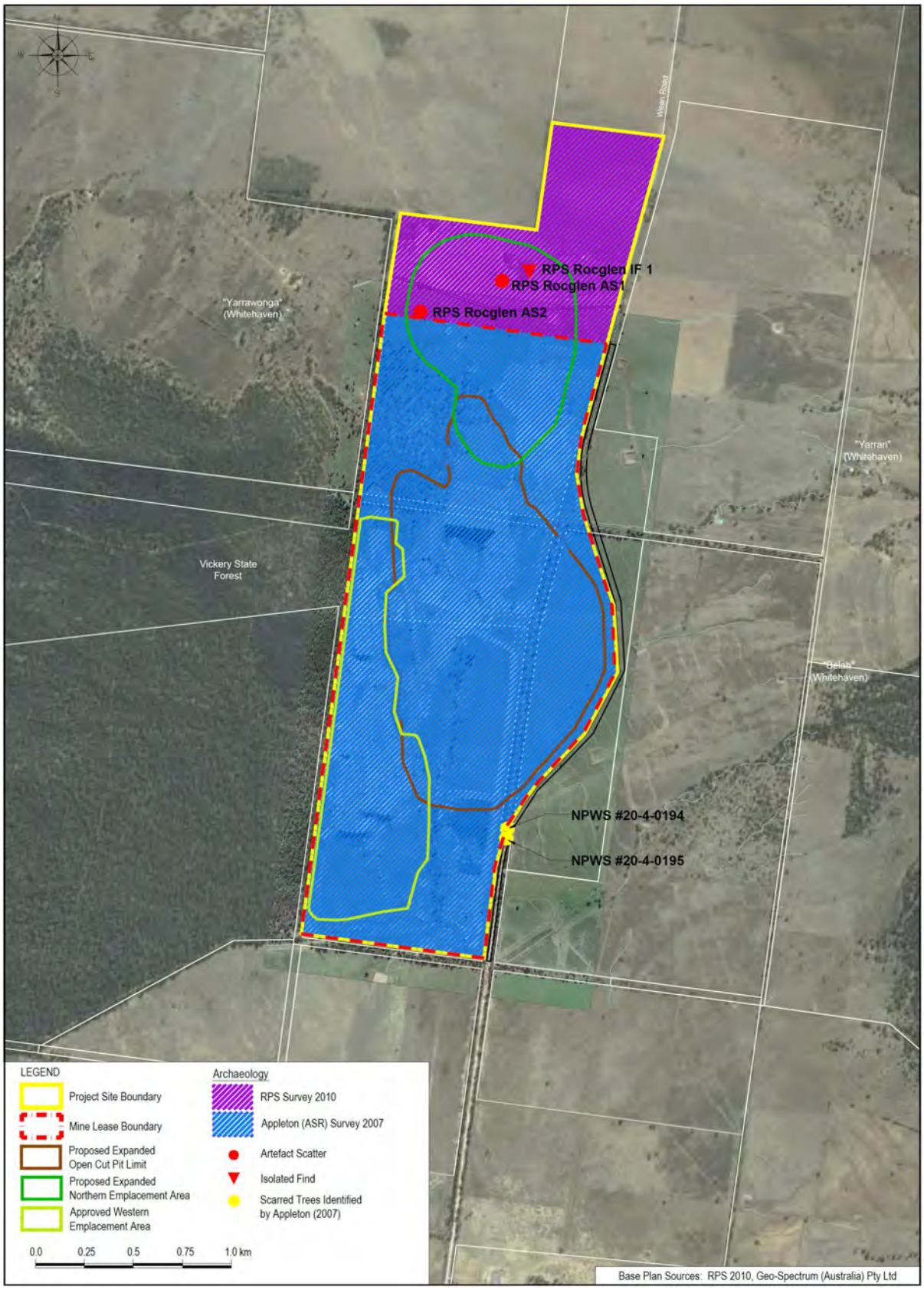

Figure 1: *Aboriginal heritage sites*

APPENDIX 7
STATEMENT OF COMMITMENTS

Compliance with the EA

(a) Whitehaven will carry out the development for the Project generally in accordance with the Project Application and this EA report.

General Operation

Production Limit

(a) Whitehaven will not extract more than 1.5 Mtpa of ROM coal from the Project Site

Hours of Operation

(b) Mining operations may be undertaken 24 hours a day, Monday to Saturday, with the exception of public holidays.

(c) Coal transport will be undertaken between 7am and 9:15pm Monday to Friday, and between 7am and 5:15pm on Saturdays.

Refinement of Mine Plan

(d) Any refinements to the concept mine plan outlined in this EA report will be detailed and assessed as part of the MOP process managed by the I&I NSW.

Consultation

(e) Routine consultation will be undertaken with residents surrounding the Project Site and along the coal transport route, as well as with the CCC, to ensure any concerns relating to mine operations are identified and appropriately addressed.

Environmental Monitoring and Reporting

Revision of Environmental Management Plans and Monitoring Programs

(a) Within 12 months of approval, Whitehaven will review, update and integrate relevant aspects of the environmental management of the Project in the existing set of environmental management plans for the Rocglen Coal Mine. This will be undertaken in consultation with the relevant government agencies.

(b) Within 12 months of approval, Whitehaven will review, update and integrate relevant aspects of the environmental monitoring of the Project in the existing set of environmental monitoring programs for the Rocglen Coal Mine. This will be undertaken in consultation with the relevant government agencies.

Annual Environmental Management Plan

(c) Whitehaven will prepare an AEMR for the Project for submission to the Director-General and relevant government agencies.

Soil Stripping, Stockpiling and Re-Spreading

(a) Soil materials within the Project Site will be stripped, handled and stockpiled in a manner that minimises the potential for soil loss and structural deterioration.

(b) Topsoil stockpiles will be established to a maximum height of 3 metres.

(c) Soil material will be maintained in a slightly moist condition during stripping, and will not be stripped in either an excessively dry or wet condition.

(d) If mining sequencing, equipment scheduling and weather conditions permit, stripped material will be placed directly onto reshaped emplacement areas and spread immediately to avoid the requirement for stockpiling.

(e) The surface of soil stockpiles will be left coarsely textured in order to promote infiltration and minimise erosion until vegetation is established, as well as to prevent anaerobic zones forming.

(f) Where long-term stockpiling is planned (that is, greater than 3 months) the stockpiles will be seeded and fertilised as soon as possible. An annual cover crop that produces sterile florets or seeds will be sown.

(g) Prior to re-spreading stockpiled material onto completed mining or overburden emplacement areas, an assessment of weed infestation on stockpiles will be undertaken to determine if individual stockpiles require herbicide application and/or 'scalping' of weed species prior to spreading.

(h) A soil inventory will be maintained to ensure adequate material is available for planned rehabilitation activities.

(i) Where natural protection from surface runoff flows is not available or achievable, protective earthworks, such as contour banks, and/or straw bale protection will be installed. Silt fencing (or similar) will be installed immediately downslope of any stockpile area potentially susceptible to erosion and maintained until the stockpile is considered stable with an effective vegetation cover.

(j) Whitehaven will adopt the general practice, where appropriate subsoil is available and targeting areas being rehabilitated to pasture, of including an intermediate layer of subsoil between the overburden material and the topdressing to improve the water holding capacity of the rehabilitated landform and reinstate a more natural soil profile. For areas being rehabilitated to bushland, Whitehaven may preferentially reduce the subsoil replacement depth and/or exclude subsoil replacement in selected areas to establish trial areas to monitor bushland development in different soil profiles.

(k) Where resources allow, topsoil and subsoil will each be spread to a nominal depth of between 100 to 150 mm, giving a combined depth of soil material on the rehabilitated landform of between 200 and 300 mm.

(l) The subsoil layer will be spread on an even but roughened surface that has been ripped along the line of the contour to break any compacted and/or smooth surfaces. Ripping will also assist the keying of subsoil into the overburden, which will, in turn, assist in the prevention of land slip and can help vegetation penetrate deep into the soil profile, encourage ingress of water and minimise erosion.

(m) Stripped soil material will be spread, treated with fertiliser and seeded in one consecutive operation in order to reduce the potential for soil loss to wind and water erosion.

Geotechnical Stability – Open Cut Pit and Highwall

(a) Progressive stability reviews and monitoring of geological conditions will be undertaken once the pit moves within 250 metres of the realigned Wean Road to ensure geotechnical stability and safe conditions. If any unfavourable conditions are observed or detected, a detailed assessment will be undertaken by a suitably qualified geotechnical engineer before mining is allowed to continue towards Wean Road.

(b) When the Belmont Fault (or fault zone) is more than 150 metres from Wean Road, operations will mine through the Belmont Fault. The uppermost alluvial material and weathered rock on the eastern side of the fault will have individual face angles no steeper than 45 degrees.

(c) Benching will be adopted at a maximum interval of 25 metres in alluvial, weathered rock and brecciated rock.

(d) In fresh strata face angles will designed at 75 degrees to pit bottom. If in following the upturned Belmont Seam down to pit bottom the floor rock is strong and competent, then the face will be developed on the dip slope without the need for benches in rock beneath the Belmont Seam.

(e) When the top of the stable highwall reaches 50 metres from Wean Road (i.e. when the eastern limit of the Belmont Fault zone reaches 150 metres from Wean Road), the eastern end wall will be turned at right angles to the west. Once the turned highwall encounters sound rock, as it continues to the west, it can be turned again to develop parallel to the Belmont Fault until it reaches the planned pit limit.

(f) The turned highwall in the fault zone will be notched to achieve a stable face. This notch will not approach Wean Road any closer than 150 metres without geotechnical advice.

(g) A block of unmined ground will be left to contain the Belmont Fault zone and prevent it causing collapse back towards Wean Road. The size of this block of unmined ground will be determined by geotechnical investigation by the time a change in highwall direction is required.

(h) If the highwall is free of faulting mining will resume southeast towards the currently planned pit limit. Such mining will cease when the pit crest reaches 50 metres from Wean Road. If additional faulting is detected in this advancing face then the relevance of such structure on highwall stability will be investigated before continuation of highwall development.

Rehabilitation and Mine Closure

Progressive Rehabilitation

(a) Whitehaven will adopt a progressive approach to the rehabilitation of disturbed areas within the Project Site to ensure that, where practicable, completed mining and overburden emplacement areas are quickly shaped, topdressed and vegetated to provide a stable landform. Early reshaping and revegetation of the external batter slopes of the emplacement areas is particularly important and will be targeted as a priority.

(b) Disturbed areas will generally undergo rehabilitation within one year of overburden emplacement and reshaping.

Overburden Placement and Shaping

(c) Placement and shaping of overburden will be undertaken to achieve stable slopes.

(d) Placement and shaping of overburden will be undertaken in a manner which, wherever practicable, ensures that any friable or weathered materials are placed below the subsoil and topsoil layers in order to provide a cover of more competent material and avoid the exposure of large rocks on the final surface.

(e) Any coarse coal rejects placed in the mine void will be covered with at least 3 metres of overburden material.

Subsoil and Topsoil Replacement

(f) Refer to commitments listed above in **Section 8.4**.

Drainage and Surface Water Structure Installation

(g) Surface water management structures will be progressively installed on the rehabilitated landform. The heights (effective depths) and cross-sectional areas of the individual banks will be determined on the basis of individual sub-catchment areas, but will typically be less than 0.7 metres and 3 square metres (m^2), respectively. Rock-lined drains will be used, where required, to convey water safely from the rehabilitated landform into the surface water management system that takes water from the site.

Revegetation

(h) The topdressed surfaces of those areas designated to be restored to rehabilitated pasture will be sown with a mixture of pasture species appropriate for the season. The seed mixture will include fast growing, short-lived species and perennial grasses and legumes.

(i) The topdressed surfaces of those areas designated to be restored as rehabilitated bushland will be initially stabilised with a non-persistent cover crop followed by planting of a selection of locally occurring tree and shrub species that will encourage the re-establishment of the pre-mining vegetation communities and, in the medium to longer term, create habitat and corridors for native fauna.

(j) All areas identified for bushland and pasture re-establishment will be fenced and have stock excluded until it can be demonstrated that the vegetation is stable and self-sustaining, and that grazing will not impact upon its establishment.

Rehabilitation Monitoring and Maintenance

(k) Areas being rehabilitated will be regularly inspected and assessed against the long and short-term rehabilitation objectives. During regular inspections, aspects of rehabilitation to be monitored will include:

- Evidence of any erosion or sedimentation from areas with establishing vegetation cover;
- Success of initial grass cover establishment;
- Success of tree and shrub plantings;
- Adequacy of drainage controls;
- Presence/absence of weeds; and

- General stability of the rehabilitation site.

(l) Where the rehabilitation success appears limited, maintenance activities will be initiated. These may include re-seeding and where necessary, re-topdressing and/or the application of specialised treatments such as composted mulch to areas with poor vegetation establishment. Tree guards will be placed around planted tube stock if grazing by native animals is found to be excessive.

(m) If drainage controls are found to be inadequate for their intended purpose or compromised by grazing stock or wildlife, these will be repaired and/or temporary fences installed to exclude animals. Should areas of excessive erosion and sedimentation be identified, remedial works such as importation of additional fill, soil material and/or the redesigning of water management structures to address erosion will be undertaken.

(n) Monitoring will be conducted periodically by independent, suitably skilled and qualified persons at locations that are representative of the range of conditions on the rehabilitating areas. Annual reviews will be conducted of monitoring data to assess trends and monitoring program effectiveness.

Conceptual Post-Mining Land Use

(o) The disturbed area within the Project Site will be restored to either rehabilitated bushland or rehabilitated pasture, with approximately 5 hectares (1 percent) remaining as a stabilised highwall of the final void.

(p) Along the eastern boundary of the Project Site, adjacent to the realigned Wean Road, a strip of rehabilitated bushland will be established to screen the view of the final void and generally improve the visual amenity from Wean Road, as well as provide vegetation connectivity north-south on the eastern side of the void.

(q) In addition to the large area to be rehabilitated to bushland, strategically placed tree lots will be established within rehabilitated pasture areas to break-up the landform and act as wildlife refuges and linkages.

(r) Tree trunks and branches less than 300 mm diameter and other smaller vegetative debris removed during clearing activities will be spread over those areas to be restored as rehabilitated bushland where practical.

Final Void Management

(s) The final void will be designed and managed as a stable landform. Appropriate long-term land use options for the void will be considered and adequately assessed in consultation with relevant stakeholders as the mine approaches closure.

Final Void Stability – Low Walls

(t) The low walls will be battered back from the angle of repose to ensure the long term geotechnical stability of the face, with the determination of geotechnical stability and recommendations as to the final slope undertaken by a qualified geotechnical engineer on the basis of an assessment of the overburden material, the likely degree of settlement, and the degree of weathering expected in the long term. It is expected that the low wall sides of the final void will be battered back to a maximum of 18 degrees with a goal of 10 degrees being optimal.

(u) Surface water drainage on and over the low wall will be minimised through the construction of drainage control structures, the construction of Dam F, and the aim of diverting as much of the catchment as possible away from the final void and back into the surface water system.

(v) Erosion of the low wall will be controlled by limiting the length of slope through the use of contour and graded drains, minimising the slope, and by the establishment of suitable vegetation.

Final Void Stability – Highwall

(w) To ensure the safety of the final void, the surrounding final slopes will be left in a condition where the risk of slope failure is minimised. The highwall of the final void will be left at 45 degrees to ensure long term geotechnical stability. This will be assessed by a suitably qualified geotechnical engineer.

(x) Whitehaven will undertake progressive stability reviews and monitoring of the highwall once it moves to within 250 metres of the Wean Road deviation to ensure safe working conditions. If any failures are observed, or additional faulting is detected, then a detailed assessment will be undertaken by a suitably qualified geotechnical engineer before mining is allowed to continue towards Wean Road.

(y) Whitehaven will adopt the geotechnical stability commitments listed above in **Section 8.5** as the open cut pit progresses and the final landform is being formed.

Biodiversity Offset Strategy

(a) The revised *Biodiversity Offset Strategy* described in **Section 5.8**, which has been prepared on the basis of the BioBanking Methodology to 'inform' the 'improve or maintain' assessment, will be implemented. This *Strategy*, in summary, comprises the retirement of 4,859 credits (for the impact to 95.44ha as a consequence of the project) from the Whitehaven Regional BioBank Site, which is in the final stages of registration by the DECCW as a BioBank Site under Part 7A of the TSC Act.

(b) The Whitehaven Regional BioBank Site will be actively managed via a BioBanking Management Plan with in-perpetuity management funding, and will have the highest level of conservation status outside of National Parks via a BioBanking Agreement registered on the land title in-perpetuity.

Air Quality

Vegetation Clearing and Soil Stripping

(c) Cleared trees and branches will be retained for use in stabilising slopes identified for restoration of rehabilitated woodland. No burning of vegetation is permitted or occurs on-site.

(d) Where practicable, soil stripping will be undertaken when there is sufficient soil moisture to prevent lift-off dust and at times that avoid periods of high winds. Where this is not possible, dust suppression by water application will be undertaken to increase soil moisture.

(e) Land disturbance, including groundcover removal, will be limited in advance of mining activities consistent with operational requirements. Under normal circumstances, a maximum of 100 metres will be prepared in advance of mining.

(f) Groundcover will be removed with the topsoil, as opposed to prior to topsoil removal.

(g) Where long-term stockpiling of soil materials is planned (typically greater than 3 months) the stockpiles will be seeded and fertilised as soon as possible.

Drilling and Blasting Activities

(h) Water injection will be used on the drilling rig.

(i) Coarse aggregates will be used for blasthole stemming at all times.

(j) Where practicable, blasting will be restricted during unfavourable weather conditions.

(k) When necessary, dust aprons will be lowered during on-site drilling.

Overburden Ripping and Placement

(l) Where practicable, ripping of softer overburden material will be avoided during periods of high winds.

Coal Mining

(m) When necessary, low moisture coal will be sprayed with water prior to excavation.

Crushing and Screening

(n) Notwithstanding the generally moist nature of the ROM coal pad, when necessary, water will be applied to the coal at the feed hopper, crusher and at all conveyor transfer and discharge points.

(o) When necessary, some flexibility does exist to enable cessation of coal processing activities during periods of concurrent high winds and temperatures that have the potential to cause coal dust dispersal independent of water applications.

Internal Transport

(p) As required, internal roads will be watered, with emphasis on those subject to frequent trafficking.

(q) The speed of all on-site vehicles and equipment will be restricted.

(r) All internal roads will be clearly defined to control their locations.

(s) As roads within the Project Site become obsolete, they will be promptly ripped and revegetated.

External Transport

(t) All trucks hauling product coal and coal rejects between Rocglen and the Whitehaven CHPP will be required to be fitted with roll-over tarpaulins.

(u) All trucks transporting coal will be well maintained to ensure optimal operation, which will minimise the potential for noise emissions.

Rehabilitation

(v) As per the commitments listed in **Section 8.6**, Whitehaven will adopt a progressive approach to the rehabilitation of disturbed areas within the Project Site to ensure that, where practicable, completed mining and overburden emplacement areas are quickly shaped, topdressed and vegetated to provide a stable landform.

Monitoring

(w) The existing *Air Quality Monitoring Program* (Whitehaven 2009a) will be reviewed and, as necessary, updated to integrate relevant aspects of the Project.

(x) A real-time PM_{10} monitor will be installed and operated. As recommended by PAEHolmes (2011), it is proposed to locate this monitor at the "Roseberry" residence, co-located within one of the existing HVAS.

(y) The existing weather station and HVAS within the "Glenroc" property will be relocated. As recommended by PAEHolmes (2011), it is proposed to move these items to "Costa Vale", which is along the axis of prevailing winds.

Noise

Project Design

(a) The external batter slopes of the expanded Northern Emplacement Area will be re-shaped and revegetated in Years 1 and 2 of the Project to, amongst other things, minimise the projection of noise from overburden transportation and emplacement activities towards privately owned residences located to the north and north-east later in the mine life.

General Operation

(b) Contractors, including all personnel and sub-contractors, will be advised of noise compliance limits prior to their work commencing. Contractors will be expected to take practical measures to limit noise generation during their activities where possible.

(c) Prior to being brought on-site, all earthmoving equipment will be tested to ensure sound power levels are consistent with the previous assessments undertaken by Spectrum Acoustics.

(d) Site personnel will be required to pay due attention to site weather conditions and modify or stand down from operational activities if directed by mine management.

(e) Where possible, equipment with lower sound power levels will be used in preference to more noisy equipment.

(f) All equipment used on-site will be regularly serviced to ensure the sound power levels remain at or below the levels used in the modelling undertaken by Spectrum Acoustics.

(g) Mid-high frequency broadband reverse beepers are fitted to on-site mobile mining equipment.

(h) The on-site road network will be maintained to limit vehicle body noise.

External Transport

(i) All transport activities, including the haul route used between Rocglen and the Whitehaven CHPP and the hours of coal haulage, will continue to be undertaken strictly in accordance with that approved under PA 06_0198.

(j) The haul route between Rocglen and the Whitehaven CHPP is fully sealed and will continue to be maintained under an existing contribution plan with Council.

(k) Drivers will be instructed to operate in accordance with an existing Transport Policy and Code of Conduct, which identify aspects such as travelling speeds, general behaviour, avoidance of exhaust brakes, load coverage, complaints and disciplinary procedures. The Policy and Code apply to all employee and contractor-owned vehicles.

(l) The trucks will be speed limited to 93 km per hour to, amongst other things, minimise engine noise.

(m) All trucks transporting coal will be well maintained to ensure optimal operation, which will minimise the potential for noise emissions.

Monitoring

(n) As per the commitments listed in **Section 8.3**, the existing *Noise Monitoring Program* (Whitehaven 2008d) will be reviewed and, as necessary, updated to integrate relevant aspects of the Project. Specifically, "Retreat" or "Penryn" will be included as a noise monitoring location in the revised Program in place of "Costa Vale" (which is now owned by Whitehaven).

(o) Traffic noise monitoring will continue to be conducted at the "Brooklyn" and "Werona" residences on Blue Vale Road in accordance with the existing *Road Noise Management Plan* (Spectrum Acoustics 2008).

Blasting and Vibration

Blast Design

(a) Blast design and implementation will be undertaken by a suitably qualified blasting engineer and/or experienced and appropriately certified shot-firer.

(b) Burden distances and stemming lengths will be designed to ensure that explosion gases are almost completely without energy by the time they emerge into the atmosphere.

(c) Blast design will ensure charges consistently detonate in carefully designed sequences.

(d) Meteorological conditions will be analysed prior to blasting to avoid times when the potential for impact is heightened, and also endeavours will be made to blast at around midday over the winter period to avoid temperature inversions.

Air Vibrations (Noise and Airblasts)

(e) Noise and airblast generation will be controlled to ensure that all, or the majority of, explosion energy is consumed in fragmenting and displacing the overburden by the time the gases vent (via the broken burden rock and/or ejected stemming material) into the atmosphere. This will be achieved via:

- Ensuring blasthole spacing is implemented in accordance with blast design;
- Careful selection and implementation of burden distance and stemming length;
- Using appropriate materials (for example, 20 mm aggregates) for stemming;
- Ensuring that charges detonate in the correct sequence and with inter-row delays that provide good progressive release of burden;
- Limited the maximum weight of explosive detonated in a given delay period (the maximum instantaneous charge (MIC)) to conservative and proven levels; and
- Refining these controls on the basis of the blast monitoring program.

Ground Vibrations

(f) Blast design will ensure the minimum practicable weight of explosive detonates at an instant (minimising the MIC) by using the maximum number of delay periods in each blast.

(g) Blast design will ensure that most of the energy liberated by the charge(s) on a given delay number is consumed in providing good fragmentation, adequate displacement and/or a loose, highly diggable muckpile.

Dust and Other Post-Blast Emissions

(h) Stemming columns will be designed to ensure ejection velocities are low.

(i) Appropriate aggregates for blasthole stemming and nonel delay-type or electronic detonators will be used to initiate charges.

Road Closures

(j) For all blasts within 500 metres of Wean Road, the road will be closed with blast notice boards updated at least 24 hours prior to each blast. Road closures typically occur for a period of up to 10 minutes.

(k) Whitehaven will inspect the road following the blast and any rock fragments removed from the road surface prior to re-opening.

(l) Whitehaven will monitor the distance flyrock travels (if any) beyond the designed blast envelope and identify if further safeguards are required.

Consultation

(m) The proposed blasting schedule will be provided to all residents within a 3 km radius of the blast providing advance notice of the date and time of each proposed blast. A verbal confirmation on the day of the blast will also be undertaken.

(n) Whitehaven will erect a blast notice board near the mine entrance on Wean Road notifying passing motorists when the next blast is scheduled.

Monitoring

(o) As per the commitments listed in **Section 8.3**, the existing *Blasting Monitoring Program* (Whitehaven 2008a) will be reviewed and, as necessary, updated to integrate relevant aspects of the Project. Specifically, "Retreat", as the nearest privately-owned residence to the north of the Project Site, will be included as a blast monitoring location in the revised Program in place of "Costa Vale" (which is now owned by Whitehaven).

Surface Water

General

(a) All hydrocarbon products will be securely stored.

(b) All of the mining fleet will be refuelled within designated areas of the Project Site.

(c) With the exception of some maintenance activities on mobile equipment, all maintenance works requiring the use of oils, greases and lubricants would be undertaken within designated areas of the Project Site.

(d) All water from wash-down areas and workshops would be directed to oil/water separators and containment systems.

(e) All storage tanks will be either self-bunded tanks or bunded with an impermeable surface with a capacity to contain a minimum of 110% of the largest storage tank capacity.

(f) Chemical flocculation to help increase the settling times of the sediment (TSS) in the water column will also be employed as required.

(g) As required, appropriate drainage structures and erosion and sediment controls will be installed and maintained.

(h) All efforts will be undertaken to ensure that any water discharged from the Project Site via the LDPs meets the quality limits imposed by the DECCW on the site's EPL.

(i) Key changes, as detailed in **Appendix M**, to be integrated into the existing surface water management system are:

- Additional water management controls to deal with water from the increased disturbance footprint in the northern area of the site;
- Additional water management controls to address TSS issues during wet weather discharge;
- Relocation of the Mine Water Dam; and
- More effective diversion of clean water from off-site catchments to the east.

(j) Dirty water generated from disturbed areas to be captured and diverted using contour banks and drop structures in a manner that minimises the potential for concentrated overland flow and subsequent erosion. This water will be channelled through a series of sediment basins to reduce sediment loads prior to discharge.

(k) Water generated within the open cut pit, primarily as a result of rainfall/runoff and some groundwater seepage, to be managed within the open cut via in-pit sumps. This water will be directed to and contained within these in-pit sumps until it is necessary to pump the water to the new Mine Water Dam, which will be constructed as a 'turkeys nest' to receive mine water only.

(l) Clean water diversions will be constructed wherever possible upstream of disturbance areas to minimise the amount of dirty water to be contained and treated within the dirty water management system.

(m) Progressive rehabilitation of all re-shaped surfaces to assist in reducing the level of TSS (and possible high pH and salinity) in runoff from disturbed areas. This will also reduce the dependence on sediment controls and generally assist in improving water quality.

(n) Water collected in the open cut extraction pit and/or dirty water dams will be used, as much as possible, for dust suppression purposes. This is the preferential use of water on-site to minimise the chance of pollution to downstream waterways.

(o) Sediment control structures will be maintained to ensure the design capacities are preserved for optimum settling rates. This will be most critical for those 'end-of-line' sediment basins that discharge from the Project Site.

(p) Implementation of an effective revegetation, maintenance and monitoring program.

Site Water Management Plan

(q) Within 12 months of Project Approval, a new *Site Water Management Plan* will be prepared in accordance with regulatory requirements and the *Blue Book (Volume 1 and Volume 2E).*

Site Water Balance and Discharge

(r) Whitehaven will consider and, where appropriate, adopt the following to improve site water balance and minimise uncontrolled overflow discharge:

- The proposed dams will be built to at least the specified sizes, and made larger where practical to provide additional storage in order to further reduce the chance of uncontrolled overflow discharge. Increasing the total storage will provide opportunity to retain and treat water prior to controlled discharge;
- Water will be promptly transferred amongst sediment basins to ensure the maximum available on-site storage capacity of rainfall events is maintained; and
- That controlled discharge of treated (settled and/or flocculated) water will be undertaken to draw down the water storage within all the dirty water dams on-site, which will provide the capacity to contain the majority rainfall events and reduce uncontrolled overflow discharge.

Drainage Lines

(s) Sections of drainage lines that are or will be impacted upon by the mining operation will be rehabilitated post-mining generally in accordance with Section 5.3.3 of the *Blue Book (Volume 1)* and the *Guidelines for Controlled Activities – In-Stream Works* (DWE 2008, as cited in GSSE 2010c) for watercourse rehabilitation and riparian zone rehabilitation.

Licensed Discharge Points

(t) While LDP 11 will continue to be used at the southern end of the Project Site, LDP 12 will be superseded and relocated in consultation with the OEH.

Monitoring

(u) As per the commitments listed in **Section 8.3**, the existing surface water monitoring program will be reviewed and, as necessary, updated to integrate relevant aspects of the Project. **Table 47** presents a summary of the proposed surface water monitoring.

Groundwater Monitoring

(a) All hydrocarbon products will be securely stored.

(b) All of the mining fleet will be refuelled within designated areas of the Project Site

(c) With the exception of some maintenance activities on mobile equipment, all maintenance works requiring the use of oils, greases and lubricants would be undertaken within designated areas of the Project Site.

(d) All water from wash-down areas and workshops would be directed to oil/water separators and containment systems.

(e) All storage tanks will be either self-bunded tanks or bunded with an impermeable surface with a capacity to contain a minimum of 110% of the largest storage tank capacity.

(f) As per the commitments listed in **Section 8.3**, the existing groundwater monitoring program will be reviewed, updated and implemented to integrate relevant aspects of the Project.

(g) Bores will be cleaned out (air-lift developed) and depth checked with a weighted tape. Bores will then be geophysically wireline logged (SP/SPR and Gamma) to confirm slotted intervals and the nature of the strata over slotted intervals.

(h) All monitoring bores will be surveyed for location and level (both ground level and the level of the RP from which groundwater levels are measured).

(i) Monitoring of groundwater levels will initially be undertaken on a monthly basis for the first year of the Project, after which the interval may potentially be relaxed subject to review of the results. In the longer term a monitoring interval of three months is anticipated. Samples will be analysed for all major ions, including carbonate.

(j) Pressure transducers/dataloggers will be installed in monitoring bores MP-01 to MP-05 for the continual recording of groundwater levels. These instruments will be downloaded every 2 months. MP-04 and MP-05 will be deepened to at least 10 metres below the water table.

(k) In order to address the concerns of the NOW in regard to the potential for impact on alluvial aquifers of the Namoi River and associated tributaries, the following program of investigations will be undertaken:

- Bores MP-04 and WB-01 are nominally located within the alluvium south and north of the mine, respectively. Once this is confirmed through the above commitments, a second bore will be drilled adjacent to each of them, to a depth at which the base of the alluvium is intersected. This adjacent bore will be completed as a monitoring bore in the Maules Creek Formation and have a pressure transducer/datalogger installed for continuous water level monitoring. Such actions will need to be agreed to by the relevant landowners; and
- There is some uncertainty regarding the nature of the interface between the southern alluvium and the weathered conglomerate profile of the Maules Creek Formation at the southern end of the proposed pit. On this basis, a pair of piezometers will be installed immediately to the south of the proposed pit, one in the Belmont Seam and one in the alluvium/weathered conglomerate. Also, hydraulic testing will be undertaken on the bore in the alluvium/weathered conglomerate to allow refinement of the groundwater model in this regard.

Flora and Fauna

(a) All efforts will be made by Whitehaven to avoid disturbance of the vegetation communities within the Project Site and to maintain and enhance as much of the existing remnant vegetation on-site, in addition to the proposed biodiversity offset areas (see **Section 5.8**), as possible.

(b) A high level of hygiene will be adopted in respect to vehicle and machinery to help prevent soil-borne disease transmission and weed seed dispersal.

(c) Strict erosion and sediment control measures will be installed, monitored and maintained to prevent the erosion and sedimentation impact on adjacent areas.

(d) Dust control measures will be implemented to protect adjacent retained vegetation communities.

(e) The minimal practicable amount of clearing will be undertaken as a general objective, particularly within those areas that currently contain identified threatened species or ecological communities.

(f) Where possible disturbance areas will be marked to protect adjoining vegetation prior to disturbance activities in order to reduce potential damage from uncontrolled or accidental access.

(g) Stockpiling of materials will occur within already disturbed areas.

(h) Weed management, monitoring and control practices will be implemented to minimise the spread of exotic species into natural areas within the site.

(i) A tree felling protocol will be developed, by a suitably qualified and licensed ecologist with previous experience supervising the felling of trees, in order to minimise harm to fauna species during clearing activities.

(j) Where possible, tree felling will be supervised by the ecologist that developed the tree felling protocol or by another suitably qualified and licensed ecologist.

(k) Where trees are to be removed an assessment of the surrounding level of tree hollow provision will be undertaken by a suitably qualified ecologist in order to determine the need for local supplementing of tree hollows (using salvaged tree hollows or nest boxes).

(l) Mature and hollow-bearing trees will be retained wherever feasible within the site.

(m) Vegetation to be removed will be clearly marked in the field using temporary fencing (flagging tape or similar) so that the boundaries are clearly established and to minimise the potential for equipment to accidently enter areas to be retained.

(n) Where possible, the timing of clearing activities will be undertaken at such times to avoid removal of hollow-bearing trees during breeding season of threatened species.

(o) Regular monitoring of the vegetation within the Project Site and offset areas will be undertaken in order to enable effective management with regards to rehabilitation (planting), regeneration, watering, fencing and weed control.

Aboriginal Heritage

(a) As per the commitments listed in **Section 8.3**, the existing ACHMP (Whitehaven 2008c) will be reviewed and, as necessary, updated to integrate relevant aspects of the Project.

(b) All efforts will be made by Whitehaven to minimise disturbance within the Project Site.

(c) Liaisons will continue to be undertaken with the registered Aboriginal stakeholders and other interested parties until all issues in relation to the management of Aboriginal cultural heritage have been resolved.

(d) If impact to the Aboriginal sites identified with the Project Site (RPS Rocglen IF1, RPS Rocglen AS1 and RPS Rocglen AS2) is unavoidable, a surface salvage will be undertaken in accordance with Section 3 of the ACHMP (Whitehaven 2008c). Artefacts salvaged will be transferred to relevant Aboriginal groups under a Care and Control Permit under Section 85A of the NP&W Act.

(e) Protective measures designed to prevent damage to the scarred trees (NPWS # 20-4-0194 and NPWS #20-4-0195) will be enacted upon as per recommendations in Appleton (2007) and the ACHMP (Whitehaven 2008c).

(f) In areas where surface excavation might occur in the future within 25 metres of the east-west oriented drainage line, Whitehaven will follow protocols in Section 4.1(iii) of the ACHMP (Whitehaven 2008c).

(g) In general during the course of the Project, if it is suspected Aboriginal cultural heritage material has been encountered, work will cease immediately in that locale. The OEH, along with the RCLALC, BBGTP, GGAC and MMAC, will be notified. Works will only recommence when an appropriate and approved management strategy has been agreed to by all of the relevant stakeholders.

(h) In the event that skeletal remains are uncovered during operations, work will stop in the vicinity immediately and the NSW Coroner's Office and NSW Police contacted. If skeletal remains are deemed to be of Aboriginal origin, a representative of the local Aboriginal Community and the OEH will be consulted.

European Heritage

(a) If significant European cultural heritage material is uncovered during site works, work will cease in that area immediately. An archaeologist will be contacted to assess the significance of the remains and works will only recommence when an appropriate and approved management strategy is instigated.

Visual Amenity

(a) All efforts will be made by Whitehaven to minimise the visual impact of the mine during and post-operation.

(b) As per the commitments listed above in **Section 8.6**, Whitehaven will adopt a progressive approach to the rehabilitation of disturbed areas within the Project Site to ensure that, where practicable, completed mining and overburden emplacement areas are quickly shaped, topdressed and vegetated. Early reshaping and revegetation of the external batter slopes of the emplacement areas will be targeted as a priority.

(c) In addition to retaining areas of existing remnant vegetation, it is proposed to restore approximately 206 hectares (58 percent) of the disturbed area within the Project Site as rehabilitated bushland. This large area, which includes the western slopes of the Northern and Western Emplacement Areas, will blend in well with the retained remnant vegetation areas within the Project Site and within the adjacent Vickery State Forest and "Yarrawonga" property.

(d) Strategically placed bushland tree lots will be integrated into the post-mining landform to break-up the landform and provide visual texture. This will be complimented by the establishment of pasture grass areas that will provide short-term visual impact mitigation prior to the trees becoming established.

(e) An earthen bund of appropriate height will be established between the realigned Wean Road and the active pit area. This bund will be vegetated immediately following construction. The bund will provide an effective visual screen of the site from Wean Road. In addition to the bund, a strip of bushland will be established to screen the view of the final void and generally improve the visual amenity from Wean Road.

(f) The requirements of the Australian Standard *AS 4282 1997 – Control of Obtrusive Effects of Outdoor Lighting* will be taken into consideration when placing lights required when working outside of daylight hours. In particular, lighting plant will be positioned and directed away from surrounding residences and aimed downwards to avoid light spill onto adjoining lands and public roads.

Greenhouse Gas Emissions

(a) The *Greenhouse and Energy Efficiency Plan* prepared by Denis Cooke & Associates in June 2009 in accordance with PA 06_0198 will continue to be implemented at Rocglen in order to promote continuous change and sustainable improvement in energy management and efficiency.

Traffic and Transport

(a) Coal transportation will be undertaken via the approval haulage route between Rocglen and the Whitehaven CHPP.

(b) Coal transport will be undertaken between the approved times of 7am and 9:15pm Monday to Friday, and between 7am and 5:15pm on Saturdays.

(c) On school days, Whitehaven will maintain the communication system between the truck drivers and the local school bus driver. The system has been negotiated between Whitehaven and the local bus drivers and involves two-way radio communication to ensure that trucks do not exceed 40 km per hour when travelling in the vicinity of the school bus.

(d) All trucks transporting coal from the mine and backloading reject from the Whitehaven CHPP will be covered with fitted roll-over tarpaulins.

(e) All trucks transporting coal will be well maintained to ensure optimal operation.

(f) Drivers will be instructed to operate in accordance with a Transport Policy and Code of Conduct, which identify aspects such as travelling speeds, general behaviour, avoidance of exhaust brakes, load coverage, complaints and disciplinary procedures. The Policy and Code apply to all employee and contractor-owned vehicles.

(g) The on-going use of the road network will be covered under the arrangements of the existing road maintenance agreement with Gunnedah Shire Council to ensure the subject roads continue to be adequately maintained.

Waste Management

(a) All production wastes and non-production wastes will be managed in accordance with current approved waste management strategies (see **Section 4.12**).

(b) Whitehaven will approach waste generation and management according to the following principles – (a) waste avoidance; (b) waste re-use; (c) waste recycling; and (d) waste removal and disposal.

Bushfire Hazard

(a) Vegetation will be cleared away from around blast sites for a distance of greater than 20 metres.

(b) All coal will be removed from open cut around blast sites.

(c) Blast design and implementation will be undertaken by a suitably qualified blasting engineer and/or experienced and appropriately certified shot-firer.

(d) An inspection of blast sites will be undertaken prior to blast.

(e) Water truck/cart will be available to douse any fire ignited or smouldering vegetation.

(f) Refuelling will be undertaken within designated fuel bays or within cleared area of the Project Site and vehicles will be turned off while refuelling.

(g) No smoking policy will be enforced in designated areas of the Project Site.

(h) Fire extinguishers will be maintained within site vehicles.

(i) Coal stockpiles will be are regularly inspected and, as required, watered.

(j) The height and volume of coal stockpiles will be controlled to limit the duration coal is retained in stockpiles.

(k) Whitehaven will regularly liaise with the NSW Forests and NSW Rural Fire Service in relation to the bushfire hazard presented by the Vickery State Forest and to a lesser extent the nearby CCC Zone 2 Kelvin.

Socio-Economic

(a) Whitehaven will continue to engage the community in consultation for the purposes of providing information relating to the Project and company operations in general. It is anticipated that consultation will include:

- Circulation of information and newsletters, as required, relating to mining activities (for example, blasting schedule); and
- Continuation of the Rocglen CCC established under PA 06_0198 for the existing Rocglen operation.

(b) Whitehaven will respond to any community complaints within 24 hours of receipt. All complaints will be investigated and the results of the investigation reported to the complainant in a timely manner.

Appendix 2

ENVIRONMENT PROTECTION

LICENCE 12870

Environment Protection Licence

Licence - 12870

Licence Details	
Number:	12870
Anniversary Date:	31-July

Licensee
WHITEHAVEN COAL MINING LIMITED
PO BOX 600
GUNNEDAH NSW 2380

Premises
ROCGLEN COAL MINE
WEAN ROAD
GUNNEDAH NSW 2380

Scheduled Activity
Coal Works
Mining for Coal

Fee Based Activity	Scale
Coal works	0-2000000 T handled
Mining for coal	> 500000-2000000 T produced

Region
North West - Armidale
Level 1, NSW Govt Offices, 85 Faulkner Street ARMIDALE NSW 2350
Phone: (02) 6773 7000
Fax: (02) 6772 2336
PO Box 494 ARMIDALE
NSW 2350

Environment Protection Licence

Licence - 12870

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Environment Protection Licence

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Information about this licence

Dictionary

A definition of terms used in the licence can be found in the dictionary at the end of this licence.

Responsibilities of licensee

Separate to the requirements of this licence, general obligations of licensees are set out in the Protection of the Environment Operations Act 1997 ("the Act") and the Regulations made under the Act. These include obligations to:

- ensure persons associated with you comply with this licence, as set out in section 64 of the Act;
- control the pollution of waters and the pollution of air (see for example sections 120 - 132 of the Act); and
- report incidents causing or threatening material environmental harm to the environment, as set out in Part 5.7 of the Act.

Variation of licence conditions

The licence holder can apply to vary the conditions of this licence. An application form for this purpose is available from the EPA.

The EPA may also vary the conditions of the licence at any time by written notice without an application being made.

Where a licence has been granted in relation to development which was assessed under the Environmental Planning and Assessment Act 1979 in accordance with the procedures applying to integrated development, the EPA may not impose conditions which are inconsistent with the development consent conditions until the licence is first reviewed under Part 3.6 of the Act.

Duration of licence

This licence will remain in force until the licence is surrendered by the licence holder or until it is suspended or revoked by the EPA or the Minister. A licence may only be surrendered with the written approval of the EPA.

Licence review

The Act requires that the EPA review your licence at least every 5 years after the issue of the licence, as set out in Part 3.6 and Schedule 5 of the Act. You will receive advance notice of the licence review.

Fees and annual return to be sent to the EPA

For each licence fee period you must pay:

- an administrative fee; and
- a load-based fee (if applicable).

Environment Protection Licence

The EPA publication “A Guide to Licensing” contains information about how to calculate your licence fees. The licence requires that an Annual Return, comprising a Statement of Compliance and a summary of any monitoring required by the licence (including the recording of complaints), be submitted to the EPA. The Annual Return must be submitted within 60 days after the end of each reporting period. See condition R1 regarding the Annual Return reporting requirements.

Usually the licence fee period is the same as the reporting period.

Transfer of licence

The licence holder can apply to transfer the licence to another person. An application form for this purpose is available from the EPA.

Public register and access to monitoring data

Part 9.5 of the Act requires the EPA to keep a public register of details and decisions of the EPA in relation to, for example:

- licence applications;
- licence conditions and variations;
- statements of compliance;
- load based licensing information; and
- load reduction agreements.

Under s320 of the Act application can be made to the EPA for access to monitoring data which has been submitted to the EPA by licensees.

This licence is issued to:

WHITEHAVEN COAL MINING LIMITED
PO BOX 600
GUNNEDAH NSW 2380

subject to the conditions which follow.

Environment Protection Licence

Licence - 12870

1 Administrative Conditions

A1 What the licence authorises and regulates

A1.1 This licence authorises the carrying out of the scheduled activities listed below at the premises specified in A2. The activities are listed according to their scheduled activity classification, fee-based activity classification and the scale of the operation.

Unless otherwise further restricted by a condition of this licence, the scale at which the activity is carried out must not exceed the maximum scale specified in this condition.

Scheduled Activity	Fee Based Activity	Scale
Coal Works	Coal works	0 - 2000000 T handled
Mining for Coal	Mining for coal	> 500000 - 2000000 T produced

A2 Premises or plant to which this licence applies

A2.1 The licence applies to the following premises:

Premises Details
ROCGLEN COAL MINE
WEAN ROAD
GUNNEDAH
NSW 2380
LOT 1 DP 787417, LOT 1 DP 1120601, LOT 4 DP 1120601

A3 Information supplied to the EPA

A3.1 Works and activities must be carried out in accordance with the proposal contained in the licence application, except as expressly provided by a condition of this licence.

In this condition the reference to "the licence application" includes a reference to:
a) the applications for any licences (including former pollution control approvals) which this licence replaces under the Protection of the Environment Operations (Savings and Transitional) Regulation 1998; and
b) the licence information form provided by the licensee to the EPA to assist the EPA in connection with the issuing of this licence.

2 Discharges to Air and Water and Applications to Land

Environment Protection Licence

Licence - 12870

P1 Location of monitoring/discharge points and areas

P1.1 The following points referred to in the table below are identified in this licence for the purposes of monitoring and/or the setting of limits for the emission of pollutants to the air from the point.

Air

EPA identification no.	Type of Monitoring Point	Type of Discharge Point	Location Description
4	Ambient Air Monitoring		Location labelled BD4 (Surrey) identified on Figure 3 Proposed Air Quality Monitoring Network provided with licence variation application and letter from Whitehaven Coal Mining Pty. Ltd. dated 27 February 2009.
6	Ambient Air Monitoring		Location labelled BD6 (Roseberry) identified on Figure 3 Proposed Air Quality Monitoring Network provided with licence variation application and letter from Whitehaven Coal Mining Pty. Ltd. dated 27 February 2009.
7	Ambient Air Monitoring		Location labelled BD7 (Roseglass) identified on Figure 3 Proposed Air Quality Monitoring Network provided with licence variation application and letter from Whitehaven Coal Mining Pty. Ltd. dated 27 February 2009.
10	Ambient Air Monitoring		PM10 location labelled "Roseberry" identified on Figure 3 Proposed Air Quality Monitoring Network provided with licence variation application and letter from Whitehaven Coal Mining Pty. Ltd. dated 27 February 2009.
17	Ambient Air Monitoring		Real time air quality monitor located on "Roseberry" as referred to in map titled "Figure 2: Air Quality Monitoring Locations" received by the EPA on 15 June 2012 (DOC12/25238).

P1.2 The following points referred to in the table are identified in this licence for the purposes of the monitoring and/or the setting of limits for discharges of pollutants to water from the point.

P1.3 The following utilisation areas referred to in the table below are identified in this licence for the purposes of the monitoring and/or the setting of limits for any application of solids or liquids to the utilisation area.

Water and land

EPA Identification no.	Type of Monitoring Point	Type of Discharge Point	Location Description

Environment Protection Licence

Licence - 12870

11	Wet weather discharge Discharge water quality monitoring	Wet weather discharge Discharge water quality monitoring	Discharge location marked as LDP11 in "Figure 5: Rocglen Coal Mine Water Management Plan. Surface and Groundwater Monitoring Locations" received by the EPA on 15 June 2012 (DOC12/25238).
12	Wet weather discharge Discharge water quality monitoring	Wet weather discharge Discharge water quality monitoring	Discharge location marked as LDP12 in "Figure 5: Rocglen Coal Mine Water Management Plan. Surface and Groundwater Monitoring Locations" received by the EPA on 15 June 2012 (DOC12/25238).
13	Ambient water quality monitoring		Monitoring location on northern side of mining lease marked as Driggle Draggle Creek Monitoring Location in "Figure 5: Rocglen Coal Mine Water Management Plan. Surface and Groundwater Monitoring Locations" received by EPA on 15 June 2012 (DOC12/25238).
14	Ambient water quality monitoring		Monitoring location on southern side of mining lease marked as Unnamed Drainage Channel Monitoring Point in "Figure 5: Rocglen Coal Mine Water Management Plan. Surface and Groundwater Monitoring Locations" received by EPA on 15 June 2012 (DOC12/25238).
15	Ambient water quality monitoring		Monitoring location on easthern side of mining lease marked as SD7 in "Figure 5: Rocglen Coal Mine Water Management Plan. Surface and Groundwater Monitoring Locations" received by EPA on 15 June 2012 (DOC12/25238).
16	Surface water quality monitoring		Monitoring location marked as Excisting Mine ater Dam in "Figure 5: Rocglen Coal Mine Water Management Plan. Surface and Groundwater Monitoring Locations" received by EPA on 15 June 2012 (DOC12/25238).

P1.4 The following point(s) in the table are identified in this licence for the purpose of the monitoring of weather parameters at the point.

EPA Identification No.	Type of Monitoring Point	Description of Location

Environment Protection Licence

Licence - 12870

W1	Weather Analysis	Weather station located on "Costa Vale" identified as Met Station in "Figure 2: Air Quality Monitoring Locations" received by the EPA on 15 June 2012 (DOC12/25238).

3 Limit Conditions

L1 Pollution of waters

L1.1 Except as may be expressly provided in any other condition of this licence, the licensee must comply with section 120 of the Protection of the Environment Operations Act 1997.

L2 Concentration limits

L2.1 For each monitoring/discharge point or utilisation area specified in the table\s below (by a point number), the concentration of a pollutant discharged at that point, or applied to that area, must not exceed the concentration limits specified for that pollutant in the table.

L2.2 Where a pH quality limit is specified in the table, the specified percentage of samples must be within the specified ranges.

L2.3 To avoid any doubt, this condition does not authorise the pollution of waters by any pollutant other than those specified in the table\s.

L2.4 Water and/or Land Concentration Limits

POINT 11,12

Pollutant	Units of Measure	50 percentile concentration limit	90 percentile concentration limit	3DGM concentration limit	100 percentile concentration limit
Oil and Grease	milligrams per litre				10
pH	pH				6.5-8.5
Total suspended solids	milligrams per litre				50

L2.5 The Total Suspended Solids concentration limits specified for Points 11 and 12 may be exceeded for water discharged provided that:

(a) the discharge occurs solely as a result of rainfall measured at the premises that exceeds 38.4 millimetres over any consecutive 5 day period immediately prior to the discharge

occurring; and

(b) all practical measures have been implemented to dewater all sediment dams within 5 days of rainfall such that they have sufficient capacity to store run off from a 38.4 millimetre, 5 day rainfall event.

Note: 38.4 mm equates to the 5 day 90%ile rainfall depth for Gunnedah sourced from Table 6.3a Managing Urban Stormwater: Soils and Construction Volume 1: 4th edition, March 2004.

L3 Noise limits

L3.1 Noise generated at the premises must not exceed the noise limits in the table below.

Locality and Location	Day- LAeq (15 minute)	Evening- LAeq (15 minute)	Night- LAeq (15 minute)	Night- LA1 (1 minute)
All surrounding residences	35	35	35	45

L3.2 For the purpose of the table above:

a) Day is defined as the period from 7am to 6pm Monday to Saturday and 8am to 6pm Sundays and Public Holidays;
b) Evening is defined as the period from 6pm to 10pm;
c) Night is defined as the period from 10pm to 7am Monday to Saturday and 10pm to 8am Sundays and Public Holidays.

L3.3 **Determining Compliance**

To determine compliance:
a) with the Leq(15 minute) noise limits in the Noise Limits table, the noise measurement equipment must be located:
i) approximately on the property boundary, where any dwelling is situated 30 metres or less from the property boundary closest to the premises; or
ii) within 30 metres of a dwelling façade, but not closer than 3m, where any dwelling on the property is situated more than 30 metres from the property boundary closest to the premises; or, where applicable
iii) within approximately 50 metres of the boundary of a National Park or a Nature Reserve.
b) with the LA1(1 minute) noise limits in the Noise Limits table, the noise measurement equipment must be located within 1 metre of a dwelling façade.
c) with the noise limits in the Noise Limits table, the noise measurement equipment must be located:
i) at the most affected point at a location where there is no dwelling at the location; or
ii) at the most affected point within an area at a location prescribed by part (a) or part (b) of this condition.

L3.4 The noise limits set out in the Noise Limits table apply under all meteorological conditions except for the following:
a) Wind speeds greater than 3 metres/second at 10 metres above ground level; or

b) Stability category F temperature inversion conditions and wind speeds greater than 2 metres/second at 10 metres above ground level; or
c) Stability category G temperature inversion conditions.

For the purposes of this condition:
a) Data recorded by the meteorological station identified as EPA Identification Point(s) W1 must be used to determine meteorological conditions; and
b) Temperature inversion conditions (stability category) are to be determined by the sigma-theta method referred to in Part E4 of Appendix E to the NSW Industrial Noise Policy.

L3.5 For the purposes of determining the noise generated at the premises the modification factors in Section 4 of the NSW Industrial Noise Policy must be applied, as appropriate, to the noise levels measured by the noise monitoring equipment.

L3.6 The noise limits set by this licence do not apply where a current legally binding agreement exists between the licensee and the occupant of a residential property that:

a) agrees to an alternative noise limit for that property; or
b)provides an alternative means of compensation to address noise impacts from the premises.

A copy of any agreement must be provided to the EPA before the licensee can take advantage of the agreement.

L4 Blasting

L4.1 The airblast overpressure level from blasting operations at the premises must not exceed 115dB (Lin Peak) at any noise sensitive locations for more than five per cent of the total number of blasts over each reporting period. Error margins associated with any monitoring equipment used to measure this are not to be taken into account in determining whether or not the limit has been exceeded.

L4.2 The airblast overpressure level from blasting operations at the premises must not exceed 120dB (Lin Peak) at any time at any noise sensitive locations. Error margins associated with any monitoring equipment used to measure this are not to be taken into account in determining whether or not the limit has been exceeded.

L4.3 Ground vibration peak particle velocity from the blasting operations at the premises must not exceed 5mm/sec at any noise sensitive locations for more than five per cent of the total number of blasts over each reporting period. Error margins associated with any monitoring equipment used to measure this are not to be taken into account in determining whether or not the limit has been exceeded.

