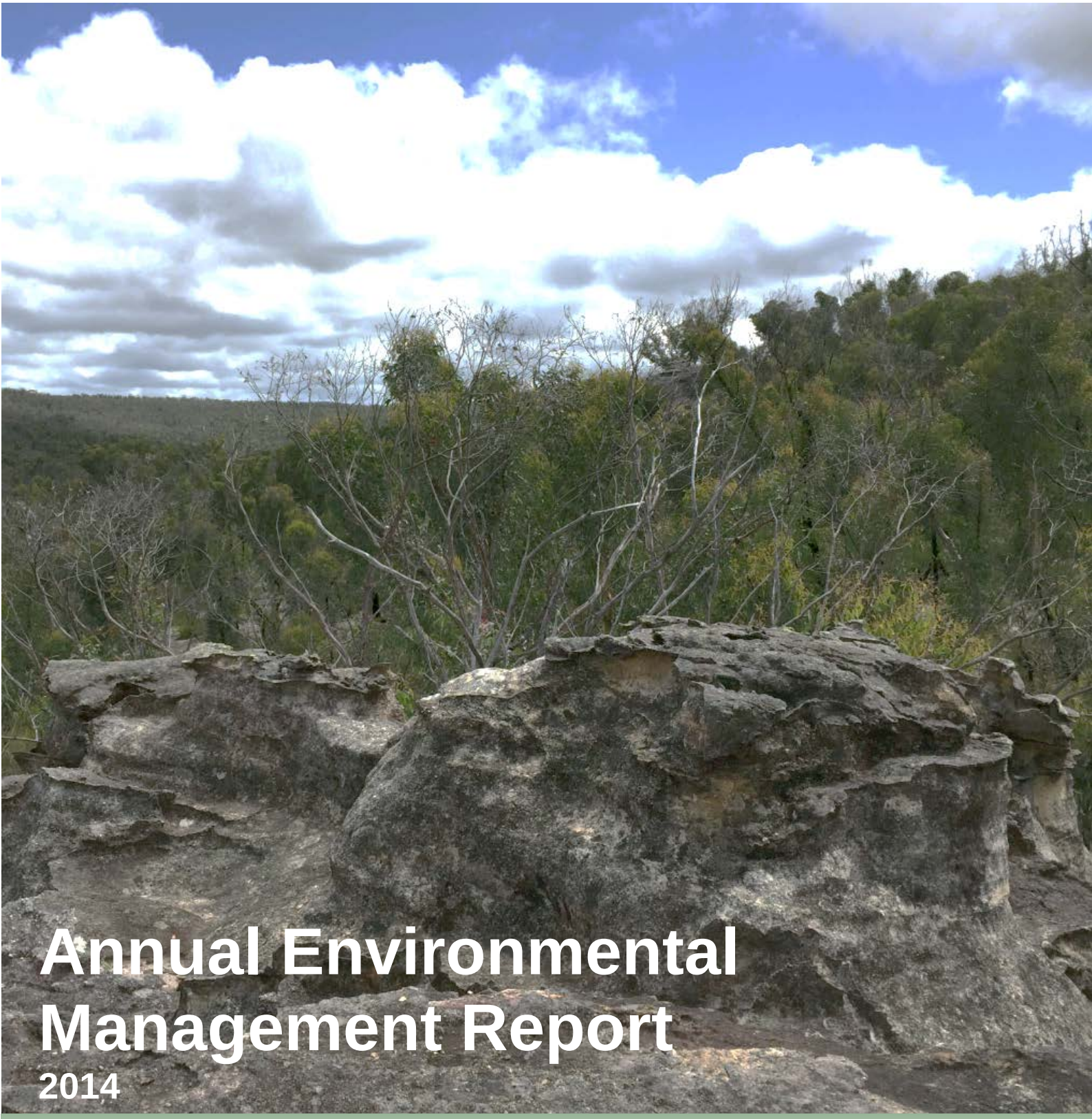
Clarence Colliery

Centennial Coal



Annual Environmental Management Report

2014

Name of mine	Clarence Colliery		
Titles/Mining Leases	CCL705, ML1353, ML1354 & ML1583		
MOP Commencement Date	01/01/2014	**MOP Completion Date**	31/12/2017
AEMR Commencement Date	01/01/2014	**AEMR End Date**	31/12/2014
Name of Leaseholder	Coalex Pty Ltd & Clarence Coal Investments Pty Ltd		
Name of mine operator (if different)	Clarence Colliery Pty Ltd		
Reporting Officer	Brian Nicholls		
Title	Mine Manager		
Signature			
Date	26/2/2015		

Contents

1. Introduction 10
1.1 Consents, Leases and Licences 11
1.2 Mine Contacts 14
1.3 Actions Required at Previous AEMR Review 14
2. Operations During the Reporting Period 16
2.1 Exploration 16
2.2 Land Preparation 17
2.3 Construction 17
2.4 Mining 17
2.5 Mineral Processing 19
2.6 Waste Management 19
2.6.1 Reject Management 20
2.6.2 Sewage Treatment 20
2.6.3 Oil and Grease Containment and Disposal 20
2.7 Product Stockpiles 21
2.8 Water Management 22
2.8.1 Water Management Strategy Team 22
2.8.2 Water Supply and Use 22
2.9 Groundwater Management 23
2.9.1 Surface Water Management 23
2.9.2 Clarence Colliery Water Treatment Plant 24
2.9.3 Clarence Water Transfer Scheme 25
2.10 Hazardous Material Management 25
3. Environmental Management and Performance 26
3.1 Environmental Protection Licence 26
3.2 Meteorological Data 26
3.2.1 Temperature 26
3.2.2 Rainfall 27
3.2.3 Wind Speed and Direction 27
3.3 Air Quality 28
3.3.1 Dust Performance Against Environmental Impact Statement Prediction 28
3.3.2 Review of Dust Monitoring Results 28
3.3.2.1 Depositional Dust Gauges 1,2 and 3 29

3.3.2.2 TSP/PM_{10} 29
3.3.3 Dust BMP Determination 31
3.4 Erosion and Sediment Management 31
3.4.1 Drainage Channels 32
3.4.2 Sediment Basins 32
3.4.3 Maintenance 32
3.5 Surface Water Quality 32
3.5.1 Monitoring and Performance Criteria 33
3.5.2 Results 33
3.5.2.1 pH 34
3.5.2.2 Total Suspended Solids 34
3.5.2.3 Oil and Grease 35
3.5.2.4 Filterable Manganese 35
3.5.2.5 Total Arsenic 36
3.5.2.6 Total Boron 36
3.5.2.7 Total Cadmium 37
3.5.2.8 Total Chloride 37
3.5.2.9 Total Chromium (Hexavalent) 38
3.5.2.10 Total Copper 38
3.5.2.11 Filterable Iron 39
3.5.2.12 Total Fluoride 39
3.5.2.13 Total Lead 40
3.5.2.14 Total Mercury 40
3.5.2.15 Total Selenium 41
3.5.2.16 Total Silver 41
3.5.2.17 Total Sulfate 42
3.5.2.18 Total Zinc 42
3.5.3 Licence Discharge Point 3 (LD3) 43
3.5.4 Licence Discharge Point 4 (LD4) 43
3.6 Ground Water Monitoring 43
3.6.1 Open Hole Piezometers 44
3.6.2 Multi-Level Piezometers 46
3.6.2.1 CLRP1 46
3.6.2.2 CLRP2 47

3.6.2.3 CLRP3 48
3.6.2.4 CLRP6 49
3.6.2.5 CC114 50
3.6.2.6 CC115 51
3.6.2.7 CLRP11 52
3.6.2.8 CLRP12 53
3.6.2.9 CLRP13 54
3.6.2.10 CLRP14 55
3.6.2.11 CLRP15 56
3.6.2.12 CLRP16 57
3.6.2.13 CLRP17 58
3.6.2.14 CLRP19 59
3.7 Threatened Flora 59
3.7.1 Swamps 59
3.7.1.1 Species Richness 60
3.7.1.2 Species Composition 60
3.7.1.3 Plant Condition 61
3.7.1.4 Exotic Species 61
3.7.1.5 Conclusion 62
3.7.2 Eastern SMP and Western SMP Area 62
3.7.2.1 Plant Condition 62
3.7.2.2 Species Richness 62
3.7.2.3 Exotic Species 62
3.7.2.4 Increaser and Decreaser Species 62
3.7.3 Outbye SMP Area 62
3.7.3.1 Plant Condition 62
3.7.3.2 Species Richness 62
3.7.3.3 Exotic Species 63
3.7.3.4 Increaser and Decreaser Species 63
3.7.4 800 SMP Area 63
3.7.4.1 Plant Condition 63
3.7.4.2 Species Richness 63
3.7.4.3 Exotic Species 63
3.7.5 900 SMP Area 63