L4.4 Ground vibration peak particle velocity from the blasting operations at the premises must not exceed 10mm/sec at any time at any noise sensitive locations. Error margins associated with any monitoring equipment used to measure this are not to be taken into account in determining whether or not the limit has been exceeded.

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4 Operating Conditions

O1 Activities must be carried out in a competent manner

O1.1 Licensed activities must be carried out in a competent manner.
This includes:
a) the processing, handling, movement and storage of materials and substances used to carry out the activity; and
b) the treatment, storage, processing, reprocessing, transport and disposal of waste generated by the activity.

O2 Maintenance of plant and equipment

O2.1 All plant and equipment installed at the premises or used in connection with the licensed activity:
a) must be maintained in a proper and efficient condition; and
b) must be operated in a proper and efficient manner.

O3 Dust

O3.1 All operations and activities occurring at the premises must be carried out in a manner that will minimise the emission of dust from the premises.

O3.2 Trucks transporting coal from the premises must be covered immediately after loading to prevent wind blown emissions and spillage. The covering must be maintained until immediately before unloading the trucks.

5 Monitoring and Recording Conditions

M1 Monitoring records

M1.1 The results of any monitoring required to be conducted by this licence or a load calculation protocol must be recorded and retained as set out in this condition.

M1.2 All records required to be kept by this licence must be:
a) in a legible form, or in a form that can readily be reduced to a legible form;
b) kept for at least 4 years after the monitoring or event to which they relate took place; and
c) produced in a legible form to any authorised officer of the EPA who asks to see them.

M1.3 The following records must be kept in respect of any samples required to be collected for the purposes of this licence:
a) the date(s) on which the sample was taken;
b) the time(s) at which the sample was collected;
c) the point at which the sample was taken; and
d) the name of the person who collected the sample.

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M2 Requirement to monitor concentration of pollutants discharged

M2.1 For each monitoring/discharge point or utilisation area specified below (by a point number), the licensee must monitor (by sampling and obtaining results by analysis) the concentration of each pollutant specified in Column 1. The licensee must use the sampling method, units of measure, and sample at the frequency, specified opposite in the other columns:

M2.2 Air Monitoring Requirements

POINT 4,6,7

Pollutant	Units of measure	Frequency	Sampling Method
Particulates - Deposited Matter	grams per square metre per month	Continuous	AM-19

POINT 10

Pollutant	Units of measure	Frequency	Sampling Method
PM10	micrograms per cubic metre	Every 6 days	AM-18

POINT 17

Pollutant	Units of measure	Frequency	Sampling Method
PM10	micrograms per cubic metre	Continuous	AM-22

M2.3 Water and/ or Land Monitoring Requirements

POINT 11,12

Pollutant	Units of measure	Frequency	Sampling Method
Conductivity	microsiemens per centimetre	Special Frequency 1	In situ
Oil and Grease	milligrams per litre	Special Frequency 1	Grab sample
pH	pH	Special Frequency 1	In situ
Total organic carbon	milligrams per litre	Special Frequency 1	Grab sample
Total suspended solids	milligrams per litre	Special Frequency 1	Grab sample

POINT 13,14,15

Pollutant	Units of measure	Frequency	Sampling Method

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Conductivity	microsiemens per centimetre	Special Frequency 2	In situ
Oil and Grease	milligrams per litre	Special Frequency 2	Grab sample
pH	pH	Special Frequency 2	In situ
Total organic carbon	milligrams per litre	Special Frequency 2	Grab sample
Total suspended solids	milligrams per litre	Special Frequency 2	Grab sample

POINT 16

Pollutant	Units of measure	Frequency	Sampling Method
Aluminium	milligrams per litre	Yearly	Grab sample
Arsenic	milligrams per litre	Yearly	Grab sample
Bicarbonate	milligrams per litre	Yearly	Grab sample
Chloride	milligrams per litre	Yearly	Grab sample
Conductivity	microsiemens per centimetre	Quarterly	In situ
Iron	milligrams per litre	Yearly	Grab sample
Manganese	milligrams per litre	Yearly	Grab sample
Oil and Grease	milligrams per litre	Quarterly	Grab sample
pH	pH	Quarterly	In situ
Sodium	milligrams per litre	Yearly	Grab sample
Total organic carbon	milligrams per litre	Quarterly	Grab sample
Total suspended solids	milligrams per litre	Quarterly	Grab sample

M2.4 For the purposes of the table(s) above Special Frequency 1 means the collection of samples as soon as practicable after each discharge commences and in any case not more than 12 hours after each discharge commences.

M2.5 For the purposes of the table(s) above Special Frequency 2 means the collection of samples quarterly (in the event of a flow during the quarter) at a time when there is flow and as soon as practicable after each wet weather discharge from points 11 and 12 commences and in any case not more than 12 hours after each discharge commences.

Note: Groundwater monitoring points have not been formally included in the licence. However, the licensee is required to undertake groundwater monitoring in accordance with a Department of Planning approved Water Management Plan required under Schedule 3, condition 2 Project Approval 06-0198 dated 15 April 2008. The licensee has submitted the document “Site Water Management Plan for the Rocglen Coal Mine, Whitehaven Coal Mining Pty Ltd, 2008.” This document has been approved by Planning following consultation by the licensee with the EPA. The results of this monitoring are required to be reported in the Annual Environmental Management Report (AEMR).

M3 Testing methods - concentration limits

M3.1 Monitoring for the concentration of a pollutant emitted to the air required to be conducted by

this licence must be done in accordance with:
a) any methodology which is required by or under the Act to be used for the testing of the concentration of the pollutant; or
b) if no such requirement is imposed by or under the Act, any methodology which a condition of this licence requires to be used for that testing; or
c) if no such requirement is imposed by or under the Act or by a condition of this licence, any methodology approved in writing by the EPA for the purposes of that testing prior to the testing taking place.

Note: The *Protection of the Environment Operations (Clean Air) Regulation 2010* requires testing for certain purposes to be conducted in accordance with test methods contained in the publication "Approved Methods for the Sampling and Analysis of Air Pollutants in NSW".

M3.2 Subject to any express provision to the contrary in this licence, monitoring for the concentration of a pollutant discharged to waters or applied to a utilisation area must be done in accordance with the Approved Methods Publication unless another method has been approved by the EPA in writing before any tests are conducted.

M4 Weather monitoring

M4.1 For each monitoring point specified in the table below, the licensee must monitor (by sampling and obtaining results by analysis) the parameters specified in Column 1. The licensee must use the sampling method, units of measure, averaging period and sample at the frequency, specified opposite in the other columns.

POINT W1

Parameter	Units of Measure	Frequency	Averaging Period	Sampling Method
Rainfall	mm/h	Continuous	1 hour	AM-4
Wind speed @10 metres	m/s	Continuous	15 minute	AM-2 & AM-4
Wind direction @10 metres	°	Continuous	15 minute	AM-2 & AM-4
Temperature @2 metres	°C	Continuous	15 minute	AM-4
Temperature @10 metres	°C	Continuous	15 minute	AM-4
Sigma theta @10 metres	°	Continuous	15 minute	AM-2 & AM-4
Solar radiation	W/m2	Continuous	15 minute	AM-4
Additional Requirements: - Siting	-	-	-	AM-1 & AM-4
Additional Requirements: - Measurement	-	-	-	AM-2 & AM-4

M4.2 The meteorological weather station must be maintained so as to be capable of continuously

monitoring the parameters specified in this section.

M5 Recording of pollution complaints

M5.1 The licensee must keep a legible record of all complaints made to the licensee or any employee or agent of the licensee in relation to pollution arising from any activity to which this licence applies.

M5.2 The record must include details of the following:
a) the date and time of the complaint;
b) the method by which the complaint was made;
c) any personal details of the complainant which were provided by the complainant or, if no such details were provided, a note to that effect;
d) the nature of the complaint;
e) the action taken by the licensee in relation to the complaint, including any follow-up contact with the complainant; and
f) if no action was taken by the licensee, the reasons why no action was taken.

M5.3 The record of a complaint must be kept for at least 4 years after the complaint was made.

M5.4 The record must be produced to any authorised officer of the EPA who asks to see them.

M6 Telephone complaints line

M6.1 The licensee must operate during its operating hours a telephone complaints line for the purpose of receiving any complaints from members of the public in relation to activities conducted at the premises or by the vehicle or mobile plant, unless otherwise specified in the licence.

M6.2 The licensee must notify the public of the complaints line telephone number and the fact that it is a complaints line so that the impacted community knows how to make a complaint.

M6.3 The preceding two conditions do not apply until 3 months after:
a) the date of the issue of this licence or
b) if this licence is a replacement licence within the meaning of the Protection of the Environment Operations (Savings and Transitional) Regulation 1998, the date on which a copy of the licence was served on the licensee under clause 10 of that regulation.

M7 Blasting

M7.1 To determine compliance with condition(s) L4.1, L4.2, L4.3 and L4.4:

a) Airblast overpressure and ground vibration levels experienced at the following noise sensitive locations must be measured and recorded for all blasts carried out in or on the premises;
- and electronically recorded at points N1, N2

b) Instrumentation used to measure the airblast overpressure and ground vibration levels must meet the requirements of Australian Standard AS 2187.2-2006.

Note: A breach of the licence will still occur where airblast overpressure or ground vibration levels from the blasting operations at the premises exceeds the limit specified in the conditions of this licence at any “noise sensitive locations” other than the locations identified in the above condition.

M7.2 For the purpose of conditions M7.1 and M8.1, the noise monitoring locations are described as:

EPA Identification No.	Description of Location
N1	Property 'Retreat' residence
N2	Property 'Surrey' residence
N3	Portable monitor

M7.3 Note: N3 is a portable monitor enabling the monitor to be relocated to areas of potential greatest impact. The licensee is responsible to ensure that it is located at the most suitable location.

M7.4 The location, frequency of monitoring and the parameters to be monitored may be varied by the EPA once the variability of the noise impact is established.

M8 Other monitoring and recording conditions

M8.1 NOISE MONITORING

For each monitoring point specified below, the Licensee must monitor the noise or vibration parameter specified in Column 1. The Licensee must use the sampling method, units of measure, and sample at the frequency, specified opposite in the other columns.

POINTS: N1, N2

Parameter	Units of Measure	Frequency	Sampling Method
Ambient Noise	LAeq (15 minute) LAmax LA1 (1 minute) LA10 LA90 LAmin	Frequency of monitoring as detailed in the document “Noise Monitoring Program for the Rocglen Mine, Whitehaven Coal Mining Pty. Ltd., 24/4/2008”	Type 1 Noise Meter – unattended and attended monitoring as detailed in the document “Noise Monitoring Program for the Rocglen Mine, Whitehaven Coal Mining Pty. Ltd., 24/4/2008”

M8.2 To assess compliance with the noise limits presented in the Noise Limits table, attended noise monitoring must be undertaken in accordance with the condition titled Determining Compliance, outlined above, and:

a) at each one of the locations listed in the Noise Limits table;
b) occur quarterly in a reporting period;
c) occur during each day, evening and night period as defined in the NSW Industrial Noise Policy for a minimum of:
i) 1.5 hours during the day;
ii) 30 minutes during the evening; and
iii) 1 hour during the night.
d) occur for three consecutive operating days.

6 Reporting Conditions

R1 Annual return documents

R1.1 The licensee must complete and supply to the EPA an Annual Return in the approved form comprising:
a) a Statement of Compliance; and
b) a Monitoring and Complaints Summary.
At the end of each reporting period, the EPA will provide to the licensee a copy of the form that must be completed and returned to the EPA.

R1.2 An Annual Return must be prepared in respect of each reporting period, except as provided below.

Note: The term "reporting period" is defined in the dictionary at the end of this licence. Do not complete the Annual Return until after the end of the reporting period.

R1.3 Where this licence is transferred from the licensee to a new licensee:
a) the transferring licensee must prepare an Annual Return for the period commencing on the first day of the reporting period and ending on the date the application for the transfer of the licence to the new licensee is granted; and
b) the new licensee must prepare an Annual Return for the period commencing on the date the application for the transfer of the licence is granted and ending on the last day of the reporting period.

Note: An application to transfer a licence must be made in the approved form for this purpose.

R1.4 Where this licence is surrendered by the licensee or revoked by the EPA or Minister, the licensee must prepare an Annual Return in respect of the period commencing on the first day of the reporting period and ending on:
a) in relation to the surrender of a licence - the date when notice in writing of approval of the surrender is given; or
b) in relation to the revocation of the licence - the date from which notice revoking the licence operates.

R1.5 The Annual Return for the reporting period must be supplied to the EPA by registered post not later than 60 days after the end of each reporting period or in the case of a transferring licence not later than 60 days after the date the transfer was granted (the 'due date').

R1.6 The licensee must retain a copy of the Annual Return supplied to the EPA for a period of at

least 4 years after the Annual Return was due to be supplied to the EPA.

R1.7 Within the Annual Return, the Statement of Compliance must be certified and the Monitoring and Complaints Summary must be signed by:
a) the licence holder; or
b) by a person approved in writing by the EPA to sign on behalf of the licence holder.

R1.8 A person who has been given written approval to certify a certificate of compliance under a licence issued under the Pollution Control Act 1970 is taken to be approved for the purpose of this condition until the date of first review of this licence.

R2 Notification of environmental harm

Note: The licensee or its employees must notify all relevant authorities of incidents causing or threatening material harm to the environment immediately after the person becomes aware of the incident in accordance with the requirements of Part 5.7 of the Act.

R2.1 Notifications must be made by telephoning the Environment Line service on 131 555.

R2.2 The licensee must provide written details of the notification to the EPA within 7 days of the date on which the incident occurred.

R3 Written report

R3.1 Where an authorised officer of the EPA suspects on reasonable grounds that:
a) where this licence applies to premises, an event has occurred at the premises; or
b) where this licence applies to vehicles or mobile plant, an event has occurred in connection with the carrying out of the activities authorised by this licence,
and the event has caused, is causing or is likely to cause material harm to the environment (whether the harm occurs on or off premises to which the licence applies), the authorised officer may request a written report of the event.

R3.2 The licensee must make all reasonable inquiries in relation to the event and supply the report to the EPA within such time as may be specified in the request.

R3.3 The request may require a report which includes any or all of the following information:
a) the cause, time and duration of the event;
b) the type, volume and concentration of every pollutant discharged as a result of the event;
c) the name, address and business hours telephone number of employees or agents of the licensee, or a specified class of them, who witnessed the event;
d) the name, address and business hours telephone number of every other person (of whom the licensee is aware) who witnessed the event, unless the licensee has been unable to obtain that information after making reasonable effort;
e) action taken by the licensee in relation to the event, including any follow-up contact with any complainants;
f) details of any measure taken or proposed to be taken to prevent or mitigate against a recurrence of such an event; and
g) any other relevant matters.

R3.4 The EPA may make a written request for further details in relation to any of the above matters if it is not satisfied with the report provided by the licensee. The licensee must provide such further details to the EPA within the time specified in the request.

R4 Other reporting conditions

R4.1 The licensee must report any exceedence of the licence blasting limits to the regional office of the EPA as soon as practicable after the exceedence becomes known to the licensee or to one of the licensee's employees or agents.

R4.2 A noise compliance assessment report must be submitted to the EPA within thirty (30) days of the completion of the quarterly noise monitoring. The assessment must be prepared by a suitably qualified and experienced acoustical consultant and include:
a) an assessment of compliance with noise limits detailed in the limit conditions of this licence; and
b) an outline of any management actions taken within the monitoring period to address any exceedences of the limits detailed in the limit conditions of this licence.

7 General Conditions

G1 Copy of licence kept at the premises or plant

G1.1 A copy of this licence must be kept at the premises to which the licence applies.

G1.2 The licence must be produced to any authorised officer of the EPA who asks to see it.

G1.3 The licence must be available for inspection by any employee or agent of the licensee working at the premises.

8 Pollution Studies and Reduction Programs

U1 PRP 1: Coal Mine Particulate Matter Control Best Practice

U1.1 The Licensee must conduct a site specific Best Management Practice (BMP) determination to identify the most practicable means to reduce particle emissions.

U1.2 The Licensee must prepare a report which includes, but is not necessarily limited to, the following:
- identification, quantification and justification of existing measures that are being used to minimise particle emissions;
- identification, quantification and justification of best practice measures that could be used to minimise particle emissions;
- evaluation of the practicability of implementing these best practice measures; and
- a proposed timeframe for implementing all practicable best practice measures.

In preparing the report, the Licensee must utilise the document entitled Coal Mine Particulate Matter Control Best Practice – Site Specific Determination Guideline - November 2011.

U1.3 All cost related information is to be included as Appendix 1 of the Report required by condition U1.2 above.

U1.4 The report required by condition U1.2 must be submitted by the Licensee to the Environment Protection Authority, Manager Armidale Region, at PO Box 494 Armidale NSW 2350 by 29 June 2012.

U1.5 The report required by condition U1.2 above, except for cost related information contained in Appendix 1 of the Report, must be made publicly available by the Licensee on the Licensee's website 6 July 2012.

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Dictionary

General Dictionary

3DGM [in relation to a concentration limit]	Means the three day geometric mean, which is calculated by multiplying the results of the analysis of three samples collected on consecutive days and then taking the cubed root of that amount. Where one or more of the samples is zero or below the detection limit for the analysis, then 1 or the detection limit respectively should be used in place of those samples
Act	Means the Protection of the Environment Operations Act 1997
activity	Means a scheduled or non-scheduled activity within the meaning of the Protection of the Environment Operations Act 1997
actual load	Has the same meaning as in the Protection of the Environment Operations (General) Regulation 2009
AM	Together with a number, means an ambient air monitoring method of that number prescribed by the *Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales*.
AMG	Australian Map Grid
anniversary date	The anniversary date is the anniversary each year of the date of issue of the licence. In the case of a licence continued in force by the Protection of the Environment Operations Act 1997, the date of issue of the licence is the first anniversary of the date of issue or last renewal of the licence following the commencement of the Act.
annual return	Is defined in R1.1
Approved Methods Publication	Has the same meaning as in the Protection of the Environment Operations (General) Regulation 2009
assessable pollutants	Has the same meaning as in the Protection of the Environment Operations (General) Regulation 2009
BOD	Means biochemical oxygen demand
CEM	Together with a number, means a continuous emission monitoring method of that number prescribed by the *Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales*.
COD	Means chemical oxygen demand
composite sample	Unless otherwise specifically approved in writing by the EPA, a sample consisting of 24 individual samples collected at hourly intervals and each having an equivalent volume.
cond.	Means conductivity
environment	Has the same meaning as in the Protection of the Environment Operations Act 1997
environment protection legislation	Has the same meaning as in the Protection of the Environment Administration Act 1991
EPA	Means Environment Protection Authority of New South Wales.
fee-based activity classification	Means the numbered short descriptions in Schedule 1 of the Protection of the Environment Operations (General) Regulation 2009.
general solid waste (non-putrescible)	Has the same meaning as in Part 3 of Schedule 1 of the Protection of the Environment Operations Act 1997

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flow weighted composite sample	Means a sample whose composites are sized in proportion to the flow at each composites time of collection.
general solid waste (putrescible)	Has the same meaning as in Part 3 of Schedule 1 of the Protection of the Environmen t Operations Act 1997
grab sample	Means a single sample taken at a point at a single time
hazardous waste	Has the same meaning as in Part 3 of Schedule 1 of the Protection of the Environment Operations Act 1997
licensee	Means the licence holder describe d at the front of this licence
load calculation protocol	Has the same meaning as in the Protection of the Environment Operations (General) Regulation 2009
local authority	Has the same meaning as in the Protection of the Environment Operations Act 1997
material harm	Has the same meaning as in section 147 Protection of the Environment Operations Act 1997
MBAS	Means methylene blue active substances
Minister	Means the Minister administering the Protection of the Environment Operations Act 1997
mobile plant	Has the same meaning as in Part 3 of Schedule 1 of the Protection of the Environment Operations Act 1997
motor vehicle	Has the same meaning as in the Protection of the Environment Operations Act 1997
O&G	Means oil and grease
percentile [in relation to a concentration limit of a sample]	Means that percentage [eg.50%] of the number of samples taken that must meet the concentration limit specified in the licence for that pollutant over a specified period of time. In this licence, the specified period of time is the Reporting Period unless otherwise stated in this licence.
plant	Includes all plant within the meaning of the Protection of the Environment Operations Act 1997 as well as motor vehicles.
pollution of waters [or water pollution]	Has the same meaning as in the Protection of the Environment Operations Act 1997
premises	Means the premises described in condition A2.1
public authority	Has the same meaning as in the Protection of the Environment Operations Act 1997
regional office	Means the relevant EPA office referred to in the Contacting the EPA document accompanying this licence
reporting period	For the purposes of this licence, the reporting period means the period of 12 months after the issue of the licence, and each subsequent period of 12 mo nths. In the case of a licence continued in force by the Protection of the Environment Operations Act 1997, the date of issue of the licence is the first anniversary of the date of issue or last renewal of the licence following the commencement of the Act.
restricted solid waste	Has the same meaning as in Part 3 of Schedule 1 of the Protection of the Environment Operations Act 1997
scheduled activity	Means an activity listed in Schedule 1 of the Protection of the Environment Operations Act 1997
special waste	Has the same meaning as in Part 3 of Schedule 1 of the Protection of the Environment Operations Act 1997
TM	Together with a number, means a test method of that number prescribed by the *Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales*.

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TSP	Means total suspended particles
TSS	Means total suspended solids
Type 1 substance	Means the elements antimony, arsenic, cadmium, lead or mercury or any compound containing one or more of those elements
Type 2 substance	Means the elements beryllium, chromium, cobalt, manganese, nickel, selenium, tin or vanadium or any compound containing one or more of those elements
utilisation area	Means any area shown as a utilisation area on a map submitted with the application for this licence
waste	Has the same meaning as in the Protection of the Environment Operations Act 1997
waste type	Means liquid, restricted solid waste, general solid waste (putrescible), general solid waste (non-putrescible), special waste or hazardous waste

Mr Robert O'Hern

Environment Protection Authority

(By Delegation)

Date of this edition: 31-July-2008

End Notes

1	Licence varied by notice 1096864, issued on 19-May-2009, which came into effect on 19-May-2009.
2	Licence varied by notice 1103283, issued on 18-Aug-2009, which came into effect on 18-Aug-2009.
3	Licence varied by notice 1126963, issued on 13-Jul-2011, which came into effect on 13-Jul-2011.
4	Licence varied by notice 1503204 issued on 20-Dec-2011
5	Licence varied by notice 1503676 issued on 21-Jun-2012

Appendix 3

COMPLIANCE REVIEWS

- PA 10_0015 (Table A3-1)
- Environment Protection Licence No 12870 (Table A3-2)
- ML 1620 and MPL 1662 (Table A3-3)

TABLE A3.1

Compliance Review – PA 10_0015

Condition	Conditional Requirement	Compliance	Comments
SCHEDULE 2: ADMINISTRATIVE CONDITIONS			
1.	The Proponent shall implement all reasonable and feasible measures to prevent and/or minimise any material harm to the environment that may result from the construction, operation or rehabilitation of the project.	No	See AEMR for details on non-compliances.
2.	The Proponent shall carry out the project generally in accordance with the: (a) EA; (b) statement of commitments; (c) the conditions of this approval.	Yes	The activities on site were being undertaken generally in accordance with the nominated documents.
3.	If there is an inconsistency between the above documents, the latter document shall prevail to the extent of the inconsistency. However, the conditions of this approval shall prevail to the extent of any inconsistency.	Not Applicable	No inconsistencies found.
4.	The Proponent shall comply with any reasonable and feasible requirements of the Director-General arising from the Departments assessment of: (a) any reports, plans, programs, strategies or correspondence that are submitted in accordance with the conditions of this approval; and (b) the implementation of any actions or measures contained in these reports, plans, programs, strategies or correspondence.	No	See discussions below regarding plans.
5.	Mining operations may take place on the site until the end December 2022.	Not yet applicable	
6.	The Proponent shall not extract more than 1.5 million tonnes of ROM coal a year from the site.	Yes	1,280,345 tonnes extracted for the year.
7.	By the end of September 2012 the proponent shall surrender the existing project approval	Yes	Request for Surrender of Previous Project Approval issued 25/09/2012 with letter to Director General.
8.	Prior to the surrender of project approval 06_0198 the conditions of that approval will prevail to the extent of any inconsistency between the two approvals.	Not Applicable	No inconsistencies found.
9.	The proponent shall ensure that all new buildings and structures, and any alterations or additions to existing buildings and structures, are constructed in accordance with the relevant requirements of the BCA.	Not Applicable	No additional buildings constructed during period.
10.	The Proponent shall ensure that all demolition work is carried out in accordance with *Australian Standard 2601-2001: The Demolition of Structures*, or its latest version.	Not Applicable	No specific demolition work carried out on any significant buildings.
11.	The Proponent shall ensure that all plant and equipment used on site is: (a) maintained in a proper and efficient condition; and (b) operated in a proper and efficient manner.	Yes	Maintenance program is in place for all equipment. Competency based training is carried out for all operators of equipment.

Condition	Conditional Requirement	Compliance	Comments
12.	With the approval of the DG the Proponent may submit any strategy, plan or program required by this approval on a progressive basis	Not Applicable	No approval sought, with relevant plans submitted.
13.	The Proponent shall continue to implement the existing strategies, plans or programs that apply to any development on site under project approval 06_0198 until they are replaced by an equivalent strategy, plan or program approved under this approval	Yes	As required.
SCHEDULE 3: ENVIRONMENTAL PERFORMANCE CONDITIONS			
1.	The Proponent shall ensure that the noise generated by the project does not exceed the noise criteria in Table 1 at any residence on privately-owned land or on more than 25 percent of any privately-owned land.	No	See AEMR for details.
2.	The Proponent shall ensure that the road traffic noise generated by the project and the Tarrawonga coal mine does not exceed the criteria in Table 2.	Yes	As per condition.
3.	The Proponent shall: (a) implement all reasonable and feasible best practice noise mitigation measures; (b) investigate ways to reduce the noise generated by the project, including off-site road and rail noise and maximum noise levels which may result in sleep disturbance; and (c) report on these investigations and the implementation and effectiveness of these measures in the AEMR, to the satisfaction of the Director-General.	Yes	As per condition.
4.	The Proponent shall prepare and implement a Noise Management Plan for the project to the satisfaction of the Director-General. This plan must: (a) be prepared in consultation with OEH, and submitted to the Director-General for approval by the end of December 2011; (b) describe the noise mitigation measures that would be implemented to ensure compliance with the relevant conditions of this approval; (c) include a Road Traffic Noise Management Plan that has been prepared in consultation with the operators of the Tarrawonga coal mine; and (d) include a noise monitoring program that: • uses a combination of real-time and supplementary attended monitoring to evaluate the performance of the project; and • includes a protocol for determining exceedances of the relevant conditions of this approval	Yes	Noise Management Plan submitted in December 2011 to the Director General, with comments received. Plan has been resubmitted awaiting approval
5.	The Proponent shall ensure that the air blast overpressure level from blasting at the project does not exceed the criteria in Table 3 and any residence on privately-owned land. • 115dBL, Allowable exceed: 5% of the total number of blasts in a 12 month period. • 120dBL at any time.	Yes	As per condition.
6.	The Proponent shall only carry out blasting on site between 9am and 5pm Monday to Saturday inclusive. No blasting is allowed on Sundays, public holidays, or at any other time without the written approval of the Director-General.	Yes	As per condition.

Condition	Conditional Requirement	Compliance	Comments
7.	The Proponent shall not carry out more than one blast a day on site, unless an additional blast is required following a blast misfire.	Yes	As per condition.
8.	If the Proponent receives a written request for a property inspection from any landowner within 2 km of proposed blasting activities, or any other landowner nominated by the Director-General, the Proponent shall within 3 months of receiving this request: (a) commission a suitably qualified person, whose appointment has been approved by the Director-General, to inspect the condition of any building or structure on the land, and recommend measures to mitigate any potential blasting impacts; and (b) give the landowner a copy of this property inspection report.	Yes	Request received by "Brolga" landowner. Inspection carried out by approved engineers January 2012. Report provided to landholder.
9.	If the owner of any privately-owned land claims that the buildings and/or structures on their land have been damaged as a result of blasting on site, then within 2 months of receiving this claim the Proponent shall: (a) commission a suitably qualified, experienced and independent person, whose appointment has been approved by the Director-General, to investigate the claim; and (b) give the landowner a copy of the property investigation report.	Yes	No claims made.
10.	The Proponent shall (a) implement best blasting management practice on site to: • protect the safety of people and livestock in the surrounding area; • protect public or private property in the surrounding area; and • minimise the dust and fume emissions of the blasting; and (b) operate a suitable system to enable the public to get up-to-date information on the proposed blasting schedule on site, to the satisfaction of the Director-General.	Yes	As per condition.
11.	The Proponent shall not undertake blasting within 500 metres of any privately-owned land, unless suitable arrangements have been made with the landowner and any tenants to minimise the risk of flyrock-related impact to the property to the satisfaction of the Director-General.	Yes	As per condition.
12.	The Proponent shall prepare and implement a Blast Management Plan for the project to the satisfaction of the Director-General. This plan must: (a) be prepared in consultation with OEH, and submitted to the Director-General for approval by the end of December 2011; (b) describe the measures that would be implemented to ensure compliance with the relevant conditions of this approval; and (c) include a blast monitoring program to evaluate the performance of the project.	Yes	Blast Management Plan submitted in December 2011 to the Director General, with comments received. Awaiting final comments from other submitted plans prior to resubmitting for approval.
13.	The Proponent shall ensure that no offensive odours, as defined under the POEO Act, are emitted from the site.	Yes	As per condition.
14.	The proponent shall implement all reasonable and feasible measures to minimise the release of greenhouse gas emissions	Yes	As per condition.

Condition	Conditional Requirement	Compliance	Comments
15.	The Proponent shall ensure that dust emissions generated by the project does not cause additional exceedances of the criteria in Tables 5 to 7 at any residence on privately owned land, or on more than 25 percent of any privately-owned land. • Total suspended particulate (TSP) matter – Annual average: 90µg/m3 • Particulate matter <10 µm(PM10) – Annual average: 30 µg/m3 • Particulate matter <10 µm(PM10) – 24 hour period - 50 µg/m3 • Deposited dust – Annual average: o Maximum increase in deposited dust level – 2 g/m2/month o Maximum total deposited dust level – 4 g/m2/month	No	See report for details.
16.	The Proponent shall: (a) implement best practice air quality management on site, including all reasonable and feasible measures to minimise the off-site odour, fume and dust emissions generated by the project, including those generated by any spontaneous combustion on site, (b) minimise any visible air pollution generated by the project; (c) minimise the surface disturbance on site; and (d) regularly assess the real-time air quality monitoring and meteorological forecasting data, and relocate, modify and/or stop operations on site to ensure compliance with the relevant conditions of this approval, to the satisfaction of the Director-General.	Yes	As per condition.
17.	The Proponent shall prepare and implement an Air Quality & Greenhouse Gas Management Plan for the project to the satisfaction of the Director-General. This plan must: (a) be prepared in consultation with OEH, and submitted to the Director-General for approval by the end of December 2011; (b) describe the measures that would be implemented to ensure compliance with the relevant conditions of this approval, including a real-time air quality management system that employs reactive and proactive mitigation measures; and (c) include an air quality monitoring program that: • uses a combination of real-time monitors, high volume samplers and dust deposition gauges to evaluate the performance of the project; and • includes a protocol for determining exceedances of the relevant conditions of this approval.	Yes	Air Quality and Greenhouse Gas Management Plan submitted in December 2011 to the Director General, with comments received. , Report resubmitted and awaiting approval.
18.	During the life of the project, the Proponent shall ensure that there is a meteorological station operating in the vicinity of the site that: (a) complies with the requirements in the *Approved Methods for Sampling of Air Pollutants in New* *South Wales* guideline; and (b) is capable of continuous real-time measurement of temperature lapse rate in accordance with the *NSW Industrial Noise Policy*, or as otherwise agreed by OEH.	Yes	New weather station installed to standard in April 2012.

Condition	Conditional Requirement	Compliance	Comments
19.	The Proponent shall ensure that the auger mining carried out on site: (a) is restricted to the areas approved for auger mining; (b) is designed to remain safe and stable in the long term; and (c) does not result in vertical subsidence of greater than 20 mm.	Not yet applicable.	No auger mining carried out during period.
20.	The Proponent shall ensure that it has sufficient water for all stages of the project, and if necessary, adjust the scale of mining operations on site to match its available water supply to the satisfaction of the Director- General.	Yes	As per condition.
21.	The Proponent shall ensure that all surface water discharges from the site comply with the discharge limits (both volume and quality) set for the project in any EPL.	No	See report for details on discharges.
22.	The Proponent shall prepare and implement a Water Management Plan for the project to the satisfaction of the Director-General. This plan must: (a) be prepared in consultation with OEH, NOW and DRE by suitably qualified expert/s whose appointment/s have been approved by the Director-General (b) be submitted to the Director-General by the end of February 2012 (c) include a: • Site Water Balance; • Erosion and Sediment Control Plan; • Surface Water Monitoring Plan; • Groundwater Monitoring Program; and • Surface and Groundwater Response Plan, setting out the procedures for: o investigating, and if necessary mitigating, any exceedances of the surface or groundwater assessment criteria (see below); and responding to any unforeseen impacts of the project.	No	Water Management Plan submitted to the Director General 6th March 2012. No comments received to date.
23.	By the end of June 2012 the proponent shall enter into a Biobanking agreement to implement the Biodiversity Offset Strategy.	Yes	Agreement reached 28th June 2012.
24.	The proponent shall prepare and implement a Heritage Management Plan for the project to the satisfaction of the DG.	Yes	Heritage Management Plan submitted in December 2011 to the Director General, with comments received. , Adjustments currently being made. OEH (now EPA) did not provide comment.
25.	By the end of December 2012, unless the Director-General agrees otherwise, the proponent shall upgrade and tar seal Wean Road to the satisfaction of Council from the northern end of the existing tar seal to the point of the Gunnedah/Narrabri Shire Council boundary, in general accordance with Council's Rural Local Roads Standard.	Not yet applicable	Preliminary work to seal Wean Road underway.
26.	During the project, the Proponent shall contribute towards the maintenance of the public roads used by the project, in accordance with the existing road maintenance agreement between the Proponent and Council.	Yes	Agreement in place with Gunnedah Shire Council.

Condition	Conditional Requirement	Compliance	Comments
28.	The proponent shall transport all coal from the site to the Whitehaven Siding coal handling and preparation plant by road; only using the designated transport route.	Yes	As per condition.
29.	The proponent will only dispatch coal between the hours of 7:00am to 9:15pm Monday to Friday and 7:00am to 5:15 pm Saturday.	Yes	As per condition.
30.	The proponent shall keep accurate records of the amount of coal transported on a monthly basis and make them available on the website at the end of each calendar year.	Yes	As per condition.
31.	The Proponent shall: (a) implement all reasonable and feasible measures to minimise the visual and off-site lighting impacts of the project; (b) establish and maintain an effective vegetative screen along the boundary of the site that adjoins public roads; (c) ensure that no outdoor lights shine above the horizontal; and (d) ensure that all external lighting associated with the project complies with *Australian Standard AS4282 (INT) 1995 - Control of Obtrusive Effects of Outdoor Lighting*, or its latest version.	No	See main report for details on visual and lighting impacts.
32.	The Proponent shall: (a) minimise the waste generated by the project; and (b) ensure that the waste generated by the project is appropriately stored, handled and disposed of in a lawful manner.	Yes	As per condition.
33.	The Proponent shall: (a) ensure that the project is suitably equipped to respond to any fires on site; and (b) assist the Rural Fire Service and emergency services as much as possible if there is a fire in the surrounding area.	Yes	Fire tender and water carts available for bushfires.
34.	The Proponent shall rehabilitate the site to the satisfaction of the Executive Director, Mineral Resources in DRE. This rehabilitation must be generally consistent with the proposed rehabilitation strategy described in the EA.	Yes	Progressive rehabilitation taking place.
35.	The Proponent shall carry out the rehabilitation of the site progressively, that is, as soon as reasonably practicable following disturbance.	Yes	Progressive rehabilitation taking place.
36.	The Proponent shall prepare and implement a Rehabilitation Management Plan to the satisfaction of the Executive Director, Mineral Resources in DRE. This plan must: (a) be prepared in consultation with the Department, NOW, OEH, Council and the CCC; (b) be submitted to the Executive Director, Mineral Resources in DRE by the end of February 2012; (c) be prepared in accordance with any relevant DRE guideline; (d) describe the measures that would be implemented to ensure compliance with the relevant conditions of this approval; (e) address all aspects of rehabilitation including mine closure, final landform, and final land use; and (f) build to the maximum extent practicable on the other management plans required under this approval.	No	Rehabilitation Management Plan submitted 6th March 2012. Approved by DRE 19th April 2012.
SCHEDULE 4: ADDITIONAL PROCEDURES			

Condition	Conditional Requirement	Compliance	Comments
1.	By the end of December 2011 the proponent shall notify the owners of "Brolga" and "Surrey" and any privately owned land within 2 kilometres of the proposed footprint of the open cut pit that they are entitled to ask for an inspection.	Yes	Notifications sent.
2.	As soon as practicable after obtaining monitoring results showing: (a) an exceedance of the relevant criteria in Schedule 3, the Proponent shall notify the affected landowner and/or tenants in writing of the exceedance, and provide regular monitoring results to each of these parties until the project is complying with the relevant criteria again; and (b) an exceedance of the relevant air quality criteria in Schedule 3, the Proponent shall send a copy of the NSW Health fact sheet entitled *"Mine Dust and You"* (as may be updated from time to time) to the affected landowners and/or existing tenants of the land (including tenants of any mine-owned land).	Yes	As per condition.
SCHEDULE 5: ENVIRONMENTAL MANAGEMENT, REPORTING AND AUDITING			
1.	The Proponent shall prepare and implement an Environmental Management Strategy for the project to the satisfaction of the Director-General. This strategy must include the requirements stated in the PA 10_0015.	Yes	Environmental Management Strategy Submitted to DG in December 2011. No comments to date.
2.	The proponent shall ensure that the management plans required under this approval are prepared in accordance with any relevant guidelines and include the requirements stated in the PA 10_0015.	Yes	As per condition.
3.	By the end of each December, the Proponent shall review the environmental performance of the project to the satisfaction of the Director-General. This review must include the requirements stated in the PA 10_0015.	Yes	Confirmation provided from DoPI that Annual Review can be combined with AEMR and submitted according to existing AEMR schedule.
4.	Within 3 months of: a) the submission of an annual review b) the submission of an incident report c) the submission of an audit report d) any modifications to the conditions of this approval the proponent shall review the strategies, plans or programs required under this approval	Not yet applicable	No audits, incidents or modifications since issue of PA 10_0015 and this is the first annual review under this approval.
5.	The Proponent shall operate a Community Consultative Committee (CCC) for the project in general accordance with the *Guidelines for Establishing and Operating Community Consultative Committees for Mining Projects* (Department of Planning, 2007, or its latest version), and to the satisfaction of the Director-General.	Yes	Committee meets quarterly, minutes on Whitehaven website.
6.	As soon as is practicable after the Proponent becomes aware of any incident associated with the project, the Proponent shall notify the Director-General and any other relevant agencies of the incident. Within 7 days of the date of the incident, the Proponent shall provide the Director-General and any relevant agencies with a detailed report on the incident.	Yes	Exceedances reported within 7 days.

Condition	Conditional Requirement	Compliance	Comments
7.	The Proponent shall provide regular reporting on the environmental performance of the project on its website, in accordance with the reporting arrangements in any plans or programs approved under the conditions of this approval.	Yes	Monitoring data continually available.
8.	By the end of March 2013, and every 3 years thereafter, unless the Director-General directs otherwise, the Proponent shall commission and pay the full cost of an Independent Environmental Audit of the project. This audit must: (a) be conducted by a suitably qualified, experienced and independent team of experts whose appointment has been endorsed by the Director-General; (b) include consultation with the relevant agencies; (c) assess the environmental performance of the project and assess whether it is complying with the requirements in this approval and any relevant EPL or Mining Lease (including any assessment, plan or program required under these approvals); (d) review the adequacy of strategies, plans or programs required under the abovementioned approvals; and (e) recommend appropriate measures or actions to improve the environmental performance of the project, and/or any assessment, plan or program required under the abovementioned approvals.	Not yet applicable	No audit undertaken yet.
9.	Within six weeks of the completion of this audit, or as otherwise agreed by the Director-General, the Proponent shall submit a copy of the audit report to the Director-General, together with its response to any recommendations contained in the audit report.	Not yet applicable	No audit undertaken yet.
10.	The Proponent shall: (a) make copies of the following publicly available on its website: · the documents referred to in Condition 2 of Schedule 2; · all current statutory approvals for the project; · all approved strategies, plans and programs required under the conditions of this approval; · a comprehensive summary of the monitoring results of the project, which have been reported in accordance with the conditions of this approval, or any approved plans and programs; · a complaints register, updated on a monthly basis; · minutes of CCC meetings; · the annual reviews of the project; · any independent environmental audit of the project, and the Proponent's response to the recommendations in any audit; · any other matter required by the Director-General; and (b) keep this information up-to-date, to the satisfaction of the Director-General.	Yes	Website continually updated as per condition.

TABLE A3.2

Compliance Review – Environment Protection Licence 12870

Condition	Conditional Requirement	Compliance	Comments
A1.1	Mining for coal: >500,000 – 2,000,000 t produced. Coal works: 0 – 2,000,000 t loaded	Yes	ROM coal for the period was 1,280,345 tonnes.
A3.1	Carry out works and activities in accordance with proposal contained in licence application.	Yes	Activities carried out in accordance with EIS/Modification EA which accompanied licence application and subsequent licence variation applications.
L1.1	Except as may be expressly provided in any other condition of this licence, the licensee must comply with section 120 of the Protection of the Environment Operations Act 1997.	No	See section 3 of report.
L2.4	Comply with concentration limits: Oil & Grease 10 mg/L pH 6.5 – 8.5 TSS 50 mg/L	No	See section 3 of report.
L3.1	Ensure noise compliance: (a) $L_{Aeq(15min)}$ criterion of 35dB(A) at all times (day, evening and night time periods); and (b) $L_{A1(1\ min)}$ criterion of 45dB(A) at night.	No	See section 3 of report.
L4.1	The overpressure level from blasting operations at the premises must not exceed 115dB(Lin Peak) for more than 5% of total number of blasts over reporting period.	Yes	As per condition.
L4.2	The overpressure level from blasting operations at the premises must not exceed 120dB(Lin Peak) at any time.	Yes	As per condition.
L4.3	Ground vibration peak particle velocity from blasting operations must not exceed 5mm/s for more than 5% of the total number of blasts during the reporting period.	Yes	As per condition.
L4.4	Ground vibration peak particle velocity from blasting operations must not exceed 10mm/s at any time.	Yes	As per condition.

Condition	Conditional Requirement	Compliance	Comments
O1.1	Carry out licensed activities in a competent manner, i.e. (a) processing, handling, movement and storage of materials and substances; and (b) treatment, storage, processing, reprocessing, transport and disposal of waste generated by the activity.	Yes	As per condition.
O2.1	All plant and equipment installed at the premises or used in connection with the licensed activity must: (a) be maintained in a proper and efficient condition; and (b) be operated in a proper and efficient manner.	Yes	Maintenance and operational procedures in place.
O3.1	All operations and activities occurring at the premises must be carried out in a manner that will minimise the emission of dust from the premises.	No	One PM_{10} exceedance during the period. See report for details.
O3.2	Trucks transporting coal from the premises must be covered immediately after loading to prevent wind blown emissions and spillage. The covering must be maintained until immediately before unloading the trucks.	Yes	All trucks fitted with tarps which are extended prior to leaving site.
M1.1	The results of any monitoring required to be conducted by this licence or a load calculation protocol must be recorded and retained as set out in this condition.	Yes	As per condition.
M1.2	Keep all monitoring records associated with this licence: (a) in a legible form; (b) for at least 4 years; (c) produced in a legible form to any authorised officer of the EPA who asks to see them.	Yes	As per condition.

Condition	Conditional Requirement	Compliance	Comments
M1.3	Keep the following records in respect to samples required: (a) sampling date; (b) sampling time; (c) sampling location; and (d) sample collector's name.	Yes	All items recorded on chain of custody documentation.
M2.1	Monitor the concentration of each pollutant discharged specified using the sampling method, units and frequency specified.	Yes	Monitoring undertaken as required.
M3.1	Monitor air pollutants in accordance with the Approved Methods publication or as approved by EPA.	Yes	Test method used refers to the EPA approved publication "Approved Methods for the Sampling and Analysis of Air Pollutants in NSW."
M3.2	Monitor pollutants discharged to waters in accordance with the Approved Methods publication or as approved by EPA.	Yes	Discharges are monitored in accordance with EPA requirements.
M4.1	Monitor the parameters specified via the aid of a meteorological weather station.	Yes	As per condition.
M4.2	The weather station must be maintained so as to be continuously capable of monitoring the parameters specified.	No	Some data not retrieved due to monitor malfunction.
M5.1	The licensee must keep a legible record of all complaints made to the licensee or any employee or agent of the licensee in relation to pollution arising from any activity to which this licence applies.	Yes	All complaints recorded and held on file.
M5.2	Keep the following records of complaints. (a) date and time of complaint; (b) method complaint made; (c) any personal details of complainant; (d) nature of complaint; (e) licensee's action in response, any follow-up contact; and (f) if no action – reason why.	Yes	All records kept.

Condition	Conditional Requirement	Compliance	Comments
M5.3	The record of a complaint must be kept for at least 4 years after the complaint was made.	Yes	As per condition.
M5.4	The record must be produced to any authorised officer of the EPA who asks to see them.	Yes	Available upon request.
M6.1	Operate telephone complaints line for receipt of complaints from the public.	Yes	Hotline currently operating.
M6.2	The licensee must notify the public of the complaints line telephone number and the fact that it is a complaints line so that the impacted community knows how to make a complaint.	Yes	Advertised on website and local paper.
M7.1	To determine compliance with conditions L4.1, L4.2, L4.3, L4.4 (a) Airblast overpressure and ground vibration levels must be measured and electronically recorded at points N1, N2- for all blasts carried out in or on the premises (b) Instrumentation used to measure the airblast overpressure and ground vibration levels must meet the requirements of AS 2187.2-2006	Yes	As per condition.
M7.2	For the purpose of conditions M7.1 and M8.1, the noise monitoring locations are described as: N1 “Retreat” N2 “Surrey” N3 Portable monitor	Yes	Currently monitoring at these locations.
M8.1	For each monitoring point specified, the Licensee must monitor the noise or vibration parameter specified	Yes	As per condition.

Condition	Conditional Requirement	Compliance	Comments
M8.2	Attended noise monitoring must be undertaken in accordance with the condition titled Determining Compliance, and: a) At each location listed b) Quarterly c) Occur during each day, evening night period as defined in the NSW industrial noise Policy: i) 1.5 hours during the day; ii) 30 minutes during the evening; and iii) 1 hour during the night. d) Occur for three consecutive operating days	Yes	As per condition.
R1.1	Complete and supply Annual Return to EPA comprising: (a) Statement of Compliance; (b) Monitoring & Complaints Summary.	Yes	Annual return submitted including parameters listed in condition.
R1.2	An Annual Return must be prepared in respect of each reporting period	Yes	As per condition.
R1.5	Provide EPA with Annual Return no later than 60 days after end of each reporting period.	Yes	Submitted within 60 day period.
R1.6	The licensee must retain a copy of the Annual Return supplied to the EPA for a period of at least 4 years after the Annual Return was due to be supplied to the EPA.	Yes	All annual returns kept on file.
R1.7	Within the Annual Return, the Statement of Compliance must be certified and the Monitoring and Complaints Summary must be signed by: a) the licence holder; or b) by a person approved in writing by the EPA to sign on behalf of the licence holder.	Yes	Signed by Director and the Company Secretary.
R2.1	Notify EPA of threatening or harmful incidents as soon as practicable by phoning EPA's Pollution Line service.	N/A	No threatening or harmful incidents during the period.

Condition	Conditional Requirement	Compliance	Comments
R2.2	Provide written details of the incident to EPA within 7 days of incident.	N/A	As above.
R3.1	Where an authorised officer of the EPA suspects on reasonable grounds that: a) where this licence applies to premises, an event has occurred at the premises; or b) where this licence applies to vehicles or mobile plant, an event has occurred in connection with the carrying out of the activities authorised by this licence, and the event has caused, is causing or is likely to cause material harm to the environment (whether the harm occurs on or off premises to which the licence applies), the authorised officer may request a written report of the event.	N/A	No requests received.
R3.2	The licensee must make all reasonable inquiries in relation to the even and supply the report to the EPA within such time as may be specified in the request.	N/A	No requests received.
R3.3	The report may be required to include: (a) event cause, time and duration; (b) type, volume and concentration of every pollutant discharged; (c) contact details of employees or agents of licensee who witnessed event; (d) contact details of any other persons witnessing the event; (e) the action taken and follow-up contact with complainants in relation to event; (f) mitigation measures proposed to prevent recurrence; (g) any other relevant matters.	N/A	No requests received.

Condition	Conditional Requirement	Compliance	Comments
R3.4	EPA may request further details – must be supplied within specified time.	N/A	No requests received.
R4	Report any exceedance of the licence blasting limits to the regional office of the EPA as soon as practicable after the exceedance becomes known.	N/A	No blast exceedances during period.
G1.1	Retain a copy of this licence at premises to which the licence applies.	Yes	Available at the Rocglen site office.
G1.2	Produce licence to EPA officer upon request.	N/A	No requests to date.
G1.3	Make licence available for inspection by any employee or agent of licencee working at premises.	Yes	Available to all employees at site office.
U1.1	The Licensee must conduct a site specific Best Management Practice (BMP) determination to identify the most practicable means to reduce particle emissions.	Yes	Air quality consultants PAE Holmes commissioned to carry out best practice investigation.
U1.2	Prepare a report including: - identification, quantification and justification of existing measures that are being used to minimise particle emissions; - identification, quantification and justification of best practice measures that could be used to minimise particle emissions; - evaluation of the practicability of implementing these best practice measures; and - a proposed timeframe for implementing all practicable best practice measures. In preparing the report, the Licensee must utilise the document entitled Coal Mine Particulate Matter Control Best Practice – Site Specific Determination Guideline - November 2011.	Yes	Report prepared in accordance with requirements of condition.
U1.3	All cost related information is to be included as Appendix 1 of the Report required by condition U1.2 above.	Yes	Included in appendix 1 of report.

Condition	Conditional Requirement	Compliance	Comments
U1.4	The report required by condition U1.2 must be submitted by the Licensee to the Environment Protection Authority.	Yes	Report submitted 29th June 2012.
U1.5	The report required by condition U1.2 above, except for cost related information contained in Appendix 1 of the Report, must be made publicly available by the Licensee on the Licensee's website 6 July 2012.	Yes	Available on website before 6th July 2012.

TABLE A3-3

Compliance Review – ML 1620 and MPL 1662

ML 1620

Relevant Condition	Conditional Requirement	Compliance	Comments
1	Service of notice on landholders of granting of mining lease.	Yes	All affected landholders were advised within 3 months of the grant date.
2	Implement all practicable measures to prevent and/or minimise any harm to the environment that may result from the construction, operation or rehabilitation of the development.	Yes	Whitehaven has established relevant Environmental Management Plans and a MOP to manage mining operations and rehabilitation taking into account environmental considerations.
3	Prepare and submit a MOP in accordance with DG's guidelines.	Yes	Initial MOP lodged with DPI and accepted on the 12th June 2008. MOP amendment for highwall stability works submitted 23rd September 2010 and approved 18th October 2010. Current MOP submitted 4th October 2011 and approved 21st October 2011. MOP period ends 30th September 2013.
4	Lodge an annual Environmental Management Report with DG annually.	Yes	This document.
5.	Prepare the EMR in accordance with requirements in the Mining Lease.	Yes	Prepared in accordance with the requirements.
6	Submit additional environmental reports as directed by the DG.	Not Yet Applicable	No directions issued.
7	Rehabilitate disturbed land to a sustainable/agreed end land use to the satisfaction of the DG.	Yes	Reshaping and rehabilitation works progressing.
8	Prepare a Subsidence Management Plan prior to commencing underground mining, in accordance with specified requirements	Not Applicable	No underground mining.
9	(a) Ensure that at least 15 competent people are efficiently employed on the lease area on each week day except Sunday or any week day that is a public holiday. OR (b) Expend on operations an amount of not less than $262,500 per annum whilst the lease is in force.	Yes	An average of 86 full time personnel employed during the reporting period.
10	Comply with any direction given by an Environmental Officer of the Department in regard to non-compliance with the Act or any condition of this lease.	Not Yet Applicable	No direction received during reporting period.

Relevant Condition	Conditional Requirement	Compliance	Comments
11	Provide an exploration report, within a period of 28 days after each anniversary of the date this lease has effect. The report must be to the satisfaction of the DG and contain the specified requirements.	Yes	Report provided within 28 days for the reporting period.
15(a)	Ensure that ground vibration peak particle velocity generated by any blasting does not exceed 10mm/sec and does not exceed 5mm/sec in more than 5% of the total number of blasts over a period of 12 months at any dwelling or occupied premises.	Yes	No exceedances recorded.
15(b)	Ensure that blast overpressure noise level generated by any blasting does not exceed 120 dB (linear) and does not exceed 115 dB (linear) more than 5% of the total number of blasts over a period of 12 months, at any dwelling or occupied premises.	Yes	No exceedances recorded.
16	Carry out operations in a manner that ensures the safety of persons and stock.	Yes	As per condition.
17(a)	Advise DWE Regional hydrogeologist of intention to drill exploration holes 28 days prior to commencement.	Yes	NSW Water and Energy notified 20th April 2011 for exploration program.
17(b)	All exploration drill holes must be completed to the satisfaction of the Director General in relation to:- • adequate marking/survey • sealed to prevent collapse • sealed with cement plugs to prevent discharge of groundwaters • if meets gas, it is plugged to prevent escape • if meets artesian or sub-artesian flow is sealed to prevent contamination of aquifer • once no longer used, is sealed according to Department guidelines • once no longer used, the land is left in a clean, tidy and stable condition.	Yes	As per condition.
18	Operations must be carried out so as not to cause or aggravate air pollution, water pollution or soil contamination or erosion.	No	Non-compliant discharges as detailed in report.