3.8 Threatened Fauna 63
3.8.1 Criteria Used to Monitor Fauna 64
3.8.2 Results 64
3.8.2.1 700 Western SMP Area 64
3.8.2.2 Outbye SMP Area 66
3.8.2.3 700 Eastern SMP Area 67
3.8.2.4 800 Eastern Area 68
3.8.2.5 900 Areas (913 and 917 Panels) 69
3.9 Weeds 71
3.10 Blasting 71
3.11 Operational Noise 71
3.11.1 Control Measures 71
3.11.2 Results 72
3.12 Visual or Stray Light 74
3.13 Aboriginal Heritage 74
3.14 European Heritage 75
3.15 Natural Heritage 76
3.16 Spontaneous Combustion 76
3.17 Bushfire 76
3.18 Mine Subsidence 76
3.18.1 SMP Applications and Variations 76
3.18.2 Summary of Subsidence Monitoring 77
3.18.3 Subsidence Results 78
3.18.4 Flora and Fauna Results 78
3.18.5 Groundwater Monitoring 78
3.19 Contaminated Land 78
3.20 Methane Drainage 79
3.21 Public Safety 79
3.22 Other Issues and Risks 79
3.22.1 Risk Management 79
3.22.2 Feral Animals 79
3.22.3 Greenhouse Gases 79
4. Community Relations 81
4.1 Environmental Complaints 81

4.2 Community Liaison 81
5. Rehabilitation 82
5.1 Buildings 82
5.2 Rehabilitation of Disturbed Land 82
5.3 Rehabilitation Monitoring 83
5.4 Mine Closure 86
6. Activities Proposed in the Next AEMR Period 87

Figures

Figure 1 Total Waste and Recycling 2014 20
Figure 2 Packaged Oily Waste Recycling 2014 21
Figure 3 Liquid Oily Waste Recycling 2014 21
Figure 4 Yearly Windrose Plot 2014 27
Figure 5 Depositional Dust Gauges 1, 2 and 3 29
Figure 6 TSP Monitoring 2014 (1st Period) 30
Figure 7 TSP Monitoring 2014 (2nd Period) 30
Figure 8 PM10 Monitoring 2014 (1st Period) 30
Figure 9 PM10 Monitoring 2014 (2nd Period) 31
Figure 10 pH 2014 Monitoring Results for LDP2 34
Figure 11 TSS 2014 Monitoring Results for LDP2 34
Figure 12 Oil and Grease 2014 Monitoring Results for LDP2 35
Figure 13 Filterable Manganese 2014 Monitoring Results 35
Figure 14 Total Arsenic 2014 Monitoring Results 36
Figure 15 Total Boron 2014 Monitoring Results 36
Figure 16 Total Cadmium 2014 Monitoring Results 37
Figure 17 Total Chloride 2014 Monitoring Results 37
Figure 18 Total Chromium (Hexavalent) 2014 Monitoring Results 38
Figure 19 Total Copper 2014 Monitoring Results 38
Figure 20 Filterable Iron 2014 Monitoring Results 39
Figure 21 Total Fluoride 2014 Monitoring Results 39
Figure 22 Lead 2014 Monitoring Results 40
Figure 23 Total Mercury 2014 Monitoring Results 40
Figure 24 Total Selenium 2014 Monitoring Results 41

Figure 25 Total Silver 2014 Monitoring Results 41
Figure 26 Total Sulfate 2014 Monitoring Results 42
Figure 27 Total Zinc 2014 Monitoring Results 42
Figure 28 CLRP4, CLRP5, CLRP6, CLRP7, CLRP8, CLRP10 and CC113 Piezometric Height 45
Figure 29 CLRP1 Piezometric Height 46
Figure 30 CLRP2 Piezometric Height 47
Figure 31 CLRP3 Piezometric Height 48
Figure 32 CLRP6 Piezometric Height 49
Figure 33 CC114 Piezometric Height 50
Figure 34 CC115 Piezometric Height 51
Figure 35 CLRP11 Piezometric Height 52
Figure 36 CLRP12 Piezometric Height 53
Figure 37 CLRP13 Piezometric Height 54
Figure 38 CLRP 14 Piezometric Height 55
Figure 39 CLRP15 Piezometric Height 56
Figure 40 CLRP16 Piezometric Height 57
Figure 41 CLRP17 Piezometric Height 58
Figure 42 CLRP19 Piezometric Height 59
Figure 43 Location of Monitoring Sites within Clarence Mining Lease 61
Figure 44 Locations of Fauna Monitoring Sites in 700 Western SMP Area 65
Figure 45 Location of Fauna Monitoring Sites in 700 Outbye SMP Area 66
Figure 46 Locations of all survey sites within Clarence Colliery Eastern SMP Application Area used during 2014. 68
Figure 47 Location of Fauna Monitoring Sites in 800 SMP Area 69
Figure 48 Locations of Two Survey Sites in Clarence 900 Areas. 70
Figure 49 REA's and Monitoring Transect Locations 85

Tables

Table 1. Clarence Colliery Licences, Consents and Approvals 11
Table 2. Contact Details for Key Mine Personnel 14
Table 3. Actions Required from Previous AEMR 14
Table 4. Drilling Activities and Rehabilitation Progress 16
Table 5. Coal Production (Run of Mine) 2002 – 2014 18
Table 6. Production and Waste Summary 18

Table 7. Process Water Supply 2014 22
Table 8. Stored Water 24
Table 9. Average Temperature 26
Table 10. Monthly Rainfall Recorded at Clarence 27
Table 11. Environment Protection Licence Concentration Limits 33
Table 12. Groundwater Monitoring Piezometers Summary 43
Table 13. Noise Impact Assessment Criteria 72
Table 14. Short Term Noise Monitoring Results 2014 (Attended) 72
Table 15. Long Term Noise Monitoring Results 2014 (Unattended) 74
Table 16. Greenhouse Gas Emissions 2014 Reporting Period (CO_2 –e T) 80
Table 17. Community Complaints at Clarence over a Five Year Period 81
Table 18. Rehabilitation Summary 82
Table 19. Maintenance Activities on Rehabilitated Land 83
Table 20. Study Transects of Rehabilitation Monitoring Program 84

Appendices

Appendix 1 Regional Location Plan
Appendix 2 2014 Workings
Appendix 3 2015 Proposed Workings
Appendix 4 Combined Surface Monitoring Points
Appendix 5 Pit Top Monitoring Locations
Appendix 6 Aerial View of Surface Facilities
Appendix 7 Surface Rehabilitation 2014
Appendix 8 Clarence Water Schematic
Appendix 9 Centennial Coal Environment and Community Policy
Appendix 10 Development Consent DA 504-00
Appendix 11 Environment Protection Licence No. 726
Appendix 12 Rehabilitation Photo Monitoring

1. Introduction

Clarence Colliery Pty Ltd (Clarence Colliery) is an underground coal mining operation located within the NSW Western Coalfields (**Appendix 1**). Clarence Colliery is a wholly owned subsidiary of Centennial Coal Company Limited (which is a wholly owned subsidiary of Banpu Public Company) and has been appointed as the management entity for the Clarence Joint Venture. Centennial Coal Company Limited has an 85% share in the Clarence Joint Venture comprised of a number of wholly owned subsidiaries including Coalex Pty Ltd (51% share), Clarence Coal Investments Pty Ltd (29% share) and Centennial Clarence Pty Ltd (5% share). The remaining 15% share in the Clarence Joint Venture is held by SK Energy Australia Pty Ltd.

Operations at Clarence Colliery commenced in 1979. Coal is extracted from the Katoomba coal seam using bord and pillar partial extraction methods supplying coal to both domestic and export markets. Clarence Colliery is located approximately 15 kilometres east of Lithgow, to the north of Chifley Road (continuation of the Bells Line of Road) and the Main Western Rail Line. Newnes Junction village is located approximately 900 metres to the south-east of the site and contains a small number of residential dwellings. Clarence Village is also located approximately 1.5 kilometres to the south-west of the site.

A number of extractive industries are also located in close proximity to Clarence Colliery including the Hanson Quarry located immediately to the west and the disused Rocla Quarry located to the south-east of the site respectively. The Newnes Kaolin Project is an approved quarry, which is proposed to be established to the south-east of the site.

Land to the east of the site is protected under the Blue Mountains National Park, one of the eight protected areas making up the World Heritage Listed Greater Blue Mountains Area (UNESCO 2013). The Newnes State Forest is located to the north and west of Clarence Colliery. Clarence Colliery is located within the Hawkesbury-Nepean Catchment and discharges water to the Wollangambe River which eventually drains to the Colo River.