Relevant Condition	Conditional Requirement	Compliance	Comments
19	Operations must not interfere with transmission lines, pipelines or any other utility, without prior written approval of the DG and subject to any conditions he may stipulate.	Yes	Powerlines at north of site removed, with Approval given by DG prior.
20	Activities must not interfere with or damage fences and gates must be closed or left open in accordance with landholder requirements.	Yes	As per condition.
21(a)	Operations must not affect any road unless in accordance with the MOP or written approval of Director General.	Yes	As per condition.
21(b)	Leaseholder must pay to the authority responsible for the road the cost incurred in fixing any damage to the roads caused by the operations.	Yes	Agreement in place with GSC.
22	Access tracks kept to a minimum and positioned so as not to cause unnecessary damage. Temporary tracks to be ripped, topsoiled and revegetated when no longer required.	Yes	As per condition.
23(a)	Trees must not be felled without the consent of the landholder who is entitled to the use of the timber.	Yes	As per condition.
23(b)	Trees must not be felled on the lease area except where it directly obstructs or prevents the carrying out of operations.	Yes	As per condition.
23(c)	Timber from Crown land within the lease area must not be used until all relevant approvals have been obtained.	Yes	As per condition.
25	Comply with direction of Director General if notice is issued with regard to resource recovery	Not Yet Applicable	No notice issued.
27	Provision of Security of $100,000 to the Minister to ensure fulfilment of lease conditions.	Yes	As per condition.

MPL 1662

Relevant Condition	Conditional Requirement	Compliance	Comments
1	Service of notice on landholders of grant/renewal of mining lease.	Not applicable	Whitehaven owned property.
2	Implement all practicable measures to prevent and/or minimise any harm to the environment that may result from the construction, operation or rehabilitation of the development.	Yes	As per condition.
3	Mining operations must not be carried out unless in accordance with a Mining Operations Plan.	Yes	As per condition.
4	The lease holder must lodge Environmental Management Reports (EMR) with the Director-General annually or at dates otherwise directed by the Director-General.	Yes	This document.
5	The lease holder must report any environmental incidents. The report must be prepared according to any relevant departmental guidelines, and be submitted within 24 hrs of the incident occurring.	Not applicable	No significant incidents have occurred.
6	Any additional environmental reports requested must be lodged as instructed.	Not applicable	None requested.
7	Rehabilitate disturbed land to a sustainable/agreed end land use to the satisfaction of the DG.	Yes	Progressive rehabilitation taking place.
10	Ensure that ground vibration peak particle velocity generated by any blasting does not exceed 10mm/sec and does not exceed 5mm/sec in more than 5% of the total number of blasts over a period of 12 months at any dwelling or occupied premises. Ensure that blast overpressure noise level generated by any blasting does not exceed 120 dB (linear) and does not exceed 115 dB (linear) more than 5% of the total number of blasts over a period of 12 months, at any dwelling or occupied premises.	Yes	Blasting results confirm compliance for the period.
11	Operations must be carried out in a manner that ensures the safety of persons or stock in the vicinity of the operations.	Yes	Safety systems in place.
12	Operations must be carried out in a manner that does not cause or aggravate air pollution, water (including groundwater) pollution, soil contamination or erosion, unless otherwise authorised by a relevant approval, and in accordance with an accepted Mining Operations Plan.	No	Non-compliant discharges as detailed in report.
13	Operations must not interfere with or impair the stability or efficiency of any transmission line, communication line, pipeline or any other utility on the lease area without the prior written approval of the Director-General and subject to any conditions stipulated.	Yes	Approval from DG gained for the re-location of powerlines.
14	The lease holder must pay to the relevant roads authority in control of the road or track the reasonable costs incurred by the	Yes	Road maintenance agreement in place with Gunnedah Shire

	roads authority in making good any damage to roads or tracks caused by operations carried out under this lease.		Council.
15	The lease holder must not fell trees, strip bark or cut timber on any land subject of this lease without the consent of the landholder who is entitled to the use of the timber. The lease holder must contact Forests NSW and obtain any required permit, licence or approval before taking timber from any Crown land within the lease area.	Not Applicable	No trees felled on any landholders or crown land.
18	The lease holder must indemnify and keep indemnified the Crown from and against all actions, suits, claims and demands of whatsoever nature and all costs, charges and expenses which may be brought against the lease holder or which the lease holder may incur in respect of any accident or injury to any person or property which may arise out of the construction, maintenance or working of any workings now existing or to be made by the lease holder within the lease area or in connection with any of the operations notwithstanding that all other conditions of this lease shall in all respects have been observed by the lease holder or that any such accident or injury shall arise from any act or thing which the lease holder may be licensed or compelled to do.	Not Applicable	None triggered as per condition.
24	The lease holder must make every reasonable attempt, and be able to demonstrate their attempts, to enter into a cooperation agreement with the holder(s) of any overlapping title(s). The cooperation agreement should address but not be limited to issues such as: • access arrangements • operational interaction procedures • dispute resolution • information exchange • well location • timing of drilling • potential resource extraction conflicts and • rehabilitation issues.	N/A	No overlapping titles on MPL 1662.

Appendix 4

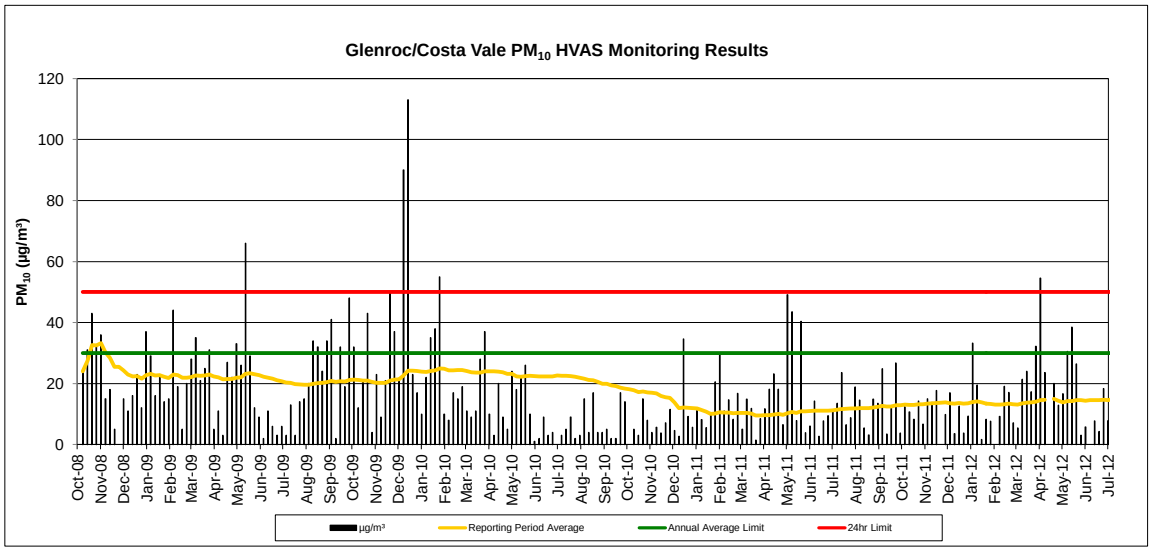
DUST MONITORING DATA

GLENROC/COSTA VALE PM10 HIGH VOLUME AIR SAMPLER

Date	mg/paper	µg/m³	Annual Average	Annual Average Limit	24hr Limit	Comments
8/10/2008	38.5	24	24.00	30	50	
14/10/2008	49.3	31	27.50	30	50	
20/10/2008	67.2	43	32.67	30	50	
26/10/2008	48.7	32	32.50	30	50	
1/11/2008	55	36	33.20	30	50	
7/11/2008	22.2	15	30.17	30	50	
13/11/2008	26.6	18	28.43	30	50	
19/11/2008	7.7	5	25.50	30	50	
25/11/2008			25.50	30	50	Unit malfunction
1/12/2008	23.2	15	24.33	30	50	
7/12/2008	16.8	11	23.00	30	50	
13/12/2008	24.4	16	22.36	30	50	
19/12/2008	26.8	23	22.42	30	50	
25/12/2008	22.8	12	21.62	30	50	
31/12/2008	56.7	37	22.71	30	50	
6/01/2009	44.4	29	23.13	30	50	
12/01/2009	25.4	16	22.69	30	50	
18/01/2009	36.5	23	22.71	30	50	
24/01/2009	20.5	14	22.22	30	50	
30/01/2009	23.8	15	21.84	30	50	
5/02/2009	66.8	44	22.95	30	50	
11/02/2009	30.3	19	22.76	30	50	
17/02/2009	7.7	5	21.95	30	50	
23/02/2009	30.4	20	21.87	30	50	
1/03/2009	43	28	22.13	30	50	
7/03/2009	54.4	35	22.64	30	50	
13/03/2009	33.7	21	22.58	30	50	
19/03/2009	39.8	25	22.67	30	50	
25/03/2009	48.2	31	22.96	30	50	
31/03/2009	8.4	5	22.34	30	50	
6/04/2009	18.2	11	21.97	30	50	
12/04/2009	5.2	3	21.35	30	50	
18/04/2009	43.8	27	21.53	30	50	
24/04/2009	35.1	22	21.55	30	50	
30/04/2009	52.9	33	21.88	30	50	
6/05/2009	41.7	26	22.00	30	50	
12/05/2009	105.8	66	23.22	30	50	
18/05/2009	45.8	29	23.38	30	50	
24/05/2009	18.9	12	23.08	30	50	
30/05/2009	14	9	22.72	30	50	
5/06/2009	3.3	2	22.20	30	50	
11/06/2009	18.2	11	21.93	30	50	
17/06/2009	10.3	6	21.55	30	50	
23/06/2009	6.4	3	21.12	30	50	
29/06/2009	4.8	6	20.77	30	50	
5/07/2009	4.6	3	20.38	30	50	
11/07/2009	21.9	13	20.22	30	50	
17/07/2009	4.1	3	19.85	30	50	
23/07/2009	22.7	14	19.73	30	50	
29/07/2009	24	15	19.63	30	50	
4/08/2009	31.9	20	19.64	30	50	
10/08/2009	54.3	34	19.92	30	50	
16/08/2009	51.4	32	20.15	30	50	
22/08/2009	38.1	24	20.23	30	50	
28/08/2009	55	34	20.48	30	50	
3/09/2009	66.5	41	20.85	30	50	
9/09/2009	2.6	2	20.52	30	50	
15/09/2009	50.5	32	20.72	30	50	
21/09/2009	29.7	19	20.69	30	50	
27/09/2009	76.9	48	21.15	30	50	
3/10/2009	50.4	32	21.33	30	50	
9/10/2009	19.5	12	21.13	30	50	
15/10/2009	32.9	21	20.97	30	50	
21/10/2009	67.3	43	20.97	30	50	
27/10/2009	6.6	4	20.50	30	50	
2/11/2009	36.2	23	20.28	30	50	
8/11/2009	14.7	9	20.18	30	50	
14/11/2009	32.9	21	20.23	30	50	
20/11/2009	75.9	50	20.98	30	50	
26/11/2009	55.7	37	21.25	30	50	
2/12/2009	33	21	21.34	30	50	
8/12/2009	133.4	90	22.64	30	50	
14/12/2009	174.9	113	24.23	30	50	
20/12/2009	36.3	23	24.23	30	50	
26/12/2009	25.9	17	24.10	30	50	
1/01/2010	16.1	10	23.87	30	50	
7/01/2010	33.7	22	23.75	30	50	
13/01/2010	52.6	35	24.07	30	50	
19/01/2010	58.8	38	24.31	30	50	
25/01/2010	84	55	24.98	30	50	
31/01/2010	15.7	10	24.90	30	50	
6/02/2010	12.4	8	24.31	30	50	
12/02/2010	25.1	17	24.28	30	50	
18/02/2010	23.4	15	24.44	30	50	
24/02/2010	12.1	19	24.43	30	50	
2/03/2010	17.9	11	24.15	30	50	
8/03/2010	13.5	9	23.72	30	50	
14/03/2010	16.7	11	23.56	30	50	

Date	mg/paper	µg/m³	Annual Average	Annual Average Limit	24hr Limit	Comments
20/03/2010	43.5	28	23.61	30	50	
26/03/2010	57.9	37	24.02	30	50	
1/04/2010	15.2	10	24.00	30	50	
7/04/2010	5.4	3	24.00	30	50	
13/04/2010	32.3	20	23.88	30	50	
19/04/2010	14.2	9	23.67	30	50	
25/04/2010	7.5	5	23.20	30	50	
1/05/2010	38.5	24	23.17	30	50	
7/05/2010	28.3	18	22.37	30	50	
13/05/2010	34.4	22	22.25	30	50	
19/05/2010	42.3	26	22.48	30	50	
25/05/2010	16.3	10	22.50	30	50	
31/05/2010	2	1	22.48	30	50	
6/06/2010	2.6	2	22.33	30	50	
12/06/2010	14.7	9	22.38	30	50	
18/06/2010	4.1	3	22.38	30	50	
24/06/2010	6.8	4	22.35	30	50	
30/06/2010			22.68	30	50	
6/07/2010	5.5	3	22.51	30	50	
12/07/2010	8	5	22.54	30	50	
18/07/2010	14.4	9	22.46	30	50	
24/07/2010	3.3	2	22.24	30	50	
30/07/2010	5.3	3	21.95	30	50	
5/08/2010	24.8	15	21.63	30	50	
11/08/2010	6.4	4	21.15	30	50	
17/08/2010	27.3	17	21.03	30	50	
23/08/2010	6.7	4	20.53	30	50	
29/08/2010	6.1	4	19.90	30	50	
4/09/2010	8.1	5	19.95	30	50	
10/09/2010	3.5	2	19.44	30	50	
16/09/2010	2.8	2	19.15	30	50	
22/09/2010	26.5	17	18.63	30	50	
28/09/2010	21.9	14	18.32	30	50	
4/10/2010	0.2	0	18.12	30	50	
10/10/2010	7.6	5	17.85	30	50	
16/10/2010	5	3	17.17	30	50	
22/10/2010	22.9	15	17.36	30	50	
28/10/2010	12.9	8	17.10	30	50	
3/11/2010	6.6	4	17.02	30	50	
9/11/2010	9.2	5.6	16.76	30	50	
15/11/2010	6.2	3.8	15.97	30	50	
21/11/2010	11.6	7.1	15.47	30	50	
27/11/2010	18.7	11.5	15.31	30	50	
3/12/2010	7.8	4.6	13.86	30	50	
9/12/2010	4.5	2.7	11.99	30	50	
15/12/2010	58.1	34.6	12.18	30	50	
21/12/2010	15.4	9.2	12.05	30	50	
27/12/2010	9.6	5.7	11.98	30	50	
2/01/2011	18.6	11.1	11.79	30	50	
8/01/2011	13.7	8.2	11.34	30	50	
14/01/2011	9.2	5.5	10.79	30	50	
20/01/2011	17.3	10.3	10.03	30	50	
26/01/2011	34.6	20.6	10.21	30	50	
1/02/2011	50.1	29.8	10.58	30	50	
7/02/2011	15.4	11	10.48	30	50	
13/02/2011	24.7	14.7	10.47	30	50	
19/02/2011	14	8.3	10.29	30	50	
25/02/2011	28.2	16.8	10.39	30	50	
3/03/2011	8.4	5	10.32	30	50	
9/03/2011	25	14.9	10.39	30	50	
15/03/2011	19.8	11.8	10.12	30	50	
21/03/2011	2.5	1.5	9.51	30	50	
27/03/2011	14.3	8.5	9.49	30	50	
2/04/2011	19.6	11.7	9.64	30	50	
8/04/2011	29.9	18.1	9.60	30	50	
14/04/2011	39	23.2	9.84	30	50	
20/04/2011	30.5	18.1	10.07	30	50	
26/04/2011	10.9	6.5	9.77	30	50	
2/05/2011	82.5	49.1	10.30	30	50	
8/05/2011	73.1	43.5	10.66	30	50	
14/05/2011	13.3	7.9	10.35	30	50	
20/05/2011	67.9	40.4	10.87	30	50	
26/05/2011	6.6	3.9	10.92	30	50	
1/06/2011	10.3	6.1	10.99	30	50	
7/06/2011	24.1	14.3	11.08	30	50	
13/06/2011	4.6	2.7	11.07	30	50	
19/06/2011	12.9	7.7	11.14	30	50	
25/06/2011	15.8	9.4	11.11	30	50	
1/07/2011	18.6	11.1	11.24	30	50	
7/07/2011	22.7	13.5	11.38	30	50	
13/07/2011	39.7	23.6	11.63	30	50	
19/07/2011	10.9	6.5	11.70	30	50	
25/07/2011	14.7	8.8	11.80	30	50	
31/07/2011	31.8	18.9	11.86	30	50	
6/08/2011	24.5	14.6	11.96	30	50	
12/08/2011	9.1	5.4	11.98	30	50	
18/08/2011	5.2	3.1	11.96	30	50	
24/08/2011	25.1	14.9	12.13	30	50	
30/08/2011	22.7	13.5	12.33	30	50	
5/09/2011	41.6	24.8	12.71	30	50	

Date	mg/paper	µg/m³	Annual Average	Annual Average Limit	24hr Limit	Comments
11/09/2011	5.9	3.5	12.48	30	50	
17/09/2011	21.5	12.8	12.46	30	50	
23/09/2011	44.9	26.7	12.92	30	50	
29/09/2011	6.4	3.8	12.90	30	50	
5/10/2011	20.9	12.4	13.06	30	50	
11/10/2011	18	10.7	12.98	30	50	
17/10/2011	13.9	8.3	12.99	30	50	
23/10/2011	24	14.3	13.16	30	50	
29/10/2011	11.3	6.7	13.18	30	50	
4/11/2011	25.1	15	13.37	30	50	
10/11/2011	23.2	13.8	13.48	30	50	
16/11/2011	29.7	17.7	13.59	30	50	
22/11/2011	<0.1	<0.1	13.74	30	50	
28/11/2011	16.5	9.8	13.87	30	50	
4/12/2011	28.5	17	13.56	30	50	
10/12/2011	6.1	3.6	13.47	30	50	
16/12/2011	21.2	12.6	13.59	30	50	
22/12/2011	6.4	3.8	13.46	30	50	
28/12/2011	15.7	9.3	13.48	30	50	
3/01/2012	55.7	33.2	13.96	30	50	
9/01/2012	32.7	19.5	14.12	30	50	
15/01/2012	2.9	1.7	13.79	30	50	
21/01/2012	13.9	8.3	13.42	30	50	
27/01/2012	12.8	7.6	13.36	30	50	
2/02/2012	19.7	0	13.11	30	50	Unit malfunction
8/02/2012	15.5	9.2	13.12	30	50	
14/02/2012	32	19.1	13.16	30	50	
20/02/2012	28.7	17.1	13.37	30	50	
26/02/2012	12	7.1	13.24	30	50	
3/03/2012	9.1	5.4	13.13	30	50	
9/03/2012	36	21.4	13.47	30	50	
15/03/2012	40.3	24	13.74	30	50	
21/03/2012	29.1	17.3	13.83	30	50	
27/03/2012	54	32.2	14.08	30	50	
2/04/2012	91.5	54.5	14.62	30	50	
8/04/2012	39.6	23.6	14.71	30	50	
16/04/2012				30	50	Unit malfunction
20/04/2012	33.6	20	14.94	30	50	
26/04/2012	21.6	12.9	14.32	30	50	
2/05/2012	28.1	16.7	13.86	30	50	
8/05/2012	51.2	30.5	14.25	30	50	
14/05/2012	64.7	38.5	14.21	30	50	
20/05/2012	44.3	26.4	14.60	30	50	
26/05/2012	5.1	3	14.55	30	50	
1/06/2012	16.3	5.8	14.40	30	50	Unit moved to Costa Vale
7/06/2012			14.61	30	50	Unit malfunction
13/06/2012	13.1	7.8	14.61	30	50	
19/06/2012	7.3	4.3	14.52	30	50	
25/06/2012	30.7	18.3	14.65	30	50	
1/07/2012	13.2	7.9	14.55	30	50	
7/07/2012	69.4	41.4	14.86	30	50	
13/07/2012	12.9	7.7	14.88	30	50	
19/07/2012	11.5	6.8	14.85	30	50	
25/07/2012	8.1	4.8	14.67	30	50	
31/07/2012	23.1	13.8	14.58	30	50	

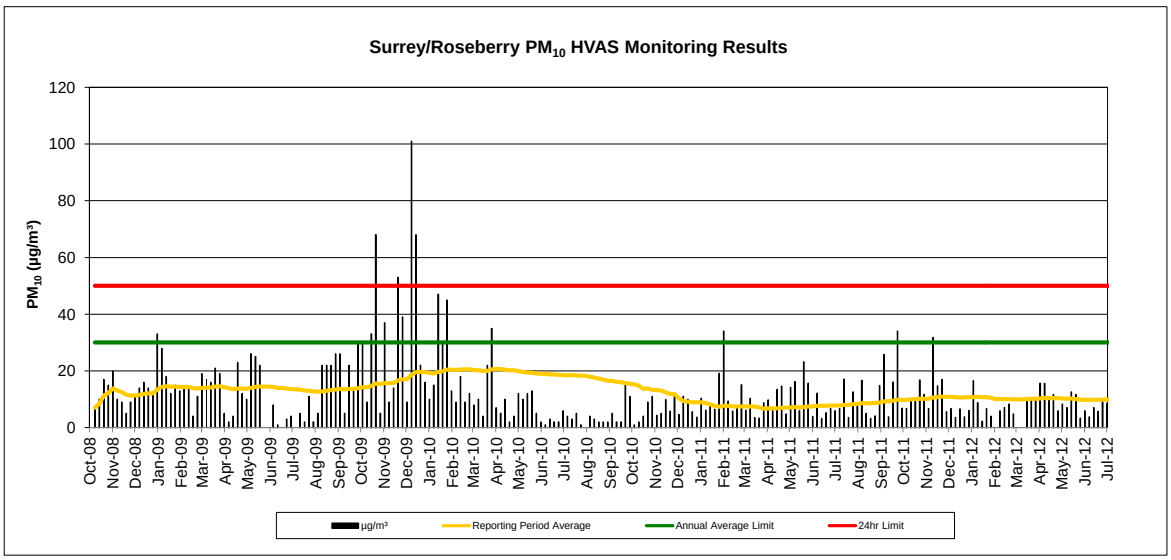


SURREY/ROSEBERRY PM10 HIGH VOLUME AIR SAMPLER

Date	mg/paper	µg/m³	Annual Average	Annual Average Limit	24hr Limit	Comments
8/10/2008	11.6	7	7.00	30	50	
14/10/2008	15.9	10	8.50	30	50	
20/10/2008	26.6	17	11.33	30	50	
26/10/2008	23.7	15	12.25	30	50	
1/11/2008	31.4	20	13.80	30	50	
7/11/2008	14.8	10	13.17	30	50	
13/11/2008	13.7	9	12.57	30	50	
19/11/2008	7	5	11.63	30	50	
25/11/2008	14.1	9	11.33	30	50	
1/12/2008	17.5	11	11.30	30	50	
7/12/2008	21.1	14	11.55	30	50	
13/12/2008	23.6	16	11.92	30	50	
19/12/2008	22.2	14	12.08	30	50	
25/12/2008	19	12	12.07	30	50	
31/12/2008	51.2	33	13.47	30	50	
6/01/2009	42.6	28	14.38	30	50	
12/01/2009	28.6	18	14.59	30	50	
18/01/2009	19.5	12	14.44	30	50	
24/01/2009	22.3	15	14.47	30	50	
30/01/2009	20.1	13	14.40	30	50	
5/02/2009	21.8	14	14.38	30	50	
11/02/2009	12.9	14	14.36	30	50	
17/02/2009	6	4	13.91	30	50	
23/02/2009	16.6	11	13.79	30	50	
1/03/2009	29.4	19	14.00	30	50	
7/03/2009	26.3	17	14.12	30	50	
13/03/2009	25.4	16	14.19	30	50	
19/03/2009	32.2	21	14.43	30	50	
25/03/2009	29	19	14.59	30	50	
31/03/2009	8.7	5	14.27	30	50	
6/04/2009	3	2	13.87	30	50	
12/04/2009	3.8	4	13.56	30	50	
18/04/2009	37	23	13.85	30	50	
24/04/2009	18.9	12	13.79	30	50	
30/04/2009	16.4	10	13.69	30	50	
6/05/2009	40.8	26	14.03	30	50	
12/05/2009	40.2	25	14.32	30	50	
18/05/2009	36	22	14.53	30	50	
24/05/2009			14.53	30	50	PM10 switched off by resident
30/05/2009			14.53	30	50	PM10 switched off by resident
5/06/2009	4	8	14.36	30	50	
11/06/2009	1.8	1	14.03	30	50	
17/06/2009			14.03	30	50	PM10 switched off by resident
23/06/2009	2.6	3	13.76	30	50	
29/06/2009	6.5	4	13.52	30	50	
5/07/2009	0.5	<1	13.52	30	50	
11/07/2009	7.8	5	13.33	30	50	
17/07/2009	3.6	2	13.07	30	50	
23/07/2009	17.8	11	13.02	30	50	
29/07/2009	3.6	2	12.78	30	50	
4/08/2009	11.1	5	12.62	30	50	
10/08/2009	35.4	22	12.81	30	50	
16/08/2009	35.2	22	13.00	30	50	
22/08/2009	34.1	22	13.18	30	50	
28/08/2009	41.9	26	13.43	30	50	
3/09/2009	42.8	26	13.67	30	50	
9/09/2009	7.7	5	13.51	30	50	
15/09/2009	35	22	13.67	30	50	
21/09/2009	19.7	13	13.65	30	50	
27/09/2009	46.9	30	13.95	30	50	
3/10/2009	46.9	30	14.23	30	50	
9/10/2009	15.1	9	14.26	30	50	
15/10/2009	51.1	33	14.67	30	50	
21/10/2009	107.5	68	15.56	30	50	
27/10/2009	7.9	5	15.39	30	50	
2/11/2009	58.4	37	15.68	30	50	
8/11/2009	14.7	9	15.67	30	50	
14/11/2009	21.4	14	15.75	30	50	
20/11/2009	79.8	53	16.60	30	50	
26/11/2009	58.5	39	17.12	30	50	
2/12/2009	14.8	9	17.09	30	50	
8/12/2009	150.6	101	18.61	30	50	
14/12/2009	104.5	68	19.53	30	50	
20/12/2009	34	22	19.67	30	50	
26/12/2009	25	16	19.50	30	50	
1/01/2010	14.8	10	19.33	30	50	
7/01/2010	22.7	15	19.11	30	50	
13/01/2010	70.2	47	19.61	30	50	
19/01/2010	47.3	30	19.93	30	50	
25/01/2010	68.1	45	20.46	30	50	
31/01/2010	20.3	13	20.46	30	50	
6/02/2010	14.4	9	20.37	30	50	
12/02/2010	27	18	20.44	30	50	
18/02/2010	14	9	20.53	30	50	
24/02/2010	18.3	12	20.54	30	50	
2/03/2010	13.2	8	20.35	30	50	
8/03/2010	15.9	10	20.23	30	50	

Date	mg/paper	µg/m³	Annual Average	Annual Average Limit	24hr Limit	Comments
14/03/2010	6.5	4	20.02	30	50	
20/03/2010	34.4	22	20.04	30	50	
26/03/2010	54.5	35	20.59	30	50	
1/04/2010	10.1	7	20.68	30	50	
7/04/2010	8.2	5	20.70	30	50	
13/04/2010	16.4	10	20.46	30	50	
19/04/2010	3.9	2	20.29	30	50	
25/04/2010	6.9	4	20.18	30	50	
1/05/2010	19.1	12	19.93	30	50	
7/05/2010	16.3	10	19.66	30	50	
13/05/2010	18.7	12	19.48	30	50	
19/05/2010	20.5	13	19.37	30	50	
25/05/2010	7.9	5	19.12	30	50	
31/05/2010	2.5	2	19.02	30	50	
6/06/2010	1.5	1	19.02	30	50	
12/06/2010	4.6	3	18.75	30	50	
18/06/2010	2.8	2	18.73	30	50	
24/06/2010	3.2	2	18.69	30	50	
30/06/2010	10	6	18.48	30	50	
6/07/2010	5.8	4	18.47	30	50	
12/07/2010	4.6	3	18.48	30	50	
18/07/2010	8	5	18.38	30	50	
24/07/2010	2	1	18.37	30	50	
30/07/2010	0.6	0	18.28	30	50	
5/08/2010	7	4	17.98	30	50	
11/08/2010	4.2	3	17.67	30	50	
17/08/2010	3.7	2	17.33	30	50	
23/08/2010	2.8	2	16.93	30	50	
29/08/2010	3.6	2	16.53	30	50	
4/09/2010	8	5	16.53	30	50	
10/09/2010	3.4	2	16.20	30	50	
16/09/2010	2.6	2	16.02	30	50	
22/09/2010	23.7	15	15.77	30	50	
28/09/2010	17.7	11	15.45	30	50	
4/10/2010	0.9	1	15.32	30	50	
10/10/2010	3.8	2	14.80	30	50	
16/10/2010	6.7	4	13.73	30	50	
22/10/2010	13.9	9	13.80	30	50	
28/10/2010	16.7	11	13.37	30	50	
3/11/2010	7.1	4.4	13.29	30	50	
9/11/2010	8.2	5	13.14	30	50	
15/11/2010	16.2	9.9	12.42	30	50	
21/11/2010	9.7	5.9	11.87	30	50	
27/11/2010	19.7	12.1	11.92	30	50	
3/12/2010	7.8	4.6	10.32	30	50	
9/12/2010	18.5	11	9.37	30	50	
15/12/2010	16.8	10	9.17	30	50	
21/12/2010	8.4	5.6	8.99	30	50	
27/12/2010	6.2	3.7	8.90	30	50	
2/01/2011	17.5	10.4	8.91	30	50	
8/01/2011	10.5	6.2	8.77	30	50	
14/01/2011	13.9	8.2	8.13	30	50	
20/01/2011	10.9	6.5	7.75	30	50	
26/01/2011	32.3	19.2	7.32	30	50	
1/02/2011	57.2	34	7.67	30	50	
7/02/2011	15.7	9.3	7.67	30	50	
13/02/2011	9.8	5.8	7.47	30	50	
19/02/2011	12.5	7.4	7.45	30	50	
25/02/2011	25.4	15.1	7.50	30	50	
3/03/2011	10.5	6.2	7.47	30	50	
9/03/2011	17.4	10.4	7.47	30	50	
15/03/2011	6	3.6	7.47	30	50	
21/03/2011	5.7	3.4	7.16	30	50	
27/03/2011	14.7	8.8	6.73	30	50	
2/04/2011	16.4	9.8	6.78	30	50	
8/04/2011	10.3	6.1	6.80	30	50	
14/04/2011	22.7	13.5	6.85	30	50	
20/04/2011	24.7	14.7	7.06	30	50	
26/04/2011	8.1	4.8	7.08	30	50	
2/05/2011	23.8	14.2	7.11	30	50	
8/05/2011	27.3	16.2	7.21	30	50	
14/05/2011	10	6	7.11	30	50	
20/05/2011	39	23.2	7.28	30	50	
26/05/2011	26.4	15.7	7.46	30	50	
1/06/2011	6.6	3.9	7.49	30	50	
7/06/2011	20.5	12.2	7.67	30	50	
13/06/2011	5.3	3.2	7.68	30	50	
19/06/2011	8.9	5.3	7.73	30	50	
25/06/2011	11.3	6.7	7.81	30	50	
1/07/2011	10	6	7.81	30	50	
7/07/2011	11.4	6.8	7.85	30	50	
13/07/2011	28.7	17.1	8.08	30	50	
19/07/2011	6	3.6	8.06	30	50	
25/07/2011	21.2	12.6	8.25	30	50	
31/07/2011	13.3	7.9	8.38	30	50	
6/08/2011	28	16.7	8.59	30	50	
12/08/2011	8.5	5.1	8.62	30	50	
18/08/2011	5.3	3.2	8.64	30	50	
24/08/2011	7.1	4.2	8.68	30	50	

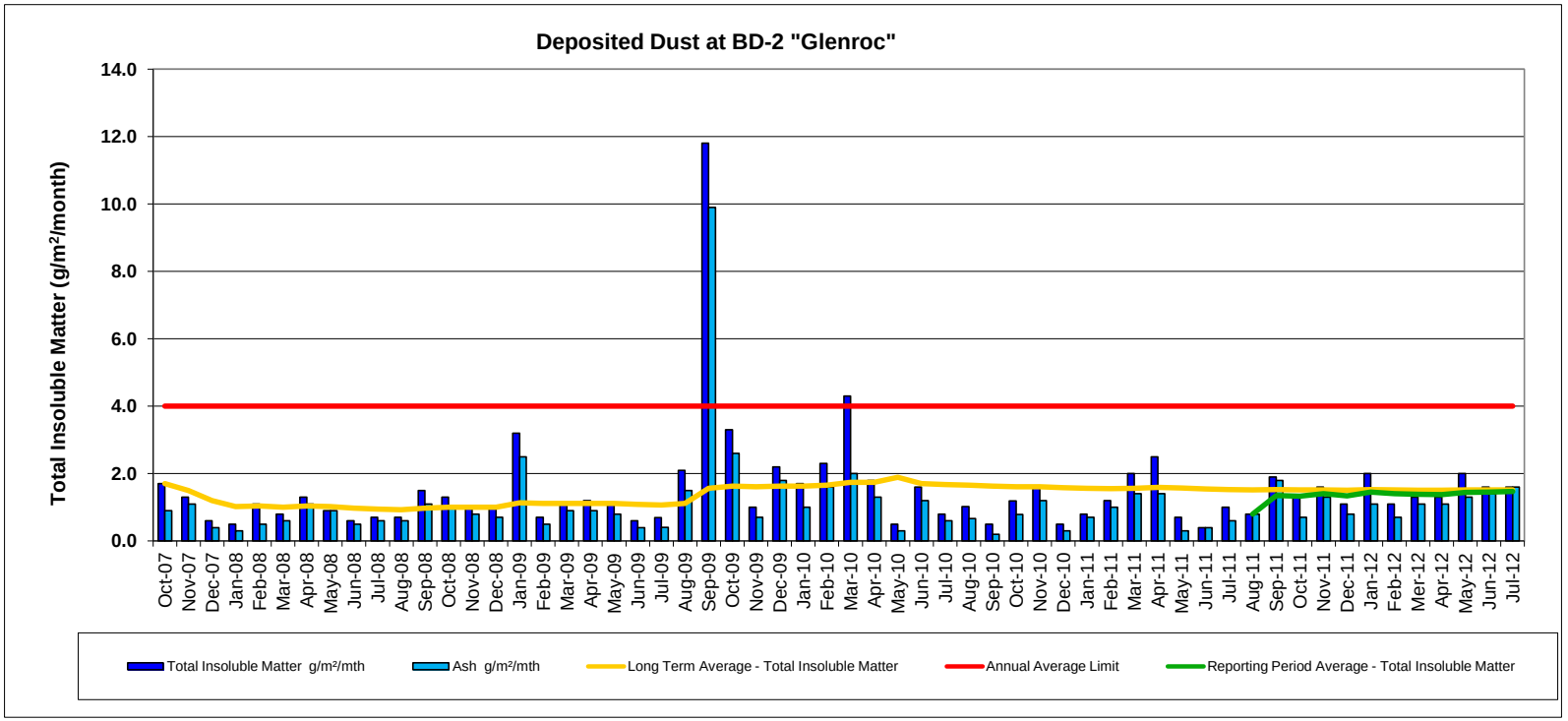
Date	mg/paper	µg/m³	Annual Average	Annual Average Limit	24hr Limit	Comments
30/08/2011	25	14.9	8.89	30	50	
5/09/2011	43.4	25.8	9.23	30	50	
11/09/2011	6.3	3.8	9.26	30	50	
17/09/2011	27	16.1	9.49	30	50	
23/09/2011	57.2	34.1	9.80	30	50	
29/09/2011	11.6	6.9	9.74	30	50	
5/10/2011	11.3	6.7	9.83	30	50	
11/10/2011	16	9.5	9.95	30	50	
17/10/2011	17.3	10.3	10.06	30	50	
23/10/2011	28.2	16.8	10.19	30	50	
29/10/2011	19.6	11.7	10.20	30	50	
4/11/2011	11.3	6.7	10.23	30	50	
10/11/2011	39.5	31.8	10.67	30	50	
16/11/2011	24.9	14.8	10.75	30	50	
22/11/2011	28.5	17	10.94	30	50	
28/11/2011	9.4	5.6	10.83	30	50	
4/12/2011	11.3	6.7	10.86	30	50	
10/12/2011	6	3.6	10.74	30	50	
16/12/2011	11.1	6.6	10.69	30	50	
22/12/2011	6.3	3.8	10.66	30	50	
28/12/2011	10.3	6.1	10.70	30	50	
3/01/2012	27.8	16.6	10.80	30	50	
9/01/2012	14.7	8.8	10.84	30	50	
15/01/2012	3.7	2.2	10.74	30	50	
21/01/2012	11.2	6.7	10.75	30	50	
27/01/2012	6.8	4	10.50	30	50	
2/02/2012	1.6		10.11	30	50	Regional flooding unit malfunction
8/02/2012	10.1	6	10.05	30	50	
14/02/2012	11.9	7.1	10.07	30	50	
20/02/2012	13.9	8.3	10.09	30	50	
26/02/2012	8.1	4.8	9.92	30	50	
3/03/2012	10.9		9.98	30	50	Power loss
9/03/2012			9.97	30	50	Unit malfunction
15/03/2012	15.8	9.4	10.07	30	50	
21/03/2012	16.9	10.1	10.19	30	50	
27/03/2012	17.5	10.4	10.21	30	50	
2/04/2012	26.3	15.7	10.32	30	50	
8/04/2012	26.3	15.6	10.48	30	50	
14/04/2012	18.1	10.8	10.43	30	50	
20/04/2012	19.7	11.7	10.38	30	50	
26/04/2012	10.1	6	10.40	30	50	
2/05/2012	14	8.3	10.30	30	50	
8/05/2012	12	7.1	10.14	30	50	
14/05/2012	21.2	12.6	10.26	30	50	
20/05/2012	19.7	11.7	10.06	30	50	
26/05/2012	5.8	3.4	9.85	30	50	
1/06/2012	10.1	6	9.88	30	50	
7/06/2012	6.4	3.8	9.74	30	50	
13/06/2012	11.9	7.1	9.81	30	50	
19/06/2012	9.6	5.7	9.81	30	50	
25/06/2012	16	9.5	9.86	30	50	
1/07/2012	14.3	8.5	9.90	30	50	
7/07/2012	12.1	7.2	9.91	30	50	
13/07/2012	11.9	7.1	9.74	30	50	
19/07/2012	12	7.1	9.80	30	50	
25/07/2012	12.3	7.3	9.71	30	50	



Deposited Dust BD-2 "Glenroc"

Sample Number	Sample Location	Sample Date	Sample Month	Sampler	Time	Volume Collected ml	Total Insoluble Matter g/m²/mth	Reporting Period Average - Total Insoluble Matter	Long Term Average - Total Insoluble Matter	Annual Average Limit	Ash g/m²/mth	Comment
28550.02	BD-2	5-Nov-07	Oct-07	Client	1330	765	1.7		1.7	4.0	0.9	
28662.02	BD-2	5-Dec-07	Nov-07	Client	1305	1255	1.3		1.5	4.0	1.1	
28923.02	BD-2	3-Jan-08	Dec-07	Client	1050	1505	0.6		1.2	4.0	0.4	
29224.02	BD-2	5-Feb-08	Jan-08	Client	1320	1510	0.5		1.0	4.0	0.3	
29525.02	BD-2	5-Mar-08	Feb-08	Client	1245	1445	1.1		1.0	4.0	0.5	
29773.02	BD-2	4-Apr-08	Mar-08	Client	0950	50	0.8		1.0	4.0	0.6	
30055.02	BD-2	5-May-08	Apr-08	Client	1155	230	1.3		1.0	4.0	1.1	
30386.02	BD-2	4-Jun-08	May-08	Client	1010	720	0.9		1.0	4.0	0.9	
30660.02	BD-2	9-Jul-08	Jun-08	Client	1415	380	0.6		1.0	4.0	0.5	
30902.02	BD-2	5-Aug-08	Jul-08	Client	0910	460	0.7		1.0	4.0	0.6	
31210.02	BD-2	1-Sep-08	Aug-08	Client	1545	715	0.7		0.9	4.0	0.6	
31527.02	BD-2	2-Oct-08	Sep-08	Client	1400	1240	1.5		1.0	4.0	1.1	
31775.02	BD-2	5-Nov-08	Oct-08	Client	1615	1780	1.3		1.0	4.0	1.0	
32023.02	BD-2	4-Dec-08	Nov-08	Client	0930	1085	1.0		1.0	4.0	0.8	
32518.02	BD-2	5-Jan-09	Dec-08	Client	1528	1075	1.0		1.0	4.0	0.7	
32246.02	BD-2	2-Feb-09	Jan-09	Client	1600	325	3.2		1.1	4.0	2.5	
32863.02	BD-2	2-Mar-09	Feb-09	Client	1458	1210	0.7		1.1	4.0	0.5	
2600 1004 -00	BD-2	1-Apr-09	Mar-09	ALS Acirl		<50	1.1		1.1	4.0	0.9	
2600 1019 -00	BD-2	1-May-09	Apr-09	ALS Acirl		500	1.2		1.1	4.0	0.9	
2600 1034 -01	BD-2	4-Jun-09	May-09	ALS Acirl		600	1.1		1.1	4.0	0.8	
2600 1042 - 01	BD-2	6-Jul-09	Jun-09	ALS Acirl		550	0.6		1.1	4.0	0.4	
2600 1054 - 01	BD-2	3-Aug-09	Jul-09	ALS Acirl	1430	350	0.7		1.1	4.0	0.4	
2600 1064 - 00	BD-2	31-Aug-09	Aug-09	ALS Acirl	1430	50	2.1		1.1	4.0	1.5	
2600 1098 - 01	BD-2	29-Sep-09	Sep-09	ALS Acirl	1327	800	11.8		1.6	4.0	9.9	
2600 1128 - 00	BD-2	3-Nov-09	Oct-09	ALS Acirl	1345	700	3.3		1.6	4.0	2.6	
2600 1204 - 00	BD-2	4-Dec-09	Nov-09	ALS Acirl	1135	dry	1		1.6	4.0	0.7	
2600 1222 - 00	BD-2	4-Jan-10	Dec-09	ALS Acirl	1615	2500	2.2		1.6	4.0	1.8	
2600 1234 - 00	BD-2	1-Feb-10	Jan-10	ALS Acirl	1430	400	1.7		1.6	4.0	1	
2600 1247 - 00	BD-2	2-Mar-10	Feb-10	ALS Acirl	1325	2300	2.3		1.7	4.0	1.6	
2600 1260 - 00	BD-2	30-Mar-10	Mar-10	ALS Acirl	1200	250	4.3		1.7	4.0	2	
2600 1268 - 00	BD-2	27-Apr-10	Apr-10	ALS Acirl	1250	350	1.8		1.7	4.0	1.3	
2600 1277 - 00	BD-2	25-May-10	May-10	ALS Acirl	1400	10	0.5		1.9	4.0	0.3	
2600 1288 - 776	BD-2	24-Jun-10	Jun-10	ALS Acirl	0950	800	1.6		1.7	4.0	1.2	
2600 1288 - 827	BD-2	22-Jul-10	Jul-10	ALS Acirl	0930	600	0.8		1.7	4.0	0.6	
2600-1309-913	BD-2	20-Aug-10	Aug-10	ALS Acirl	1315	2000	1.0		1.7	4.0	0.7	Insects, Plant Material
6800-4319-07	BD-2	21-Sep-10	Sep-10	ALS Acirl	1150	800	0.5		1.6	4.0	0.2	insects:bird droppings
2600-1340-09	BD-2	21-Oct-10	Oct-10	ALS Acirl	1145	2500	1.2		1.6	4.0	0.8	No observations recorded
EN1002887-001	BD-2	22-Nov-10	Nov-10	ALS Acirl	1340	2200	1.6		1.6	4.0	1.2	Insects/Plant Material
EN1003102-001	BD-2	22-Dec-10	Dec-10	ALS Acirl	1300	1600	0.5		1.6	4.0	0.3	Insects/Plant Material
EN1100201-001	BD-2	21-Jan-11	Jan-11	ALS Acirl	1315	200	0.8		1.6	4.0	0.7	Insects/Plant Material
EN1100445-001	BD-2	22-Feb-11	Feb-11	ALS Acirl	1150	200	1.2		1.6	4.0	1.0	Insects/Plant Material
EN1100694-001	BD-2	24-Mar-11	Mar-11	ALS Acirl	1045	400	2		1.6	4.0	1.4	Insects/Plant Material
EN1100921-001	BD-2	20-Apr-11	Apr-11	ALS Acirl	1115	250	2.5		1.6	4.0	1.4	Bird Droppings/Plant Material
EN1101201-001	BD-2	20-May-11	May-11	ALS Acirl	1141	Nil	0.7		1.6	4.0	0.3	Bird Droppings
EN1101447-001	BD-2	20-Jun-11	Jun-11	ALS Acirl	1145	50	0.4		1.5	4.0	0.4	Insects/Plant Material/Funnel Broken
EN1101811-001	BD-2	19-Jul-11	Jul-11	ALS Acirl	1215	100	1		1.5	4.0	0.6	Clear
EN1102303-001	BD-2	17-Aug-11	Aug-11	ALS	1140	100	0.8	0.8	1.5	4.0	0.8	Insects and Plant Material
EN1102774-001	BD-2	16-Sep-11	Sep-11	ALS	1210	300	1.9	1.4	1.5	4.0	1.8	Insects, broken funnel, replaced, glas s in bottle

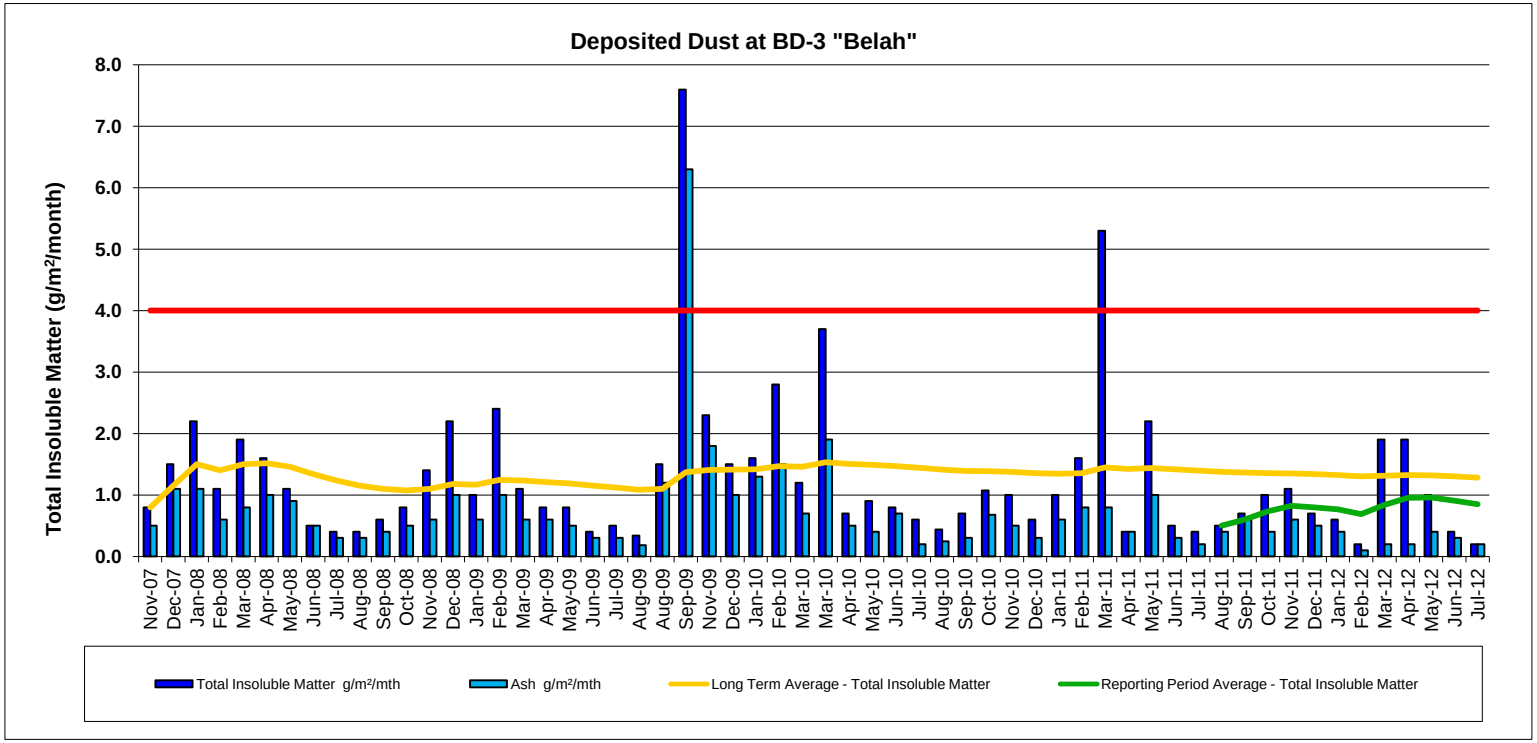
Sample Number	Sample Location	Sample Date	Sample Month	Sampler	Time	Volume Collected ml	Total Insoluble Matter g/m²/mth	Reporting Period Average - Total Insoluble Matter	Long Term Average - Total Insoluble Matter	Annual Average Limit	Ash g/m²/mth	Comment
EN1103123-001	BD-2	17-Oct-11	Oct-11	ALS	1220	1700	1.3	1.3	1.5	4.0	0.7	Insects, Bird Droppings
EN1103468-001	BD-2	15-Nov-11	Nov-11	ALS	1245	600	1.6	1.4	1.5	4.0	1.3	Insects, Plant material
EN1104230-001	BD-2	15-Dec-11	Dec-11	ALS	1200	2500	1.1	1.3	1.5	4.0	0.8	Insects, Plant material
EN1200243-001	BD-2	13-Jan-12	Jan-12	ALS	1310	700	2	1.5	1.5	4.0	1.1	Insects, Plant material
EN1200609-001	BD-2	13-Feb-12	Feb-12	ALS	1350	2500	1.1	1.4	1.5	4.0	0.7	Insects, Plant material
EN1201022-001	BD-2	15-Mar-12	Mer-12	ALS	1140	500	1.3	1.4	1.5	4.0	1.1	Insects, Plant material
EN1201452-001	BD-2	16-Apr-12	Apr-12	ALS	1200	200	1.3	1.4	1.5	4.0	1.1	Insects, Bird droppings, Plant material
EN1201861-001	BD-2	17-May-12	May-12	ALS	1225	300	2	1.4	1.5	4.0	1.3	Insects
EN1202262-001	BD-2	18-Jun-12	Jun-12	ALS	1245	1200	1.6	1.5	1.5	4.0	1.4	Insects
EN1202678-001	BD-2	18-Jul-12	Jul-12	ALS	1310	1600	1.6	1.5	1.5	4.0	1.6	Insects



Deposited Dust BD-3 "Belah"