The principal components of the existing operations include:

- An underground coal mine with maximum production levels of three million tonnes per annum (Mtpa).
- Associated pit top area containing surface infrastructure including:
    - Mine administration and bath house building;
    - Store and workshop building;
    - Water treatment plant;
    - Rail loop and load out facilities;
    - Conveyor systems to transfer coal from the underground mine to the pit top facilities including the load out on the rail loop;
    - Run-of-Mine stockpile area;
    - Ventilation facility;
    - Washed coal stockpile area;
    - Coal Handling and Preparation Plant (CHPP);
    - One active and four partially rehabilitated existing Reject Emplacement Areas (REA);
    - Various water management structures include storage and leachate dams and irrigation area which forms part of the water management on site;
    - Sewage treatment plant; and
    - A downcast ventilation shaft located on the Newnes Plateau.

Environmental aspects of the Clarence Operation are managed in accordance with legislation, lease, licence and approval conditions with reference to the Clarence Colliery Environmental Management System (EMS). In accordance with Clarence EMS, Clarence has adopted the Centennial Coal Environment and Community Policy, included in **Appendix 9**.

This Annual Environmental Management Report (AEMR) has been prepared to meet the reporting requirements of the NSW Department of Trade and Investment, Regional Infrastructure and Services (DTIRIS), NSW Department of Planning and Environment (DP&E), NSW Office of Water (NoW) and other such regulatory bodies. This AEMR has been prepared in accordance with the Guidelines to Mining, Rehabilitation and Environmental Management Process (2006) published by DTIRIS.

1.1 Consents, Leases and Licences

Mining at Clarence is undertaken within Consolidated Coal Lease 705 (CCL705), Mining Lease 1353 (ML1353), Mining Lease 1354 (ML1354) and Mining Lease 1583 (ML1583) issued by the DTIRIS. Mining during 2014 occurred within CCL705 and ML1583 (**Appendix 1**).
Clarence Colliery currently operates under three separate development consents. Approval to commence mining was originally granted in 1976 by the Blaxland Shire Council, now known as Lithgow City Council (LCC) for the construction of surface facilities. The approval area partially encompassed CCL705.
This consent was then modified in 1993 by Greater Lithgow County Council (now Lithgow City Council) to amend the REAs proposed in the original consent and expand the mining area to include all of CCL705.
Development consent for an extension of underground coal mining to the north (encompassing ML1353 and ML1354) and the consequent extension of surface reject disposal areas, water management and ancillary structures within the Clarence Colliery pit top was granted by Greater Lithgow County Council in 1994.
In 2005, Clarence received approval from the Department of Infrastructure, Planning and Natural Resources (now the Department of Planning and Environment) to expand the operations into a new mining lease (ML1583) which consisted of the conversion of a number of tenements into the new mining lease. The development application number for this consent is 'DA 504-00'.
Centennial lodged a development application (DA) with Lithgow City Council in October 2000 for the proposed lease extension of Clarence Colliery. This DA was for the conversion of coal authorisations EL5072, ALA5, ALA8 and ALA307 to mining leases for the purpose of coal extraction using the existing mining system and pit top facilities. The development application (DA 504-00) was approved by the Minister for Planning on the 19th December 2005.

In 2014, two modifications to DA504.00, including the construction of an additional Reject Emplacement Area (REA VI) and the trucking of coal product to the west, were approved by the Minister for Planning (DP&E) on the 27th May, 2014. A copy of Clarence Development Consent is attached in **Appendix 10**.

Clarence operates in accordance with Environmental Protection Licence (EPL) 726 issued by the Environment Protection Authority (EPA). A copy of EPL 726 is attached in **Appendix 11**. In 2014, EPL726 was modified to reduce the lower pH limit at Licence Discharge Points (LDP's) 1, 2, 3 and 4 from 6.5 to 6, decrease the Zinc concentration limit at LDP's 1, 2, 3 and 4 from 2.5 mg/l to 1.5 mg/l, and to introduce two heavy rainfall related discharge conditions.

Clarence's first Mining Operations Plan (MOP) covered the period 2001-2006. A second MOP, approved in February 2007, covered the period from 2007-2013. In November 2010 Clarence requested an amendment of the MOP for the development of REA IV and V, update of mine contact details, proposed land preparation and construction and future water management, use of mining equipment and rehabilitation. A new MOP for the period covering 2014-2017 was approved on the 25th November 2014, which included (amongst other things) a new Reject Emplacement Area, REA VI.
All licences, consents and approvals held by Clarence Colliery are listed in **Table 1**.