Sample Number	Sample Location	Sample Date	Sample Month	Sampler	Time	Volume Collected ml	Total Insoluble Matter g/m²/mth	Reporting Period Average - Total Insoluble Matter	Long Term Average - Total Insoluble Matter	Annual Average Limit	Ash g/m²/mth	Comment
28550.03	BD-3	5-Nov-07	Oct-07	Client	1315	630	0.8		0.8	4.0	0.5	
28662.03	BD-3	5-Dec-07	Nov-07	Client	1315	1515	1.5		1.2	4.0	1.1	
28923.03	BD-3	3-Jan-08	Dec-07	Client	1035	1345	2.2		1.5	4.0	1.1	
29224.03	BD-3	5-Feb-08	Jan-08	Client	1330	1335	1.1		1.4	4.0	0.6	
29525.03	BD-3	5-Mar-08	Feb-08	Client	1205	1170	1.9		1.5	4.0	0.8	
29773.03	BD-3	4-Apr-08	Mar-08	Client	0940	90	1.6		1.5	4.0	1.0	
30055.03	BD-3	5-May-08	Apr-08	Client	1205	230	1.1		1.5	4.0	0.9	
30386.03	BD-3	4-Jun-08	May-08	Client	1020	865	0.5		1.3	4.0	0.5	
30660.03	BD-3	9-Jul-08	Jun-08	Client	1330	445	0.4		1.2	4.0	0.3	
30902.03	BD-3	5-Aug-08	Jul-08	Client	0850	395	0.4		1.2	4.0	0.3	
31210.03	BD-3	1-Sep-08	Aug-08	Client	1640	740	0.6		1.1	4.0	0.4	
31527.03	BD-3	2-Oct-08	Sep-08	Client	1545	1085	0.8		1.1	4.0	0.5	
31775.03	BD-3	5-Nov-08	Oct-08	Client	1750	1685	1.4		1.1	4.0	0.6	
32023.03	BD-3	4-Dec-08	Nov-08	Client	0730	1005	2.2		1.2	4.0	1.0	
32518.03	BD-3	5-Jan-09	Dec-08	Client	1558	1130	1.0		1.2	4.0	0.6	
32246.03	BD-3	2-Feb-09	Jan-09	Client	1650	230	2.4		1.2	4.0	1.0	
32863.03	BD-3	2-Mar-09	Feb-09	Client	1535	1300	1.1		1.2	4.0	0.6	
2600 1004 -00	BD-3	1-Apr-09	Mar-09	ALS Acirl		<50	0.8		1.2	4.0	0.6	
2600 1019 -00	BD-3	1-May-09	Apr-09	ALS Acirl		400	0.8		1.2	4.0	0.5	
2600 1034 -01	BD-3	4-Jun-09	May-09	ALS Acirl		600	0.4		1.2	4.0	0.3	
2600 1042 - 01	BD-3	6-Jul-09	Jun-09	ALS Acirl		500	0.5		1.1	4.0	0.3	
2601 1054 - 01	BD-3	3-Aug-09	Jul-09	ALS Acirl	1500	350	0.3		1.1	4.0	0.2	
2600 1064 - 00	BD-3	31-Aug-09	Aug-09	ALS Acirl	1450	50	1.5		1.1	4.0	1.2	
2600 1098 - 01	BD-3	29-Sep-09	Sep-09	ALS Acirl	1355	600	7.6		1.4	4.0	6.3	
2600 1128 - 00	BD-3	3-Nov-09	Oct-09	ALS Acirl	1405	600	2.3		1.4	4.0	1.8	
2601 1204 - 00	BD-3	4-Dec-09	Nov-09	ALS Acirl	1150	dry	1.5		1.4	4.0	1	
2600 1222 - 00	BD-3	4-Jan-10	Dec-09	ALS Acirl	1625	2500	1.6		1.4	4.0	1.3	
2600 1234 - 00	BD-3	1-Feb-10	Jan-10	ALS Acirl	1450	200	2.8		1.5	4.0	1.5	
2600 1247 - 00	BD-3	2-Mar-10	Feb-10	ALS Acirl	1345	2000	1.2		1.5	4.0	0.7	
2600 1260 - 00	BD-3	30-Mar-10	Mar-10	ALS Acirl	1230	200	3.7		1.5	4.0	1.9	
2600 1268 - 00	BD-3	27-Apr-10	Apr-10	ALS Acirl	1320	400	0.7		1.5	4.0	0.5	
2600 1277 - 00	BD-3	25-May-10	May-10	ALS Acirl	1420	10	0.9		1.5	4.0	0.4	
2600 1288 - 776	BD-3	24-Jun-10	Jun-10	ALS Acirl	0930	900	0.8		1.5	4.0	0.7	
2600 1288 - 827	BD-3	22-Jul-10	Jul-10	ALS Acirl	0940	600	0.6		1.4	4.0	0.2	
2600-1309-913	BD-3	20-Aug-10	Aug-10	ALS Acirl	1325	2000	0.4		1.4	4.0	0.2	Insects
6800-4319-07	BD-3	21-Sep-10	Sep-10	ALS Acirl	1115	800	0.7		1.4	4.0	0.3	insects
2600-1340-09	BD-3	21-Oct-10	Oct-10	ALS Acirl	1110	2500	1.1		1.4	4.0	0.7	No observations recorded
EN1002887-002	BD-3	22-Nov-10	Nov-10	ALS Acirl	1430	2200	1.0		1.4	4.0	0.5	Insects/Plant Material
EN1003102-002	BD-3	22-Dec-10	Dec-10	ALS Acirl	1340	1400	0.6		1.4	4.0	0.3	Insects/Plant Material
EN1100201-002	BD-3	21-Jan-11	Jan-11	ALS Acirl	1340	200	1.0		1.3	4.0	0.6	Insects/Plant Material
EN1100445-002	BD-3	22-Feb-11	Feb-11	ALS Acirl	1210	200	1.6		1.4	4.0	0.8	Insects/Plant Material/Spiders
EN1100694-002	BD-3	24-Mar-11	Mar-11	ALS Acirl	1110	400	5.3		1.4	4.0	0.8	Spiders/Insects/Bird Droppings/Plant
EN1100921-002	BD-3	20-Apr-11	Apr-11	ALS Acirl	1145	250	0.4		1.4	4.0	0.4	Plant Material
EN1101201-002	BD-3	20-May-11	May-11	ALS Acirl	1150	Nil	2.2		1.4	4.0	1	Insects
EN1101447-002	BD-3	20-Jun-11	Jun-11	ALS Acirl	1215	1600	0.5		1.4	4.0	0.3	Insects/Plant Material
EN1101811-002	BD-3	19-Jul-11	Jul-11	ALS Acirl	1235	50	0.4		1.4	4.0	0.2	Clear

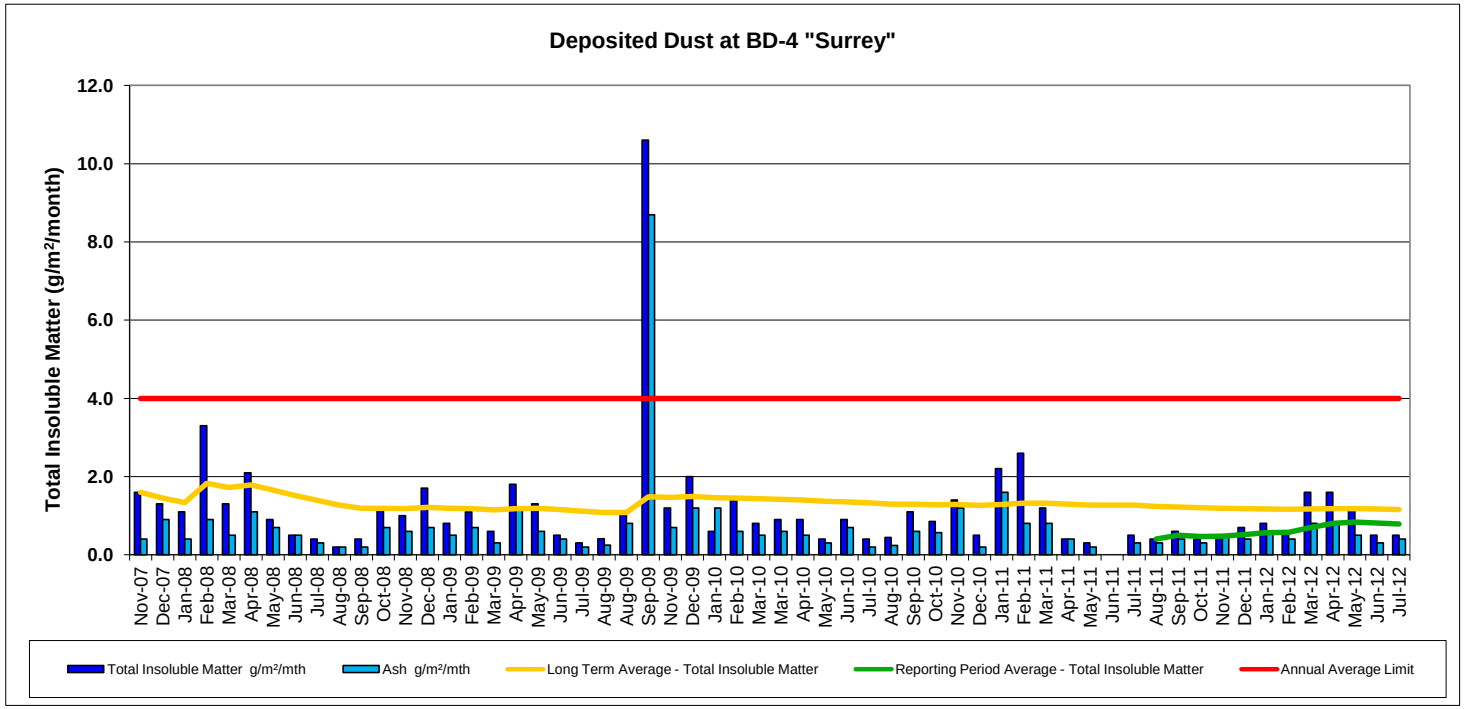
Sample Number	Sample Location	Sample Date	Sample Month	Sampler	Time	Volume Collected ml	Total Insoluble Matter g/m²/mth	Reporting Period Average - Total Insoluble Matter	Long Term Average - Total Insoluble Matter	Annual Average Limit	Ash g/m²/mth	Comment
EN1102303-002	BD-3	17-Aug-11	Aug-11	ALS	1215	80	0.5	0.5	1.4	4.0	0.4	Bird droppings, plant material
EN1102774-002	BD-3	16-Sep-11	Sep-11	ALS	1245	700	0.7	0.6	1.4	4.0	0.6	Insects, Plant material
EN1103123-002	BD-3	17-Oct-11	Oct-11	ALS	1250	1700	1	0.7	1.4	4.0	0.4	
EN1103468-002	BD-3	15-Nov-11	Nov-11	ALS	1245	400	1.1	0.8	1.4	4.0	0.6	Insects, Plant material
EN1104230-002	BD-3	15-Dec-11	Dec-11	ALS	1220	2500	0.7	0.8	1.3	4.0	0.5	Insects, Plant material
EN1200243-002	BD-3	13-Jan-12	Jan-12	ALS	1245	600	0.6	0.8	1.3	4.0	0.4	Insects, Plant material
EN1200609-002	BD-3	13-Feb-12	Feb-12	ALS	1400	2500	0.2	0.7	1.3	4.0	0.1	Insects, Plant material
EN1201022-002	BD-3	15-Mar-12	Mar-12	ALS	1200	500	1.9	0.8	1.3	4.0	0.2	Insects, Plant material
EN1201452-002	BD-3	16-Apr-12	Apr-12	ALS	1215	100	1.9	1.0	1.3	4.0	0.2	Insects, Plant material
EN1201861-002	BD-3	17-May-12	May-12	ALS	1245	200	1	1.0	1.3	4.0	0.4	Insects, Plant material
EN1202262-002	BD-3	18-Jun-12	Jun-12	ALS	1300	1500	0.4	0.9	1.3	4.0	0.3	Plant material
EN1202678-002	BD-3	18-Jul-12	Jul-12	ALS	1330	1600	0.2	0.9	1.3	4.0	0.2	Insects



Deposited Dust BD-4 "Surrey"

Sample Number	Sample Location	Sample Date	Sample Month	Sampler	Time	Volume Collected ml	Total Insoluble Matter g/m²/mth	Reporting Period Average - Total Insoluble Matter	Long Term Average - Total Insoluble Matter	Annual Average Limit	Ash g/m²/mth	Comment
28550.04	BD-4	5-Nov-07	Oct-07	Client	1245	610	1.6		1.6	4.0	0.4	
28662.04	BD-4	5-Dec-07	Nov-07	Client	1400	1530	1.3		1.5	4.0	0.9	
28923.04	BD-4	3-Jan-08	Dec-07	Client	1000	1465	1.1		1.3	4.0	0.4	
29224.04	BD-4	5-Feb-08	Jan-08	Client	1415	1365	3.3		1.8	4.0	0.9	
29525.04	BD-4	5-Mar-08	Feb-08	Client	1135	1115	1.3		1.7	4.0	0.5	
29773.04	BD-4	4-Apr-08	Mar-08	Client	0845	100	2.1		1.8	4.0	1.1	
30055.04	BD-4	5-May-08	Apr-08	Client	1300	210	0.9		1.7	4.0	0.7	
30386.04	BD-4	4-Jun-08	May-08	Client	1140	965	0.5		1.5	4.0	0.5	
30660.04	BD-4	9-Jul-08	Jun-08	Client	1300	505	0.4		1.4	4.0	0.3	
30902.04	BD-4	5-Aug-08	Jul-08	Client	0840	280	0.2		1.3	4.0	0.2	
31210.04	BD-4	1-Sep-08	Aug-08	Client	1730	715	0.4		1.2	4.0	0.2	
31527.04	BD-4	2-Oct-08	Sep-08	Client	1500	1215	1.2		1.2	4.0	0.7	
31775.04	BD-4	5-Nov-08	Oct-08	Client	1735	1760	1.0		1.2	4.0	0.6	
32023.04	BD-4	4-Dec-08	Nov-08	Client	0845	1150	1.7		1.2	4.0	0.7	
32518.04	BD-4	5-Jan-09	Dec-08	Client	1642	1100	0.8		1.2	4.0	0.5	
32246.04	BD-4	2-Feb-09	Jan-09	Client	1504	215	1.1		1.2	4.0	0.7	
32863.04	BD-4	2-Mar-09	Feb-09	Client	1628	1620	0.6		1.1	4.0	0.3	
2600 1004 -00	BD-4	1-Apr-09	Mar-09	ALS Acirl		<50	1.8		1.2	4.0	1.2	
2600 1019 -00	BD-4	1-May-09	Apr-09	ALS Acirl		300	1.3		1.2	4.0	0.6	
2600 1034 -01	BD-4	4-Jun-09	May-09	ALS Acirl		600	0.5		1.2	4.0	0.4	
2600 1042 - 01	BD-4	6-Jul-09	Jun-09	ALS Acirl		450	0.3		1.1	4.0	0.2	
2602 1054 - 01	BD-4	3-Aug-09	Jul-09	ALS Acirl	1530	350	0.4		1.1	4.0	0.2	
2600 1064 - 00	BD-4	31-Aug-09	Aug-09	ALS Acirl	1512	20	1.1		1.1	4.0	0.8	
2600 1098 - 01	BD-4	29-Sep-09	Sep-09	ALS Acirl	1425	800	10.6		1.5	4.0	8.7	
2600 1128 - 00	BD-4	3-Nov-09	Oct-09	ALS Acirl	1433	700	1.2		1.5	4.0	0.7	
2601 1204 - 00	BD-4	4-Dec-09	Nov-09	ALS Acirl	1230	dry	2		1.5	4.0	1.2	
2600 1222 - 00	BD-4	4-Jan-10	Dec-09	ALS Acirl	1640	2500	0.6		1.5	4.0	1.2	
2600 1234 - 00	BD-4	1-Feb-10	Jan-10	ALS Acirl	1525	50	1.4		1.5	4.0	0.6	
2600 1247 - 00	BD-4	2-Mar-10	Feb-10	ALS Acirl	1410	2300	0.8		1.4	4.0	0.5	
2600 1260 - 00	BD-4	30-Mar-10	Mar-10	ALS Acirl	1340	200	0.9		1.4	4.0	0.6	
2600 1268 - 00	BD-4	27-Apr-10	Apr-10	ALS Acirl	1400	350	0.9		1.4	4.0	0.5	
2600 1277 - 00	BD-4	25-May-10	May-10	ALS Acirl	1505	10	0.4		1.4	4.0	0.3	
2600 1288 - 776	BD-4	24-Jun-10	Jun-10	ALS Acirl	0915	900	0.9		1.4	4.0	0.7	
2600 1288 - 827	BD-4	22-Jul-10	Jul-10	ALS Acirl	0835	600	0.4		1.3	4.0	0.2	
2600-1309-913	BD-4	20-Aug-10	Aug-10	ALS Acirl	1425	2000	0.4		1.3	4.0	0.2	Insects, Plant Material
6800-4319-07	BD-4	21-Sep-10	Sep-10	ALS Acirl	1025	800	1.1		1.3	4.0	0.6	Insects
2600-1340-09	BD-4	21-Oct-10	Oct-10	ALS Acirl	1230	2500	0.8		1.3	4.0	0.6	No observations recorded
EN1002887-003	BD-4	22-Nov-10	Nov-10	ALS Acirl	1535	2400	1.4		1.3	4.0	1.2	Insects/Plant Material
EN1003102-003	BD-4	22-Dec-10	Dec-10	ALS Acirl	1440	1300	0.5		1.3	4.0	0.2	Insects/Bird Droppings/Plant
EN1100201-003	BD-4	21-Jan-11	Jan-11	ALS Acirl	1405	300	2.2		1.3	4.0	1.6	Insects/Plant Material
EN1100445-003	BD-4	22-Feb-11	Feb-11	ALS Acirl	1300	200	2.6		1.3	4.0	0.8	Insects/Plant Mat/Bird Droppings
EN1100694-003	BD-4	24-Mar-11	Mar-11	ALS Acirl	1150	400	1.2		1.3	4.0	0.8	Insects/Plant Material
EN1100921-003	BD-4	20-Apr-11	Apr-11	ALS Acirl	1230	250	0.4		1.3	4.0	0.4	flying ants/Insects
EN1101201-003	BD-4	20-May-11	May-11	ALS Acirl	1210	Nil	0.3		1.3	4.0	0.2	Insects/Plant Material
	BD-4	20-Jun-11	Jun-11	ALS Acirl	1300				1.3	4.0		Dry/Funnel Broken/Bottle Broken
EN1101811-003	BD-4	19-Jul-11	Jul-11	ALS Acirl	1310	50	0.5		1.3	4.0	0.3	Clear
EN1102303-003	BD-4	17-Aug-11	Aug-11	ALS	1310	80	0.4	0.4	1.2	4.0	0.3	Insects
EN1102774-003	BD-4	16-Sep-11	Sep-11	ALS	1330	900	0.6	0.5	1.2	4.0	0.4	Insects, Plant material

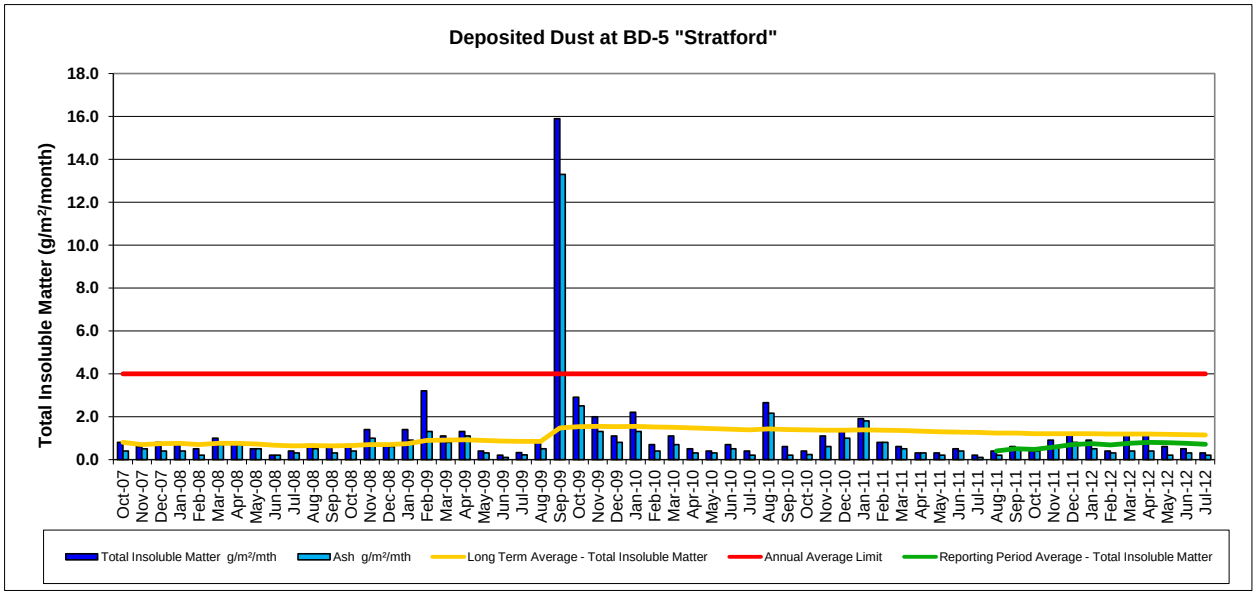
Sample Number	Sample Location	Sample Date	Sample Month	Sampler	Time	Volume Collected ml	Total Insoluble Matter g/m²/mth	Reporting Period Average - Total Insoluble Matter	Long Term Average - Total Insoluble Matter	Annual Average Limit	Ash g/m²/mth	Comment
EN1103123-003	BD-4	17-Oct-11	Oct-11	ALS	1340	1700	0.4	0.5	1.2	4.0	0.3	Insects, Bird Droppings
EN1103468-003	BD-4	15-Nov-11	Nov-11	ALS	1330	300	0.5	0.5	1.2	4.0	0.5	Insects, Plant material
EN1104230-003	BD-4	15-Dec-11	Dec-11	ALS	1225	2500	0.7	0.5	1.2	4.0	0.4	Insects, Plant material
EN1200243-003	BD-4	13-Jan-12	Jan-12	ALS	1340	300	0.8	0.6	1.2	4.0	0.6	Insects, Plant material
EN1200609-003	BD-4	13-Feb-12	Feb-12	ALS	1445	2500	0.6	0.6	1.2	4.0	0.4	Insects, Plant material
EN1201022-003	BD-4	15-Mar-12	Mar-12	ALS	1230	500	1.6	0.7	1.2	4.0	0.8	Insects, Plant material
EN1201452-003	BD-4	16-Apr-12	Apr-12	ALS	1300	200	1.6	0.8	1.2	4.0	0.8	Insects, Plant material
EN1201861-003	BD-4	17-May-12	May-12	ALS	1415	200	1.2	0.8	1.2	4.0	0.5	Insects, Bird Droppings
EN1202262-003	BD-4	18-Jun-12	Jun-12	ALS	1415	1200	0.5	0.8	1.2	4.0	0.3	Insects
EN1202678-003	BD-4	18-Jul-12	Jul-12	ALS	1455	1600	0.5	0.8	1.2	4.0	0.4	Insects



Deposited Dust BD-5 "Stratford"

Sample Number	Sample Location	Sample Date	Sample Month	Sampler	Time	Volume Collected ml	Total Insoluble Matter g/m²/mth	Reporting Period Average - Total Insoluble Matter	Long Term Average - Total Insoluble Matter	Annual Average Limit	Ash g/m²/mth	Comment
28550.05	BD-5	5-Nov-07	Oct-07	Client	1300	695	0.8		0.8	4.0	0.4	
28662.05	BD-5	5-Dec-07	Nov-07	Client	1350	1165	0.6		0.7	4.0	0.5	
28923.05	BD-5	3-Jan-08	Dec-07	Client	1020	1500	0.8		0.7	4.0	0.4	
29224.05	BD-5	5-Feb-08	Jan-08	Client	1350	1220	0.8		0.8	4.0	0.4	
29525.05	BD-5	5-Mar-08	Feb-08	Client	1150	1050	0.5		0.7	4.0	0.2	
29773.05	BD-5	4-Apr-08	Mar-08	Client	0905	50	1.0		0.8	4.0	0.7	
30055.05	BD-5	5-May-08	Apr-08	Client	1230	175	0.8		0.8	4.0	0.7	
30386.05	BD-5	4-Jun-08	May-08	Client	1110	835	0.5		0.7	4.0	0.5	
30660.05	BD-5	9-Jul-08	Jun-08	Client	1315	555	0.2		0.7	4.0	0.2	
30902.05	BD-5	5-Aug-08	Jul-08	Client	0820	280	0.4		0.6	4.0	0.3	
31210.05	BD-5	2-Sep-08	Aug-08	Client	1100	640	0.7		0.6	4.0	0.5	
31527.05	BD-5	2-Oct-08	Sep-08	Client	1430	995	0.6		0.6	4.0	0.3	
31775.05	BD-5	5-Nov-08	Oct-08	Client	1700	1500	0.7		0.6	4.0	0.4	
32023.05	BD-5	4-Dec-08	Nov-08	Client	0805	1175	1.4		0.7	4.0	1.0	
32518.05	BD-5	5-Jan-09	Dec-08	Client	1614	1180	0.7		0.7	4.0	0.6	
32246.05	BD-5	2-Feb-09	Jan-09	Client	1442	235	1.4		0.7	4.0	0.9	
32863.05	BD-5	2-Mar-09	Feb-09	Client	1551	1520	3.2		0.9	4.0	1.3	
2600 1004 -00	BD-5	1-Apr-09	Mar-09	ALS Acirl		50	1.1		0.9	4.0	0.8	
2600 1019 -00	BD-5	1-May-09	Apr-09	ALS Acirl		400	1.3		0.9	4.0	1.1	
2600 1034 -01	BD-5	4-Jun-09	May-09	ALS Acirl		500	0.4		0.9	4.0	0.3	
2600 1042 - 01	BD-5	6-Jul-09	Jun-09	ALS Acirl		550	0.2		0.9	4.0	0.1	
2603 1054 - 01	BD-5	3-Aug-09	Jul-09	ALS Acirl	1355	450	0.3		0.8	4.0	0.2	
2600 1064 - 00	BD-5	31-Aug-09	Aug-09	ALS Acirl	1524	20	0.9		0.8	4.0	0.5	
2600 1098 - 01	BD-5	29-Sep-09	Sep-09	ALS Acirl	1450	700	15.9		1.5	4.0	13.3	
2600 1128 - 00	BD-5	3-Nov-09	Oct-09	ALS Acirl	1445	600	2.9		1.5	4.0	2.5	
2601 1204 - 00	BD-5	4-Dec-09	Nov-09	ALS Acirl	1205	10	2		1.5	4.0	1.3	
2600 1222 - 00	BD-5	4-Jan-10	Dec-09	ALS Acirl	1645	2500	1.1		1.5	4.0	0.8	
2600 1234 - 00	BD-5	1-Feb-10	Jan-10	ALS Acirl	1500	300	2.2		1.6	4.0	1.3	
2600 1247 - 00	BD-5	2-Mar-10	Feb-10	ALS Acirl	1430	2200	0.7		1.5	4.0	0.4	
2600 1260 - 00	BD-5	30-Mar-10	Mar-10	ALS Acirl	1300	400	1.1		1.5	4.0	0.7	
2600 1268 - 00	BD-5	27-Apr-10	Apr-10	ALS Acirl	1335	400	0.5		1.5	4.0	0.3	
2600 1277 - 00	BD-5	25-May-10	May-10	ALS Acirl	1345	10	0.4		1.4	4.0	0.3	
2600 1288 - 776	BD-5	24-Jun-10	Jun-10	ALS Acirl	1136	800	0.7		1.4	4.0	0.5	
2600 1288 - 827	BD-5	22-Jul-10	Jul-10	ALS Acirl	0855	600	0.4		1.4	4.0	0.2	
2600-1309-913	BD-5	20-Aug-10	Aug-10	ALS Acirl	1245	2000	2.6		1.4	4.0	2.2	Insects, Plant Material
6800-4319-07	BD-5	21-Sep-10	Sep-10	ALS Acirl	1205	900	0.6		1.4	4.0	0.2	insects
2600-1340-09	BD-5	21-Oct-10	Oct-10	ALS Acirl	1050	2500	0.4		1.4	4.0	0.2	No observations recorded
EN1002887-004	BD-5	22-Nov-10	Nov-10	ALS Acirl	1445	2400	1.1		1.4	4.0	0.6	Insects/Plant Material
EN1003102-004	BD-5	22-Dec-10	Dec-10	ALS Acirl	1355	1800	1.3		1.4	4.0	1.0	Insects
EN1100201-004	BD-5	21-Jan-11	Jan-11	ALS Acirl	1245	400	1.9		1.4	4.0	1.8	Glass in Gauge/Insects/Plant
EN1100445-004	BD-5	22-Feb-11	Feb-11	ALS Acirl	1230	200	0.8		1.4	4.0	0.8	No field observations
EN1100694-004	BD-5	24-Mar-11	Mar-11	ALS Acirl	1125	500	0.6		1.3	4.0	0.5	Insects/Plant Material
EN1100921-004	BD-5	20-Apr-11	Apr-11	ALS Acirl	1200	300	0.3		1.3	4.0	0.3	Insects
EN1101201-004	BD-5	20-May-11	May-11	ALS Acirl	1240	Nil	0.3		1.3	4.0	0.2	Plant Material
EN1101447-003	BD-5	20-Jun-11	Jun-11	ALS Acirl	1315	1500	0.5		1.3	4.0	0.4	Plant Material
EN1101811-004	BD-5	19-Jul-11	Jul-11	ALS Acirl	1244	100	0.2		1.3	4.0	0.1	Clear
EN1102303-004	BD-5	17-Aug-11	Aug-11	ALS Acirl	1330	100	0.4	0.4	1.2	4.0	0.2	Insects
EN1102774-004	BD-5	16-Sep-11	Sep-11	ALS Acirl	1300	900	0.6	0.5	1.2	4.0	0.5	Insects
EN1103123-004	BD-5	17-Oct-11	Oct-11	ALS Acirl	1310	1700	0.4	0.5	1.2	4.0	0.4	Insects
EN1103468-004	BD-5	15-Nov-11	Nov-11	ALS Acirl	1300	400	0.9	0.6	1.2	4.0	0.6	Insects, Plant material
EN1104230-004	BD-5	15-Dec-11	Dec-11	ALS Acirl	1250	2500	1.2	0.7	1.2	4.0	0.8	Insects, Plant material

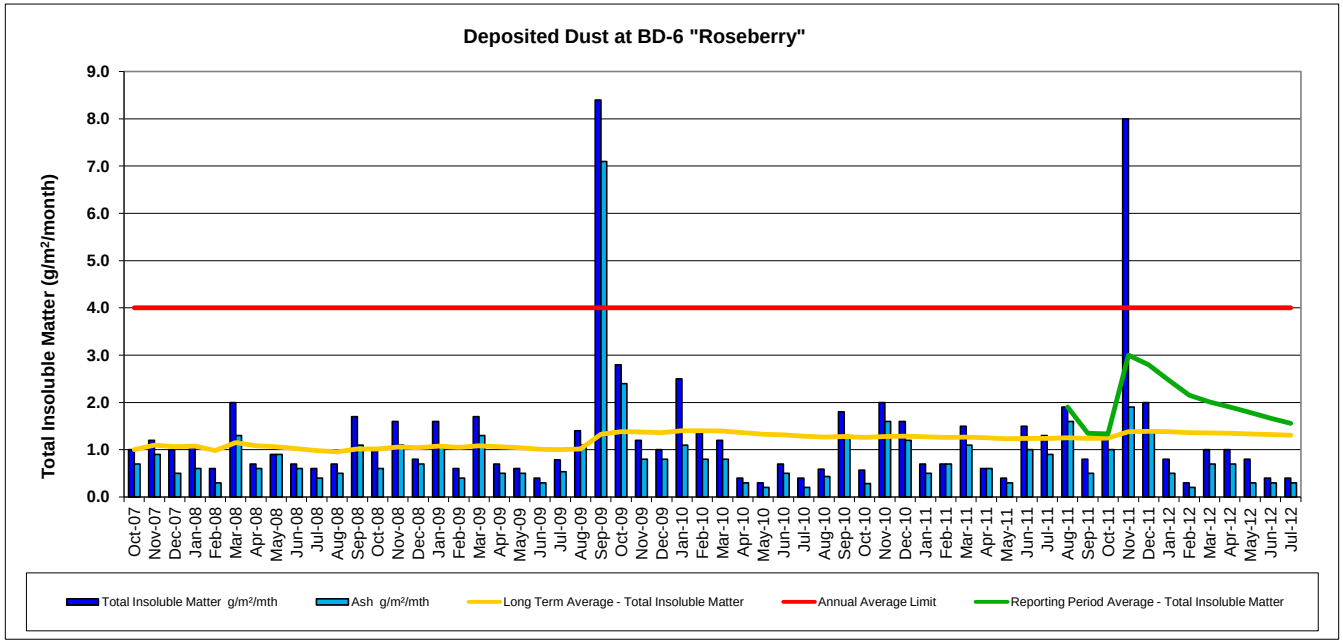
Sample Number	Sample Location	Sample Date	Sample Month	Sampler	Time	Volume Collected ml	Total Insoluble Matter g/m²/mth	Reporting Period Average - Total Insoluble Matter	Long Term Average - Total Insoluble Matter	Annual Average Limit	Ash g/m²/mth	Comment
EN1200243-004	BD-5	13-Jan-12	Jan-12	ALS Acirl	1350	300	0.9	0.7	1.2	4.0	0.5	Insects, Plant material
EN1200609-004	BD-5	13-Feb-12	Feb-12	ALS Acirl	1430	2500	0.4	0.7	1.2	4.0	0.3	Insects, Plant material
EN1201022-004	BD-5	15-Mar-12	Mar-12	ALS Acirl	1300	500	1.2	0.8	1.2	4.0	0.4	Insects, Plant material
EN1201452-004	BD-5	16-Apr-12	Apr-12	ALS Acirl	1315	200	1.2	0.8	1.2	4.0	0.4	Insects, Plant material
EN1201861-004	BD-5	17-May-12	May-12	ALS Acirl	1325	200	0.6	0.8	1.2	4.0	0.2	Insects
EN1202262-004	BD-5	18-Jun-12	Jun-12	ALS Acirl	1315	1300	0.5	0.8	1.2	4.0	0.3	Insects, Plant material
EN1202678-004	BD-5	18-Jul-12	Jul-12	ALS Acirl	1420	1600	0.3	0.7	1.1	4.0	0.2	Surround still very wet



Deposited Dust BD-6 "Roseberry"

Sample Number	Sample Location	Sample Date	Sample Month	Sampler	Time	Volume Collected ml	Total Insoluble Matter g/m²/mth	Reporting Period Average - Total Insoluble Matter	Long Term Average - Total Insoluble Matter	Annual Average Limit	Ash g/m²/mth	Comment
28550.06	BD-6	5-Nov-07	Oct-07	Client	1250	610	1.0		1.0	4.0	0.7	
28662.06	BD-6	5-Dec-07	Nov-07	Client	1330	1690	1.2		1.1	4.0	0.9	
28923.06	BD-6	3-Jan-08	Dec-07	Client	1010	1235	1.0		1.1	4.0	0.5	
29224.06	BD-6	5-Feb-08	Jan-08	Client	1400	1065	1.1		1.1	4.0	0.6	
29525.06	BD-6	5-Mar-08	Feb-08	Client	1145	1090	0.6		1.0	4.0	0.3	
29773.06	BD-6	4-Apr-08	Mar-08	Client	0855	130	2.0		1.2	4.0	1.3	
30055.06	BD-6	5-May-08	Apr-08	Client	1240	215	0.7		1.1	4.0	0.6	
30386.06	BD-6	4-Jun-08	May-08	Client	1125	860	0.9		1.1	4.0	0.9	
30660.06	BD-6	9-Jul-08	Jun-08	Client	1305	565	0.7		1.0	4.0	0.6	
30902.06	BD-6	5-Aug-08	Jul-08	Client	0830	310	0.6		1.0	4.0	0.4	
31210.06	BD-6	1-Sep-08	Aug-08	Client	1700	665	0.7		1.0	4.0	0.5	
31527.06	BD-6	2-Oct-08	Sep-08	Client	1515	1245	1.7		1.0	4.0	1.1	
31775.06	BD-6	5-Nov-08	Oct-08	Client	1710	1595	1.0		1.0	4.0	0.6	
32023.06	BD-6	4-Dec-08	Nov-08	Client	0825	1275	1.6		1.1	4.0	1.1	
32518.06	BD-6	5-Jan-09	Dec-08	Client	1630	1230	0.8		1.0	4.0	0.7	
32246.06	BD-6	2-Feb-09	Jan-09	Client	1520	110	1.6		1.1	4.0	1.1	
32863.06	BD-6	2-Mar-09	Feb-09	Client	1605	1450	0.6		1.0	4.0	0.4	
2600 1004 -00	BD-6	1-Apr-09	Mar-09	ALS Acirl		<50	1.7		1.1	4.0	1.3	
2600 1019 -00	BD-6	1-May-09	Apr-09	ALS Acirl		300	0.7		1.1	4.0	0.5	
2600 1034 -01	BD-6	4-Jun-09	May-09	ALS Acirl		600	0.6		1.0	4.0	0.5	
2600 1042 - 01	BD-6	6-Jul-09	Jun-09	ALS Acirl		650	0.4		1.0	4.0	0.3	
2604 1054 - 01	BD-6	3-Aug-09	Jul-09	ALS Acirl	1510	350	0.8		1.0	4.0	0.5	
2600 1064 - 00	BD-6	31-Aug-09	Aug-09	ALS Acirl	1500	20	1.4		1.0	4.0	1.1	
2600 1098 - 01	BD-6	29-Sep-09	Sep-09	ALS Acirl	1405	300	8.4		1.3	4.0	7.1	
2600 1128 - 00	BD-6	3-Nov-09	Oct-09	ALS Acirl	1415	700	2.8		1.4	4.0	2.4	
2601 1204 - 00	BD-6	4-Dec-09	Nov-09	ALS Acirl	1215	dry	1.2		1.4	4.0	0.8	
2600 1222 - 00	BD-6	4-Jan-10	Dec-09	ALS Acirl	1635	2500	1		1.4	4.0	0.8	
2600 1234 - 00	BD-6	1-Feb-10	Jan-10	ALS Acirl	1517	100	2.5		1.4	4.0	1.1	
2600 1247 - 00	BD-6	2-Mar-10	Feb-10	ALS Acirl	1400	2300	1.4		1.4	4.0	0.8	
2600 1260 - 00	BD-6	30-Mar-10	Mar-10	ALS Acirl	1330	200	1.2		1.4	4.0	0.8	
2600 1268 - 00	BD-6	27-Apr-10	Apr-10	ALS Acirl	1345	400	0.4		1.4	4.0	0.3	
2600 1277 - 00	BD-6	25-May-10	May-10	ALS Acirl	1450	10	0.3		1.3	4.0	0.2	
2600 1288 - 776	BD-6	24-Jun-10	Jun-10	ALS Acirl	0920	800	0.7		1.3	4.0	0.5	
2600 1288 - 827	BD-6	22-Jul-10	Jul-10	ALS Acirl	0845	500	0.4		1.3	4.0	0.2	
2600-1309-913	BD-6	20-Aug-10	Aug-10	ALS Acirl	1410	2000	0.6		1.3	4.0	0.4	Insects, Plant Material
6800-4319-07	BD-6	21-Sep-10	Sep-10	ALS Acirl	1040	900	1.8		1.3	4.0	1.3	insects, plant material
2600-1340-09	BD-6	21-Oct-10	Oct-10	ALS Acirl	1225	2500	0.6		1.3	4.0	0.3	No observations recorded
EN1002887-005	BD-6	22-Nov-10	Nov-10	ALS Acirl	1520	2200	2.0		1.3	4.0	1.6	Insects
EN1003102-005	BD-6	22-Dec-10	Dec-10	ALS Acirl	1415	2000	1.6		1.3	4.0	1.2	Insects/Plant Material
EN1100201-005	BD-6	21-Jan-11	Jan-11	ALS Acirl	1355	500	0.7		1.3	4.0	0.5	Insects/Plant Material
EN1100445-005	BD-6	22-Feb-11	Feb-11	ALS Acirl	1250	300	0.7		1.3	4.0	0.7	Insects/Plant Material
EN1100694-005	BD-6	24-Mar-11	Mar-11	ALS Acirl	1140	400	1.5		1.3	4.0	1.1	Insects/Plant Material
EN1100921-005	BD-6	20-Apr-11	Apr-11	ALS Acirl	1215	250	0.6		1.2	4.0	0.6	Plant Material
EN1101201-005	BD-6	20-May-11	May-11	ALS Acirl	1200	Nil	0.4		1.2	4.0	0.3	Insects
EN1101447-004	BD-6	20-Jun-11	Jun-11	ALS Acirl	1240	1500	1.5		1.2	4.0	1	Bird Droppings/Plant Material
EN1101811-005	BD-6	19-Jul-11	Jul-11	ALS Acirl	1300	100	1.3		1.2	4.0	0.9	Green
EN1102303-005	BD-6	17-Aug-11	Aug-11	ALS Acirl	1250	80	1.9	1.9	1.3	4.0	1.6	Broken funnel - glass in bottle
EN1102774-005	BD-6	16-Sep-11	Sep-11	ALS Acirl	1315	700	0.8	1.4	1.2	4.0	0.5	Insects
EN1103123-005	BD-6	17-Oct-11	Oct-11	ALS Acirl	1330	1500	1.3	1.3	1.2	4.0	1	Insects, Plant material
EN1103468-005	BD-6	15-Nov-11	Nov-11	ALS Acirl	1315	200	8	3.0	1.4	4.0	1.9	Insects, Bird Droppings, Plant Material
EN1104230-005	BD-6	15-Dec-11	Dec-11	ALS Acirl	1230	2500	2	2.8	1.4	4.0	1.4	Insects, Plant material

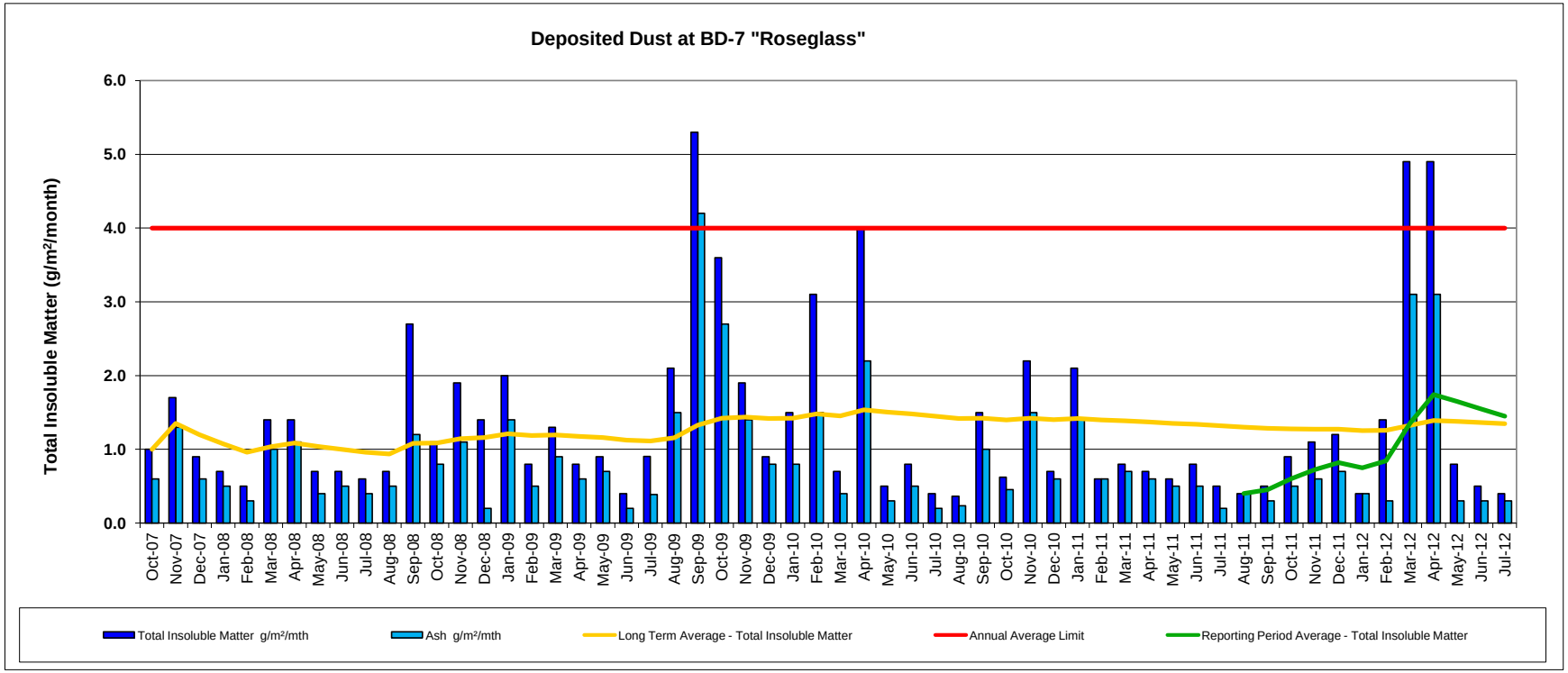
Sample Number	Sample Location	Sample Date	Sample Month	Sampler	Time	Volume Collected ml	Total Insoluble Matter g/m²/mth	Reporting Period Average - Total Insoluble Matter	Long Term Average - Total Insoluble Matter	Annual Average Limit	Ash g/m²/mth	Comment
EN1200243-005	BD-6	13-Jan-12	Jan-12	ALS Acirl	1330	300	0.8	2.5	1.4	4.0	0.5	Insects, Plant material
EN1200609-005	BD-6	13-Feb-12	Feb-12	ALS Acirl	1440	2500	0.3	2.2	1.4	4.0	0.2	Insects, Plant material
EN1201022-005	BD-6	15-Mar-12	Mar-12	ALS Acirl	1215	500	1	2.0	1.4	4.0	0.7	Insects, Plant material, funnel broken in bottle
EN1201452-005	BD-6	16-Apr-12	Apr-12	ALS Acirl	1300	<100ml	1	1.9	1.3	4.0	0.7	Insects, Plant material, dead frog in bottle
EN1201861-005	BD-6	17-May-12	May-12	ALS Acirl	1350	200	0.8	1.8	1.3	4.0	0.3	Insects, Plant material
EN1202262-005	BD-6	18-Jun-12	Jun-12	ALS Acirl	1350	600	0.4	1.7	1.3	4.0	0.3	Plant material
EN1202678-005	BD-6	18-Jul-12	Jul-12	ALS Acirl	1440	1600	0.4	1.6	1.3	4.0	0.3	Surround still very wet



Deposited Dust BD-7 "Roseglass"

Sample Number	Sample Location	Sample Date	Sample Month	Sampler	Time	Volume Collected ml	Total Insoluble Matter g/m²/mth	Reporting Period Average - Total Insoluble Matter	Long Term Average - Total Insoluble Matter	Annual Average Limit	Ash g/m²/mth	Comment
28550.07	BD-7	5-Nov-07	Oct-07	Client	1355	600	1.0		1.0	4.0	0.6	
28662.07	BD-7	5-Dec-07	Nov-07	Client	1240	1270	1.7		1.4	4.0	1.3	
28923.07	BD-7	3-Jan-08	Dec-07	Client	1110	1315	0.9		1.2	4.0	0.6	
29224.07	BD-7	5-Feb-08	Jan-08	Client	1300	1370	0.7		1.1	4.0	0.5	
29525.07	BD-7	5-Mar-08	Feb-08	Client	1305	1630	0.5		1.0	4.0	0.3	
29773.07	BD-7	4-Apr-08	Mar-08	Client	1010	50	1.4		1.0	4.0	1.0	
30055.07	BD-7	5-May-08	Apr-08	Client	1130	180	1.4		1.1	4.0	1.1	
30386.07	BD-7	4-Jun-08	May-08	Client	0945	770	0.7		1.0	4.0	0.4	
30660.07	BD-7	9-Jul-08	Jun-08	Client	1440	370	0.7		1.0	4.0	0.5	
30902.07	BD-7	5-Aug-08	Jul-08	Client	0925	350	0.6		1.0	4.0	0.4	
31210.07	BD-7	1-Sep-08	Aug-08	Client	1515	710	0.7		0.9	4.0	0.5	
31527.07	BD-7	2-Oct-08	Sep-08	Client	1330	1180	2.7		1.1	4.0	1.2	
31775.07	BD-7	5-Nov-08	Oct-08	Client	1541	1640	1.1		1.1	4.0	0.8	
32023.07	BD-7	4-Dec-08	Nov-08	Client	1000	990	1.9		1.1	4.0	1.1	
32518.07	BD-7	5-Jan-09	Dec-08	Client	1514	1200	1.4		1.2	4.0	0.2	
32246.07	BD-7	2-Feb-09	Jan-09	Client	1624	145	2.0		1.2	4.0	1.4	
32863.07	BD-7	2-Mar-09	Feb-09	Client	1442	1490	0.8		1.2	4.0	0.5	
2600 1004 -00	BD-7	1-Apr-09	Mar-09	ALS Acirl		<50	1.3		1.2	4.0	0.9	
2600 1019 -00	BD-7	1-May-09	Apr-09	ALS Acirl		500	0.8		1.2	4.0	0.6	
2600 1034 -01	BD-7	4-Jun-09	May-09	ALS Acirl		550	0.9		1.2	4.0	0.7	
2600 1042 - 01	BD-7	6-Jul-09	Jun-09	ALS Acirl		400	0.4		1.1	4.0	0.2	
2605 1054 - 01	BD-7	3-Aug-09	Jul-09	ALS Acirl	1410	350	0.9		1.1	4.0	0.4	
2600 1064 - 00	BD-7	31-Aug-09	Aug-09	ALS Acirl	1420	50	2.1		1.2	4.0	1.5	
2600 1098 - 01	BD-7	29-Sep-09	Sep-09	ALS Acirl	1308	800	5.3		1.3	4.0	4.2	
2600 1128 - 00	BD-7	3-Nov-09	Oct-09	ALS Acirl	1330	700	3.6		1.4	4.0	2.7	
2601 1204 - 00	BD-7	4-Dec-09	Nov-09	ALS Acirl	1110	25	1.9		1.4	4.0	1.4	
2600 1222 - 00	BD-7	4-Jan-10	Dec-09	ALS Acirl	1600	2500	0.9		1.4	4.0	0.8	
2600 1234 - 00	BD-7	1-Feb-10	Jan-10	ALS Acirl	1420	1600	1.5		1.4	4.0	0.8	
2600 1247 - 00	BD-7	2-Mar-10	Feb-10	ALS Acirl	1315	2300	3.1		1.5	4.0	1.5	
2600 1260 - 00	BD-7	30-Mar-10	Mar-10	ALS Acirl	1140	300	0.7		1.5	4.0	0.4	
2600 1268 - 00	BD-7	27-Apr-10	Apr-10	ALS Acirl	1240	350	4		1.5	4.0	2.2	
2600 1277 - 00	BD-7	25-May-10	May-10	ALS Acirl	1350	10	0.5		1.5	4.0	0.3	
2600 1288 - 776	BD-7	24-Jun-10	Jun-10	ALS Acirl	1000	800	0.8		1.5	4.0	0.5	
2600 1288 - 827	BD-7	22-Jul-10	Jul-10	ALS Acirl	0955	600	0.4		1.5	4.0	0.2	
2600-1309-913	BD-7	20-Aug-10	Aug-10	ALS Acirl	1303	2000	0.4		1.4	4.0	0.2	Insects, Plant Material
6800-4319-07	BD-7	21-Sep-10	Sep-10	ALS Acirl	1220	900	1.5		1.4	4.0	1.0	insects
2600-1340-09	BD-7	21-Oct-10	Oct-10	ALS Acirl	1200	2500	0.6		1.4	4.0	0.5	No observations recorded on Acirl Analysis Sheet
EN1002887-006	BD-7	22-Nov-10	Nov-10	ALS Acirl	1320	2200	2.2		1.4	4.0	1.5	Insects/Plant Material
EN1003102-006	BD-7	22-Dec-10	Dec-10	ALS Acirl	1245	2000	0.7		1.4	4.0	0.6	Insects/Plant Material
EN1100201-006	BD-7	21-Jan-11	Jan-11	ALS Acirl	1305	300	2.1		1.4	4.0	1.4	Insects/Plant Material
EN1100445-006	BD-7	22-Feb-11	Feb-11	ALS Acirl	1140	400	0.6		1.4	4.0	0.6	Insects/Plant Material
EN1100694-006	BD-7	24-Mar-11	Mar-11	ALS Acirl	1035	500	0.8		1.4	4.0	0.7	Insects/Plant Material
EN1100921-006	BD-7	20-Apr-11	Apr-11	ALS Acirl	1100	300	0.7		1.4	4.0	0.6	Insects
EN1101201-006	BD-7	20-May-11	May-11	ALS Acirl	1130	Nil	0.6		1.4	4.0	0.5	Insects
EN1101447-005	BD-7	20-Jun-11	Jun-11	ALS Acirl	1120	1300	0.8		1.3	4.0	0.5	Insects/Plant Material
EN1101811-006	BD-7	19-Jul-11	Jul-11	ALS Acirl	1200	100	0.5		1.3	4.0	0.2	Clear
EN1102303-006	BD-7	17-Aug-11	Aug-11	ALS Acirl	1110	80	0.4	0.4	1.3	4.0	0.4	Plant material
EN1102774-006	BD-7	16-Sep-11	Sep-11	ALS Acirl	1200	800	0.5	0.5	1.3	4.0	0.3	Insects, Plant material
EN1103123-006	BD-7	17-Oct-11	Oct-11	ALS Acirl	1150	1700	0.9	0.6	1.3	4.0	0.5	Insects

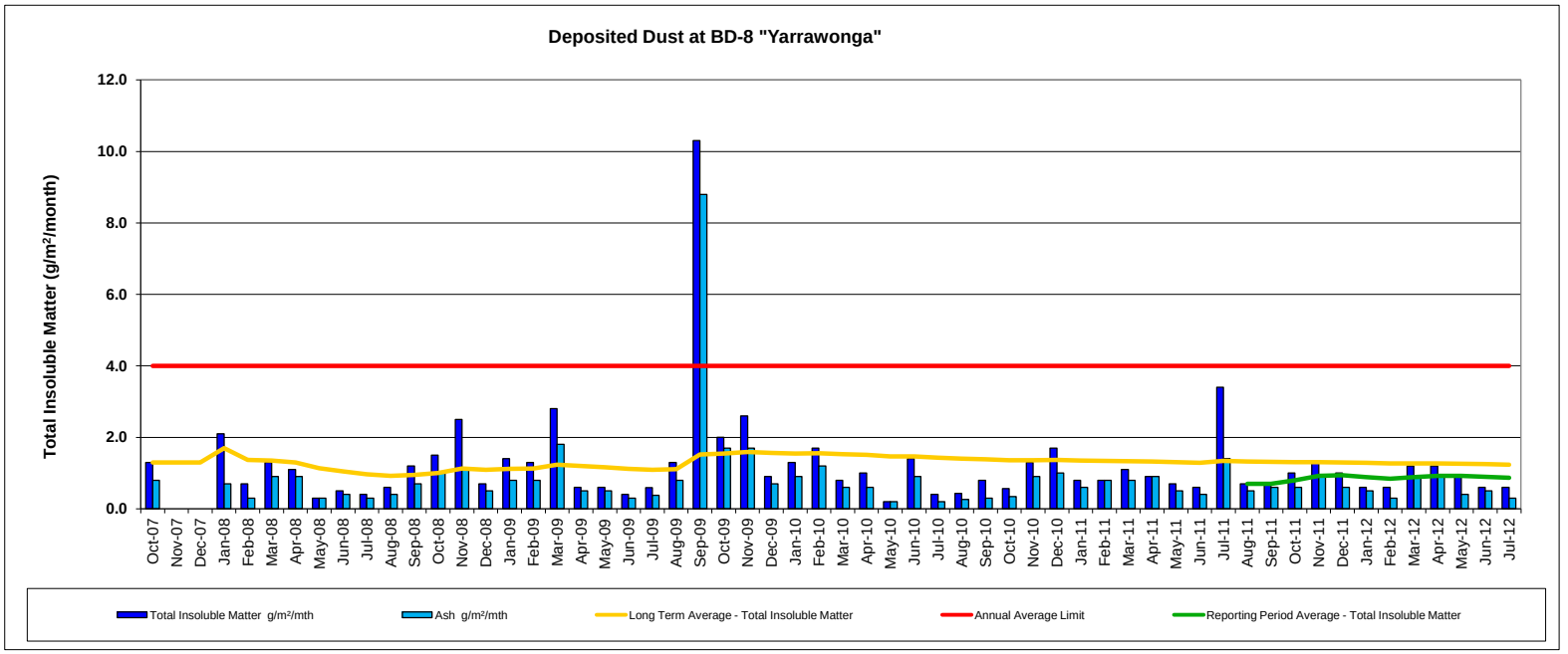
Sample Number	Sample Location	Sample Date	Sample Month	Sampler	Time	Volume Collected ml	Total Insoluble Matter g/m²/mth	Reporting Period Average - Total Insoluble Matter	Long Term Average - Total Insoluble Matter	Annual Average Limit	Ash g/m²/mth	Comment
EN1103468-006	BD-7	15-Nov-11	Nov-11	ALS Acirl	1200	900	1.1	0.7	1.3	4.0	0.6	Insects, Plant material
EN1104230-006	BD-7	15-Dec-11	Dec-11	ALS Acirl	1150	2500	1.2	0.8	1.3	4.0	0.7	Insects, Plant material
EN1200243-006	BD-7	13-Jan-12	Jan-12	ALS Acirl	1210	600	0.4	0.8	1.3	4.0	0.4	Insects, Plant material
EN1200609-006	BD-7	13-Feb-12	Feb-12	ALS Acirl	1340	2500	1.4	0.8	1.3	4.0	0.3	Insects, Plant material
EN1201022-006	BD-7	15-Mar-12	Mar-12	ALS Acirl	1120	500	4.9	1.4	1.3	4.0	3.1	Insects, Plant materia, dead frog in bottlel
EN1201452-006	BD-7	16-Apr-12	Apr-12	ALS Acirl	1130	200	4.9	1.7	1.4	4.0	3.1	Insects, Bird droppings, Plant material
EN1201861-006	BD-7	17-May-12	May-12	ALS Acirl	1200	300	0.8	1.7	1.4	4.0	0.3	Insects
EN1202262-006	BD-7	18-Jun-12	Jun-12	ALS Acirl	1230	900	0.5	1.5	1.4	4.0	0.3	Plant material
EN1202678-006	BD-7	18-Jul-12	Jul-12	ALS Acirl	1240	140	0.4	1.5	1.3	4.0	0.3	Surround still very wet



Deposited Dust BD-8 "Yarrawonga"

Sample Number	Sample Location	Sample Date	Sample Month	Sampler	Time	Volume Collected ml	Total Insoluble Matter g/m²/mth	Reporting Period Average - Total Insoluble Matter	Long Term Average - Total Insoluble Matter	Annual Average Limit	Ash g/m²/mth	Comment
28550.08	BD-8	5-Nov-07	Oct-07	Client	1130	630	1.3		1.3	4.0	0.8	
28662.08	BD-8	5-Dec-07	Nov-07	Client	1320				1.3	4.0		No access
28923.08	BD-8	3-Jan-08	Dec-07	Client	1045				1.3	4.0		No access
29224.08	BD-8	5-Feb-08	Jan-08	Client	1340	>2500	2.1		1.7	4.0	0.7	Exposure period 85 days
29525.08	BD-8	6-Mar-08	Feb-08	Client	1030	1595	0.7		1.4	4.0	0.3	
29773.08	BD-8	4-Apr-08	Mar-08	Client	0925	75	1.3		1.4	4.0	0.9	
30055.08	BD-8	5-May-08	Apr-08	Client	1215	380	1.1		1.3	4.0	0.9	
30386.08	BD-8	4-Jun-08	May-08	Client	1045	795	0.3		1.1	4.0	0.3	
30660.08	BD-8	9-Jul-08	Jun-08	Client	1405	470	0.5		1.0	4.0	0.4	
30902.08	BD-8	5-Aug-08	Jul-08	Client	0900	445	0.4		1.0	4.0	0.3	
31210.08	BD-8	1-Sep-08	Aug-08	Client	1615	800	0.6		0.9	4.0	0.4	
31527.08	BD-8	2-Oct-08	Sep-08	Client	1410	1360	1.2		1.0	4.0	0.7	
31775.08	BD-8	5-Nov-08	Oct-08	Client	1627	1980	1.5		1.0	4.0	1.0	
32023.08	BD-8	4-Dec-08	Nov-08	Client	0920	1185	2.5		1.1	4.0	1.1	
32518.08	BD-8	5-Jan-09	Dec-08	Client	1537	1460	0.7		1.1	4.0	0.5	
32246.08	BD-8	2-Feb-09	Jan-09	Client	1535	500	1.4		1.1	4.0	0.8	
32863.08	BD-8	2-Mar-09	Feb-09	Client	1517	1575	1.3		1.1	4.0	0.8	
2600 1004 -00	BD-8	1-Apr-09	Mar-09	ALS Acirl		<50	2.8		1.2	4.0	1.8	
2600 1019 -00	BD-8	1-May-09	Apr-09	ALS Acirl		400	0.6		1.2	4.0	0.5	
2600 1034 -01	BD-8	4-Jun-09	May-09	ALS Acirl		500	0.6		1.2	4.0	0.5	
2600 1042 - 01	BD-8	6-Jul-09	Jun-09	ALS Acirl		600	0.4		1.1	4.0	0.3	
2606 1054 - 01	BD-8	3-Aug-09	Jul-09	ALS Acirl	1440	450	0.6		1.1	4.0	0.4	
2600 1064 - 00	BD-8	31-Aug-09	Aug-09	ALS Acirl	1440	50	1.3		1.1	4.0	0.8	
2600 1098 - 01	BD-8	29-Sep-09	Sep-09	ALS Acirl	1340	800	10.3		1.5	4.0	8.8	
2600 1128 - 00	BD-8	3-Nov-09	Oct-09	ALS Acirl	1355	500	2		1.5	4.0	1.7	
2601 1204 - 00	BD-8	4-Dec-09	Nov-09		1145	50	2.6		1.6	4.0	1.7	
2600 1222 - 00	BD-8	4-Jan-10	Dec-09	ALS Acirl	1620	2500	0.9		1.6	4.0	0.7	
2600 1234 - 00	BD-8	1-Feb-10	Jan-10	ALS Acirl	1440	1000	1.3		1.5	4.0	0.9	
2600 1247 - 00	BD-8	2-Mar-10	Feb-10	ALS Acirl	1330	2200	1.7		1.6	4.0	1.2	
2600 1260 - 00	BD-8	30-Mar-10	Mar-10	ALS Acirl	1215	250	0.8		1.5	4.0	0.6	
2600 1268 - 00	BD-8	27-Apr-10	Apr-10	ALS Acirl	1310	350	1		1.5	4.0	0.6	
2600 1277 - 00	BD-8	25-May-10	May-10	ALS Acirl	1415	10	0.2		1.5	4.0	0.2	
2600 1288 - 776	BD-8	24-Jun-10	Jun-10	ALS Acirl	0940	900	1.4		1.5	4.0	0.9	
2600 1288 - 827	BD-8	22-Jul-10	Jul-10	ALS Acirl	0910	600	0.4		1.4	4.0	0.2	
2600-1309-913	BD-8	20-Aug-10	Aug-10	ALS Acirl	1345	2000	0.4		1.4	4.0	0.3	Plant Material
6800-4319-07	BD-8	21-Sep-10	Sep-10	ALS Acirl	1130	900	0.8		1.4	4.0	0.3	insects,plant material
2600-1340-09	BD-8	21-Oct-10	Oct-10	ALS Acirl	1115	2500	0.6		1.4	4.0	0.3	No observations recorded on Acirl Analysis Sheet
EN1002887-007	BD-8	22-Nov-10	Nov-10	ALS Acirl	1410	2200	1.3		1.4	4.0	0.9	Insects/Plant Material
EN1003102-007	BD-8	22-Dec-10	Dec-10	ALS Acirl	1320	1600	1.7		1.4	4.0	1.0	Insects/Plant Material
EN1100201-007	BD-8	21-Jan-11	Jan-11	ALS Acirl	1330	300	0.8		1.4	4.0	0.6	Insects/Plant Material
EN1100445-007	BD-8	22-Feb-11	Feb-11	ALS Acirl	1200	300	0.8		1.3	4.0	0.8	Insects/Plant Material
EN1100694-007	BD-8	24-Mar-11	Mar-11	ALS Acirl	1055	600	1.1		1.3	4.0	0.8	Insects/Plant Material
EN1100921-007	BD-8	20-Apr-11	Apr-11	ALS Acirl	1130	250	0.9		1.3	4.0	0.9	Plant Material
EN1101201-007	BD-8	20-May-11	May-11	ALS Acirl	1230	Nil	0.7		1.3	4.0	0.5	No field observations
EN1101447-006	BD-8	20-Jun-11	Jun-11	ALS Acirl	1200	1600	0.6		1.3	4.0	0.4	Insects
EN1101811-007	BD-8	19-Jul-11	Jul-11	ALS Acirl	1225	100	3.4		1.3	4.0	1.4	Clear
EN1102303-007	BD-8	17-Aug-11	Aug-11	ALS Acirl	1155	110	0.7	0.7	1.3	4.0	0.5	No field observations
EN1102774-007	BD-8	16-Sep-11	Sep-11	ALS Acirl	1230	800	0.7	0.7	1.3	4.0	0.6	Insects
EN1103123-007	BD-8	17-Oct-11	Oct-11	ALS Acirl	1230	1700	1	0.8	1.3	4.0	0.6	Insects, Bird Droppings
EN1103468-007	BD-8	15-Nov-11	Nov-11	ALS Acirl	1000	500	1.3	0.9	1.3	4.0	0.9	Insects, Plant material
EN1104230-007	BD-8	15-Dec-11	Dec-11	ALS Acirl	1210	2500	1	0.9	1.3	4.0	0.6	Insects, Plant material

Sample Number	Sample Location	Sample Date	Sample Month	Sampler	Time	Volume Collected ml	Total Insoluble Matter g/m²/mth	Reporting Period Average - Total Insoluble Matter	Long Term Average - Total Insoluble Matter	Annual Average Limit	Ash g/m²/mth	Comment
EN1200243-007	BD-8	13-Jan-12	Jan-12	ALS Acirl	1300	600	0.6	0.9	1.3	4.0	0.5	Insects, Plant material
EN1200609-007	BD-8	13-Feb-12	Feb-12	ALS Acirl	1420	2500	0.6	0.8	1.3	4.0	0.3	Insects, Plant material
EN1201022-007	BD-8	15-Mar-12	Mar-12	ALS Acirl	1240	500	1.2	0.9	1.3	4.0	0.9	Insects, Plant material
EN1201452-007	BD-8	16-Apr-12	Apr-12	ALS Acirl	1230	200	1.2	0.9	1.3	4.0	0.9	Insects, Plant material
EN1201861-007	BD-8	17-May-12	May-12	ALS Acirl	1310	250	0.9	0.9	1.3	4.0	0.4	No field observations
EN1202262-007	BD-8	18-Jun-12	Jun-12	ALS Acirl	1330	1300	0.6	0.9	1.2	4.0	0.5	Insects, Plant material
EN1202678-007	BD-8	18-Jul-12	Jul-12	ALS Acirl	1350	1600	0.6	0.9	1.2	4.0	0.3	Surround still very wet



Appendix 5

SURFACE WATER AND WET WEATHER DISCHARGE MONITORING DATA

Surface Water Monitoring Data

Sample No.	Date	Time	Sample Location	pH	Electrical Conductivity (µS/cm)	Total Suspended Solids (mg/L)	Total Organic Carbon (TOC)	Grease & Oil (mg/L)	Comments
31492.01	23 September 2008	1310	UNDC	7.7	150	510		<2	
32279.01	17 December 2008	1029	SB8	7.8	295	1080		<2	
32279.02	17 December 2008	1100	UNDC	6.6	145	21		<2	
ES0909245-001	24 June 2009		Dam Void 1	9.3	1540	216	20	<10	Limit of Reporting was raised for Oil and Grease due to insufficient samples
ES0909245-002	24 June 2009		SB3	8.36	502	110	10	<10	Limit of Reporting was raised for Oil and Grease due to insufficient samples
ES0909245-003	24 June 2009		SD3	8.56	354	1340	35	<10	Limit of Reporting was raised for Oil and Grease due to insufficient samples
ES0912984-001	27 August 2009	1335	Dam Void 1	8.85	2260	60	3	<10	Limit of Reporting (LOR) was raised for Oil and Grease due to insufficient samples
ES0912984-002	27 August 2009	1240	SB3	8.86	504	66	10	<10	Limit of Reporting (LOR) was raised for Oil and Grease due to insufficient samples
ES0912984-003	27 August 2009	1255	SD3	8.34	587	71	8	<10	Limit of Reporting (LOR) was raised for Oil and Grease due to insufficient samples
ES0918304-001	30 November 2009	1130	SB3	7.78	620	128	3	<10	Limit of Reporting (LOR) was raised for Oil and Grease due to insufficient samples
ES0919288-001	16 December 2009	1415	Dam Void 1	9.15	4210	14	4	<10	Limit of Reporting (LOR) was raised for Oil and Grease due to insufficient samples
ES0919290-001	16 December 2009	1205	SB7	9.38	600	18	8	<10	Limit of Reporting (LOR) was raised for Oil and Grease due to insufficient samples
ES0919290-002	16 December 2009	1225	SB5	8.9	1440	50	7	<10	Limit of Reporting (LOR) was raised for Oil and Grease due to insufficient samples
ES0919290-003	16 December 2009	1255	SB14	8.76	577	50	7	<10	Limit of Reporting (LOR) was raised for Oil and Grease due to insufficient samples
ES0919733-001	29 December 2009	1530	SB19	6.85	110	444	5		
ES1003579-001	25 February 2010	1535	SB3	8.34	423	56	15	<5	Limit of Reporting (LOR) was raised for TOC due to matrix interference
ES1003579-002	25 February 2010	1550	SD3	8.44	374	37	<5	<5	
ES1003579-003	25 February 2010	1515	Dam Void 1	8.99	1390	106	5	<5	
ES1005718-001	25 March 2010	1550	SD3	8.71	445	58		<5	
ES1008743-001	7 May 2010	0830	SD3	8.26	434	13		<5	
ES1008996-001	12 May 2010	1400	SB3	8.2	565	64	7	<5	
ES1008996-002	12 May 2010	1408	SD3	8.42	422	19	14	56	
ES1008996-003	12 May 2010	1315	Dam Void 1	8.9	2470	20	3	<5	
ES1009880-001	24 May 2010	1320	SD3	8.57	412	92	4	6	
ES1014922-001	26 July 2010	0840	SB8	8.34	458	17	5	<5	
ES1015928-001	9 August 2010	1015	SB19	7.47	464	238	13	<5	
ES1015928-002	9 August 2010	0955	SD3	7.62	458	239	12	<5	
ES1015928-003	9 August 2010	1055	Dam Void 1	8.56	2330	8	2	<5	
ES1015928-004	9 August 2010	1035	SD7	7.85	92	8	9	<5	

Sample No.	Date	Time	Sample Location	pH	Electrical Conductivity (µS/cm)	Total Suspended Solids (mg/L)	Total Organic Carbon (TOC)	Grease & Oil (mg/L)	Comments
ES1022524-001	8 November 2010	0920	SB19	8.39	636	41	5	<5	
ES1022524-002	8 November 2010	0905	SD3	8.42	472	107	7	<5	
ES1022524-003	8 November 2010	0950	Dam Void 1	9.12	2330	16	2	<5	
ES1022524-004	8 November 2010	1010	SD7	9.56	77	52	11	<5	
ES1104559-001	2 March 2011	0920	SD3	8.43	605	210	22	<5	
ES1104559-002	2 March 2011	0940	SB19	8.45	573	70	9	<5	
ES1104559-003	2 March 2011	1020	SB18	8.4	724	43	8	<5	
ES1104559-004	2 March 2011	1000	SD7	9.17	1080	236	37	<5	
ES1110300-001	17 May 2011	1030	SB19	8.75	880	76	15	<5	
ES1110300-002	17 May 2011	1020	SD3	8.31	709	214	15	<5	
ES1110300-003	17 May 2011	1040	SB18	9.12	1610	3090	17	<5	
ES1110300-004	17 May 2011	0925	SD7	7.45	159	78	23	<5	
ES1110300-005	17 May 2011	1100	Dam Void 1	8.51	3320	25	2	<5	
ES1116911-001	4 August 2011	1015	SD3	8.49	563	124	11	<5	
ES1116911-002	4 August 2011	1200	SB19	8.38	657	116	8	<5	
ES1116911-003	4 August 2011	1120	SB18	8.07	655	428	16	<5	
ES1116911-004	4 August 2011	1225	SD7	7.4	213	290	66	<5	
ES1116911-005	4 August 2011	1135	VOID	8.16	2920	78	1	<5	
ES1121353-001	29 September 2011	730	DDCK	7.13	43	83	9	<5	DDCK flowing but no discharge
ES1121353-002	29 September 2011	1130	UNDC	7.15	41	152	10	<5	UNDC flowing but no discharge
ES1116911-001	10 November 2011	910	SD3	8.4	511	56	4	<5	
ES1116911-002	10 November 2011	845	SB19	8.33	466	18	4	<5	
ES1116911-004	10 November 2011	940	SD7	7.61	173	83	15	<5	
ES1116911-005	10 November 2011	1040	VOID	8.42	2530	8	<1	<5	
ES1124937-001	14 November 2011	730	DDCK	7.34	102	186	24	<5	DDCK flowing but no discharge
ES1124937-002	14 November 2011	800	SD7	7.67	176	88	15	<5	Upstream sample but no discharge
ES1127736-001	28 November 2011	1530	SD7	7.01	154	60	11	<5	Background quality testing
ES1200148-001	4 January 2012	1010	Bore Dam	8.87	1320	6	3	<5	Background quality testing
ES1201040-001	16 January 2012	1530	Void	8.5	1890	6	3	<5	Background quality testing
ES1205567-001	7 March 2012	1040	SD3	8.09	389	78	3	<5	
ES1205567-002	7 March 2012	1100	SB19	8.29	397	141	3	<5	
ES1205567-004	7 March 2012	1015	VOID	8.47	972	34	2	<5	
ES1205567-005	7 March 2012	900	SD7	7.49	165	16	14	<5	
ES1211330-001	7 May 2012	1040	SD3	8.55	692	30	5	<5	
ES1211330-002	7 May 2012	1100	SB19	8.49	490	14	2	<5	
ES1211330-003	7 May 2012	1130	SD7	7.61	192	34	14	<5	
ES1211330-004	7 May 2012	1015	VOID	8.49	1150	6	<1	<5	

Wet Weather Discharge Monitoring Data

Sample No.	Sample Location	Date	Time	pH	Electrical Conductivity (µS/cm)	Total Suspended Solids (mg/L)	Total Organic Carbon (TOC)	Grease & Oil (mg/L)	Comments
ES0919733-002	SD3	29 December 2009	1530	7.51	180	552	4		
ES0919733-003	UNDC	29 December 2009	1545	6.87	94	236	7		
ES1000144-001	SD3	4 January 2010	1200	7.74	325	1490	2	<5	
ES1000144-002	UNDC	4 January 2010	1245	7.37	467	34	17	6	
ES1000715-001	DD CK	15 January 2010	1130	6.86	338	258	3	<5	
ES1000715-002	SB 18	15 January 2010	1150	7.51	356	1490	3	<5	
ES1002195-001	SD3	8 February 2010	0925	7.87	323	157	6	6	
ES1002884-001	SD3	15 February 2010	0900	7.48	329	406	3	<5	
ES1002884-002	UNDC	15 February 2010	0925	7.15	318	186	8	<5	
ES1002884-003	SB 18	15 February 2010	0945	7.37	395	556	5	<5	
ES1002884-004	DDCK	15 February 2010	1010	7.34	359	15	6	<5	
ES1002884-005	SB 20	16 February 2010	0715	7.16	119	46	9	<5	
ES1006098-001	SD3	31 March 2010	0925	8.14	435	108	12	<5	
ES1010661-001	SD3	2 June 2010	1200	8.21	410	260	35	<5	
ES1014922-001	SD 3 Pre discharge (controlled)	26 July 2010	0840	8.34	458	17	5	<5	
ES1015036-001	SD3	28 July 2010	1430	8.23	437	23	4	<10	
ES1015610-001	Downstream Bluevale	3 August 2010	1320	7.43	109	45	17	<5	
ES1016051-001	DDCK	10 August 2010	1340	7.40	151	964	12	<5	
ES1016051-002	SB18	10 August 2010	1405	7.37	261	2320	<5	<5	
ES1016145-001	SD3	11 August 2010	1350	8.04	450	368	6	<5	
ES1016145-002	UNDC	11 August 2010	1420	7.72	333	116	12	<5	
ES1016965-001	SB18	20 August 2010	1500	7.97	422	2300	10	<5	
ES1016965-002	DDCK	20 August 2010	1520	7.96	344	912	20	<5	
ES1016965-003	SD3	20 August 2010	1540	8.04	508	172	10	<5	
ES1016965-004	UNDC	20 August 2010	1555	7.90	390	152	25	<5	
ES1018433-001	SD3	10 September 2010	1215	8.18	583	50	6	<5	
ES1018433-002	SB18	10 September 2010	1230	7.94	500	1220	<5	<5	
ES1018433-003	DDCK	10 September 2010	1245	7.74	359	680	<5	<5	
ES1018433-004	UNDC	10 September 2010	1300	8.34	477	229	5	<5	

Sample No.	Sample Location	Date	Time	pH	Electrical Conductivity (µS/cm)	Total Suspended Solids (mg/L)	Total Organic Carbon (TOC)	Grease & Oil (mg/L)	Comments
ES1020462-001 ES1021130-001	SD 3 Pre discharge (controlled) SD 3 Re-sample (oil and grease)	12 October 2010 19 October 2010	1645 1500	8.31 8.64	575 556	11 33	5 6	32 <5	Sample taken to determine whether a controlled discharge could occur. Grease and oil high. No discharge occurred. Oil and grease within limit, however no discharge occurred due to a high pH.
ES1021254-001	SB18 (Pre flocculation)	21 October 2010	1315	8.56	554	276	9	<5	
ES1022161-001	SD 3 Pre discharge (controlled)	2 November 2010	1200	8.25	478	33	6	<5	Sample taken to determine whether a controlled discharge could occur. Water was discharged after results were obtained (all results are within limits).
ES1021481-001 ES1021481-002	SB18 DDCK	25 October 2010 25 October 2010	0745 0800	7.60 7.13	477 95	488 234	11 9	<5 <5	
ES1022526-001	SB18 (Pre flocculation)	8 November 2010	1200	8.19	558	1070	<10	<5	
ES1024131-001	SD3 (Pre flocculation)	25 November 2010	1010	7.40	522	52	9	36	High oil and grease. Resample was taken after flocculation and prior to discharge (see below). Oil And Grease for resample remained within limits.
ES1024689-001	SD3 Pre discharge (controlled)	1 December 2010	1300	8.05	507	23	7	<5	Sample taken to determine whether a controlled discharge could occur. Water was discharged after results were obtained (all results are within limits).
ES1025105-001 ES1025105-002 ES1025105-003	UNDC SB18 DDCK	6 December 2010 6 December 2010 6 December 2010	1300 1320 1335	7.58 8.15 8.37	378 532 452	25 996 462	15 11 8	<5 <5 <5	
ES1121654-001 ES1121654-002	SD3 UNDC	4 October 2011 4 October 2011	0840 1500	7.77 7.27	158 175	62 26	3 17	<5 <5	
ES1123154-001	SD3	21 October 2011	1030	8.13	427	104	<1	<5	Pre Flocculation
ES1123743-001	SD3	31 October 2011	1130	8.06	798	52	7	<5	During flocculation
ES1124306-001	SD3	7 November 2011	1030	8.13	456	31	7	<5	Post flocculation and controlled discharge
ES1126003-001 ES1126003-002 ES1126003-003 ES1126003-004	SD3 UNDC SD7 DDCK	24 November 2011 24 November 2011 24 November 2011 24 November 2011	1300 1320 1335 1350	7.97 7.44 7.51 7.76	360 266 172 319	408 90 118 448	16 25 21 23	<5 <5 <5 <5	

Sample No.	Sample Location	Date	Time	pH	Electrical Conductivity (µS/cm)	Total Suspended Solids (mg/L)	Total Organic Carbon (TOC)	Grease & Oil (mg/L)	Comments
ES1126317-001	Northern Discharge Point	28 November 2011	0830	7.46	326	56	15	<5	
ES1126317-002	DDCK	28 November 2011	0830	7.60	287	108	16	<5	
ES1127736-001	SD7	28 November 2011	1500	7.01	154	60	11	<5	
ES1200056-001	SD3	29 December 2011	1030	8.01	424	228	5	<5	Sample taken prior to flocculant treatment
ES1200703-001	SD3	12 January 2012	1330	8.71	451	200	3	<5	Sample taken during flocculation
ES1202282-001	SD3	31 January 2012	1000	8.39	433	42	4	<5	
ES1202283-001	SD7	31 January 2012	0730	7.76	143	42	9	<5	
ES1202507-001	DDCK	1 February 2012	1445	6.89	23	32	5	<5	
ES1202507-002	SB18	1 February 2012	1455	7.43	114	112	3	<5	
ES1202507-003	UNDC	1 February 2012	1555	7.06	42	40	8	<5	
ES1204082-001	SD7	21 February 2012	0745	7.62	154	<5	14	<5	
ES1204082-002	SD3	21 February 2012	0810	7.97	350	340	17	<5	
ES1204082-003	UNDC	21 February 2012	0845	7.51	254	236	26	<5	
ES121257-001	NDP	18 May 2012	1000	8.03	426	<5	3	<5	Pre controlled discharge sample following flocculation in dam A1
ES1213744-001	NDP	29 May 2012	0700	8.34	418	<5	3	<5	Sample taken upon release from dam A1
ES1214169-001	SD3	5 June 2012	1500	8.32	359	253	7	<5	Sample taken prior to flocculant treatment
ES1214601-001	SD3	12 June 2012	1030	8.02	381	<5	3	<5	Post flocculation
ES1216238-001	SD3	28 June 2012	1300	8.29	403	30	4	<5	Pre-controlled discharge sample
ES1216947-001	Floc Dam 1-3 Hrs	4 July 2012	1600	7.92	512	31	3	<5	Flocculant trial
ES1216947-002	Dam 1 Floc-24 Hrs	5 July 2012	1230	8.12	545	26	3	<5	Flocculant trial
ES1216947-003	Dam 1 Floc-48 Hrs	6 July 2012	1300	8.21	546	7	3	<5	Flocculant trial
ES1216947-004	Floc Dam 2-3 Hrs	4 July 2012	1600	8.02	255	36	6	<5	Flocculant trial
ES1216947-005	Dam 2 Floc-24 Hrs	5 July 2012	1215	7.97	361	71	5	<5	Flocculant trial
ES1216947-006	Dam 2 Floc - 48 Hrs	6 July 2012	1300	7.81	359	22	6	<5	Flocculant trial
ES1217578-001	LDP11	13 July 2012	1300	7.89	313	372	11	<5	
ES1217578-002	UNDC	13 July 2012	1600	7.44	86	86	14	<5	
ES1217578-003	SD7	13 July 2012	1430	7.64	148	57	20	<5	
ES1217578-004	LDP12	13 July 2012	1500	7.61	333	274	5	<5	
ES1217578-005	DDCK	13 July 2012	1530	7.30	79	202	22	<5	
ES1218648-001	SB18	30 July 2012	1500	8.09	332	10	2	<5	Post flocculation and controlled discharge

Denotes samples taken prior to a controlled discharge, prior or during flocculation or post rainfall to determine appropriate flocculation rates. These samples are not associated with wet weather discharge.

Appendix 6

GROUNDWATER

MONITORING DATA

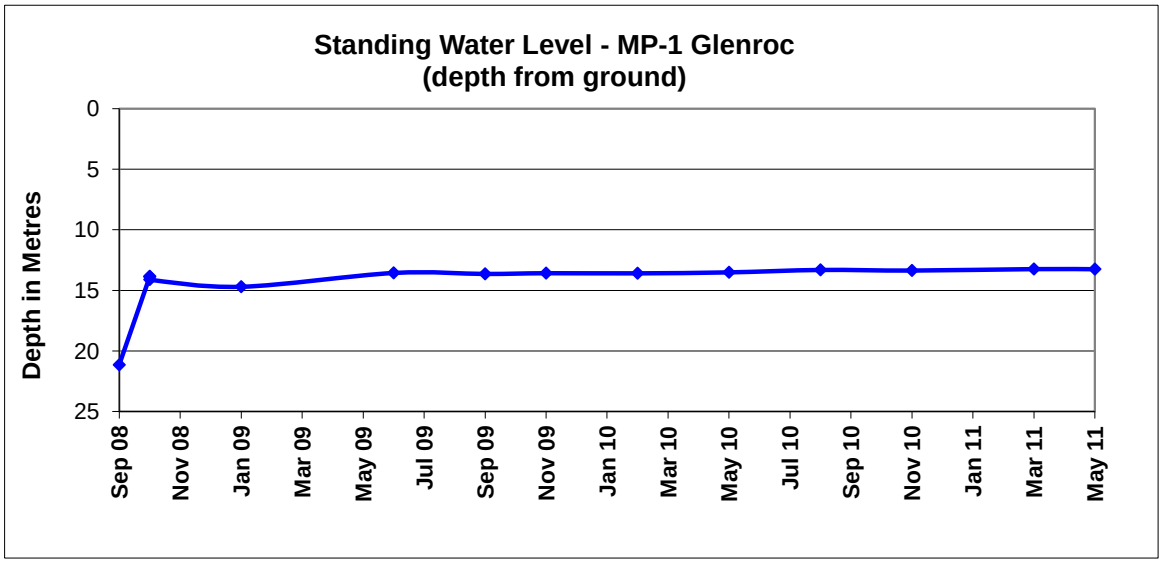
Site ID	Date	Time	Depth to Ground - mbgl	Depth to Stand - mbtoc	Field Parameters			Total Metals																Major Cations					Major Anions													Comments
					pH - Field	EC - Field - µS/cm	Temp. - Field °C	Aluminium (Al) - mg/L	Arsenic (As) - mg/L	Barium (Ba) - mg/L	Beryllium (Be) - mg/L	Cadmium (Cd) - mg/L	Chromium (Cr) - mg/L	Cobalt (Co) - mg/L	Copper (Cu) - mg/L	Iron (Fe) - mg/L	Lead (Pb) - mg/L	Manganese (Mn) - mg/L	Nickel (Ni) - mg/L	Vanadium (V) mg/L	Zinc (Zn) - mg/L	Mercury (Hg) - mg/L	pH - Lab	EC - Lab - µS/cm	Calcium (Ca) - mg/L	Magnesium (Mg) - mg/L	Sodium (Na) - mg/L	Potassium (K) - mg/L	Total Cations - meq/L	Chloride (Cl) - mg/L	Sulfate (SO4) - mg/L	Hydroxide Alkalinity as CaCO3 - mg/L	Carbonate Alkalinity as CaCO3 - mg/L	Bicarbonate Alkalinity as CaCO3 - mg/L	Alkalinity - mg/L	Total Anions - meq/L	Ionic Balance	Ammonia as Nitrogen (N)	Nitrite as N (mg/L)	Nitrate as N (mg/L)	NOX as N (mg/L)	Total Dissolved Solids	
ANZECC guideline*								**5**	**0.5**			**0.01**	**1**	**1**	**1**		**0.1**			**1**		**20**	**0.002**			**1000**						**1000**								**1500**	**400**		**4000**	
MP-1	04-Sep-08	1040	21.14	22.11																																						
Registered Number:	13-Oct-08	1500	13.87	14.84																																						
GW968533	23-Oct-08	0915	13.83	14.8																																						
Licence Number:	29-Oct-08		14.10	15.07	7.61	2360	22.1		0.011	0.148	<0.0001	0.0001	0.002	0.001	0.002	0.84	0.004	0.332	0.332	<0.01	0.016	<0.0001			51	32	400	4	22.7	222	51	<1	<1	686	686	21	3.76	<0.01				
90BL254855	23-Jan-09	1600	14.69	15.66																																						
	22-Jun-09	0915	13.55	14.65	7.8	2250	19.8		0.013	0.147	<0.001	<0.0001	0.01	0.002	0.009	1.12	0.003	0.249	0.014	<0.01	0.067	<0.0001		2210	39	25	487	4	25.3	235	78	<1	<1	741	741	23	4.6	<0.01				1300
	15-Sep-09	1540	13.63	14.6																																						
	30-Nov-09	1250	13.57	14.54	7.77	2251	25.3	<0.01	0.004				<0.005		<0.001	<0.05	<0.001	0.237	0.013		<0.005	<0.0001	7.85	2250	31	26	465	4	24.1	224	120	<1	<1	751	751	23.8	0.51		<0.01	0.17	0.17		
	25-Feb-10	1425	13.58	14.55																																						
	03-May-10	1410	13.50	14.47	8.06	2440	22.8		0.009	0.313	<0.001	0.0004	0.01	0.006	0.14	12.2	0.032	0.832	0.04	0.02	0.886	<0.0001		2100	34	23	493	6	25.2	255	102	<1	<1	828	828	25.9	1.37	3.12				1170
	26-Aug-10	1140	13.42	14.27	8.00	1650	Probe Broken																																			
	08-Nov-10	1240	13.35	14.32	7.36	2080	24.5																																			
	02-Mar-11	1240	13.23	14.20	7.24	1942	27.6	<0.01	0.003				<0.005		<0.001	<0.05	<0.001	0.301	<0.001		<0.005	<0.0001	7.49	2020	38	24	501	9	25.9	248	37	<1	79	740	819	24.1	3.48		0.02	0.72	0.73		
	03-May-11	1050	13.24	14.21	7.45	1872	21.4																																			
				Bore covered by production area																																						
MP-2	03-Sep-08	1650	13.53	14.55																																						
Registered Number:	13-Oct-08	1255	12.98	14.00																																						
GW968534	23-Oct-08	0930	13.56	14.58																																						
Licence Number:	29-Oct-08		13.2	14.22	7.35	4180	21		0.001	0.618	<0.001	0.0001	0.002	0.001	0.003	1.1	0.011	0.234	0.234	<0.01	0.042	<0.0001			174	101	529	5	40.1	926	45	<1	<1	559	559	38.2	2.37	0.02				
90BL254856	23-Jan-09	1741	14.6	15.7																																						
	22-Jun-09	1200	13.7	14.8	7	5210	22.5		0.001	0.766	<0.001	<0.0001	0.01	0.003	0.008	5.01	0.007	0.145	0.011	0.01	0.095	<0.0001		4830	254	150	646	7	53.3	1490	61	<1	<1	538	538	54.1	0.74	<0.01				3040
	15-Sep-09	1520	13.88	14.88																																						
	30-Nov-09	1030	13.9	14.9	6.91	5230	30.2	<0.01	0.002				<0.005		0.019	<0.05	<0.001	0.07	0.006		0.01	<0.0001	6.99	4560	247	161	593	7	51.6	1390	19.5	<1	<1	446	446	48.4	3.16		<0.01	0.6	0.6		
	25-Feb-10	1320	14.14	15.14																																						
	03-May-10	1130	14.0	15.0	7.37	5240	22.3		<0.001	0.737	<0.001	<0.0001	0.004	0.002	0.022	4.31	0.012	0.148	0.009	0.01	0.335	<0.0001		4760	237	150	584	6	49.8	1510	28.6	<1	<1	527	527	53.8	3.88	0.01				3120
	26-Aug-10	1040	13.48	14.48	7.07	5060	Probe Broken																																			
	08-Nov-10	1355	12.04	13.04	6.72	3720	26.9																																			
	07-Mar-11	1320	10.49	11.49	6.98	4060	25.2	0.71	<0.001				0.001		0.057	0.52	0.006	0.077	0.004		0.299	<0.0001	7	5070	247	162	611	1	52.5	1390	22	<1	<1	529	529	50.1	2.3		0.01	0.77	0.78		
	03-May-11	1210	11.10	12.10	6.95	4110	21.7																																			
	30-Aug-11	1130	11.54	12.54	6.9	3950	22.4	7.63	0.006	1.28	<0.001	0.0001	0.008	0.005	0.154	9.79	0.019	0.436	0.014	0.02	1.2	<0.0001	7.27	5320	243	152	600	7	50.9	1490	20	<1	<1	477	477	52	1.03	<0.01	<0.01	0.47	0.47	2960	
	04-Nov-11	1140	11.78	12.78	6.8	3820	23.9																																			
	21-Mar-12	0945	8.17	9.17	7.01	4330	22.3	0.26	0.003	0.867	<0.001	<0.0001	0.001	<0.001	0.037	0.12	0.003	0.028	0.003	<0.01	0.13	<0.0001	7.39	5080	272	168	639	9	55.4	1530	25	<1	<1	500	500	53.7	1.61	0.18	0.03	0.84	0.87	3770	
	23-May-12	1140	8.43	9.43	7.32	4170	15.4																																			
MP-3	04-Sep-08	1130	11.81	12.75																																						
Registered Number:	13-Oct-08	1000	9.06	10.00																																						
GW968535	23-Oct-08	0830	17.36	18.3																																						
Licence Number:	29-Oct-08																																									
90BL254857	23-Jan-09	1800	18.3	19.24																																						
	22-Jun-09	1240		Dry																																						
	15-Sep-09	1505		Dry																																						
	30-Nov-09	1220		Dry																																						
	25-Feb-10	1140		Dry																																						
	03-May-10	1050		Dry																																						
	26-Aug-10	1000		Dry																																						
	08-Nov-10	1400		Dry																																						
	07-Mar-11	1150		Dry																																						
	03-May-11	1315		Dry																																						
	30-Aug-11	1000		Dry																																						
	04-Nov-11	1040		Dry																																						
	20-Mar-12	0950		Dry																																						
	23-May-12	1000		Dry																																						
MP-4	03-Sep-08	1715	22.62	23.60																																						
Registered Number:	13-Oct-08	1045	23.02	24.00																																						
GW968536	22-Oct-08	1555	23.17	24.15																																						
Licence Number:	29-Oct-08																																									
90BL254858	23-Jan-09	1810	24.16	25.14																																						
	22-Jun-09	1247		Dry																																						
	15-Sep-09	1455		Dry																																						
	30-Nov-09	1220		Dry																																						
	25-Feb-10	1035		Dry																																						
	03-May-10	1000		Dry																																						
	26-Aug-10	830		Dry																																						
	07-Mar-11	1040	24.12	25.1																																						
	03-May-11	1330		Dry																																						
	30-Aug-11	0915		Dry																																						
	04-Nov-11	0950		Dry																																						
	20-Mar-12	0900		Dry																																						
	23-May-12	1000		Dry																																						
MP-5	04-Sep-08	0940	53.13	54.00																																						
Registered Number:	13-Oct-08	1515	52.9	53.77																																						
GW968537	23-Oct-08	0900	52.96	53.83																																						
Licence Number:	29-Oct-08																																									
90BL254859	23-Jan-09	1616	54.44	55.26																																						
	22-Jun-09	1020		Dry																																						
	15-Sep-09	1608		Dry																																						
	30-Nov-09	0915	54.42	55.52																																						
	25-Feb-10	1445	54.48	55.58																																						
	03-May-10	1330	54.6	55.45																																						
	26-Aug-10	1210	54.69	55.66																																						
	08-Nov-10	1140	54.88	55.73																																						
	02-Mar-11	1130	54.85	55.7																																						
	03-May-11	1000	54.8	55.65																																						
	30-Aug-11	1330	54.89	55.74																																						Insufficient water to sample
	04-Nov-11	1300	54.78	55.63																																						Insufficient water to sample
	20-Mar-12	1020	54.85	55.7																																						
	23-May-12	1030	54.41	55.26																																						Insufficient water to sample
WB-1	13-Oct-08	1640	8.95	9.35																																						
Registered Number:	28-Oct-08		8.85	9.25	7.93	1996	22.4		0.018	0.355	<0.001	0.0001	<0.001	<0.001	0.009	8.7	0.027	0.045	0.045	<0.01	1.19	<0.0001			9	12	388	4	18.4	286	30	<1	<1	483	483	17.8	1.57	1.23				1050	
GW000743	6-Dec-11	1230	8.64	9.04	8.08	1450	22.3																																				Windmill at Costa Vale back paddock
	21-Mar-12	1030	8.49	8.89	7.98	1640	23.6	0.1	0.022	0.386	<0.001	0.0001	<0.001	<0.001	0.015	9.31	0.006	0.039	<0.001	<0.01	0.468	<0.0001	8.1	1730	12	13	420	7	20.1	286	10	<1	<1	508	508	18.4	4.34	2.04	<0.01	0.07	0.07	932	
	24-May-12	1310	8.52	8.82	8.03	1537	22																																				
WB-2	3-Sep-08	1400	16.87	17.25																																						
Registered Number:	13-Oct-08	1630	16.49	16.87																																						
GW050395	28-Oct-08		16.60	16.98	7.72	3430	22.7		<0.001	0.127	<0.001	<0.0001	<0.001	<0.001	0.011	0.15	<0.001	0.01	0.01	0.02	0.023	<0.0001			207	120	281	3	32.5	816	6	<1	<1	389	389	31.4	1.7	0.17				2310	
Licence Number:	23-Jan-09	1532	17	17.39																																						
90BL111536	22-Jun-09	0830	16.65	17.03	7.2	3160	19.6		0.003	0.128	<0.001	<0.0001	0.001	<0.001	0.132	20.1	0.012	0.826	0.024	0.05	1.32	<0.0001		3050	205	103	274	4	30.7	798	27	<1	<1	464	464	32.3	2.52	0.08				1750	
	15-Sep-09	1552	16.45	16.83																																						
	6-Jan-10	0930	16.45	16.83	8.5	2070	24.1	<0.01	<0.001				<0.001		0.021	<0.05	<0.001	0.036	0.009		0.334	<0.0001	7.51	2010	126	62	159	7	18.5	326	13.7	<1	<1	330	330	16.7	5		0.02	8.96	8.98		
	25-Feb-10	1355	16.48	16.86																																						
	3-May-10	1250	16.56	16.94	7.84	1821	23.1		0.001	0.084	<0.001	0.0002	<0.001	<0.001	0.138	11.8	0.007	0.541	0.01	0.03	1.03	<0.0001		2190	148	73	194	7	22	505	35.5	<1	<1	364	364	22.3	0.47	2.77				1290	
	30-Aug-11	1400	16.36	16.74	8.3	2170	21.8	<0.01	<0.001	0.083	<0.001	<0.0001	<0.001	<0.001	0.016	0.19	<0.001	0.002	<0.001	0.01	0.025	<0.0001	7.87	2880	127	103	269	3	26.6	778	32	<1	<1	290	290	28.4	3.3	<0.01	<0.01	0.5	0.5	1460	From windmill outlet
	4-Nov-11	1330	16.44	16.82	8.4	2110	25.4																																			
	20-Mar-12	1330	16.42	16.8	8.46	2410	24.5	<0.01	0.002	0.023	<0.001	<0.0001	<0.001	<0.001	0.002	0.08	<0.001	0.007	<0.001	0.01	0.007	<0.0001	8.64	2650	57	110	335	4	26.6	804	17	<1	32	114	146	26	1.18	0.07	<0.01	0.08	0.08	1540	
	23-May-12	1300	16.14	16.52	8.56	2610	15.7																																			

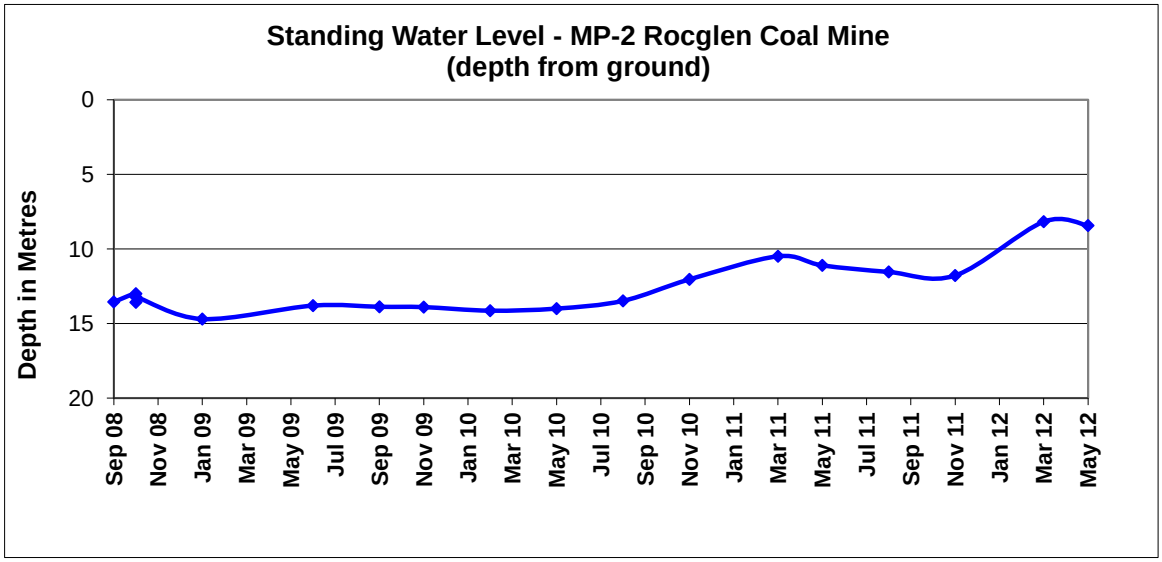
					Field Parameters			Total Metals																	Major Cations					Major Anions													
Site ID	Date	Time	Depth to Ground - mbgl	Depth to Stand - mbtoc	pH - Field	EC - Field - µs/cm	Temp - Field - °C	Aluminium (Al) - mg/L	Arsenic (As) - mg/L	Barium (Ba) - mg/L	Beryllium (Be) - mg/L	Cadmium (Cd) - mg/L	Chromium (Cr) - mg/L	Cobalt (Co) - mg/L	Copper (Cu) - mg/L	Iron (Fe) - mg/L	Lead (Pb) - mg/L	Manganese (Mn) - mg/L	Nickel (Ni) - mg/L	Vanadium (V) - mg/L	Zinc (Zn) - mg/L	Mercury (Hg) - mg/L	pH - Lab	EC - Lab - µs/cm	Calcium (Ca) - mg/L	Magnesium (Mg) - mg/L	Sodium (Na) - mg/L	Potassium (K) - mg/L	Total Cations - meq/L	Chloride (Cl) - mg/L	Sulfate (SO4) - mg/L	Hydroxide Alkalinity as CaCO3 - mg/L	Carbonate Alkalinity as CaCO3 - mg/L	Bicarbonate Alkalinity as CaCO3 - mg/L	Alkalinity - mg/L	Total Anions - meq/L	Ionic Balance	Ammonia as Nitrogen (N)	Nitrite as N (mg/L)	Nitrate as N (mg/L)	NOX as N (mg/L)	Total Dissolved Solids	Comments
ANZECC guideline*								5	0.5			0.01	1	1	1		0.1		1		20	0.002			1000						1000								1500	400		4000	
WB-3	3-Sep-08	1430	8.82	9.40																																							
Registered Number:	13-Oct-08	1555	8.87	9.45																																							
GW050166	29-Oct-08		8.95	9.53	7.2	4480	21.7		0.002	0.012	<0.001	0.0004	0.05	0.001	0.009	0.61	0.003	0.026	0.026	0.04	0.026	<0.0001			264	196	363	2	45.1	1210	29	<1	<1	395	395	42.7	2.75	0.06					
Licence Number:	23-Jan-09	1545	23.72	24.3																																							
90BL110883	9-Feb-09	1600	9	9.5																																							
	22-Jun-09	0905	8.99	9.57	7.5	4380	15.9		<0.001	0.005	<0.001	<0.0001	<0.001	<0.001	0.028	0.06	<0.001	0.004	0.006	0.04	0.131	<0.0001		4080	259	184	407	2	45.8	1270	22	<1	<1	434	434	44.8	1.1	0.18				2690	
	15-Sep-09	1549	8.76	9.57																																							
	30-Nov-09	0845	8.8	9.61	7.67	2900	25.6	<0.01	0.001				<0.005		0.017	<0.05	<0.001	0.003	0.005		0.078	<0.0001	7.74	3890	215	185	360	3	41.7	1220	21.2	<1	<1	324	324	41.3	0.5		<0.01	3.78	3.78		
	25-Feb-10	1410	8.69	9.5																																							
	3-May-10	1320	18.53	19.11	7.88	4290	23.5		0.001	0.006	<0.001	<0.0001	<0.001	<0.001	<0.001	<0.05	<0.001	<0.001	<0.001	0.04	<0.005	<0.0001		4000	229	168	354	2	40.7	1210	29.8	<1	<1	428	428	43.2	3.06	<0.01				2680	
	26-Aug-10	1250	8.94	9.52	8.28	3260	Probe Broken																																				
	8-Nov-10	1110	8.98	9.56	8.02	2360	25.8																																				
	2-Mar-11	1150	17.63	18.21	7.44	3770	27.4	<0.01	0.003				<0.001		0.009	<0.05	<0.001	0.004	0.002		0.015	<0.0001	7.6	4820	274	157	498	8	48.5	1460	26	<1	<1	145	145	44.7	4.05		0.09	0.88	0.97		
	3-May-11	945	9.07	9.65	7.7	3790	14.3																																				
	1-Sep-11	1010	9.14	9.72	8.1	3830	16.9	<0.01	0.001	0.01	<0.001	<0.0001	<0.001	<0.001	0.006	<0.05	<0.001	0.005	<0.001	0.02	0.016	<0.0001	8.32	4860	147	191	411	3	41	1300	31	<1	3	171	174	40.8	0.27	0.11	<0.01	0.12	0.12	2480	Water from trough near MP4
	6-Dec-11	1100	9.07	9.65	7.05	3650	22.2																																				
	20-Mar-12	1300	8.71	9.29	6.95	3720	24.3	<0.01	0.001	0.002	<0.001	<0.0001	<0.001	<0.001	0.002	<0.05	0.04	<0.001	<0.001	<0.001	0.009	<0.0001	7.36	4280	256	184	393	2	45.1	1160	33	<1	<1	398	398	41.4	4.29	0.06	<0.01	3.64	3.64	2750	
	23-May-12	1255	8.49	9.07																																							
WB-4	3-Sep-08	casing sealed																																									
Registered Number:	13-Oct-08	casing sealed																																									
GW045621	29-Oct-08	casing sealed																																									
Licence Number:	22-Jun-09	casing sealed																																									
90BL104367	15-Sep-09	casing sealed																																									
	30-Nov-09	casing sealed																																									
	25-Feb-10	casing sealed																																									
	26-Aug-10	1230			7.83	3650	Probe Broken																																				
	8-Nov-10	1205			Tank empty unable to sample																																						
	2-Mar-11	1130			7.03	3320	29.2	<0.01	0.001				<0.001		0.005	<0.05	<0.001	0.002	<0.001		0.027	<0.0001	7.16	4010	247	183	363	2	43.2	1200	26	<1	<1	312	312	40.6	3.13		<0.01	3.79	3.79		
	3-May-11	1030			7.1	3160	14.5																																				
	1-Sep-11	1030			7.15	3650	16.8																																				Bore covered by pump unable to dip, Sample taken from tank
	6-Dec-11	1200			7.36	3590	22.3																																				
	20-Mar-12	1040			7.32	3680	21.7	<0.01	0.002	0.003	<0.001	<0.0001	<0.001	<0.001	0.028	<0.05	0.001	0.002	<0.001	0.04	0.022	<0.0001	7.61	4260	244	182	402	2	44.7	1170	33	<1	<1	378	378	41.2	4.02	0.05	0.02	3.21	3.23	2710	
	24-May-12	1330			7.91	3580	15.3																																				
WB-5	3-Sep-08	1540	4.23	4.65																																							
Registered Number:	13-Oct-08	1600	12.92	13.34																																							
GW011066	28-Oct-08		12.85	13.27	7.29	8400	22.5		<0.001	0.165	<0.001	0.0002	<0.001	<0.001	0.003	0.47	<0.001	0.267	0.267	<0.01	0.103	<0.0001			314	288	979	8	82.1	2350	89	<1	<1	505	505	78.2	2.39	0.22				5680	
Licence Number:	23-Jan-09	1700	13.1	13.5																																							
90BL004169	22-Jun-09	1045			6.6	7930	21.3		<0.001	0.163	<0.001	<0.0001	<0.001	<0.001	0.002	2.36	<0.001	0.231	0.002	<0.01	0.045	<0.0001	7590		318	270	1080	9	85.3	2680	67	<1	<1	612	612	89.4	2.36	0.02				4580	
	15-Sep-09	1620			Unable to dip																																						
	30-Nov-09	0930	22.93	23.33	7.06	4880	27.9	<0.01	<0.001				<0.005		0.002	<0.05	<0.001	0.253	0.001		0.086	<0.0001	7250	7.26	282	280	965	10	79.3	2330	63.8	<1	<1	494	494	77	1.45		<0.01	2.23	2.23		
	25-Feb-10	1345	13.14	13.54																																							
	3-May-10	1215	12.97	13.37	7.43	7500	23		<0.001	0.124	<0.001	<0.0001	<0.001	<0.001	0.003	0.21	<0.001	0.124	0.001	<0.01	0.085	<0.0001	6720		217	268	1020	9	77.5	2360	91	<1	<1	415	415	76.8	0.41	<0.01				4570	
	26-Aug-10	1125	13.01	13.41	7.47	7480	Probe Broken																																				
	8-Nov-10	1255	14.06	14.46	7.86	5810	25.5																																				
	2-Mar-11	1315	20.99	21.39	6.45	5590	26.2	<0.01	<0.001				<0.005		<0.001	<0.05	<0.001	0.243	<0.001		0.017	<0.0001	7540	6.67	301	259	958	10	78.3	2420	75	<1	<1	216	216	74	2.79		0.02	2.13	2.14		
	3-May-11	1150	12.7	13.1	6.8	5760	16.1																																				
	30-Aug-11	1240	12.7	13.1	7.8	5610	19.5	0.6	0.001	0.154	<0.001	0.0002	<0.001	<0.001	0.022	1.02	0.004	0.102	0.006	<0.01	0.201	<0.0001	7780	7.85	191	266	1020	9	76	2500	70	<1	<1	328	328	78.5	1.63	<0.01	<0.01	2.1	2.1	4290	Water from tank
	4-Nov-11	1230	12.79	13.19	7.9	5550	26.1																																				
	20-Mar-12	1026	9.86	10.26	7.82	6670	24.5	<0.01	0.001	0.091	<0.001	<0.0001	0.001	<0.001	0.004	0.65	<0.001	0.044	<0.001	0.02	0.022	<0.0001	7870	7.86	176	301	1220	11	86.9	2680	95	<1	<1	258	258	82.7	2.45	<0.10	0.02	1.59	1.61	4810	
	23-May-12	1245	9.06	9.46	8.17	6360	16.8																																				
WB-6	3-Sep-08	1626	23.18	23.64																																							
Registered Number:	13-Oct-08	1315	23.05	23.51																																							
GW044068	29-Oct-08																																										
Licence Number:	23-Jan-09	1720	23.81	24.3																																							
90BL102845	22-Jun-09	1110	23.74	24.2	Unable to sample																																						
	15-Sep-09	1528	23.83	24.32																																							
	30-Nov-09	1000	24.02	24.51	Bore equipped																																						
	25-Feb-10	1335	25.05	25.54																																							
	3-May-10	1155	23.71	24.2																																							
	26-Aug-10	1055	23.47	23.96	Windmill over bore																																						
	8-Nov-10	1310	23.31	23.8	Windmill over bore																																						
	7-Mar-11	1340	22.74	23.23	Windmill over bore																																						
	3-May-11	1140	22.02	23.02	Windmill over bore																																						
	30-Aug-11	1150	22.55	23.04																																							
	4-Nov-11	1155	22.67	23.16																																							
	20-Mar-12	1140	21.72	22.21																																							
	23-May-12	1200	21.06	21.55																																							
WB-7	4-Sep-08	0830	41.75	42.00																																							
Registered Number:	13-Oct-08	1240	19.11	19.36																																							
GW022319	28-Oct-08		18.90	19.15	7.25	2730	22.1		0.002	0.609	<0.001	<0.0001	<0.001	<0.001	0.021	0.19	<0.001	0.012	0.012	0.02	0.052	<0.0001			113	63	387	4	27.8	529	25	<1	<1	489	489	25.2	4.78	<0.001				1540	
Licence Number:	23-Jan-09	1752	21.35	21.43																																							
90BL013922	22-Jun-09	1210	Sample from tank		7.4	2690	18.8		0.001	0.665	<0.001	<0.0001	<0.001	<0.001	0.02	0.09	<0.001	0.012	<0.001	0.02	0.046	<0.0001		2660	117	58	417	4	28.9	604	33	<1	<1	533	533	28.4	0.92	1.4				1460	
	15-Sep-09	1508			Bore equipped																																						
	30-Nov-09	1200	Sample from tank		7.39	2640	30.8	<0.01	0.002				<0.005		0.019	<0.05	<0.001	0.006	<0.001		0.029	<0.001	7.3	2260	102	58	367	4	25.9	571	21.7	<1	<1	497	497	26.5	1.06		0.09	5.94	6.03		
	25-Feb-10	1300	Sample from tank																																								
	3-May-10	1100	15	15.27	7.45	2890	21.4		0.002	0.663	<0.001	<0.0001	<0.001	<0.001	0.038	0.45	0.006	0.024	0.003	0.002	5.72	<0.0001		2470	122	58	360	3	26.6	535	28.1	<1	<1	572	572	27.1	0.84	<0.01				1320	
	26-Aug-10	1020	25.91	26.18	Windmill over bore																																						
	8-Nov-10	1340	31.53	31.8	7.24	2240	31.3																																				
	7-Mar-11	1240	25.13	25.4	7.24	2230	28.5	<0.01	0.002				<0.001		0.035	<0.05	0.001	0.008	<0.001		1.57	<0.0001	7.23	2440	126	59	378	4	27.6	535	22	<1	<1	573	573	27	1.19		<0.01	6.45	6.45		
	3-May-11	1230	14.78	15.05	7.45	2130	18																																				
	30-Aug-11	1035	17.66	17.93	7.9	2060	18.7	55.1	0.072	2.72	0.002	0.0002	0.053	0.042	1.46	108	0.442	3.67	0.069	0.26	16.1	<0.0001	7.91	2750	122	57	382	4	27.5	585	27	<1	<1	516	516	27.4	0.21	0.04	<0.01	6.8	6.8	1470	water from tank on windmill
	4-Nov-11	1100	29.41	29.68	7.7	2080	23.8																																				
	20-Mar-12	1110	2.96	3.23	7.41	3120	23.7	0.07	0.027	1	<0.001	<0.0001	0.005	<0.001	0.35	12.3	0.149	0.067	<0.001	0.07	2.48	<0.0001	7.74	3550	203	71	475	5	36.8	845	49	<1	<1	482	482	34.5	3.19	0.06	<0.01	40.5	40.5	2420	
	23-May-12	1100	4.60	4.87	8.11	3070	14.9																																				
WB-8	3-Sep-08	no access																																									
Registered Number:	13-Oct-08	no access																																									
GW052958	29-Oct-08	no access																																									
Licence Number:	23-Jan-09	1840	46.4	46.9																																							
90BL107181	22-Jun-09	1255	32.75	33.17	8.2	2240	18.5		0.02	0.173	<0.001		<0.001	<0.001	0.004	0.36	0.003	0.016	<0.001	0.01	0.335	<0.0001		2190	49	38	429	7	24.4	378	37	<1	<1	554	554	22.5	4.04	0.12				1210	
	15-Sep-09	1450	43.38	43.88																																							
	30-Nov-09	1350		Dry																																							
	25-Feb-10	1045	49.32	49.82																																							
	3-May-10	1035	32.59	33.09																																							
	26-Aug-10	925	32.23	32.73																																							
	9-Nov-10	1350	32.14	32.64	Unable to sample. Pump over bore																																						
	7-Mar-11	1050			Unable to sample. Gate Locked																																						
	3-May-11				Unable to sample. Gate Locked																																						
	1-Sep-11	1130	31.77	32.27	Unable to sample																																						
	6-Dec-11	1010	31.58	32.08	Unable to sample																																						
	21-Mar-12	1340	31.43	31.93	Unable to sample																																						
	24-May-12	1240	31.03	31.53	Unable to sample																																						

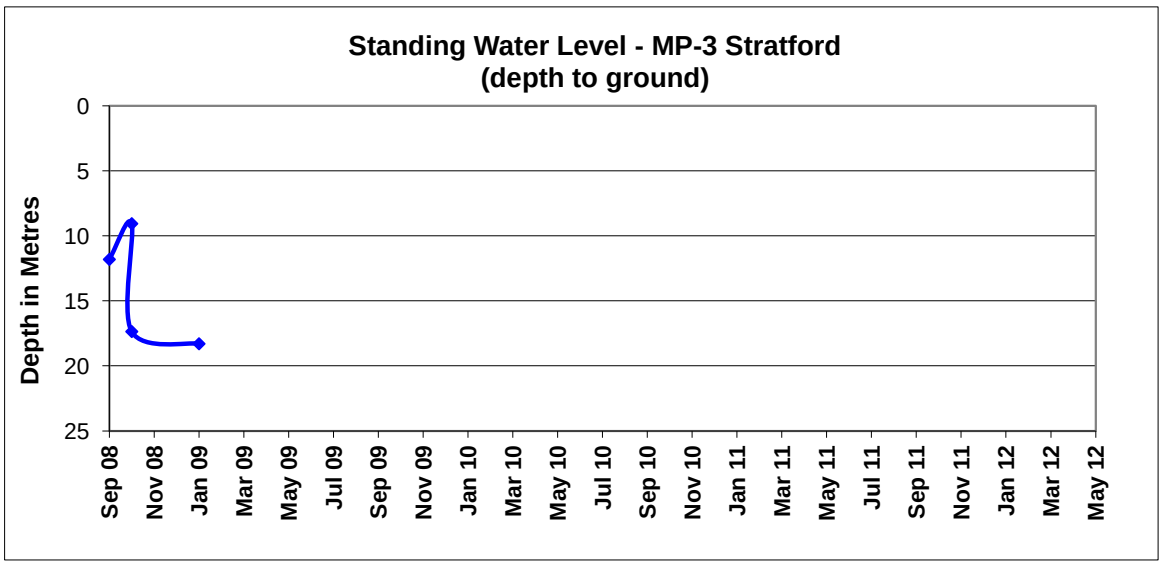
					Field Parameters			Total Metals																	Major Cations					Major Anions													
Site ID	Date	Time	Depth to Ground - mbgl	Depth to Stand - mbtoc	pH - Field	EC - Field - µs/cm	Temp - Field °C	Aluminium (Al) - mg/L	Arsenic (As) - mg/L	Barium (Ba) - mg/L	Beryllium (Be) - mg/L	Cadmium (Cd) - mg/L	Chromium (Cr) - mg/L	Cobalt (Co) - mg/L	Copper (Cu) - mg/L	Iron (Fe) - mg/L	Lead (Pb) - mg/L	Manganese (Mn) - mg/L	Nickel (Ni) - mg/L	Vanadium (V) - mg/L	Zinc (Zn) - mg/L	Mercury (Hg) - mg/L	pH - Lab	EC - Lab - µs/cm	Calcium (Ca) - mg/L	Magnesium (Mg) - mg/L	Sodium (Na) - mg/L	Potassium (K) - mg/L	Total Cations - meq/L	Chloride (Cl) - mg/L	Sulfate (SO4) - mg/L	Hydroxide Alkalinity as CaCO3 - mg/L	Carbonate Alkalinity as CaCO3 - mg/L	Bicarbonate Alkalinity as CaCO3 - mg/L	Alkalinity - mg/L	Total Anions - meq/L	Ionic Balance	Ammonia as Nitrogen (N)	Nitrite as N (mg/L)	Nitrate as N (mg/L)	NOX as N (mg/L)	Total Dissolved Solids	Comments
ANZECC guideline*								5	0.5			0.01	1	1	1		0.1		1		20	0.002			1000						1000								1500	400		4000	
WB-9	3-Sep-08	1740	23.88	24.15																																							
	13-Oct-08	1100	24.09	24.36																																							
	28-Oct-08		24.50	24.77	7.53	931	23.3		0.021	0.459	<0.001	0.0008	0.001	<0.001	0.023	37.3	0.034	0.157	0.157	0.02	2.44	<0.0001			40	32	99	5	9.04	88	17	<1	<1	300	300	8.83	1.12	4.54				417	
	23-Jan-09	1816	24.27	24.57																																							
	22-Jun-09	1345	23.99	24.26	7.9	1080	20.6		0.005	0.648	<0.01	0.0017	<0.001	<0.001	0.004	11.8	0.005	0.034	0.002	<0.001	0.792	<0.0001		1040	21	27	104	8	8.03	84	<10	<1	<1	403	403	10.4	13	1.34				508	
	15-Sep-09	1443	23.94	24.25																																							
	30-Nov-09	1400	24.05	24.36	7.17	1261	25.3	<0.01	<0.001				<0.005		<0.001	0.33	<0.001	0.158	0.002		1.78	<0.001	7.14	1020	91	46	115	2	13.3	56.1	64.5	<1	<1	527	527	13.4	0.48		<0.01	0.2	0.2		
	25-Feb-10	1120	25.58	25.89																																							
	3-May-10	1010	24.26	24.57																																							
	26-Aug-10	900	24.59	24.9	7.72	1057	15.5																																				
	9-Nov-10	1340	24.34	24.65	Windmill over bore																																						
	7-Mar-11	1130	24.68	24.99	7.44	1143	26.7	<0.01	0.002				<0.001		0.014	0.66	<0.001	0.004	<0.001		0.063	<0.0001	7.46	1020	92	44	122	2	13.6	58	61	<1	<1	525	525	13.4	0.61		<0.01	0.3	0.3		
	3-May-11	1345	25.26	25.57	7.6	1014	18.9																																				
	30-Aug-11	930	24.36	24.67	7.9	981	17.4	<0.01	0.001	0.111	<0.001	<0.0001	<0.001	<0.001	0.005	0.51	<0.001	0.005	<0.001	0.01	0.037	<0.0001	7.92	1260	85	44	116	2	13	61	67	<1	<1	480	480	12.7	0.97	<0.01	<0.01	0.16	0.16	712	
	4-Nov-11	1015	24.58	24.89	7.7	937	23.1																																				
	20-Mar-12	0930	24.59	24.9	7.58	1126	23.5	<0.01	0.01	0.523	<0.001	<0.0001	0.004	<0.001	0.067	16.3	0.002	0.044	<0.001	0.08	0.597	<0.0001	7.85	1220	102	49	141	2	15.3	67	80	<1	<1	517	517	13.9	4.85	0.06	<0.01	0.31	0.31	780	
	23-May-12	0930	24.21	24.52	8.15	902	17.8																																				
WB-10	25-Jul-08	1050	13.75	13.85																																							
	4-Sep-08	0750	13.80	13.90																																							
	13-Oct-08	1200	13.77	13.87																																							
	28-Oct-08		13.9	14	7.45	2235	17.8		0.002	0.045	<0.001	<0.0001	0.001	<0.001	0.002	6.47	0.004	0.02	0.02	0.01	0.571	<0.0001			138	79	248	<1	24.2	141	280	<1	<1	632	632	22.4	3.72	0.04				1310	
	27-Jan-09	1119	14.23	14.27																																							
	22-Jun-09	1530	14.01	14.08	7	2220	21.2		0.002	0.05	<0.001	<0.0001	<0.001	<0.001	0.004	6.91	0.003	0.021	0.002	0.01	0.858	<0.0001		2180	139	70	283	1	25	150	279	<1	<1	751	751	25.1	0.06	0.21				1320	
	11-Sep-09	1432	14.65	14.72																																							
	30-Nov-09	1450	14.62	14.69	7.11	2052	23.8	<0.01	<0.001				<0.005		0.008	<0.05	<0.001	0.014	0.001		0.195	<0.0001	6.89	1690	123	67	259	<1	23	117	225	<1	<1	717	717	22.3	1.47		<0.01	0.15	0.15		
	25-Feb-10	1015	14.23	14.3																																							
	3-May-10	1440	14.47	14.54	7.93	2300	22.5		0.005	0.089	<0.001	0.0003	0.001	0.001	0.02	18	0.016	0.069	0.005	0.03	1.12	<0.0001		2010	137	70	266	<1	24.2	155	360	<1	<1	722	722	26.3	4.17	<0.01				1260	
	24-Sep-10	1020	14.05	14.1	6.7	1833	23.5																																				
	10-Nov-10	1150	14.1	14.17	6.72	1905	24.2																																				
	7-Mar-11	950	14.34	14.41	6.75	1910	24.7	0.27	0.004				0.002		0.042	21.7	0.009	0.136	0.002		1.11	<0.0001	6.91	1850	136	73	266	2	24.4	147	251	<1	<1	735	735	24.1	0.64		<0.01	0.15	0.15		
	3-May-11	1425	14.07	14.14	6.8	1685	21																																				
	1-Sep-11	1240	16.47	16.54	6.95	1745	22.6	0.14	<0.001	0.045	<0.001	<0.0001	<0.001	<0.001	0.006	2.23	0.002	0.029	0.001	<0.01	0.203	<0.0001	7.74	2050	126	64	234	<1	21.7	164	274	<1	<1	504	504	20.4	3.15	0.06	<0.01	0.16	0.16	1230	In small shed
	6-Dec-11	0920	14.12	14.19	6.92	1780	21.1																																				
	21-Mar-12	1220	14.13	14.2	6.94	1880	24.3	0.04	<0.001	0.047	<0.001	<0.0001	<0.001	>0.001	0.02	0.99	0.002	0.026	<0.001	<0.01	0.259	<0.0001	7.4	2020	140	71	246	1	23.6	175	326	<1	<1	635	635	24.4	1.8	0.03	>0.01	0.29	0.29	1320	
	24-May-12	1135	13.95	14.02	6.68	1902	21.7																																				
WB-11	25-Jul-08	1105	18.11	18.28																																							
	4-Sep-08	0740	18.61	18.78																																							
	13-Oct-08	1150	18.13	18.30																																							
	28-Oct-08		18.4	18.57	7.57	1086	19.6		<0.001	0.124	<0.001	<0.0001	<0.001	<0.001	0.004	4.24	0.004	0.253	0.253	<0.01	0.048	<0.0001			34	28	149	6	10.6	133	31	<1	<1	323	323	10.9	1.15	0.78				576	
	23-Jan-09	1109	18.73	18.91																																							
	22-Jun-09	1505	18.1	18.35	8	880	21.3		<0.001	0.1	<0.001	<0.0001	<0.001	<0.001	0.002	5.4	0.004	0.298	0.002	<0.01	0.041	<0.0001		917	360	24	130	2	9.2	132	10	<1	<1	247	247	8.86	1.86	1.79				476	
	11-Sep-09	1425	18.63	18.88																																							
	30-Nov-09	1425	18.6	18.85	7.89	938	23.1	<0.01	<0.001				<0.001		0.001	<0.05	<0.001				0.005	<0.0001	6.65	929	29	24	122	2	8.79	138	2.52	<1	<1	251	251	8.97	1.05		<0.01	0.08	0.08		
	25-Feb-10	1000	18.47	18.72																																							
	3-May-10	1515	18.24	18.49	8.37	1083	22.5		<0.001	0.08	<0.001	<0.0001	<0.001	<0.001	0.001	6.02	0.003	0.379	0.002	<0.01	0.016	<0.0001		921	33	24	127	2	9.19	156	5.84	<1	<1	246	246	9.44	1.34	0.95				474	
	24-Sep-10	1000	17.65	17.91	7.59	865	24																																				
	10-Nov-10	1140	17.49	17.74	7.49	867	25.8																																				
	7-Mar-11	930	18.57	18.82	7.05	944	24.5	0.13	<0.001				0.001		0.014	8.99	0.002	0.586	0.001		0.438	<0.0001	7.38	845	37	25	132	3	9.71	181	<1	<1	<1	238	238	9.88	0.88		<0.01	0.02	0.02		
	3-May-11	1400	17.34	17.59	7.25	867	20.3																																				
	1-Sep-11	1220	17.57	17.82	7.55	926	22.7	0.1	<0.001	0.078	<0.001	<0.0001	<0.001	<0.001	0.002	10.6	<0.001	0.538	<0.001	<0.01	0.009	<0.0001	8.13	1200	37	25	132	2	9.7	229	<1	<1	<1	176	176	9.98	1.43	0.34	<0.01	0.02	0.02	528	Near irrigation pump
	6-Dec-11	0900	16.93	17.18	7.5	905	21																																				
	21-Mar-12	1150	16.75	17	7.93	910	23.2	0.03	<0.001	0.057	<0.001	<0.0001	<0.001	<0.001	0.005	3.24	0.001	0.397	<0.001	<0.01	0.016	<0.0001	7.97	1020	31	24	140	4	9.71	258	1	<1	<1	156	156	10.4	3.5	0.15	0.23	0.69	0.92	522	
	24-May-12	1115	16.5	16.75																																							No sample. New pump over bore
WB-12	25-Jul-08	1120	12.73	13.03																																							
	4-Sep-08	0800	12.80	13.10																																							
	13-Oct-08	1213	12.83	13.13																																							
	28-Oct-08		12.95	13.25	8.15	2152	19.4		0.001	0.102	<0.001	0.0001	0.001	0.001	0.005	5.55	0.003	0.099	0.099	<0.01	0.314	<0.0001			34	78	301	3	21.3	254	2	<1	<1	649	649	20.2	2.57	6.95				1040	
	27-Jan-09	1129	13.16	13.33																																							
	22-Jun-09	1550	12.99	13.21	8	2070	22.2		0.001	0.108	<0.001	<0.0001	0.004	0.001	0.002	8.97	0.003	0.13	0.007	<0.01	0.871	<0.0001		1990	31	79	325	2	22.2	261	<5	<1	<1	725	725	21.8	0.81	6.82				1050	
	11-Sep-09	1438	13.05	13.27																																							
	30-Nov-09	1425	12.99	13.21	8.6	1537	22.8	<0.01	<0.001				<0.005		0.009	<0.05	<0.001	0.029	0.001		0.017	<0.0001	8.34	1640	16	43	284	6	16.8	149	10.8	<1	86	516	602	16.4	1.13		0.02	1.37	1.39		
	25-Feb-10	1020	13.19	13.41																																							
	3-May-10	1500	13.15	13.37	8.27	1490	22.5		0.002	0.069	<0.001	0.0001	<0.001	<0.001	0.004	6.2	0.003	0.111	0.003	<0.01	1.27	<0.0001		1390	19	43	266	4	16.2	137	13.6	<1	15	567	582	15.8	1.17	3.1				750	
	24-Sep-10	1035	13.22	13.44	8.71	873	23.7																																				
	10-Nov-10	1210	13.13	13.35	7.07	891	25.9																																				
	7-Mar-11	1010	13.18	13.4	7.37	1867	24	0.49	<0.001				<0.001		0.054	17.4	0.004	0.427	0.007		0.842	<0.0001	7.38	1780	28	68	274	10	19.1	213	2	<1	<1	744	744	20.9	4.48		0.01	0.04	0.05		
	3-May-11	1440	13.15	13.37	7.45	1657	20.8																																				
	1-Sep-11	1310	13.23	13.45	7.65	1720	22.9	1.03	<0.001	0.106	<0.001	0.0002	0.001	<0.001	0.008	6.08	0.006	0.226	0.002	<0.01	0.148	<0.0001	8.57	2130	34	70	277	3	19.6	260	4	<1	83	591	674	20.9	3.25	9.19	0.02	0.14	0.16	1030	Gate No 4
	6-Dec-11	0950	13.13	13.35	7.66	1390	21.1																																				
	21-Mar-12	0945	13.08	13.3	7.92	885	24	0.14	<0.001	0.044	<0.001	<0.0001	0.001	<0.001	0.016	3.84	0.001	0.212	0.001	<0.01	0.064	<0.0001	7.99	1150	17	26	190	11	11.5	71	6	<1	<1	489	489	11.9	1.6	21.7	0.02	0.12	0.14	556	
	24-May-12	1200	13.14	13.36	7.19	2150	21.9																																				
Yarrari	3-Sep-08	1555	55.24	56.06																																							
	13-Oct-08	1310	50.18	51.00																																							
	29-Oct-08				7.35	4030	24		<0.001	0.1	<0.001	0.0002	0.001	<0.001	0.005	0.11	<0.001	0.011	0.011	<0.01	0.013	0.0001			51	50	558	3	39.4	987	46	<1	<1	372	372	36.2	4.12	0.1					
	29-Oct-08								0.003	0.104	<0.001	<0.0001	<0.001	<0.001	0.004	0.08	<0.001	0.011	<0.001	<0.01	0.016	<0.0001			214	50	563	3	39.3	1040	46	<1	<1	374	374	37.8	1.94	<0.01					
	23-Jan-09	1714	49.90	50.58																																							
	22-Jun-09	1120		>50	7.1	3580	21.3	Sample not analysed due to lab administrative error																																			
	27-Aug-09	1500			7.34	3330	22.1		<0.001	0.061	<0.001	<0.0001	<0.001	<0.001	0.013	<0.05	<0.001	0.026	<0.001	<0.01	0.041	<0.0001		3070	167	32	504	3	33	803	42.9	<1	<1	430	430	32.1	1.31	<0.01				1980	
	30-Nov-09	1005			7.25	3480	27.4	<0.01	<0.001				<0.005	0.004		<0.05	<0.001	<0.001	<0.001		0.006	<0.0001	7.2	3160	178	35	508	3	33.9	882	34.7	<1	<1	377	377	33.1	1.19		<0.01	0.51	0.51		
	25-Feb-10	1330	Bore equipped																																								
	3-May-10	1205			7.52	3520	22		<0.001	0.063	<0.001	<0.0001	<0.001	<0.001	0.005	<0.05	<0.001	0.018	<0.001	<0.01	0.007	<0.0001		3310	175	32	528	3	34.4	930	52.4	<1	<1	314	314	33.6	1.14	<0.01				1900	
	26-Aug-10	1105			7.42	3340	Probe Broken																																				
	8-Nov-10	1320			Pump switched off																																						
	7-Mar-11	1350			6.97	2880	27.1	<0.01	<0.001				<0.001		0.007	<0.05	0.003	0.002	<0.001		0.039	<0.0001	7.29	3410	180	35	530	4	35	877	38	<1	<1	409	409	33.7	1.88		<0.01	0.3	0.3		
	3-May-11	1115			7	2930	20.2																																				
	30-Aug-11	1200	Bore equipped		7	2780	18.8	<0.01	<0.001	0.071	<0.001	<0.0001	<0.001	<0.001	0.007	<0.05	<0.001	0.005	<0.001	<0.01	0.08	<0.0001	7.25	3800	190	34	526	3	35.2	990	44	<1	<1	384	384	36.5	1.78	<0.01	<0.01	0.23	0.23	2020	Bore covered by pump unable to dip. Sample taken from tap
	4-Nov-11	1200	Bore equipped		7.1	2790	18.8																																				
	20-Mar-12	1200	Bore equipped		6.92	3380	25.2	<0.01	0.001	0.084	<0.001	<0.0001	<0.001	<0.001	0.012	<0.05	<0.001	0.002	<0.001	<0.01	0.047	<0.0001	7.37	3800	213	42	591	4	39.9	1000	51	<1	<1	405	405	37.4	3.28	0.05	<0.01	0.46	0.46	2320	
	23-May-12	1230	Bore equipped		7.51	3330	20.5																																				
Wundurra Stud	27-Jan-09	11:54	20.37	21.95																																							
Surrey No 2	25-Feb-10	1100	38.13	38.44																																							
	26-Aug-10	930	34.66	34.97	7.25	3140	16.8																																				
	9-Nov-10	1400	34.92	35.23	6.92	2380	25.7																																				
	7-Mar-11	1100	35.66	35.97	7.2	2710	24.9	0.62	<0.001				<0.001		0.074	0.82	0.004	0.044	0.001		0.154	<0.0001	7.15	3180	104	92	465	10	33.2	751	43	<1	<1	545	545	33	0.33		<0.01	1.54	1.54		
	3-May-11				No Access. Gate Locked.																																						
	1-Sep-11	1110	35.11	35.42	7.15	2760	23.6	0.22	<0.001	0.058	<0.001	<0.0001	<0.001	<0.001	0.004	0.37	<0.001	0.012	<0.001	0.02	0.022	<0.0001	7.97	3320	100	88	475	8	33.1	763	50	<1	<1	402	402	30.6	3.92	0.04	<0.01	1.59	1.59	1670	
	21-Mar-12	1320	34.49	34.80	7.6	1520	24.2	5.9	0.004	0.082	<0.001	<0.0001	0.008	0.003	0.033	8.88	0.004	0.102	0.005	0.05	0.062	<0.0001	7.88	1630	36	26	291	9	16.8	341	62	<1	<1	235	235	15.6	3.74	0.18	<0.01	9.4	9.4	1000	
	24-May-12	1225	34.59	34.9	7.2	2790	21.8																																				

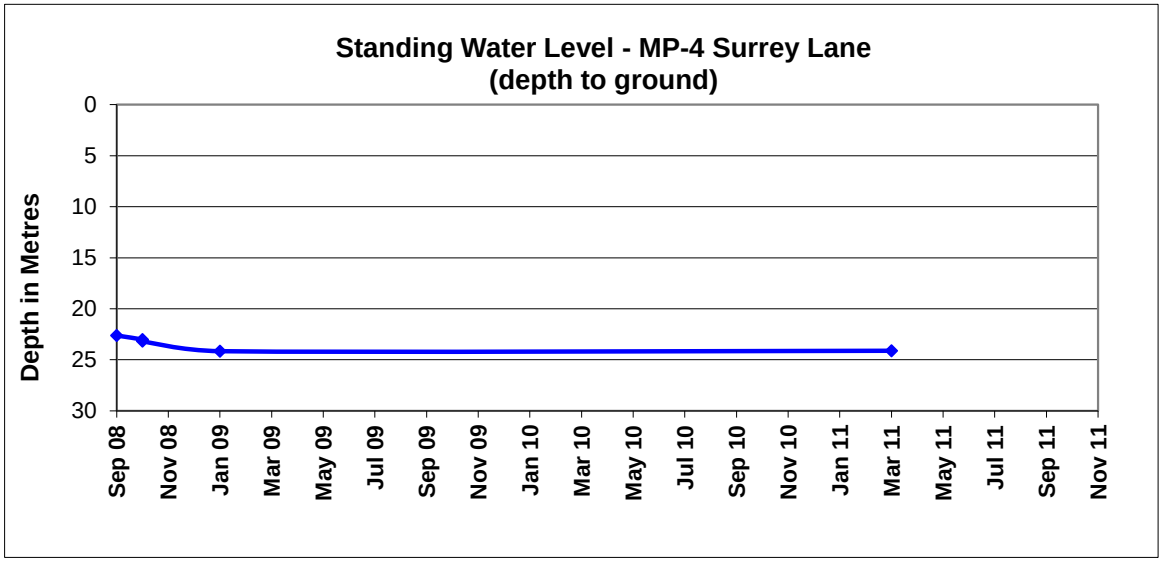
* ANZECC guideline - stock drinking water (cattle)

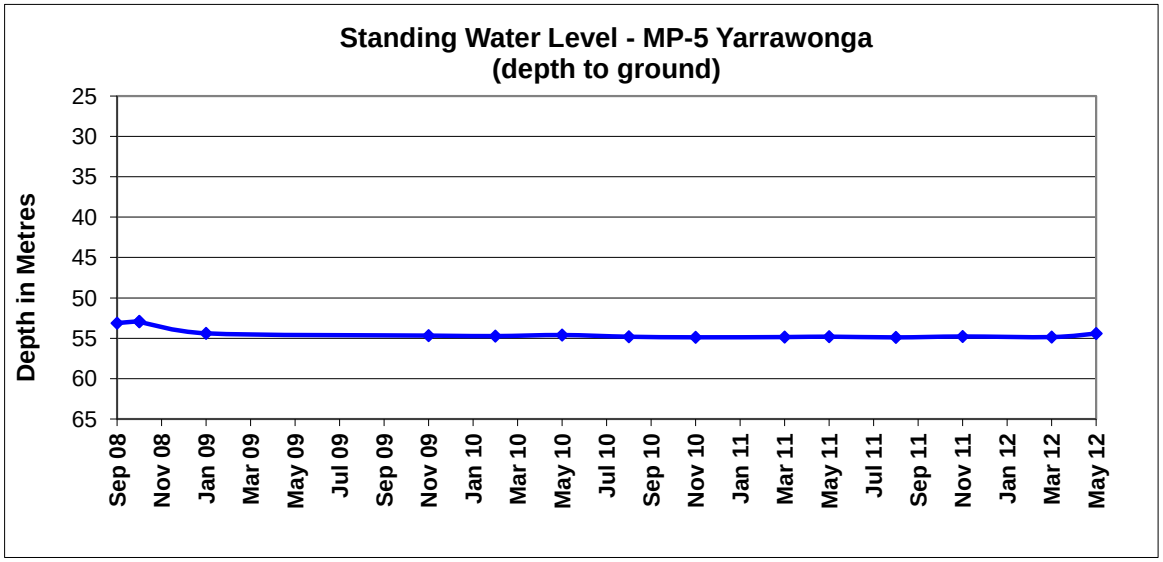
(green shading) Denotes dissolved metals

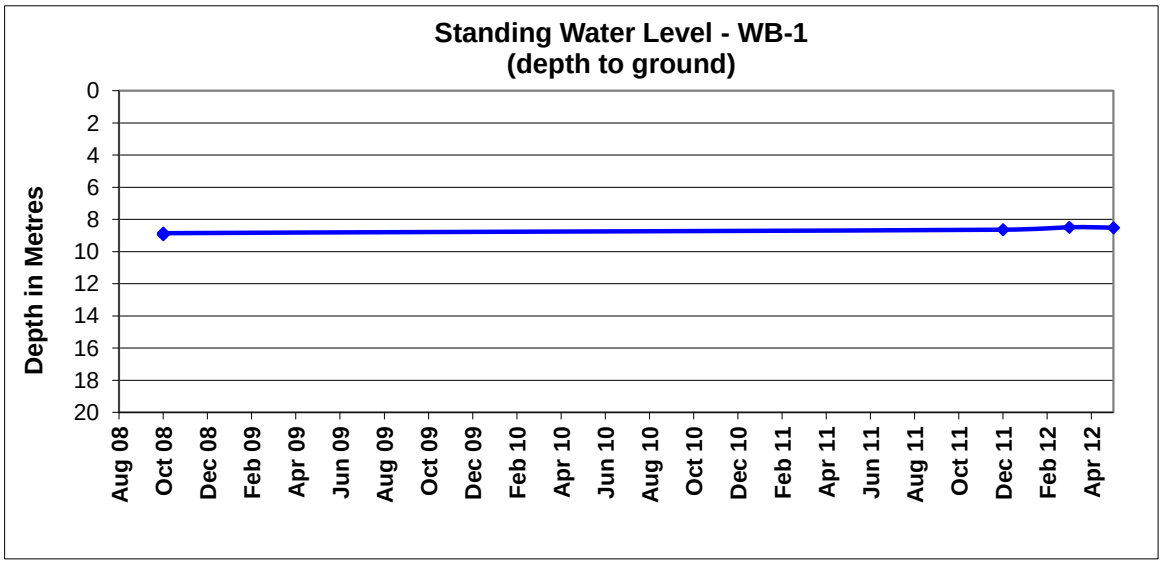

Standing Water Level - MP-1 Glenroc
(depth from ground)
Depth in Metres
0
5
10
15
20
25
Sep 08
Nov 08
Jan 09
Mar 09
May 09
Jul 09
Sep 09
Nov 09
Jan 10
Mar 10
May 10
Jul 10
Sep 10
Nov 10
Jan 11
Mar 11
May 11

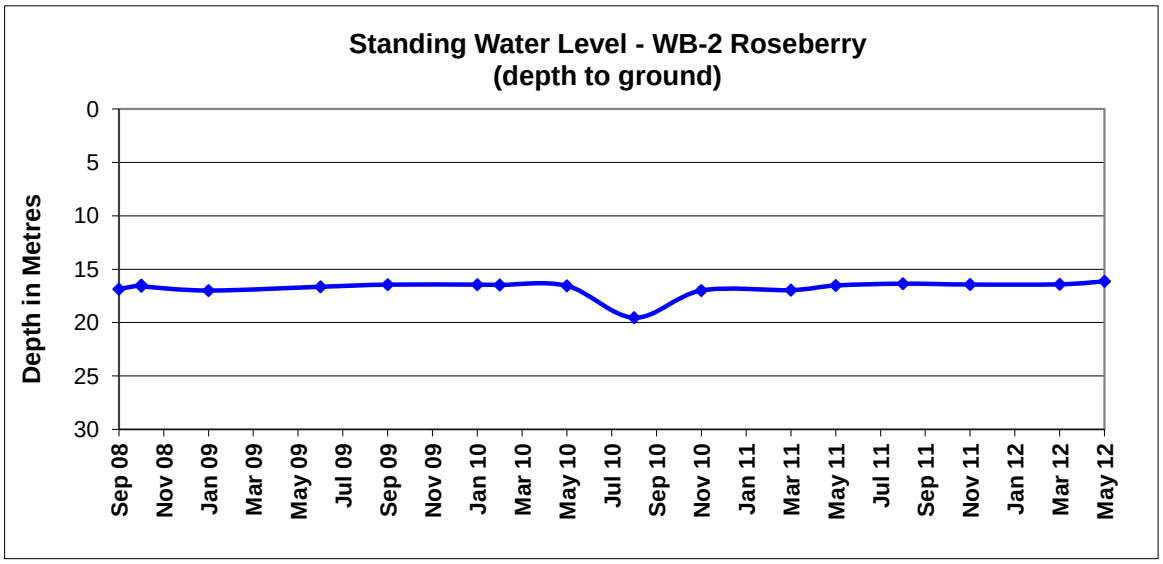

Standing Water Level - MP-2 Rocglen Coal Mine
(depth from ground)
Depth in Metres
0
5
10
15
20
Sep 08
Nov 08
Jan 09
Mar 09
May 09
Jul 09
Sep 09
Nov 09
Jan 10
Mar 10
May 10
Jul 10
Sep 10
Nov 10
Jan 11
Mar 11
May 11
Jul 11
Sep 11
Nov 11
Jan 12
Mar 12
May 12

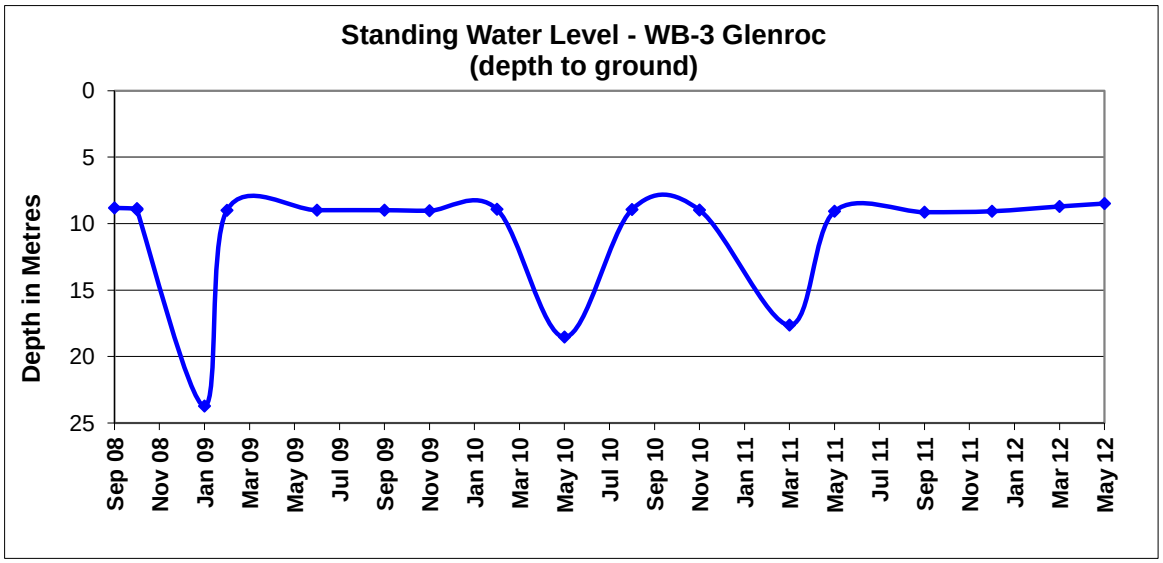

Standing Water Level - MP-3 Stratford
(depth to ground)
Depth in Metres
0
5
10
15
20
25
Sep 08
Nov 08
Jan 09
Mar 09
May 09
Jul 09
Sep 09
Nov 09
Jan 10
Mar 10
May 10
Jul 10
Sep 10
Nov 10
Jan 11
Mar 11
May 11
Jul 11
Sep 11
Nov 11
Jan 12
Mar 12
May 12

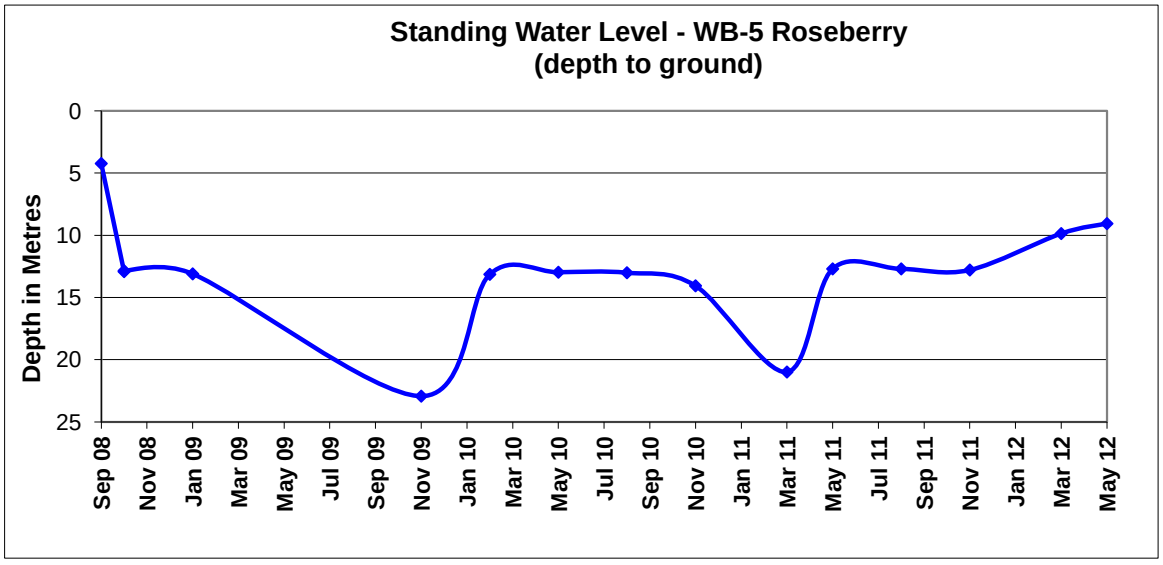

Standing Water Level - MP-4 Surrey Lane
(depth to ground)
Depth in Metres
0
5
10
15
20
25
30
Sep 08
Nov 08
Jan 09
Mar 09
May 09
Jul 09
Sep 09
Nov 09
Jan 10
Mar 10
May 10
Jul 10
Sep 10
Nov 10
Jan 11
Mar 11
May 11
Jul 11
Sep 11
Nov 11

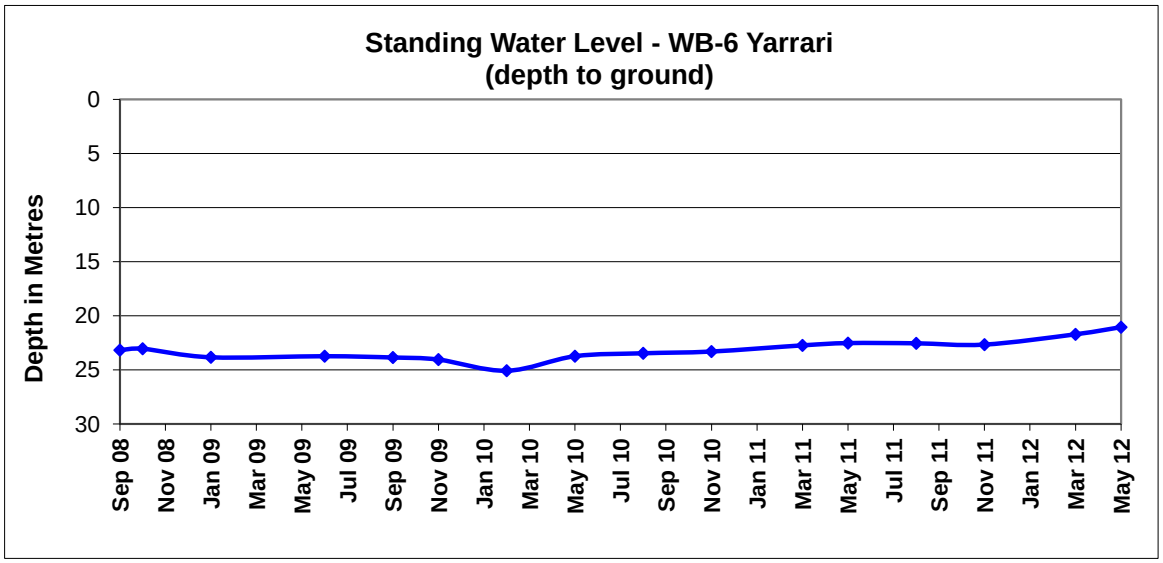

Standing Water Level - MP-5 Yarrawonga
(depth to ground)
Depth in Metres
25
30
35
40
45
50
55
60
65
Sep 08
Nov 08
Jan 09
Mar 09
May 09
Jul 09
Sep 09
Nov 09
Jan 10
Mar 10
May 10
Jul 10
Sep 10
Nov 10
Jan 11
Mar 11
May 11
Jul 11
Sep 11
Nov 11
Jan 12
Mar 12
May 12

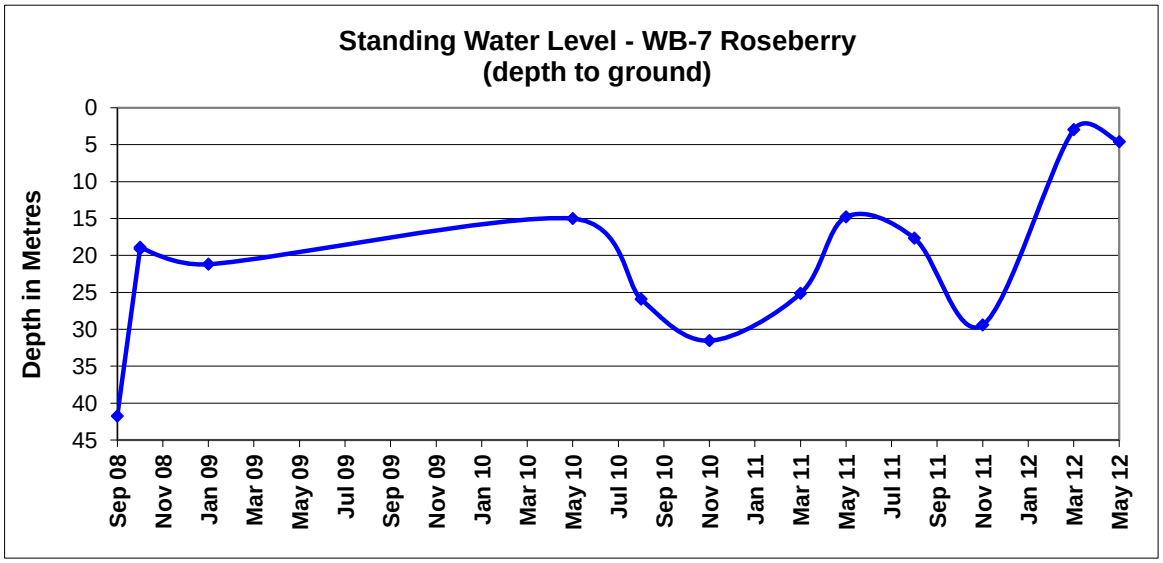

Standing Water Level - WB-1
(depth to ground)
Depth in Metres
0
2
4
6
8
10
12
14
16
18
20
Aug 08
Oct 08
Dec 08
Feb 09
Apr 09
Jun 09
Aug 09
Oct 09
Dec 09
Feb 10
Apr 10
Jun 10
Aug 10
Oct 10
Dec 10
Feb 11
Apr 11
Jun 11
Aug 11
Oct 11
Dec 11
Feb 12
Apr 12

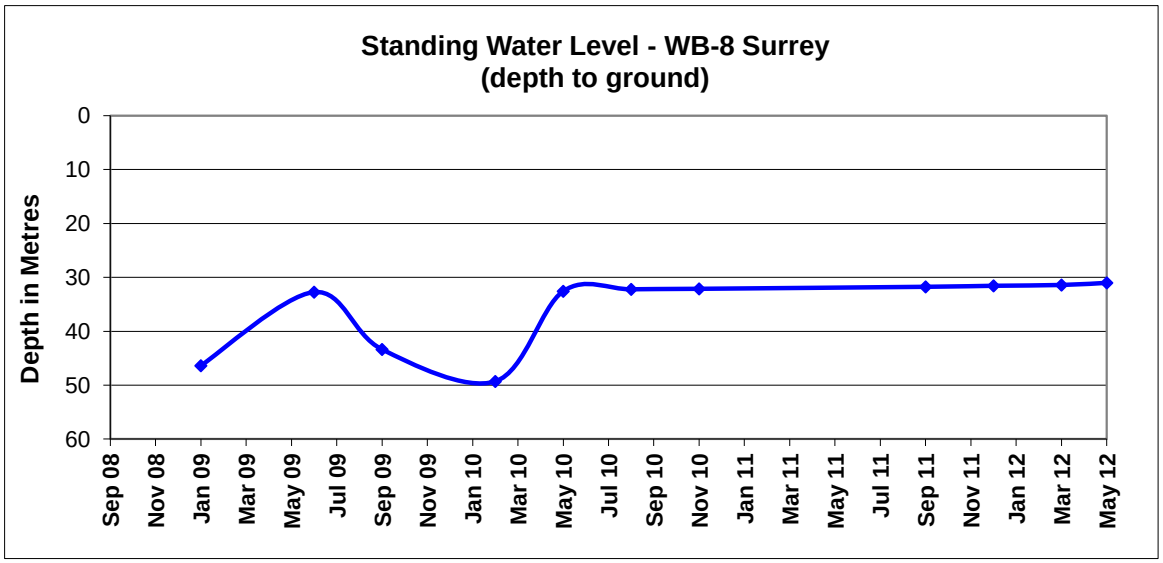

Standing Water Level - WB-2 Roseberry
(depth to ground)
Depth in Metres
0
5
10
15
20
25
30
Sep 08
Nov 08
Jan 09
Mar 09
May 09
Jul 09
Sep 09
Nov 09
Jan 10
Mar 10
May 10
Jul 10
Sep 10
Nov 10
Jan 11
Mar 11
May 11
Jul 11
Sep 11
Nov 11
Jan 12
Mar 12
May 12

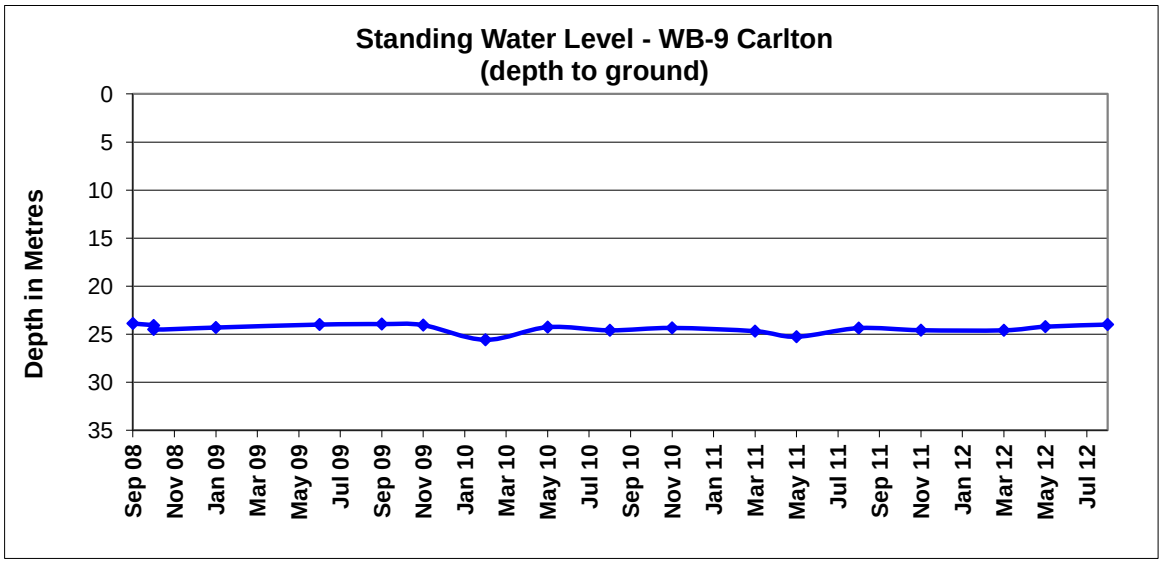

Standing Water Level - WB-3 Glenroc
(depth to ground)
Depth in Metres
0
5
10
15
20
25
Sep 08
Nov 08
Jan 09
Mar 09
May 09
Jul 09
Sep 09
Nov 09
Jan 10
Mar 10
May 10
Jul 10
Sep 10
Nov 10
Jan 11
Mar 11
May 11
Jul 11
Sep 11
Nov 11
Jan 12
Mar 12
May 12


Standing Water Level - WB-5 Roseberry
(depth to ground)
Depth in Metres
0
5
10
15
20
25
Sep 08
Nov 08
Jan 09
Mar 09
May 09
Jul 09
Sep 09
Nov 09
Jan 10
Mar 10
May 10
Jul 10
Sep 10
Nov 10
Jan 11
Mar 11
May 11
Jul 11
Sep 11
Nov 11
Jan 12
Mar 12
May 12


Standing Water Level - WB-6 Yarrari
(depth to ground)
Depth in Metres
0
5
10
15
20
25
30
Sep 08
Nov 08
Jan 09
Mar 09
May 09
Jul 09
Sep 09
Nov 09
Jan 10
Mar 10
May 10
Jul 10
Sep 10
Nov 10
Jan 11
Mar 11
May 11
Jul 11
Sep 11
Nov 11
Jan 12
Mar 12
May 12


Standing Water Level - WB-7 Roseberry
(depth to ground)
Depth in Metres
0
5
10
15
20
25
30
35
40
45
Sep 08
Nov 08
Jan 09
Mar 09
May 09
Jul 09
Sep 09
Nov 09
Jan 10
Mar 10
May 10
Jul 10
Sep 10
Nov 10
Jan 11
Mar 11
May 11
Jul 11
Sep 11
Nov 11
Jan 12
Mar 12
May 12


Standing Water Level - WB-8 Surrey
(depth to ground)
Depth in Metres
0
10
20
30
40
50
60
Sep 08
Nov 08
Jan 09
Mar 09
May 09
Jul 09
Sep 09
Nov 09
Jan 10
Mar 10
May 10
Jul 10
Sep 10
Nov 10
Jan 11
Mar 11
May 11
Jul 11
Sep 11
Nov 11
Jan 12
Mar 12
May 12


Standing Water Level - WB-9 Carlton
(depth to ground)
Depth in Metres
0
5
10
15
20
25
30
35
Sep 08
Nov 08
Jan 09
Mar 09
May 09
Jul 09
Sep 09
Nov 09
Jan 10
Mar 10
May 10
Jul 10
Sep 10
Nov 10
Jan 11
Mar 11
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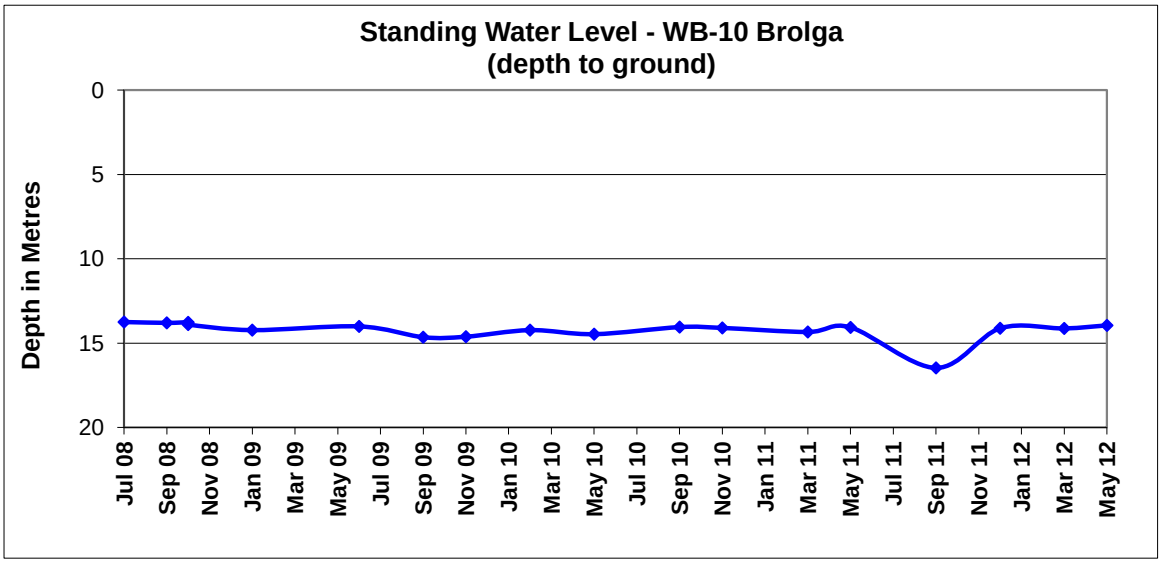
Sep 11
Nov 11
Jan 12
Mar 12
May 12
Jul 12


Standing Water Level - WB-10 Brolga
(depth to ground)
Depth in Metres
0
5
10
15
20
Jul 08
Sep 08
Nov 08
Jan 09
Mar 09
May 09
Jul 09
Sep 09
Nov 09
Jan 10
Mar 10
May 10
Jul 10
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Jan 11
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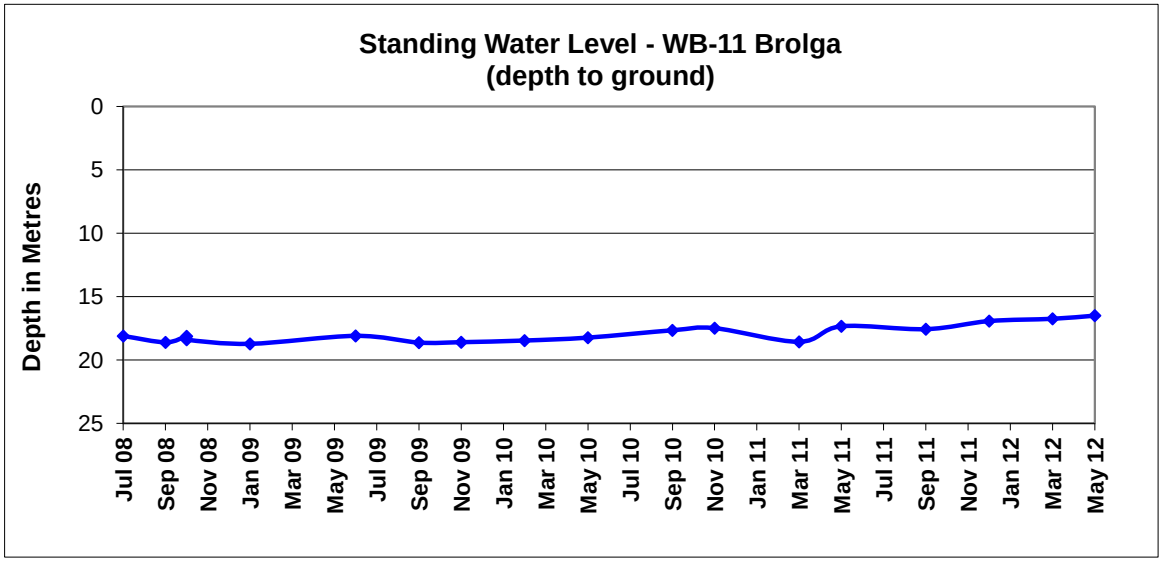
Jul 11
Sep 11
Nov 11
Jan 12
Mar 12
May 12


Standing Water Level - WB-11 Brolga
(depth to ground)
Depth in Metres
0
5
10
15
20
25
Jul 08
Sep 08
Nov 08
Jan 09
Mar 09
May 09
Jul 09
Sep 09
Nov 09
Jan 10
Mar 10
May 10
Jul 10
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Jan 11
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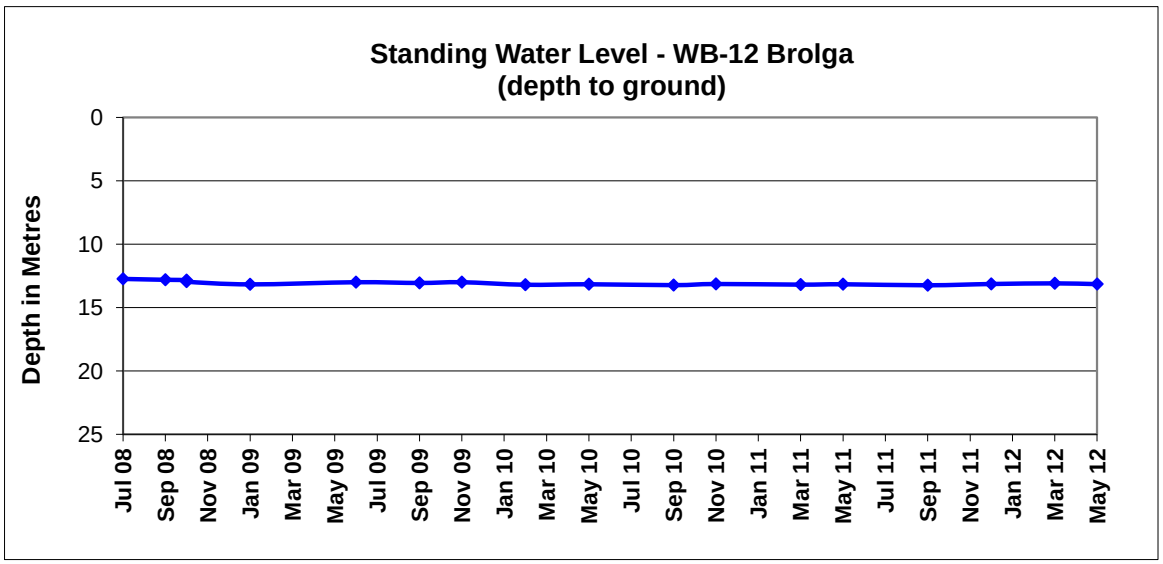
Nov 11
Jan 12
Mar 12
May 12


Standing Water Level - WB-12 Brolga
(depth to ground)
Depth in Metres
0
5
10
15
20
25
Jul 08
Sep 08
Nov 08
Jan 09
Mar 09
May 09
Jul 09
Sep 09
Nov 09
Jan 10
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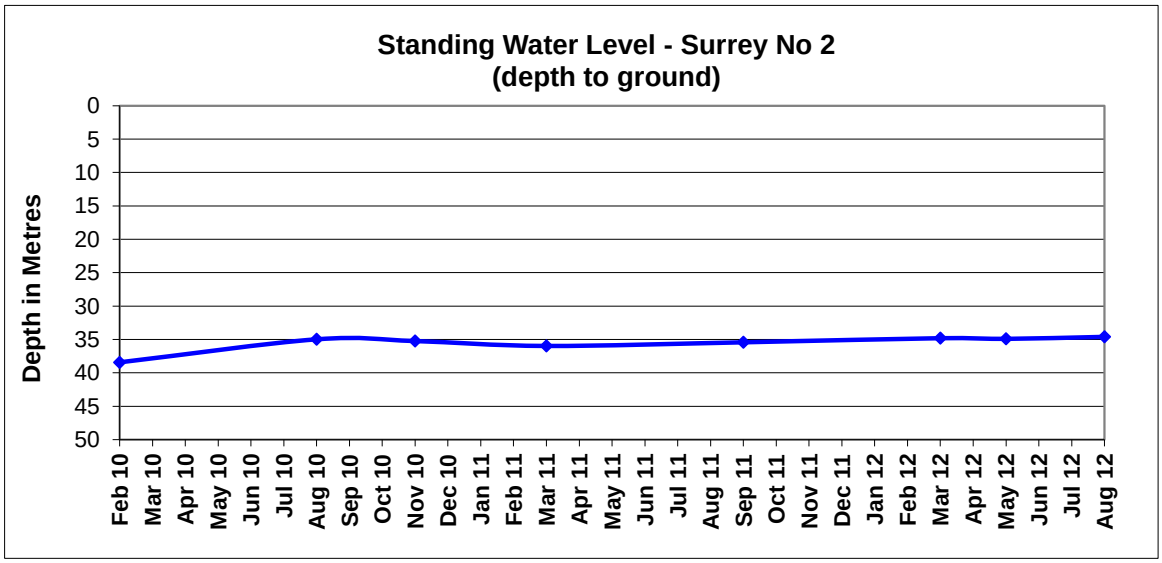
Nov 11
Jan 12
Mar 12
May 12


Standing Water Level - Surrey No 2
(depth to ground)
Depth in Metres
0
5
10
15
20
25
30
35
40
45
50
Feb 10
Mar 10
Apr 10
May 10
Jun 10
Jul 10
Aug 10
Sep 10
Oct 10
Nov 10
Dec 10
Jan 11
Feb 11
Mar 11
Apr 11
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Jan 12
Feb 12
Mar 12
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May 12
Jun 12
Jul 12
Aug 12

Appendix 7

BLAST MONITORING RESULTS

Rocglen - Environmental Blast Monitoring

SHOT NO	DATE	MONITOR LOCATION	PEAK GROUND PRESSURE mm/s	PEAK OVERPRESSURE dBL	TIME
1	14/Aug/08	Costa Vale	DNT	DNT	DNT
1	14/Aug/08	Brolga	DNT	DNT	DNT
1	14/Aug/08	Surrey	DNT	DNT	DNT
2	22/Aug/08	Costa Vale	DNT	DNT	DNT
2	22/Aug/08	Roadside	0.66	102.1	13:48:38
3	03/Sep/08	Costa Vale	0.10	110.2	9:08:16
3	03/Sep/08	Roadside	0.58	110.7	9:07:58
4	11/Sep/08	Costa Vale	DNT	DNT	DNT
4	11/Sep/08	Brolga	DNT	DNT	DNT
4	11/Sep/08	Surrey	DNT	DNT	DNT
5 (block 3)	25/Sep/08	Costa Vale	DNT	DNT	DNT
5 (block 3)	25/Sep/08	Brolga	DNT	DNT	DNT
5 (block 3)	25/Sep/08	Surrey	DNT	DNT	DNT
5 (block 4b)	26/Sep/08	Costa Vale	DNT	DNT	DNT
5 (block 4b)	26/Sep/08	Brolga	DNT	DNT	DNT
5 (block 4b)	26/Sep/08	Surrey	DNT	DNT	DNT
6	02/Oct/08	Costa Vale	0.65	102.3	12:08:53
6	02/Oct/08	Roseberry	0.66	102.1	12:08:38
7	21/Oct/08	Costa Vale	0.35	110.5	12:37:23
7	21/Oct/08	Roseberry	0.86	107.5	12:37:48
7	21/Oct/08	Roadside	0.86	107.5	12:37:48
8	31/Oct/08	Costa Vale	DNT	DNT	DNT
8	31/Oct/08	Surrey	DNT	DNT	DNT
8	31/Oct/08	Roseberry	DNT	DNT	DNT
9	28/Nov/08	Costa Vale	0.36	105.5	12:14:57
9	28/Nov/08	Surrey	DNT	DNT	DNT
9	28/Nov/08	Roseberry	1.04	103.2	12:14:04
10	12/Dec/08	Costa Vale	1.46	115	10:06:25
10	12/Dec/08	Roseberry	1.50	114.9	10:06:14
12	30/Jan/09	Roseberry	1.48	114.8	9:14:12
12	30/Jan/09	Costa Vale	1.46	114.9	9:14:25
13	10/Feb/09	Costa Vale	0.53	111.2	12:29:19
13	10/Feb/09	Roseberry	DNT	DNT	DNT
14	25/Feb/09	Costa Vale	0.51	107.2	12:13:59
14	25/Feb/09	Roseberry	0.33	102.2	12:14:15
15	27/Feb/09	Costa Vale	0.36	114.9	10:58:03
15	27/Feb/09	Roseberry	DNT	DNT	DNT
16	12/Mar/09	Costa Vale	0.56	113.2	12:10:42
16	12/Mar/09	Roseberry	1.22	114.6	12:10:26
17	25/Mar/09	Costa Vale	0.40	108.2	12:59:41
17	25/Mar/09	Roseberry	0.13	111.7	13:00:06
18	08/Apr/09	Costa Vale	0.71	107.2	12:05:38
18	08/Apr/09	Roseberry	0.30	114.8	12:05:55
19	24/Apr/09	Costa Vale	Monitors not set		
19	24/Apr/09	Roseberry	Monitors not set		
20	08/May/09	Costa Vale	0.43	103.3	11:59:57
20	08/May/09	Roseberry	DNT	DNT	DNT
21	25/May/09	Costa Vale	0.76	109.1	15:13:22
21	25/May/09	Roseberry	0.46	111.5	15:15:04
22	01/Jun/09	Costa Vale	0.48	87.4	12:03:17
22	01/Jun/09	Roseberry	DNT	DNT	DNT
23	04/Jun/09	Costa Vale	DNT	DNT	DNT
23	04/Jun/09	Roseberry	DNT	DNT	DNT
24	16/Jun/09	Costa Vale	DNT	DNT	DNT
24	16/Jun/09	Roseberry	DNT	DNT	DNT
25	26/Jun/09	Costa Vale	0.43	107.2	14:52:49
25	26/Jun/09	Roseberry	0.43	104.6	15:53:04
25	26/Jun/09	Brolga	0.71	104.5	14:52:34
26	07/Jul/09	Costa Vale	0.68	106.7	12:10:16
26	07/Jul/09	Roseberry	DNT	DNT	DNT
26	07/Jul/09	Brolga	DNT	DNT	DNT
27	27/Jul/09	Costa Vale	0.78	103.7	12:07:24
27	27/Jul/09	Roseberry	0.47	100.2	12:07:18
27	27/Jul/09	Brolga	DNT	DNT	DNT
28	06/Aug/09	Costa Vale	0.56	113.2	12:43:42
28	06/Aug/09	Roseberry	0.99	109.2	12:43:08
28	06/Aug/09	Brolga	DNT	DNT	DNT
29	24/Aug/09	Costa Vale	0.41	119.9	11:41:53
29	24/Aug/09	Roseberry	DNT	DNT	DNT
30	27/Aug/09	Costa Vale	0.38	116.9	12:02:45
30	27/Aug/09	Roseberry	DNT	DNT	DNT
31	16/Sep/09	Costa Vale	0.53	101.9	12:27:48
31	16/Sep/09	Roseberry	0.76	100	12:27:52
32	17/Sep/09	Costa Vale	0.43	99.3	12:09:22

SHOT NO	DATE	MONITOR LOCATION	PEAK GROUND PRESSURE mm/s	PEAK OVERPRESSURE dBL	TIME
32	17/Sep/09	Roseberry	DNT	DNT	DNT
33	08/Oct/09	Costa Vale	1.39	108.8	11:03:10
33	08/Oct/09	Roseberry	0.43	110.5	11:03:07
33	08/Oct/09	Brolga	0.25	109.7	11:02:50
34	23/Oct/09	Costa Vale	DNT	DNT	DNT
34	23/Oct/09	Roseberry	DNT	DNT	DNT
35	06/Nov/09	Costa Vale	DNT	DNT	DNT
35	06/Nov/09	Roseberry	DNT	DNT	DNT
36	19/Nov/09	Costa Vale	0.84	104	11:57:29
36	19/Nov/09	Roseberry	DNT	DNT	DNT
37	30/Nov/09	Costa Vale	0.68	103.6	12:21:03
37	30/Nov/09	Roseberry	0.69	106.9	12:21:09
38	16/Dec/09	Costa Vale	0.65	102.3	12:08:53
38	16/Dec/09	Roseberry	0.66	102.1	12:08:38
39	21/Jan/10	Costa Vale	0.58	110.2	13:00:56
39	21/Jan/10	Roseberry	DNT	DNT	DNT
40	28/Jan/10	Costa Vale	0.74	100.9	12:01:59
40	28/Oct/10	Roseberry	DNT	DNT	DNT
41	05/Feb/10	Costa Vale	DNT	DNT	DNT
41	05/Feb/10	Roseberry	0.13	111.2	11:09:02
42	02/Mar/10	Costa Vale	0.96	108.6	12:18:47
42	02/Mar/10	Roseberry	DNT	DNT	DNT
43	05/Mar/10	Costa Vale	0.84	104.3	10:33:29
43	05/Mar/10	Roseberry	0.13	113.5	10:33:59
44	16/Mar/10	Costa Vale	DNT	DNT	DNT
44	16/Mar/10	Roseberry	DNT	DNT	DNT
45	30/Mar/10	Costa Vale	0.13	109.4	12:16:37
45	30/Mar/10	Roseberry	DNT	DNT	DNT
46	24/Mar/10	Costa Vale	0.81	111.9	12:03:47
46	24/Mar/10	Roseberry	DNT	DNT	DNT
47	19/Apr/10	Costa Vale	DNT	DNT	DNT
47	19/Apr/10	Roseberry	DNT	DNT	DNT
48	28/Apr/10	Costa Vale	0.61	110.7	12:06:05
48	28/Apr/10	Roseberry	DNT	DNT	DNT
49	14/May/10	Costa Vale	DNT	DNT	DNT
49	14/May/10	Roseberry	DNT	DNT	DNT
50	25/May/10	Costa Vale	0.89	108.2	12:08:57
50	25/May/10	Roseberry	0.13	111.3	12:08:28
51	25/Jun/10	Costa Vale	0.99	104.2	10:13:36
51	25/Jun/10	Roseberry	DNT	DNT	DNT
52	09/Jul/10	Costa Vale	DNT	DNT	DNT
52	09/Jul/10	Roseberry	DNT	DNT	DNT
53	06/Aug/10	Costa Vale	0.42	104.4	9:59:28
53	06/Aug/10	Roseberry	DNT	DNT	DNT
54	26/Aug/10	Costa Vale	DNT	DNT	DNT
54	26/Aug/10	Roseberry	DNT	DNT	DNT
55	14/Sep/10	Costa Vale	DNT	DNT	DNT
55	14/Sep/10	Roseberry	DNT	DNT	DNT
56	23/Sep/10	Costa Vale	0.55	101.4	12:44:05
56	23/Sep/10	Roseberry	DNT	DNT	DNT
57	29/Sep/10	Costa Vale	0.46	103.2	10:03:18
57	29/Sep/10	Roseberry	DNT	DNT	DNT
58	14/Oct/10	Costa Vale	0.43	98.5	10:04:39
58	14/Oct/10	Roseberry	0.31	107.7	10:04:51
59	28/Oct/10	Costa Vale	DNT	DNT	DNT
59	28/Oct/10	Roseberry	DNT	DNT	DNT
60	28/Oct/10	Costa Vale	DNT	DNT	DNT
60	28/Oct/10	Roseberry	DNT	DNT	DNT
61	01/Nov/10	Costa Vale	DNT	DNT	DNT
61	01/Nov/10	Roseberry	DNT	DNT	DNT
62	11/Nov/10	Costa Vale	DNT	DNT	DNT
62	11/Nov/10	Roseberry	DNT	DNT	DNT
63	06/Dec/10	Costa Vale	0.70	88.7	12:04:48
63	06/Dec/10	Roseberry	0.36	92.8	12:04:32
64	21/Dec/10	Costa Vale	DNT	DNT	DNT
64	21/Dec/10	Roseberry	DNT	DNT	DNT
65	30/Dec/10	Costa Vale	DNT	DNT	DNT
65	30/Dec/10	Roseberry	DNT	DNT	DNT
66	15/Jan/11	Costa Vale	DNT	DNT	DNT
66	15/Jan/11	Roseberry	DNT	DNT	DNT
67	27/Jan/11	Costa Vale	0.27	107.2	12:06:52
67	27/Jan/11	Roseberry	DNT	DNT	DNT
68	10/Mar/11	Costa Vale	DNT	DNT	DNT
68	10/Mar/11	Roseberry	DNT	DNT	DNT
69	18/Mar/11	Costa Vale	DNT	DNT	DNT
69	18/Mar/11	Roseberry	DNT	DNT	DNT

SHOT NO	DATE	MONITOR LOCATION	PEAK GROUND PRESSURE mm/s	PEAK OVERPRESSURE dBL	TIME
70	25/Mar/11	Costa Vale	0.55	100.7	12:07:44
70	25/Mar/11	Roseberry	0.39	103.5	12:08:32
71	01/Apr/11	Costa Vale	DNT	DNT	DNT
71	01/Apr/11	Roseberry	0.39	101.4	10:09:27
72	12/Apr/11	Costa Vale	DNT	DNT	DNT
72	12/Apr/11	Roseberry	DNT	DNT	DNT
73	16/Apr/11	Costa Vale	0.14	113.4	10:09:01
73	16/Apr/11	Roseberry	0.47	109.3	10:09:15
74	13/May/11	Costa Vale	DNT	DNT	DNT
74	13/May/11	Roseberry	DNT	DNT	DNT
75	27/May/11	Costa Vale	0.43	102.4	10:13:05
75	27/May/11	Roseberry	DNT	DNT	DNT
76	03/Jun/11	Costa Vale	DNT	DNT	DNT
76	03/Jun/11	Roseberry	DNT	DNT	DNT
77	08/Jun/11	Costa Vale	DNT	DNT	DNT
77	08/Jun/11	Roseberry	DNT	DNT	DNT
78	22/Jun/11	Costa Vale	0.42	87.0	16:08:53
78	22/Jun/11	Roseberry	0.39	83.7	16:11:24
79	07/Jul/11	Costa Vale	DNT	DNT	DNT
79	07/Jul/11	Roseberry	DNT	DNT	DNT
80	21/Jul/11	Costa Vale	0.46	103.3	12:16:26
80	21/Jul/11	Roseberry	DNT	DNT	DNT
81	26/Jul/11	Costa Vale	DNT	DNT	DNT
81	26/Jul/11	Roseberry	0.58	101.9	14:10:57
82	28/Jul/11	Costa Vale	DNT	DNT	DNT
82	28/Jul/11	Roseberry	DNT	DNT	DNT
83	04/Aug/11	Costa Vale	DNT	DNT	DNT
83	04/Aug/11	Roseberry	0.41	104.3	10:22:42
84	15/Aug/11	Costa Vale	DNT	DNT	DNT
84	15/Aug/11	Roseberry	DNT	DNT	DNT
85	24/Aug/11	Costa Vale	DNT	DNT	DNT
85	24/Aug/11	Roseberry	DNT	DNT	DNT
86	02/Sep/11	Costa Vale	0.43	91.7	12:08:33
86	02/Sep/11	Roseberry	DNT	DNT	DNT
87	16/Sep/11	Costa Vale	DNT	DNT	DNT
87	16/Sep/11	Roseberry	DNT	DNT	DNT
88	14/Oct/11	Costa Vale	DNT	DNT	12:06:00
88	14/Oct/11	Roseberry	DNT	DNT	12:06:00
89	03/Nov/11	Costa Vale	DNT	DNT	12:12:00
89	03/Nov/11	Roseberry	DNT	DNT	12:12:00
90	04/Nov/11	Costa Vale	DNT	DNT	12:02:00
90	04/Nov/11	Roseberry	DNT	DNT	12:02:00
91	03/Dec/11	Costa Vale	DNT	DNT	DNT
91	03/Dec/11	Roseberry	DNT	DNT	DNT
92	22/Dec/11	Costa Vale	0.46	114.9	12:02:43
92	22/Dec/11	Roseberry	0.64	109	12:02:01
93	23/Dec/11	Costa Vale	Monitor malfunction	Monitor malfunction	10:59:00
93	23/Dec/11	Roseberry	0.36	101	10:59:02
94	17/Jan/12	Costa Vale	0.32	107.3	12:06:30
94	17/Jan/12	Roseberry	DNT	DNT	12:06:00
95	20/Jan/12	Costa Vale	0.47	106.5	12:03:11
95	20/Jan/12	Roseberry	0.47	99.2	12:03:09
96	18/Feb/12	Costa Vale	DNT	DNT	DNT
96	18/Feb/12	Roseberry	DNT	DNT	DNT
97	06/Mar/12	Costa Vale	0.52	108.5	11:57:09
97	06/Mar/12	Roseberry	0.48	103	11:57:10
98	15/Mar/12	Costa Vale	DNT	DNT	DNT
98	15/Mar/12	Roseberry	0.47	105.6	12:09:23
99	30/Mar/12	Costa Vale	0.41	92.6	12:09:00
99	30/Mar/12	Roseberry	DNT	DNT	DNT
100	27/Apr/12	Costa Vale	DNT	DNT	DNT
100	27/Apr/12	Roseberry	1.12	84.2	13:19:17
101	14/May/12	Costa Vale	0.77	113.6	12:50:15
101	14/May/12	Roseberry	DNT	DNT	12:50:00
102	30/May/12	Roseberry	0.44	96.7	12:07:49
102	30/May/12	Costa Vale	0.36	99.9	12:09:12
103	19/Jun/12	Costa Vale	0.50	104.2	12:06:08
103	19/Jun/12	Roseberry	0.17	99.7	12:05:20
104	06/Jul/12	Costa Vale	DNT	DNT	12:00:00
104	06/Jul/12	Roseberry	DNT	DNT	12:00:00
105	31/Jul/12	Costa Vale	0.37	107.3	12:20:02
105	31/Jul/12	Roseberry	DNT	DNT	12:20:00

DNT - Indicates the blast did not trigger the monitor

Appendix 8

NOISE MONITORING RESULTS

Attended Noise Monitoring

September 2011

RCM Noise Monitoring Results – 13 September 2011 (Day)				
Location	**Time**	**dB(A),Leq**	**Wind speed/ direction**	**Identified Noise Sources**
Surrey	3:13 pm	38	0.5m/s, NW	Birds (38), **RCM (27)**
Costa Vale	3:51 pm	41	0.5m/s, NW	Birds (41), **RCM inaudible**

RCM Noise Monitoring Results – 13 September 2011 (Evening)				
Location	**Time**	**dB(A),Leq**	**Wind speed/ direction**	**Identified Noise Sources**
Surrey	8:57 pm	35	<0.5 m/s, NW	**RCM (35)**, frogs (23)
Costa Vale	8:30 pm	25	<0.5 m/s, NW	**RCM (25)**

RCM Noise Monitoring Results – 13 September 2011 (Night)				
Location	**Time**	**dB(A),Leq**	**Wind speed/ direction**	**Identified Noise Sources**
Surrey	11:19 pm	28	Calm	**RCM (28)**
Costa Vale	11:45 pm	31	Calm	**RCM (31)**

December 2011

RCM Noise Monitoring Results – 13 December 2011 (Day)				
Location	**Time**	**dB(A),Leq**	**Wind speed/ direction**	**Identified Noise Sources**
Surrey	3:15 pm	46	1.5m/s, SW	Birds & insects (46), cattle (36), farm noise (35), **RCM inaudible**
Costa Vale	3:48 pm	42	1.5m/s, SW	Birds (42), **RCM (28)**

RCM Noise Monitoring Results – 13 December 2011 (Evening)				
Location	**Time**	**dB(A),Leq**	**Wind speed/ direction**	**Identified Noise Sources**
Surrey	6:37 pm	42	2.0 m/s, S	Birds (40), rooster (38), **RCM inaudible**
Costa Vale	6:05 pm	49	2.0 m/s, S	Birds (49), **RCM (27)**

RCM Noise Monitoring Results – 13 December 2011 (Night)				
Location	**Time**	**dB(A),Leq**	**Wind speed/ direction**	**Identified Noise Sources**
Surrey	11:00 pm	34	0.5 m/s S	Insects & frogs (34), **RCM inaudible**
Costa Vale	10:22 pm	38	0.5 m/s S	**RCM (36)**, insects & frogs (34)

March 2012

RCM Noise Monitoring Results – 16 March 2012 (Day)				
Location	**Time**	**dB(A),Leq**	**Wind speed/ direction**	**Identified Noise Sources**
Surrey	8:34 am	44	1m/s, N	Birds & insects (43), farm noise (37), **RCM (33)**
Costa Vale	9:04 am	44	1m/s, N	Birds & insects (44), **RCM (<30)**

RCM Noise Monitoring Results – 16 March 2012 (Evening)				
Location	**Time**	**dB(A),Leq**	**Wind speed/ direction**	**Identified Noise Sources**
Surrey	6:00 pm	35	0.5 m/s, NNE	Birds & insects (35), **RCM inaudible**
Costa Vale	6:25 pm	36	0.5 m/s, NNE	Birds & insects (36), **RCM (15)**

RCM Noise Monitoring Results – 16 March 2012 (Night)				
Location	**Time**	**dB(A),Leq**	**Wind speed/ direction**	**Identified Noise Sources**
Surrey	10:10 pm	44	Calm	Birds & insects (43), **RCM (31)**
Costa Vale	10:42 pm	37	Calm	Birds & insects (37), **RCM (27)**

June 2012

RCM Noise Monitoring Results – 27 June 2012 (Day)				
Location	**Time**	**dB(A),Leq**	**Wind speed/ direction**	**Identified Noise Sources**
Surrey	7:50 am	42	1 m/s, SE	Birds (42), **RCM (<20)**
Costa Vale	8:20 am	54	1 m/s, SE	Birds (54), **RCM (36)**

RCM Noise Monitoring Results – 27 June 2012 (Evening)				
Location	**Time**	**dB(A),Leq**	**Wind speed/ direction**	**Identified Noise Sources**
Surrey	6:04 pm	33	1 m/s, SE	Birds & insects (33), **RCM inaudible**
Costa Vale	6:31 pm	36	1 m/s, SE	**RCM (35)**, birds (30)

RCM Noise Monitoring Results – 27 June 2012 (Night)				
Location	**Time**	**dB(A),Leq**	**Wind speed/ direction**	**Identified Noise Sources**
Surrey	10:10 pm	33	0.5 m/s, SE	Domestic noise (33), **RCM (25)**
Costa Vale	10:34 pm	40	0.5 m/s, SE	Birds (37), **RCM (37)**

Unattended Noise Monitoring

September 2011

Costa Vale

Date	Leq(day)	Leq(eve)	Leq(night)	L90(day)	L90(eve)	L90(night)
13-Sep-11	48.8	50.4	45.3	29.3	28.4	22.1
14-Sep-11	47.9	49.7	45.2	27.0	26.9	21.0
15-Sep-11	48.1	49.1	45.1	27.9	27.7	21.1
LAeq	**48**	**49**	**45**			
L90				**28**	**28**	**21**

Surrey

Date	Leq(day)	Leq(eve)	Leq(night)	L90(day)	L90(eve)	L90(night)
13-Sep-11	44.8	38.1	36.0	29.6	32.2	18.6
14-Sep-11	40.4	42.5	36.5	28.1	29.8	17.1
15-Sep-11	40.0	39.5	38.1	24.3	24.8	20.2
LAeq	**42**	**40**	**37**			
L90				**26**	**30**	**19**

**** Note 17.1 dB(A) is the lower limit of the logger as setup***

December 2011

Costa Vale

Date	Leq(day)	Leq(eve)	Leq(night)	L90(day)	L90(eve)	L90(night)
13-Dec-11	42.9	39.7	37.2	30.0	28.0	25.1
14-Dec-11	43.5	40.1	38.6	28.5	27.4	22.3
15-Dec-11	51.3	42.1	42.7	31.3	27.3	20.1
LAeq	**48**	**41**	**40**			
L90				**30**	**27**	**24**

Surrey

Date	Leq(day)	Leq(eve)	Leq(night)	L90(day)	L90(eve)	L90(night)
13-Dec-11	57.3	49.8	52.9	35.2	27.9	24.2
14-Dec-11	52.6	39.8	46.2	27.5	26.9	32.5
15-Dec-11	48.3	51.9	39.5	27.7	25.2	23.1
LAeq	**54**	**49**	**49**			
L90				**28**	**27**	**25**

June 2012

Costa Vale

Date	Leq(day)	Leq(eve)	Leq(night)	L90(day)	L90(eve)	L90(night)
25-Jun-12	40.0	37.8	34.1	19.9	19.2	19.2
26-Jun-12	48.7	42.8	32.5	31.1	20.9	20.5
27-Jun-12	49.1	38.9	34.4	30.3	22.2	21.0
LAeq	**47**	**40**	**34**			
L90				**30**	**21**	**20**

Surrey

Date	Leq(day)	Leq(eve)	Leq(night)	L90(day)	L90(eve)	L90(night)
25-Jun-12	48.8	37.0	34.3	25.8	23.2	22.5
26-Jun-12	41.5	38.4	34.6	19.8	23.8	22.0
27-Jun-12	47.8	41.1	31.8	29.5	24.0	19.5
LAeq	**47**	**39**	**34**			
L90				**26**	**23**	**22**

Road Traffic Noise Monitoring

September 2011

Coal Truck pass bys - "Brooklyn", Blue Vale Road 13/09/11	
Time (am)	**Vehicle direction of travel**
7:51	Laden coal truck to CPP
7:53	Empty coal truck to mine
7:53	Laden coal truck to CPP
7:54	Laden coal truck to CPP
8:00	Laden coal truck to CPP
8:06	Empty coal truck to mine
8:07	Laden coal truck to CPP
8:08	Empty coal truck to mine
8:08	Empty coal truck to mine
8:08	Empty coal truck to mine
8:12	Laden coal truck to CPP
8:13	Laden coal truck to CPP
8:15	Laden coal truck to CPP
8:15	Empty coal truck to mine
8:19	Laden coal truck to CPP
8:21	Empty coal truck to mine
8:23	Laden coal truck to CPP
8:24	Laden coal truck to CPP
8:25	Empty coal truck to mine

8:26	Empty coal truck to mine
8:30	Laden coal truck to CPP
8:32	Laden coal truck to CPP
8:36	Empty coal truck to mine
8:36	Laden coal truck to CPP
8:36	Laden coal truck to CPP
8:39	Laden coal truck to CPP
8:39	Empty coal truck to mine
8:40	Laden coal truck to CPP
8:41	Laden coal truck to CPP
8:43	Laden coal truck to CPP
8:44	Laden coal truck to CPP
8:44	Empty coal truck to mine
8:45	Empty coal truck to mine
8:46	Empty coal truck to mine
8:47	Laden coal truck to CPP
8:47	Laden coal truck to CPP
8:49	Laden coal truck to CPP
8:50	Empty coal truck to mine

Coal Truck pass bys - "Weroona", Blue Vale Road 13/09/11	
Time (am)	**Vehicle direction of travel**
7:25	Empty coal truck to mine
7:25	Empty coal truck to mine
7:26	Empty coal truck to mine
7:27	Empty coal truck to mine
7:28	Laden coal truck to CPP
7:28	Laden coal truck to CPP
7:30	Empty coal truck to mine
7:31	Empty coal truck to mine
7:31	Laden coal truck to CPP
7:36	Laden coal truck to CPP
7:40	Laden coal truck to CPP
7:43	Empty coal truck to mine
7:47	Laden coal truck to CPP
7:47	Laden coal truck to CPP
7:49	Empty coal truck to mine
7:50	Laden coal truck to CPP
7:50	Laden coal truck to CPP
7:55	Laden coal truck to CPP
8:02	Empty coal truck to mine
8:03	Laden coal truck to CPP
8:03	Empty coal truck to mine
8:04	Empty coal truck to mine
8:04	Empty coal truck to mine
8:08	Laden coal truck to CPP
8:09	Laden coal truck to CPP
8:11	Laden coal truck to CPP

8:11	Empty coal truck to mine
8:15	Laden coal truck to CPP
8:17	Empty coal truck to mine
8:19	Laden coal truck to CPP
8:20	Laden coal truck to CPP
8:20	Empty coal truck to mine
8:21	Empty coal truck to mine
8:25	Laden coal truck to CPP

April 2012

Coal Truck pass bys - "Brooklyn", (Residence 1) - Blue Vale Road 27/04/12	
Time	**Vehicle direction of travel**
11:14 am	Empty coal truck to mine
11:15	Empty coal truck to mine
11:15	Laden coal truck from mine
11:16	Empty coal truck to mine
11:16	Laden coal truck from mine
11:16	Laden coal truck from mine
11:24	Laden coal truck from mine
11:28	Empty coal truck to mine
11:29	Empty coal truck to mine
11:30	Laden coal truck from mine
11:30	Empty coal truck to mine
11:31	Laden coal truck from mine
11:32	Empty coal truck to mine
11:33	Laden coal truck from mine
11:36	Laden coal truck from mine
11:38	Laden coal truck from mine
11:39	Laden coal truck from mine
11:40	Laden coal truck from mine
11:43	Laden coal truck from mine
11:44	Empty coal truck to mine
11:44	Empty coal truck to mine
11:48	Laden coal truck from mine
11:50	Empty coal truck to mine
11:51	Empty coal truck to mine
11:51	Laden coal truck from mine
11:52	Empty coal truck to mine
11:55	Empty coal truck to mine
12:00 pm	Laden coal truck from mine
12:01	Empty coal truck to mine
12:01	Laden coal truck from mine
12:03	Laden coal truck from mine
12:04	Empty coal truck to mine
12:05	Empty coal truck to mine
12:05	Laden coal truck from mine
12:07	Laden coal truck from mine
12:09	Laden coal truck from mine
12:11	Laden coal truck from mine
12:14	Empty coal truck to mine

Coal Truck pass bys - "Brooklyn", (Residence 2) - Blue Vale Road 27/04/12	
Time	**Vehicle direction of travel**
12:22 pm	Empty coal truck to mine
12:22	Empty coal truck to mine
12:22	Laden coal truck from mine
12:23	Laden coal truck from mine
12:25	Empty coal truck to mine
12:25	Laden coal truck from mine
12:27	Laden coal truck from mine
12:29	Laden coal truck from mine
12:34	Empty coal truck to mine
12:36	Empty coal truck to mine
12:38	Laden coal truck from mine
12:38	Empty coal truck to mine
12:40	Empty coal truck to mine
12:40	Empty coal truck to mine
12:41	Empty coal truck to mine
12:42	Empty coal truck to mine
12:43	Laden coal truck from mine
12:48	Empty coal truck to mine
12:51	Laden coal truck from mine
12:52	Empty coal truck to mine
12:52	Empty coal truck to mine
12:55	Laden coal truck from mine
12:56	Laden coal truck from mine
12:57	Laden coal truck from mine
12:58	Laden coal truck from mine
12:59	Laden coal truck from mine
1:00	Empty coal truck to mine
1:00	Empty coal truck to mine
1:03	Laden coal truck from mine
1:05	Empty coal truck to mine
1:06	Laden coal truck from mine
1:07	Empty coal truck to mine
1:08	Empty coal truck to mine
1:08	Laden coal truck from mine
1:09	Empty coal truck to mine
1:10	Laden coal truck from mine
1:14	Empty coal truck to mine
1:15	Laden coal truck from mine
1:15	Empty coal truck to mine
1:17	Laden coal truck from mine
1:20	Empty coal truck to mine
1:20	Laden coal truck from mine

Coal Truck pass bys - "Weroona", Blue Vale Road 27/04/12	
Time	**Vehicle direction of travel**
1:35 pm	Empty coal truck to mine
1:36	Empty coal truck to mine
1:37	Laden coal truck to CPP
1:40	Empty coal truck to mine
1:40	Laden coal truck to CPP
1:41	Laden coal truck to CPP
1:42	Laden coal truck to CPP

1:42	Empty coal truck to mine
1:46	Laden coal truck to CPP
1:47	Empty coal truck to mine
1:49	Empty coal truck to mine
1:56	Laden coal truck to CPP
1:57	Empty coal truck to mine
1:57	Laden coal truck to CPP
1:58	Laden coal truck to CPP
1:59	Laden coal truck to CPP
1:59	Laden coal truck to CPP
2:00	Laden coal truck to CPP
2:03	Empty coal truck to mine
2:03	Empty coal truck to mine
2:05	Empty coal truck to mine
2:06	Laden coal truck to CPP
2:07	Laden coal truck to CPP
2:08	Empty coal truck to mine
2:08	Laden coal truck to CPP
2:14	Laden coal truck to CPP
2:17	Laden coal truck to CPP
2:20	Laden coal truck to CPP
2:20	Empty coal truck to mine
2:21	Laden coal truck to CPP
2:22	Empty coal truck to mine
2:22	Laden coal truck to CPP
2:24	Empty coal truck to mine
2:25	Empty coal truck to mine
2:26	Empty coal truck to mine
2:26	Empty coal truck to mine
2:27	Empty coal truck to mine
2:28	Empty coal truck to mine
2:29	Laden coal truck to CPP
2:30	Laden coal truck to CPP
2:31	Empty coal truck to mine
2:33	Laden coal truck to CPP
2:35	Laden coal truck to CPP
2:36	Empty coal truck to mine

Appendix 9

METEOROLOGICAL DATA

Rocglen Coal Mine Average Monthly Results

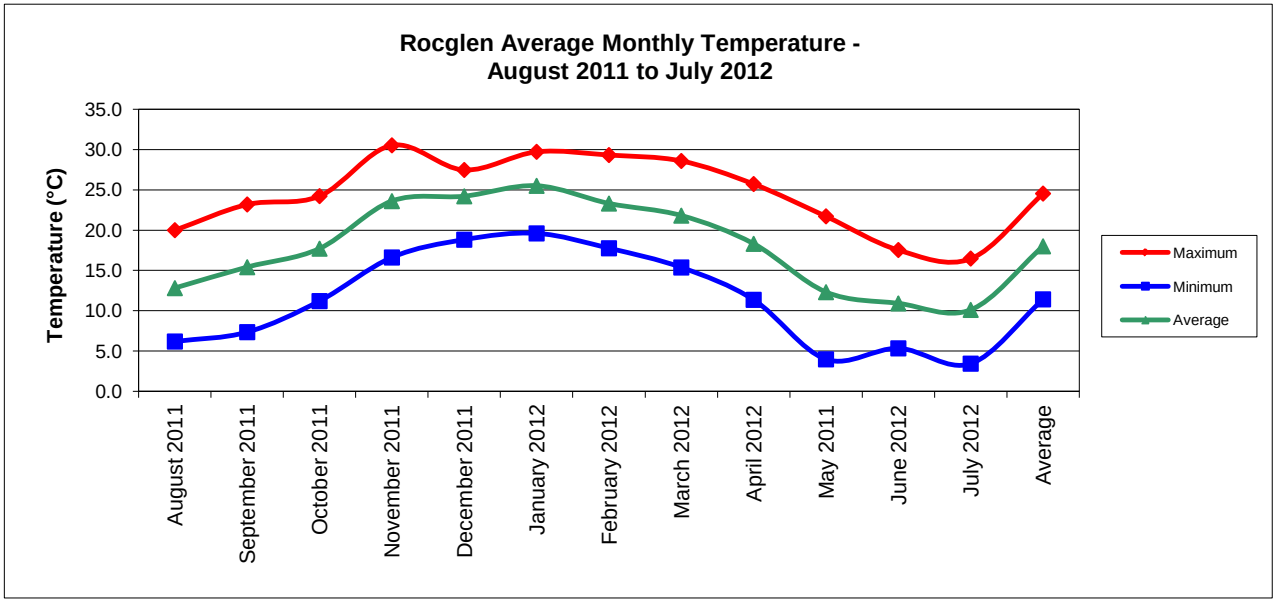
Month	Minimum Air Temp (°C)	Average Air Temp(°C)	Maximum Air Temp (°C)	Minimum Relative Humidity (%)	Average Relative Humidity(%)	Maximum Relative Humidity (%)	Minimum Wind Speed (m/s)	Average Wind Speed (m/s)	Maximum Wind Speed (m/s)
August 2011	6.2	12.8	20.0	42.2	69.1	92.3	0.0	1.3	4.9
September 2011	7.3	15.4	23.2	**32.7**	**58.4**	84.2	0.0	1.7	6.0
October 2011	11.2	17.7	24.2	43.1	67.5	90.5	0.0	1.5	5.6
November 2011	16.6	23.6	**30.5**	38.4	61.5	88.1	0.1	1.7	6.3
December 2011	18.8	24.2	27.5	-	-	-	-	-	-
January 2012	**19.6**	**25.5**	29.7	48.7	66.0	85.1	0.3	**3.1**	**8.4**
February 2012	17.7	23.3	29.3	45.3	69.5	91.0	0.0	2.0	8.1
March 2012	15.4	21.8	28.6	40.9	64.9	89.9	0.2	2.0	6.5
April 2012	11.4	18.3	25.7	38.9	66.6	90.9	0.0	1.3	4.9
May 2011	4.0	12.3	21.7	35.0	66.8	94.0	0.0	**0.9**	3.8
June 2012	5.3	10.9	17.5	**52.0**	**78.0**	**82.0**	0.0	1.4	4.6
July 2012	**3.4**	**10.1**	**16.5**	46.5	73.5	**94.9**	0.0	1.6	**3.0**
Average	**11.4**	**18.0**	**24.5**	**42.2**	**67.4**	**89.4**	**0.1**	**1.7**	**5.7**
Minimum	**3.4**	**10.1**	**16.5**	**32.7**	**58.4**	**82.0**	**0.0**	**0.9**	**3.0**
Maximum	**19.6**	**25.5**	**30.5**	**52.0**	**78.0**	**94.9**	**0.3**	**3.1**	**8.4**
Total									

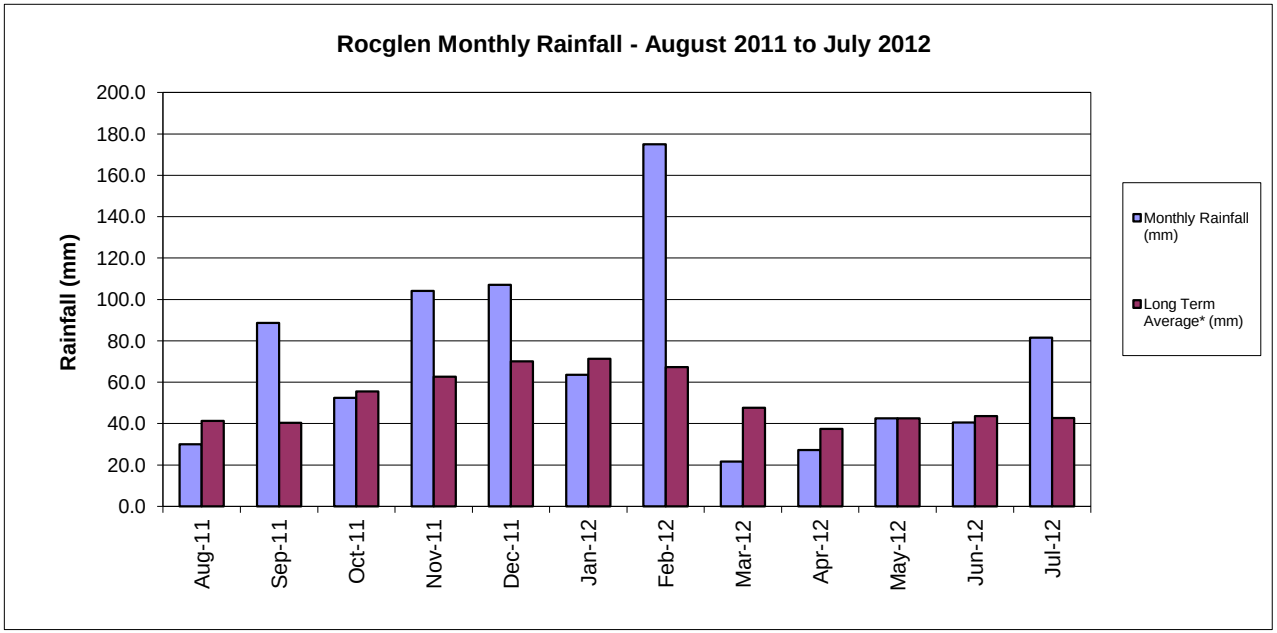
Month	Monthly Rainfall (mm)	Long Term Average* (mm)	Cumulative Rainfall (mm)	Number of Rain Days**
August 2011	30.0	41.3	30.0	6
September 2011	88.6	40.3	118.6	6
October 2011	52.4	55.5	171.0	6
November 2011	104.2	62.6	275.2	7
December 2011	107.0	70.1	382.2	11
January 2012	63.6	71.3	445.8	8
February 2012	175.0	67.3	620.8	7
March 2012	21.6	47.7	642.4	3
April 2012	27.2	37.5	669.6	3
May 2012	42.6	42.5	712.2	3
June 2012	40.6	43.6	752.8	8
July 2012	81.6	42.7	834.4	8
Total	**834.4**	**622.4**	**834.4**	**76**

*December data from Bureau of Meteorology due to weather station malfunction

** Long term average is from Gunnedah Pool (Station 055023) 1877 - 2012

*** Rain day: >1.0mm


Rocglen Average Monthly Temperature -
August 2011 to July 2012
Temperature (°C)
35.0
30.0
25.0
20.0
15.0
10.0
5.0
0.0
August 2011
September 2011
October 2011
November 2011
December 2011
January 2012
February 2012
March 2012
April 2012
May 2011
June 2012
July 2012
Average
Maximum
Minimum
Average


Rocglen Monthly Rainfall - August 2011 to July 2012
Rainfall (mm)
200.0
180.0
160.0
140.0
120.0
100.0
80.0
60.0
40.0
20.0
0.0
Aug-11
Sep-11
Oct-11
Nov-11
Dec-11
Jan-12
Feb-12
Mar-12
Apr-12
May-12
Jun-12
Jul-12
Monthly Rainfall (mm)
Long Term Average* (mm)

Daily Summary **August 2011**

Date	Min Temp (°C)	Ave Temp (°C)	Max Temp (°C)	Min RH (%)	Ave RH (%)	Max RH (%)	Rain (mm)	Min WS (m/s)	Ave WS (m/s)	Max WS (m/s)
01/08/11	3.1	12.3	22.9	32	62	91	0.0	0.0	0.2	2.2
02/08/11	3.0	12.9	23.7	24	59	94	0.0	0.0	0.4	2.7
03/08/11	3.9	13.3	24.2	27	57	89	0.0	0.0	0.4	2.2
04/08/11	3.3	13.2	23.6	29	59	94	0.0	0.0	0.6	3.1
05/08/11	6.7	15.3	22.3	33	56	90	0.0	0.0	0.7	3.1
06/08/11	11.2	17.1	22.4	37	59	74	0.0	0.0	1.4	5.4
07/08/11	10.8	13.8	18.4	60	80	92	8.4	0.0	1.6	5.4
08/08/11	5.6	10.7	15.9	45	71	91	0.4	0.0	1.4	6.3
09/08/11	7.9	10.4	14.4	48	69	84	0.0	0.0	1.7	6.3
10/08/11	4.3	9.5	13.9	51	73	89	0.4	0.0	1.0	5.4
11/08/11	6.9	10.0	14.5	60	84	96	2.6	0.0	0.4	2.7
12/08/11	3.3	9.9	16.6	57	80	97	0.0	0.0	1.4	5.8
13/08/11	3.6	11.3	18.8	41	69	96	0.0	0.0	0.8	4.5
14/08/11	3.9	10.9	20.6	43	77	92	4.4	0.0	0.8	5.8
15/08/11	4.3	11.9	19.5	41	72	96	0.0	0.0	0.3	1.8
16/08/11	6.4	14.0	22.1	32	62	92	0.0	0.0	0.8	5.4
17/08/11	13.6	16.9	20.4	45	61	79	1.2	0.0	3.9	8.9
18/08/11	9.1	11.0	14.5	54	78	93	8.4	0.0	2.7	8.0
19/08/11	7.4	10.7	15.2	63	80	91	0.6	0.0	0.6	3.6
20/08/11	6.8	12.6	18.6	51	75	96	0.2	0.0	3.7	8.5
21/08/11	5.7	12.5	19.6	48	71	95	0.0	0.0	4.1	8.9
22/08/11	6.2	12.5	18.2	59	75	96	0.0	0.0	4.8	9.4
23/08/11	5.6	14.2	21.8	43	68	94	0.0	0.0	3.0	9.4
24/08/11	7.1	14.3	21.7	37	63	91	0.0	0.0	0.7	3.1
25/08/11	3.7	12.9	23.7	30	67	96	0.0	0.0	0.1	1.3
26/08/11	3.7	13.8	23.9	20	57	94	0.0	0.0	0.6	2.7
27/08/11	8.7	12.8	15.6	53	79	96	3.2	0.0	0.6	4.9
28/08/11	6.9	12.5	21.8	41	81	98	0.2	0.0	0.1	1.3
29/08/11	4.9	14.2	23.8	34	69	96	0.0	0.0	0.9	4.5
30/08/11	7.6	15.2	23.9	35	69	95	0.0	0.0	1.1	6.7
31/08/11	6.2	14.8	23.3	34	63	95	0.0	0.0	0.5	4.0
Average	**6.2**	**12.8**	**20.0**	**42**	**69**	**92**		**0.0**	**1.3**	**4.9**
Maximum	**13.6**	**17.1**	**24.2**	**63**	**84**	**98**	**8.4**	**0.0**	**4.8**	**9.4**
Minimum	**3.0**	**9.5**	**13.9**	**20**	**56**	**74**	**0.0**	**0.0**	**0.1**	**1.3**
Total							**30.0**			

Daily Summary **September 2011**

Date	Min Temp (°C)	Ave Temp (°C)	Max Temp (°C)	Min RH (%)	Ave RH (%)	Max RH (%)	Rain (mm)	Min WS (m/s)	Ave WS (m/s)	Max WS (m/s)
01/09/11	4.9	13.8	23.7	27	59	92	0.0	0.0	0.7	3.1
02/09/11	8.9	16.1	22.7	32	56	81	0.0	0.0	3.5	11.2
03/09/11	9.2	15.8	22.8	27	47	70	0.0	0.0	1.3	4.0
04/09/11	5.3	15.1	22.8	32	55	86	0.0	0.0	0.6	3.1
05/09/11	5.9	14.6	23.7	33	60	90	0.0	0.0	0.4	3.1
06/09/11	6.6	15.2	24.2	32	58	90	0.0	0.0	1.0	4.9
07/09/11	7.3	16.3	25.2	30	56	80	0.0	0.0	1.2	5.4
08/09/11	9.1	14.9	20.4	53	73	95	20.4	0.0	1.0	4.9
09/09/11	7.2	10.8	**14.1**	**57**	**86**	96	18.2	0.0	1.7	7.2
10/09/11	5.1	**9.5**	14.8	44	69	91	0.0	0.0	2.4	7.6
11/09/11	3.8	10.1	15.3	43	68	92	1.6	0.0	1.3	7.2
12/09/11	3.3	10.2	17.4	46	76	**97**	0.0	0.0	1.0	4.0
13/09/11	**2.7**	11.7	21.1	31	66	96	0.0	0.0	0.5	2.7
14/09/11	4.3	13.6	23.4	23	55	92	0.0	0.0	0.8	3.6
15/09/11	7.1	15.7	25.3	23	47	73	0.0	0.0	1.6	6.7
16/09/11	6.5	17.0	27.4	19	48	77	0.0	0.0	1.1	5.4
17/09/11	9.7	20.2	28.7	19	38	67	0.0	0.0	1.4	4.0
18/09/11	**12.8**	20.5	28.6	23	41	**60**	0.0	0.0	1.1	4.5
19/09/11	8.4	20.0	29.4	22	44	79	0.0	0.0	1.7	5.4
20/09/11	8.9	**20.7**	26.8	25	**37**	**60**	0.0	0.0	4.6	8.9
21/09/11	4.9	13.4	22.1	21	48	76	0.0	0.0	1.1	4.9
22/09/11	4.1	16.0	27.3	28	53	85	0.0	0.0	**0.4**	**2.2**
23/09/11	8.4	18.5	28.1	33	60	88	0.0	0.0	1.1	4.5
24/09/11	6.8	19.8	**30.7**	**15**	54	94	0.0	0.0	1.1	5.8
25/09/11	10.1	16.2	23.0	37	72	91	2.4	0.0	4.3	10.3
26/09/11	7.9	15.5	22.0	37	62	91	0.0	0.0	**5.1**	**12.1**
27/09/11	12.5	17.9	25.3	32	49	66	0.0	0.0	1.6	10.7
28/09/11	11.0	16.1	20.3	56	73	91	2.6	0.0	1.3	5.4
29/09/11	10.3	14.9	19.7	42	76	94	**43.4**	0.0	3.9	10.3
30/09/11	7.1	13.2	19.3	39	65	86	0.0	0.0	1.5	6.3
Average	**7.3**	**15.4**	**23.2**	**33**	**58**	**84**		**0.0**	**1.7**	**6.0**
Maximum	**12.8**	**20.7**	**30.7**	**57**	**86**	**97**	**43.4**	**0.0**	**5.1**	**12.1**
Minimum	**2.7**	**9.5**	**14.1**	**15**	**37**	**60**	**0.0**	**0.0**	**0.4**	**2.2**
Total							**88.6**			

Daily Summary **October 2011**

Date	Min Temp (°C)	Ave Temp (°C)	Max Temp (°C)	Min RH (%)	Ave RH (%)	Max RH (%)	Rain (mm)	Min WS (m/s)	Ave WS (m/s)	Max WS (m/s)
1/10/2011	7.2	9.8	14.4	70	87	95	6.4	0.0	0.7	7.2
02/10/11	6.7	10.6	15.2	67	84	95	0.2	0.0	2.2	9.8
03/10/11	5.3	12.8	19.0	49	71	97	0.0	0.0	2.8	7.6
04/10/11	4.9	13.9	20.6	43	65	94	0.0	0.0	2.3	6.3
05/10/11	7.3	13.7	18.1	60	75	92	0.0	0.0	0.5	2.7
06/10/11	12.4	14.7	17.2	80	90	96	6.6	0.0	0.2	2.2
07/10/11	9.9	16.8	22.6	57	80	97	0.0	0.0	0.2	2.2
08/10/11	11.7	17.9	23.9	40	74	95	5.8	0.0	0.8	4.5
09/10/11	10.0	16.4	23.9	36	69	95	0.0	0.0	1.4	6.7
10/10/11	11.4	16.1	23.2	35	66	90	0.0	0.0	0.8	4.9
11/10/11	7.8	15.3	22.9	30	61	94	0.0	0.0	1.2	4.9
12/10/11	5.2	15.0	23.7	24	59	94	0.0	0.0	1.0	4.0
13/10/11	12.9	19.5	25.4	49	63	82	0.0	0.0	2.5	9.4
14/10/11	15.7	21.6	26.3	46	63	85	1.0	0.0	2.3	6.3
15/10/11	14.5	18.9	23.9	54	80	95	19.4	0.0	1.0	4.9
16/10/11	11.6	18.4	25.3	39	67	97	0.0	0.0	2.0	6.3
17/10/11	11.1	18.1	24.7	36	59	77	0.0	0.0	3.8	7.6
18/10/11	10.7	16.8	22.8	29	57	78	0.0	0.0	1.9	4.9
19/10/11	9.7	17.8	25.1	22	58	86	0.0	0.0	0.8	4.0
20/10/11	9.2	18.4	27.0	30	60	92	0.0	0.0	0.6	2.2
21/10/11	10.4	19.3	28.2	29	61	93	0.0	0.0	0.7	3.6
22/10/11	11.2	20.5	29.8	28	58	89	0.0	0.0	0.7	3.6
23/10/11	13.9	21.1	29.5	34	60	85	0.0	0.0	0.9	4.0
24/10/11	13.2	22.0	29.0	32	55	85	0.0	0.0	1.2	4.9
25/10/11	15.3	22.1	31.4	36	63	93	0.4	0.0	1.7	8.0
26/10/11	15.1	19.0	23.7	60	73	93	0.0	0.0	4.5	10.3
27/10/11	13.6	20.7	26.7	48	61	79	0.0	0.0	2.9	8.0
28/10/11	15.3	23.2	29.7	39	58	80	0.0	0.0	0.7	4.0
29/10/11	17.6	21.2	26.1	60	80	94	12.6	0.0	0.4	4.9
30/10/11	14.5	20.5	25.5	44	76	97	0.0	0.0	1.6	7.6
31/10/11	7.6	18.1	26.1	29	58	91	0.0	0.0	3.1	6.3
Average	**11.2**	**17.7**	**24.2**	**43**	**68**	**90**		**0.0**	**1.5**	**5.6**
Maximum	**17.6**	**23.2**	**31.4**	**80**	**90**	**97**	**19.4**	**0.0**	**4.5**	**10.3**
Minimum	**4.9**	**9.8**	**14.4**	**22**	**55**	**77**	**0.0**	**0.0**	**0.2**	**2.2**
Total							**52.4**			

Daily Summary **November 2011**

Date	Min Temp (°C)	Ave Temp (°C)	Max Temp (°C)	Min RH (%)	Ave RH (%)	Max RH (%)	Rain (mm)	Min WS (m/s)	Ave WS (m/s)	Max WS (m/s)
01/11/11	11.6	20.0	27.4	34	60	89	0.0	0.0	0.9	3.1
02/11/11	12.1	21.1	30.2	25	54	90	0.0	0.0	1.4	5.4
03/11/11	9.5	19.6	28.0	30	57	90	0.0	0.0	1.8	6.3
04/11/11	10.5	21.4	29.8	24	57	96	0.0	0.0	1.3	5.4
05/11/11	15.9	23.9	31.1	34	55	83	0.0	0.0	0.7	3.6
06/11/11	15.8	21.3	25.7	56	74	93	2.0	0.0	0.5	4.9
07/11/11	15.8	23.9	32.5	35	66	96	0.0	0.0	1.0	4.5
08/11/11	16.7	26.7	34.6	27	52	89	0.0	0.0	1.7	6.7
09/11/11	20.4	27.6	34.6	27	46	77	0.0	0.0	1.7	6.3
10/11/11	19.2	25.1	29.2	40	52	69	0.0	0.0	1.4	5.8
11/11/11	13.1	24.4	33.8	30	55	85	0.0	0.0	1.6	6.7
12/11/11	18.7	26.3	32.7	30	51	79	0.0	0.0	2.1	6.3
13/11/11	19.0	23.3	31.6	44	66	90	36.6	0.0	3.0	13.0
14/11/11	18.7	26.9	34.9	28	54	84	0.0	0.0	1.0	3.6
15/11/11	18.7	29.4	39.1	19	46	83	5.6	0.0	1.3	5.8
16/11/11	18.3	24.9	30.1	47	66	88	10.8	0.0	3.2	8.9
17/11/11	17.3	21.6	27.2	58	79	95	7.0	0.0	1.7	6.7
18/11/11	18.5	23.2	30.3	40	73	95	3.8	0.0	1.0	4.9
19/11/11	18.8	26.4	33.7	31	58	89	0.0	0.0	0.6	2.7
20/11/11	21.1	26.4	33.6	30	50	81	0.2	0.0	2.3	7.2
21/11/11	19.5	23.3	27.8	49	70	91	0.0	0.0	2.0	7.2
22/11/11	17.2	25.2	31.7	34	56	94	0.0	0.0	3.0	6.7
23/11/11	15.8	18.0	23.4	69	93	97	38.0	0.0	3.2	15.2
24/11/11	16.3	17.0	19.6	80	86	91	0.2	1.3	3.2	4.5
25/11/11	-	-	-	-	-	-	-	-	-	-
26/11/11	-	-	-	-	-	-	-	-	-	-
27/11/11	-	-	-	-	-	-	-	-	-	-
28/11/11	-	-	-	-	-	-	-	-	-	-
29/11/11	-	-	-	-	-	-	-	-	-	-
30/11/11	-	-	-	-	-	-	-	-	-	-
Average	**16.6**	**23.6**	**30.5**	**38**	**62**	**88**		**0.1**	**1.7**	**6.3**
Maximum	**21.1**	**29.4**	**39.1**	**80**	**93**	**97**	**38.0**	**1.3**	**3.2**	**15.2**
Minimum	**9.5**	**17.0**	**19.6**	**19**	**46**	**69**	**0.0**	**0.0**	**0.5**	**2.7**
Total							**104.2**			

*Meteorological Station malfunctioning

Daily Summary **December 2011**

Date	Min Temp (°C)	Ave Temp (°C)	Max Temp (°C)	Min RH (%)	Ave RH (%)	Max RH (%)	Rain (mm)	Min WS (m/s)	Ave WS (m/s)	Max WS (m/s)
01/12/11	-	-	-	-	-	-	-	-	-	-
02/12/11	-	-	-	-	-	-	-	-	-	-
03/12/11	-	-	-	-	-	-	-	-	-	-
04/12/11	-	-	-	-	-	-	-	-	-	-
05/12/11	-	-	-	-	-	-	-	-	-	-
06/12/11	-	-	-	-	-	-	-	-	-	-
07/12/11	-	-	-	-	-	-	-	-	-	-
08/12/11	-	-	-	-	-	-	-	-	-	-
09/12/11	-	-	-	-	-	-	-	-	-	-
10/12/11	-	-	-	-	-	-	-	-	-	-
11/12/11	-	-	-	-	-	-	-	-	-	-
12/12/11	-	-	-	-	-	-	-	-	-	-
13/12/11	-	-	-	-	-	-	-	-	-	-
14/12/11	20.5	24.4	27.1	-	-	-	-	-	-	-
15/12/11	17.8	23.0	26.6	-	-	-	-	-	-	-
16/12/11	16.9	23.2	27.4	-	-	-	-	-	-	-
17/12/11	17.3	22.9	26.4	-	-	-	-	-	-	-
18/12/11	19.6	23.4	26.6	-	-	-	-	-	-	-
19/12/11	17.9	**21.4**	**22.9**	-	-	-	-	-	-	-
20/12/11	18.2	24.7	28.7	-	-	-	-	-	-	-
21/12/11	20.3	25.0	27.8	-	-	-	-	-	-	-
22/12/11	19.7	24.5	27.9	-	-	-	-	-	-	-
23/12/11	20.2	24.1	27.3	-	-	-	-	-	-	-
24/12/11	20.5	26.3	30.1	-	-	-	-	-	-	-
25/12/11	21.6	**27.2**	**30.7**	-	-	-	-	-	-	-
26/12/11	**22.8**	24.5	26.3	-	-	-	-	-	-	-
27/12/11	18.5	24.6	26.8	-	-	-	-	-	-	-
28/12/11	16.9	24.0	28.0	-	-	-	-	-	-	-
29/12/11	17.1	24.3	27.3	-	-	-	-	-	-	-
30/12/11	17.5	23.6	27.6	-	-	-	-	-	-	-
31/12/11	**15.3**	24.9	28.9	-	-	-	-	-	-	-
Average	**18.8**	**24.2**	**27.5**	**0**	**0**	**0**		**0.0**	**0.0**	**0.0**
Maximum	**22.8**	**27.2**	**30.7**	**0**	**0**	**0**	**0.0**	**0.0**	**0.0**	**0.0**
Minimum	**15.3**	**21.4**	**22.9**	**0**	**0**	**0**	**0.0**	**0.0**	**0.0**	**0.0**
Total							**0.0**			

* Meteorological Station malfunctioning

Daily Summary **January 2012**

Date	Min Temp (°C)	Ave Temp (°C)	Max Temp (°C)	Min RH (%)	Ave RH (%)	Max RH (%)	Rain (mm)	Min WS (m/s)	Ave WS (m/s)	Max WS (m/s)
01/01/12	17.3	26.1	30.1	-	-	-	-	-	-	-
02/01/12	18.2	27.8	32.4	-	-	-	-	-	-	-
03/01/12	19.5	28.6	33.1	-	-	-	-	-	-	-
04/01/12	22.7	29.7	34.0	-	-	-	-	-	-	-
05/01/12	24.3	29.5	32.6	-	-	-	-	-	-	-
06/01/12	19.7	26.7	30.4	-	-	-	-	-	-	-
07/01/12	17.9	28.1	33.7	-	-	-	-	-	-	-
08/01/12	25.9	31.4	34.8	-	-	-	-	-	-	-
09/01/12	23.8	28.4	31.2	-	-	-	-	-	-	-
10/01/12	19.9	26.5	29.3	-	-	-	-	-	-	-
11/01/12	17.9	25.5	28.7	-	-	-	-	-	-	-
12/01/12	15.2	22.5	26.6	-	-	-	-	-	-	-
13/01/12	20.3	25.5	28.3	-	-	-	-	-	-	-
14/01/12	20.9	24.8	28.1	-	-	-	-	-	-	-
15/01/12	17.9	20.3	23.3	-	-	-	-	-	-	-
16/01/12	17.8	23.5	26.6	-	-	-	-	-	-	-
17/01/12	16.7	25.7	29.4	-	-	-	-	-	-	-
18/01/12	17.1	28.1	33.3	25	43	67	1.0	0.0	2.0	5.8
19/01/12	15.9	26.3	34.5	23	54	96	0.0	0.0	2.6	10.3
20/01/12	18.8	27.1	33.7	28	46	76	0.0	0.0	3.1	8.5
21/01/12	19.8	25.7	31.4	25	52	77	0.0	0.0	3.5	8.9
22/01/12	19.3	24.4	30.8	40	54	71	0.0	0.4	5.4	11.2
23/01/12	18.9	24.1	29.4	39	55	79	0.0	2.2	5.5	10.7
24/01/12	17.4	22.2	27.6	55	74	90	2.8	0.0	3.3	8.0
25/01/12	19.3	21.5	24.1	70	84	92	6.8	0.9	3.6	8.0
26/01/12	20.6	23.9	30.2	54	76	94	10.2	0.0	3.7	11.6
27/01/12	20.6	24.9	29.2	51	66	83	0.0	0.4	4.4	8.5
28/01/12	20.4	22.2	24.1	62	75	86	2.0	0.0	1.1	4.9
29/01/12	20.2	22.5	24.6	65	77	88	2.6	0.0	1.9	7.6
30/01/12	21.7	25.2	29.4	65	75	96	12.8	0.0	3.1	7.6
31/01/12	21.5	23.1	26.4	80	93	97	25.4	0.0	0.7	5.4
Average	**19.6**	**25.5**	**29.7**	**49**	**66**	**85**		**0.3**	**3.1**	**8.4**
Maximum	**25.9**	**31.4**	**34.8**	**80**	**93**	**97**	**25.4**	**2.2**	**5.5**	**11.6**
Minimum	**15.2**	**20.3**	**23.3**	**23**	**43**	**67**	**0.0**	**0.0**	**0.7**	**4.9**
Total							**63.6**			

*Meteorological Station malfunctioning

WHITEHAVEN COAL MINING PTY LTD
Meteorological Summary - February 2012

Daily Summary **February 2012**

Date	Min Temp (°C)	Ave Temp (°C)	Max Temp (°C)	Min RH (%)	Ave RH (%)	Max RH (%)	Rain (mm)	Min WS (m/s)	Ave WS (m/s)	Max WS (m/s)
01/02/12	18.1	19.0	21.6	87	92	96	89.0	0.4	7.9	18.8
02/02/12	17.6	18.7	20.1	88	92	96	27.4	0.0	6.7	19.2
03/02/12	16.9	19.2	21.3	90	93	97	10.2	0.0	1.4	6.3
04/02/12	16.8	22.6	29.9	41	78	98	0.0	0.0	0.7	3.1
05/02/12	16.9	24.7	32.3	36	70	97	0.0	0.0	0.5	2.7
06/02/12	19.7	25.7	33.8	43	72	94	4.4	0.0	0.8	12.5
07/02/12	18.3	24.3	30.7	41	75	97	0.0	0.0	1.8	5.4
08/02/12	18.6	22.7	29.2	50	77	95	5.2	0.0	2.6	10.7
09/02/12	19.8	24.6	29.1	41	59	73	0.0	0.0	2.7	11.2
10/02/12	19.0	24.3	30.8	35	61	85	0.0	0.0	2.2	7.2
11/02/12	17.3	23.6	30.4	36	65	91	0.4	0.0	1.7	4.9
12/02/12	14.2	22.5	30.4	28	64	97	0.0	0.0	0.5	2.7
13/02/12	15.3	23.6	31.7	24	58	94	0.0	0.0	1.4	6.3
14/02/12	19.1	24.7	30.4	31	51	70	0.0	0.0	2.9	8.9
15/02/12	18.3	24.3	30.1	28	55	76	0.0	0.0	2.4	8.5
16/02/12	17.2	23.8	29.5	38	58	83	0.0	0.0	1.2	7.6
17/02/12	13.1	22.6	31.5	34	63	95	0.0	0.0	0.5	4.0
18/02/12	15.1	24.2	32.4	31	60	92	0.0	0.0	2.0	15.2
19/02/12	18.3	25.3	32.5	38	65	91	0.4	0.0	1.3	8.0
20/02/12	19.1	23.8	33.2	43	79	96	24.2	0.0	2.1	10.3
21/02/12	19.8	22.7	27.6	55	79	97	0.4	0.0	1.9	5.8
22/02/12	18.5	22.3	25.3	58	68	80	0.0	0.0	2.1	4.9
23/02/12	16.5	23.9	30.1	35	65	93	0.0	0.0	1.7	9.4
24/02/12	15.9	24.7	30.9	33	57	96	0.0	0.0	3.1	12.1
25/02/12	18.9	23.2	26.6	52	66	86	0.0	0.0	3.0	13.0
26/02/12	18.9	21.3	24.6	63	84	95	13.4	0.0	0.9	5.4
27/02/12	20.2	24.5	29.4	49	67	95	0.0	0.0	1.1	3.6
28/02/12	18.7	25.1	31.7	46	69	92	0.0	0.0	0.6	2.7
29/02/12	18.6	25.4	33.1	41	70	92	0.0	0.0	1.0	4.5
Average	**17.7**	**23.3**	**29.3**	**45**	**69**	**91**		**0.0**	**2.0**	**8.1**
Maximum	**20.2**	**25.7**	**33.8**	**90**	**93**	**98**	**89.0**	**0.4**	**7.9**	**19.2**
Minimum	**13.1**	**18.7**	**20.1**	**24**	**51**	**70**	**0.0**	**0.0**	**0.5**	**2.7**
Total							**175.0**			

Daily Summary **March 2012**

Date	Min Temp (°C)	Ave Temp (°C)	Max Temp (°C)	Min RH (%)	Ave RH (%)	Max RH (%)	Rain (mm)	Min WS (m/s)	Ave WS (m/s)	Max WS (m/s)
01/03/12	19.3	26.3	32.8	37	60	88	0.0	0.0	2.4	7.2
02/03/12	21.9	24.0	28.6	56	75	88	0.4	0.0	3.1	10.7
03/03/12	18.4	23.5	29.6	55	74	93	8.0	0.4	2.9	5.8
04/03/12	22.3	26.9	33.8	42	62	85	0.0	0.0	2.0	6.7
05/03/12	19.7	22.6	26.8	70	86	96	9.6	0.0	1.5	9.8
06/03/12	17.8	22.1	27.7	51	69	85	0.0	0.4	4.7	8.9
07/03/12	14.5	18.6	23.6	49	73	90	0.0	0.9	4.1	8.0
08/03/12	9.2	17.3	25.1	42	72	97	0.0	0.0	1.1	3.6
09/03/12	10.5	19.2	27.9	35	67	97	0.0	0.0	1.0	4.9
10/03/12	11.2	19.9	29.2	30	64	97	0.0	0.0	0.4	3.6
11/03/12	14.5	21.5	29.8	34	63	90	0.0	0.0	0.7	4.0
12/03/12	14.4	22.1	30.1	40	65	92	0.0	0.0	1.6	10.3
13/03/12	17.0	24.2	29.7	40	58	87	0.0	0.0	2.5	9.8
14/03/12	17.1	23.6	29.1	34	56	86	0.0	0.0	1.4	6.3
15/03/12	19.9	23.6	28.7	43	64	82	0.0	0.0	1.2	3.6
16/03/12	17.4	24.3	30.1	47	66	89	0.0	0.0	0.6	2.7
17/03/12	18.6	21.9	25.3	67	84	95	3.6	0.0	0.7	4.9
18/03/12	16.5	21.2	27.3	40	68	94	0.0	1.8	4.6	8.0
19/03/12	16.2	21.0	27.2	44	61	86	0.0	0.4	5.5	10.7
20/03/12	16.0	22.8	29.9	42	67	93	0.0	1.3	3.6	5.8
21/03/12	15.7	22.3	29.7	37	66	92	0.0	0.0	0.6	2.7
22/03/12	17.1	23.4	31.7	35	65	90	0.0	0.0	0.3	2.7
23/03/12	13.2	21.3	28.3	29	62	88	0.0	0.0	2.1	8.0
24/03/12	6.1	15.8	25.2	25	58	96	0.0	0.0	1.6	4.9
25/03/12	8.2	19.2	28.4	34	59	92	0.0	0.0	1.3	8.0
26/03/12	17.4	22.1	27.8	40	56	74	0.0	0.0	2.2	7.6
27/03/12	13.8	21.8	28.1	38	58	90	0.0	0.0	2.0	7.2
28/03/12	18.1	23.0	28.4	34	51	72	0.0	0.0	1.7	5.4
29/03/12	13.4	21.0	28.3	36	61	90	0.0	0.0	1.2	8.5
30/03/12	10.7	20.2	29.5	29	63	97	0.0	0.0	1.2	6.7
31/03/12	10.2	20.5	28.4	32	58	97	0.0	0.0	1.7	5.8
Average	**15.4**	**21.8**	**28.6**	**41**	**65**	**90**		**0.2**	**2.0**	**6.5**
Maximum	**22.3**	**26.9**	**33.8**	**70**	**86**	**97**	**9.6**	**1.8**	**5.5**	**10.7**
Minimum	**6.1**	**15.8**	**23.6**	**25**	**51**	**72**	**0.0**	**0.0**	**0.3**	**2.7**
Total							**21.6**			

Daily Summary **April 2012**

Date	Min Temp (°C)	Ave Temp (°C)	Max Temp (°C)	Min RH (%)	Ave RH (%)	Max RH (%)	Rain (mm)	Min WS (m/s)	Ave WS (m/s)	Max WS (m/s)
01/04/12	8.6	20.3	29.4	23	53	95	0.0	0.0	1.5	4.9
02/04/12	14.7	21.6	30.4	29	55	77	0.0	0.0	1.2	5.4
03/04/12	10.8	20.9	31.1	22	57	94	0.0	0.0	0.6	3.1
04/04/12	12.5	23.4	32.7	30	51	86	0.0	0.0	1.0	6.3
05/04/12	15.7	23.6	30.7	34	55	83	0.0	0.0	1.0	4.9
06/04/12	15.9	22.4	29.2	40	59	81	0.0	0.0	0.8	4.0
07/04/12	13.9	21.2	30.1	40	67	91	0.0	0.0	0.4	2.7
08/04/12	16.7	24.0	32.4	27	62	91	7.0	0.0	1.8	5.4
09/04/12	9.9	17.1	23.7	27	66	93	0.2	0.0	1.0	4.9
10/04/12	6.2	13.4	19.8	26	57	90	0.0	0.0	3.7	8.0
11/04/12	8.1	15.0	22.4	38	58	75	0.0	0.9	4.1	8.9
12/04/12	7.1	16.6	24.6	34	62	93	0.0	0.0	2.8	6.7
13/04/12	11.8	19.1	25.8	29	55	81	0.0	0.0	1.9	5.8
14/04/12	11.1	19.8	26.5	38	59	92	0.0	0.0	1.0	5.4
15/04/12	15.7	20.9	26.1	49	66	80	0.0	0.0	1.2	4.0
16/04/12	14.9	19.7	25.2	57	76	94	0.0	0.0	1.4	6.7
17/04/12	15.7	17.2	19.6	73	85	92	0.8	0.0	1.8	5.4
18/04/12	14.3	18.9	25.8	49	78	94	2.8	0.0	0.6	3.1
19/04/12	12.6	19.1	27.1	43	74	97	0.2	0.0	0.3	2.7
20/04/12	11.2	18.4	28.1	35	71	97	0.0	0.0	0.3	1.8
21/04/12	10.1	18.6	28.6	31	66	97	0.0	0.0	0.4	1.8
22/04/12	10.2	19.8	29.0	33	61	95	0.0	0.0	0.6	4.9
23/04/12	16.4	18.3	24.1	42	86	95	13.2	0.0	0.6	4.0
24/04/12	9.1	17.5	23.5	42	77	96	0.0	0.0	1.7	5.8
25/04/12	3.9	10.3	17.2	45	72	97	0.0	0.0	1.3	4.9
26/04/12	4.3	11.8	20.9	44	73	96	0.0	0.0	0.6	3.1
27/04/12	7.4	13.7	21.7	49	78	96	0.0	0.0	0.4	4.0
28/04/12	12.8	15.1	19.1	67	87	95	3.0	0.0	1.0	3.6
29/04/12	8.1	15.5	23.9	31	74	98	0.0	0.0	2.5	7.2
30/04/12	10.8	17.1	23.0	39	61	87	0.0	0.0	2.2	7.2
Average	**11.4**	**18.3**	**25.7**	**38.9**	**66.6**	**90.9**		**0.0**	**1.3**	**4.9**
Maximum	**16.7**	**24.0**	**32.7**	**73.0**	**87.3**	**98.0**	**13.2**	**0.9**	**4.1**	**8.9**
Minimum	**3.9**	**10.3**	**17.2**	**22.0**	**50.6**	**75.0**	**0.0**	**0.0**	**0.3**	**1.8**
Total							**27.2**			

Daily Summary **May 2012**

Date	Min Temp (°C)	Ave Temp (°C)	Max Temp (°C)	Min RH (%)	Ave RH (%)	Max RH (%)	Rain (mm)	Min WS (m/s)	Ave WS (m/s)	Max WS (m/s)
01/05/12	9.3	17.1	24.9	36	61	91	0.0	0.0	0.7	3.6
02/05/12	7.9	17.6	25.6	35	69	95	0.6	0.0	0.5	3.1
03/05/12	11.2	16.6	21.8	59	85	97	10.6	0.0	0.4	2.7
04/05/12	6.0	13.2	22.8	38	77	97	0.4	0.0	0.4	2.7
05/05/12	2.9	11.1	20.9	41	75	97	0.0	0.0	0.4	2.2
06/05/12	2.8	10.9	20.7	33	72	97	0.0	0.0	0.3	2.7
07/05/12	5.2	12.1	22.8	31	69	93	0.0	0.0	0.3	1.8
08/05/12	3.8	12.4	24.1	31	68	96	0.0	0.0	0.4	2.2
09/05/12	3.9	13.7	25.7	25	64	97	0.0	0.0	0.4	2.2
10/05/12	4.9	14.4	26.8	21	60	94	0.0	0.0	0.4	2.2
11/05/12	4.8	15.0	26.8	27	59	92	0.0	0.0	0.5	2.2
12/05/12	5.1	14.4	24.0	37	61	89	0.0	0.0	1.5	5.8
13/05/12	1.1	9.6	17.7	34	64	95	0.0	0.0	1.2	4.9
14/05/12	0.9	8.9	17.8	31	65	97	0.0	0.0	0.5	3.1
15/05/12	-0.4	8.9	19.3	24	60	96	0.0	0.0	0.7	3.1
16/05/12	0.8	9.8	21.7	24	58	87	0.0	0.0	0.4	2.2
17/05/12	0.6	10.1	22.6	25	61	94	0.0	0.0	0.3	2.2
18/05/12	0.8	10.3	22.8	22	58	97	0.0	0.0	0.3	1.8
19/05/12	1.1	9.8	21.8	21	58	88	0.0	0.0	0.4	2.7
20/05/12	0.3	10.2	21.3	22	56	93	0.0	0.0	0.8	3.6
21/05/12	1.3	12.0	22.1	37	67	94	0.4	0.0	0.5	2.7
22/05/12	1.8	10.5	22.1	22	64	97	0.2	0.0	0.5	3.1
23/05/12	0.5	10.9	23.3	22	56	90	0.0	0.0	0.4	2.7
24/05/12	8.8	17.1	24.4	44	72	96	16.8	0.0	1.4	4.9
25/05/12	7.0	12.1	16.4	59	83	96	13.6	0.0	2.3	6.3
26/05/12	4.1	8.9	14.6	51	76	93	0.0	0.0	0.4	2.7
27/05/12	4.1	10.0	16.2	53	78	96	0.0	0.0	0.7	3.1
28/05/12	2.0	10.3	18.9	51	76	97	0.0	0.0	2.1	5.8
29/05/12	4.1	12.9	20.9	46	71	96	0.0	0.0	3.8	10.3
30/05/12	7.2	14.2	21.2	39	66	94	0.0	0.0	2.2	10.3
31/05/12	9.0	15.4	21.1	45	61	82	0.0	0.0	3.1	9.8
Average	**4.0**	**12.3**	**21.7**	**35.0**	**66.8**	**94.0**		**0.0**	**0.9**	**3.8**
Maximum	**11.2**	**17.6**	**26.8**	**59.0**	**85.5**	**97.0**	**16.8**	**0.0**	**3.8**	**10.3**
Minimum	**-0.4**	**8.9**	**14.6**	**21.0**	**55.9**	**82.0**	**0.0**	**0.0**	**0.3**	**1.8**
Total							**42.6**			

Daily Summary **June 2012**

Date	Min Temp (°C)	Ave Temp (°C)	Max Temp (°C)	Min RH (%)	Ave RH (%)	Max RH (%)	Rain (mm)	Min WS (m/s)	Ave WS (m/s)	Max WS (m/s)
01/06/12	9.8	15.1	19.8	47	69	92	0.0	0.0	0.9	4.5
02/06/12	12.5	13.3	15.3	71	89	95	8.0	0.0	1.0	3.6
03/06/12	11.8	13.5	15.4	92	96	97	19.4	0.0	0.9	4.5
04/06/12	8.2	12.6	16.0	70	90	97	3.0	0.0	1.4	5.8
05/06/12	6.2	8.5	11.4	74	87	95	1.0	0.0	1.2	6.3
06/06/12	7.7	11.1	15.9	59	81	97	0.2	0.0	3.4	8.9
07/06/12	5.8	10.9	16.6	57	79	95	0.0	0.0	3.2	6.3
08/06/12	5.9	11.8	17.3	46	72	95	0.0	0.0	0.6	3.1
09/06/12	5.6	10.8	18.0	42	70	90	0.0	0.0	0.8	3.6
10/06/12	3.2	10.8	18.6	32	66	95	0.2	0.0	1.7	4.9
11/06/12	4.4	10.7	14.7	64	82	95	0.0	0.0	3.4	6.3
12/06/12	5.3	12.1	18.4	60	80	96	0.0	0.0	3.2	7.2
13/06/12	5.3	12.0	19.3	52	78	96	0.0	0.0	2.2	5.4
14/06/12	5.3	11.8	20.7	46	77	96	0.0	0.0	0.2	1.8
15/06/12	3.7	11.6	22.2	37	76	100	0.0	0.0	0.6	4.5
16/06/12	8.1	14.0	20.8	47	74	94	1.6	0.0	1.3	5.4
17/06/12	7.2	11.3	16.7	49	79	97	1.2	0.0	0.8	4.0
18/06/12	3.9	9.9	16.8	48	76	97	0.4	0.0	0.8	4.0
19/06/12	1.7	8.3	17.7	50	80	97	0.0	0.0	0.4	4.0
20/06/12	0.8	7.9	18.1	44	80	97	0.8	0.0	0.2	1.8
21/06/12	1.0	10.3	19.7	36	69	97	0.0	0.0	1.4	4.9
22/06/12	6.7	13.4	17.3	55	66	91	0.0	0.0	2.1	5.8
23/06/12	0.8	6.3	13.4	52	81	97	0.0	0.0	0.6	3.6
24/06/12	-2.6	4.5	15.2	43	80	97	0.4	0.0	0.3	2.2
25/06/12	-2.7	6.0	17.9	31	75	97	0.0	0.0	0.3	2.2
26/06/12	1.2	9.7	19.5	43	73	92	0.0	0.0	1.7	5.4
27/06/12	9.1	12.0	15.2	65	84	95	2.4	0.0	3.1	5.8
28/06/12	8.3	13.1	19.3	50	75	95	2.0	0.0	2.0	6.7
29/06/12	7.8	12.2	19.6	57	80	94	0.0	0.0	0.3	2.2
30/06/12	7.8	12.2	19.2	42	74	97	0.0	0.0	0.8	4.5
Average	**5.3**	**10.9**	**17.5**	**52.0**	**78.0**	**82.0**		**0.0**	**1.4**	**4.6**
Maximum	**12.5**	**15.1**	**22.2**	**92.0**	**96.0**	**100.0**	**19.4**	**0.0**	**3.4**	**8.9**
Minimum	**-2.7**	**4.5**	**11.4**	**31.0**	**66.1**	**90.0**	**0.0**	**0.0**	**0.2**	**1.8**
Total							**40.6**			

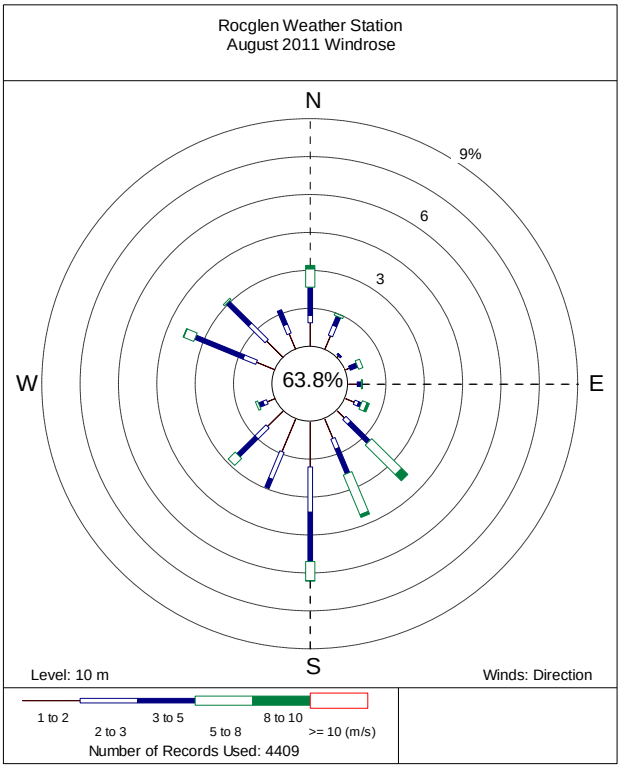
Daily Summary July 2012

Date	Min Temp (°C)	Ave Temp (°C)	Max Temp (°C)	Min RH (%)	Ave RH (%)	Max RH (%)	Rain (mm)	Min WS (m/s)	Ave WS (m/s)	Max WS (m/s)
1/07/12	6.6	11.9	19.5	36	71	97	0	0	1	0
2/07/12	1.2	8.8	14.9	34	66	88	0	0	1.4	2.2
3/07/12		-	-	-	-	-	-	-	-	-
4/07/12	1.3	6.9	14.3	42	67	90	0	0	0	1.4
5/07/12	-4	5.1	13.3	44	73	98	0	0	1.5	0
6/07/12	-0.5	7.8	15.9	45	70	96	0	0	2.5	2.7
7/07/12	0.9	9.2	16	47	68	95	0	0	2.5	1.6
8/07/12	0.4	9.1	17.4	27	66	97	0	0	0.8	5.9
9/07/12	2.6	9.5	18	27	63	94	0	0	0.6	0.8
10/07/12	1.3	11.6	19.3	26	56	89	0	0	2.7	8.8
11/07/12	11.3	15.3	19.3	46	61	78	0.2	0.3	4.3	10.9
12/07/12	11.4	14.5	18.8	65	85	98	23	0	1.2	0.6
13/07/12	11.5	14.3	16.3	75	93	98	20.8	0	0.7	0
14/07/12	12.2	14.9	17	82	92	98	17.6	0	0	0
15/07/12	10.1	12.3	14.4	77	89	96	13	0	1.1	3.7
16/07/12	1.5	9.2	14.7	47	78	97	1.8	0	1.1	1.1
17/07/12	-1.1	6.3	14.7	50	80	99	0	0	1.1	0.6
18/07/12	1.6	11.1	19.2	38	70	97	0.6	0	0.9	4.7
19/07/12	7.4	11.7	17.1	60	86	98	1.4	0	0.5	2.8
20/07/12	1.1	8.5	14.7	30	73	99	0	0	1.3	1
21/07/12	-0.3	7.4	14.9	42	72	96	0.2	0	2.4	6.3
22/07/12	1.3	9.6	16	60	74	96	0	0	4.1	9
23/07/12	4.9	10.5	15.7	55	73	89	0	0	3.9	8.2
24/07/12	6.4	11.4	16.8	40	69	88	0	0	3.1	7.8
25/07/12	1.3	10.1	17.6	45	71	98	0	0	1	3.3
26/07/12	2.2	10.1	20.2	34	70	94	0	0	0.4	0.8
27/07/12	5.5	12.2	19.1	48	74	94	2.4	0	0.8	0.9
28/07/12	3.1	9.3	15.5	40	74	98	0.6	0	1.1	0
29/07/12	3	9.1	13.3	55	76	97	0	0	2.1	2
30/07/12	0.2	7.8	15.7	46	75	98	0	0	0.8	0.7
31/07/12	-1.6	6.6	14.6	34	70	98	0	0	1.6	1.4
Average	**3.4**	**10.1**	**16.5**	**46.5**	**73.5**	**94.9**		**0.0**	**1.6**	**3.0**
Maximum	**12.2**	**15.3**	**20.2**	**81.7**	**93.3**	**99.1**	**23.0**	**0.3**	**4.3**	**10.9**
Minimum	**-4.0**	**5.1**	**13.3**	**26.0**	**55.7**	**77.7**	**0.0**	**0.0**	**0.0**	**0.0**
Total							**81.6**			

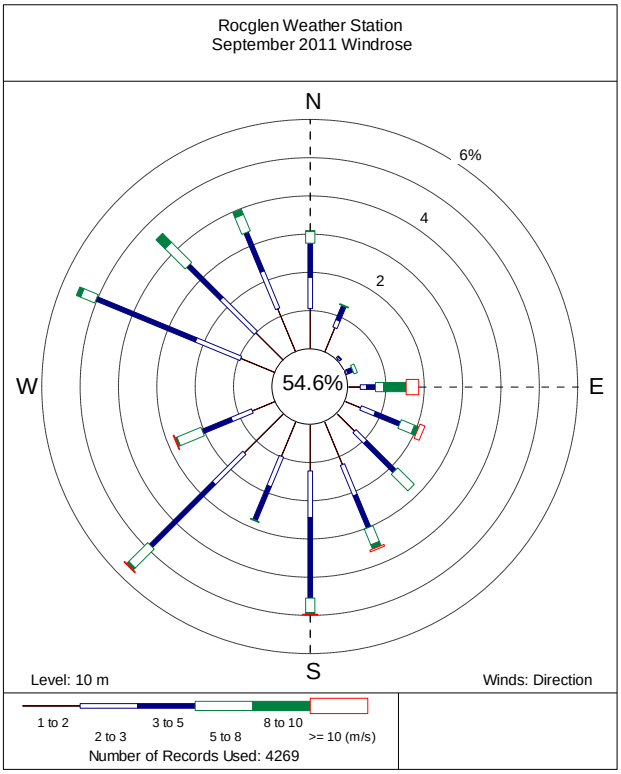
*Meteorological Station malfunctioning

Rocglen Windroses

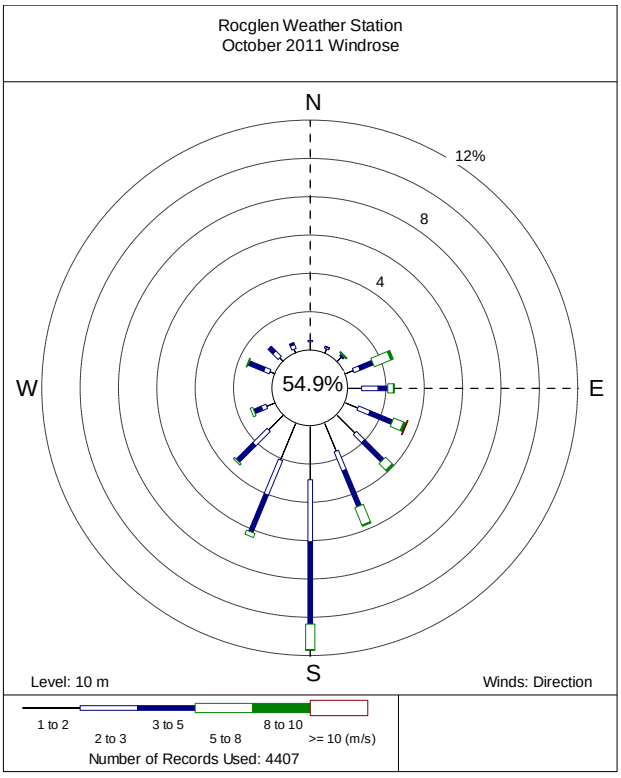
August 2011



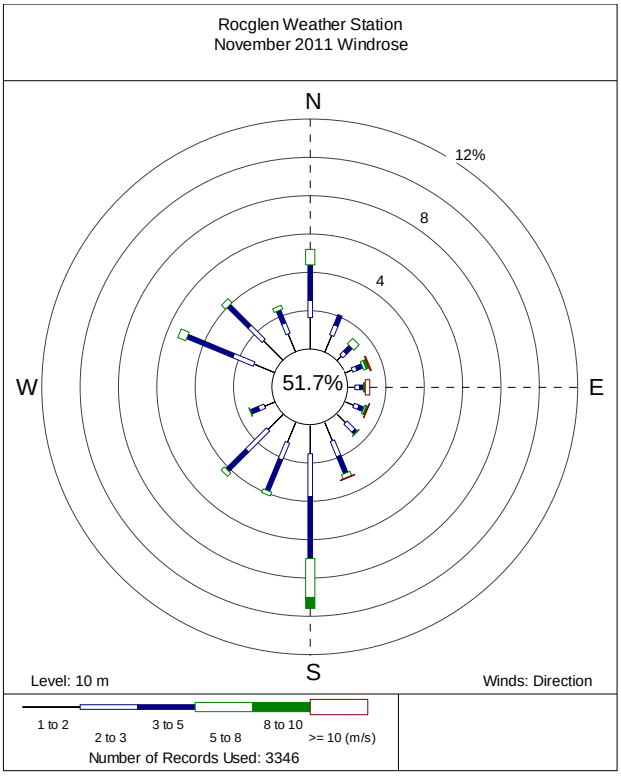
September 2011



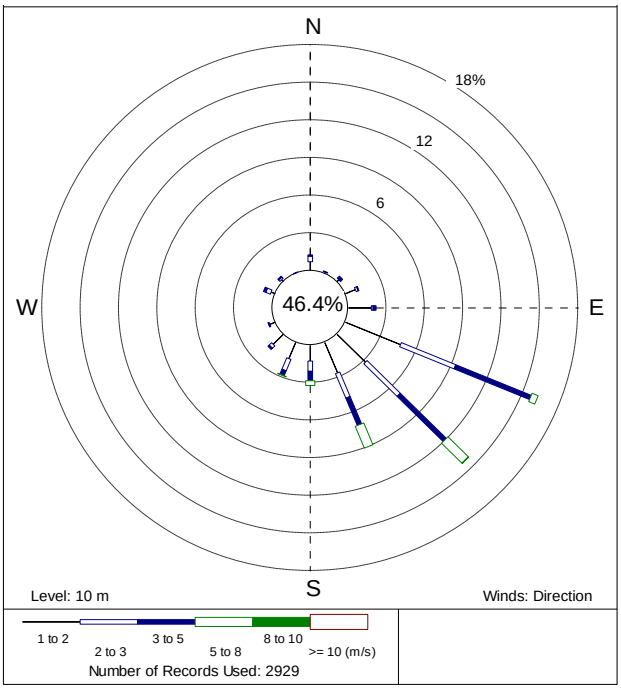
October 2011



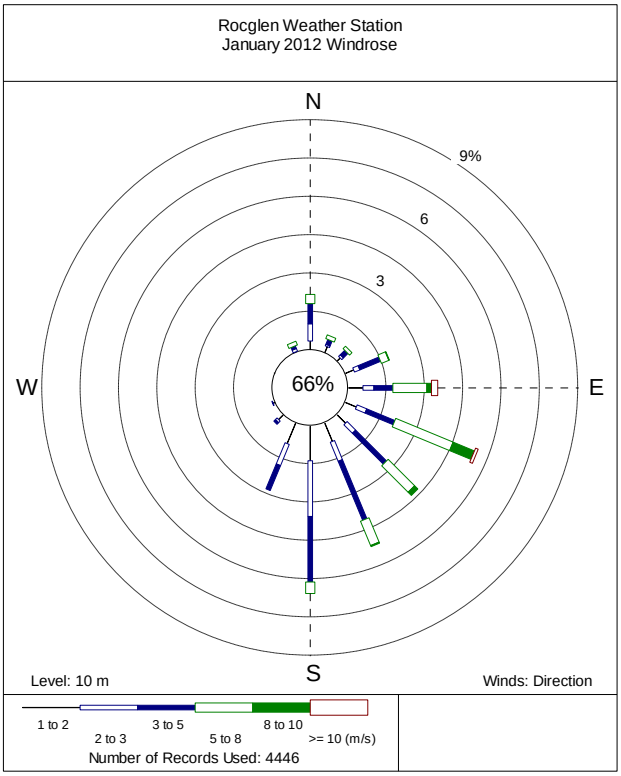
November 2011



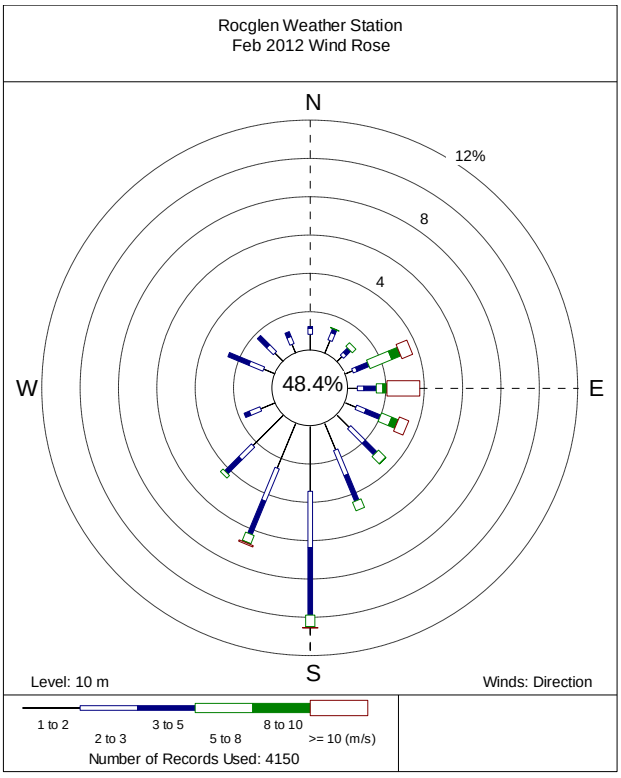
December 2011



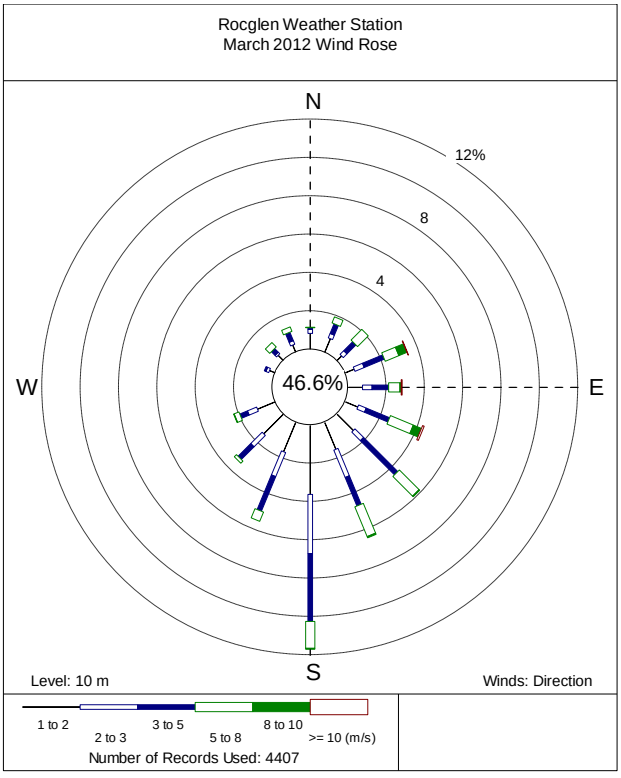
January 2012



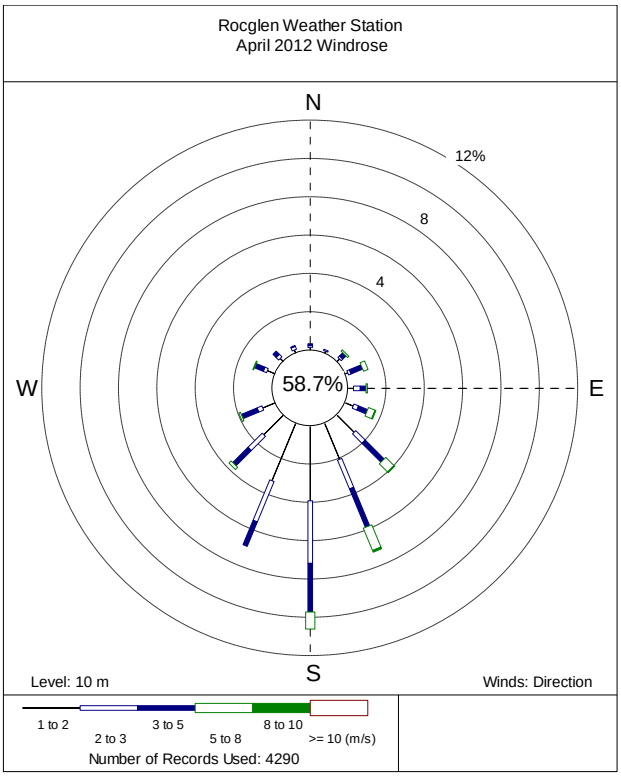
February 2012



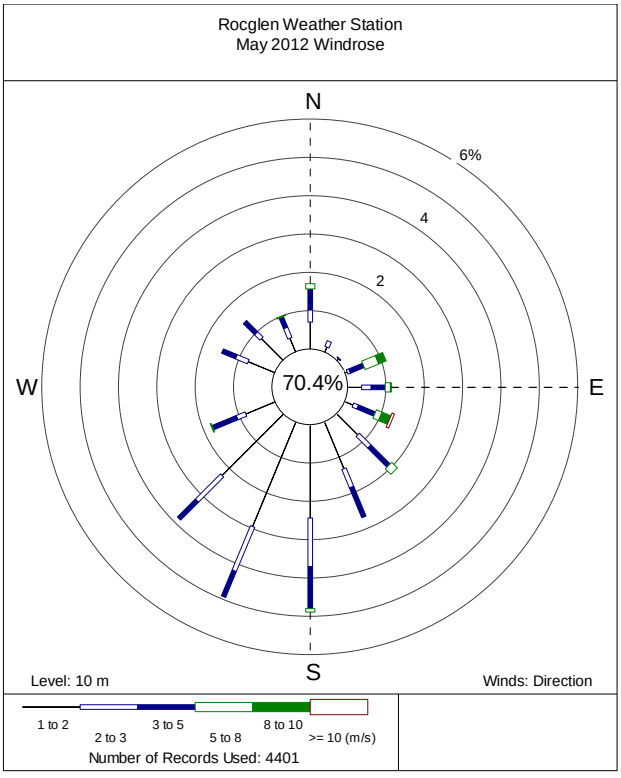
March 2012



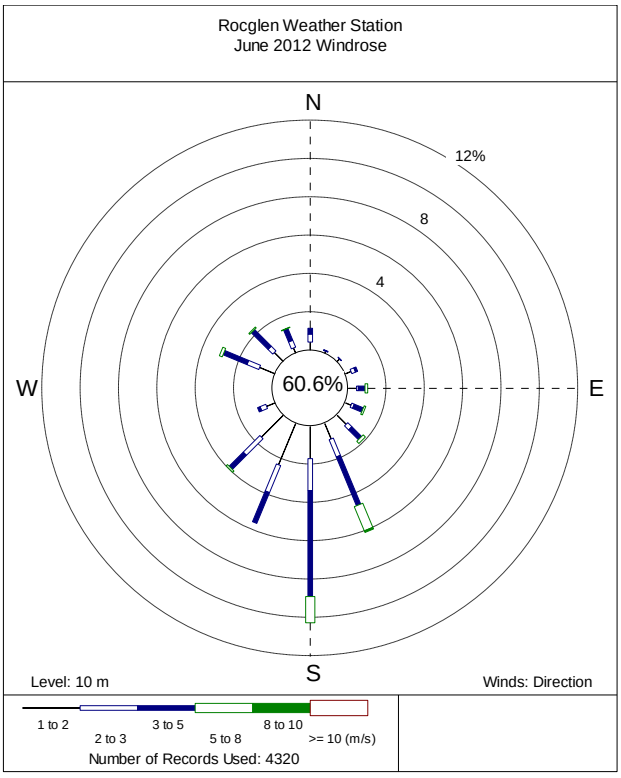
April 2012



May 2012



June 2012



July 2012