Table 1. Clarence Colliery Licences, Consents and Approvals

Licence/Approval/Consent	Approval/Number	Approval Authority	Date Granted-Expiry/Renewal Date
Development Consents			
Original Development Consent	IRM.GE.76	Blaxland Shire Council	Approved 15/06/1976
Development Consent Modification	IRM.GE.76	Lithgow City Council	Approved 21/07/1993
Development Consent	174/93	Lithgow City Council	Approved 15/02/1994
Development Consent	DA504-00	Department of Planning & Environment	19/12/2005-31/12/2026

Licences			
Environmental Protection Licence	EPL726	Environment Protection Authority	02/07/2014-Renewed Annually 1st of January
Radiation (density gauge) Licence	RR739	Environment Protection Authority	2013-18/05/2015
Radiation (density gauge) Licence	RR740	Environment Protection Authority	2013-18/05/2015
Radiation (density gauge) Licence	RR1120	Environment Protection Authority	2013-18/05/2015
Radiation (density gauge) Licence	RR1121	Environment Protection Authority	2013-18/05/2015
Radiation (density gauge) Licence	RR1122	Environment Protection Authority	2013-18/05/2015
Radiation Licence	RL31190	Department of Environment and Heritage	22/05/2014 – 18/05/2017
Dangerous Goods Licence	NDG020999	WorkCover Authority NSW	03/04/2014-05/03/2015
Bore Licence Leachate Transfer	10BL604765	NSW Office of Water	12/12/2012-11/12/2017
Bore Licence CLRP1	10BL161964	NSW Office of Water	13/08/2003-Perpetuity
Bore Licence CLRP2	10BL161965	NSW Office of Water	13/08/2003-Perpetuity
Bore Licence CLRP3	10BL602213	NSW Office of Water	10/12/2007-Perpetuity
Bore Licence CLRP4	10BL161962	NSW Office of Water	30/08/2003-Perpetuity
Bore Licence CLRP5, CLRP7, CLRP10	10BL602211	NSW Office of Water	10/12/2007-Perpetuity
Bore Licence CLRP6	10BL602212	NSW Office of Water	10/12/2007-Perpetuity
Bore Licence CLRP 12	10BL604063	NSW Office of Water	07/07/2010-Prepetuity
Bore Licence CLRP 11, 13, 14	10BL604099	NSW Office of Water	05/07/2010-Perpetuity
Bore Licence CLRP 15, 16	10BL604098	NSW Office of Water	05/07/2010-Perpetuity
Bore Licence CLRP 17, 20	10BL605316	NSW Office of Water	30/01/2013-Perpetuity
Bore Licence CC114	10BL602819	NSW Office of Water	09/03/2009-Perpetuity
Bore Licence CC115	10BL602820	NSW Office of Water	09/03/2009-Perpetuity
Bore Licence HV1, HV2, HVU1, HVU2	10BL603337	NSW Office of Water	07/09/2009-Perpetuity
Bore Licence	10BL605494	NSW Office of Water	12/12/2013-Perpetuity
Bore Licence CLRP18, 22	10BL605612	NSW Office of Water	11/08/2014-Perpetuity
Surface Licence Main Dam	10WA118714	NSW Office of Water	30/06/2014-30/06/2015
Water Access Licence 36479	10WA118758	NSW Office of Water	22/10/2014 – 22/10/2015
Surface Authority Town Water Supply	10SA001409	NSW Office of Water	30/09/2007-30/09/2017
Exploration Licence	EL5072	Department of Primary Industries	11/11/2010 – 11/11/2015
Authorisations			
Authorisation 307	A307	Department of Primary Industries	05/02/2010-24/08/2014*
Authorisation A416	A416	Department of Primary Industries	29/03/2010-24/08/2014*
Authorisation A451	A451	Department of Primary Industries	05/02/2010-24/08/2014*
Project Approval			
Reject Emplacement Area II	Section 126	Department of Primary Industries	Approved 19/06/1992

Reject Emplacement Area III	Section 126	Department of Primary Industries	Approved 07/10/1993
Reject Emplacement Area IV	Section 100	Department of Primary Industries	28/03/2011-01/07/2015
Reject Emplacement Area IVa extension	Section 100	Department of Primary Industries	18/09/2013-01/09/2017
Reject Emplacement Area VI	Section 100	Department of Primary Industries	11/08/2014-04/08/2017
Leases			
Consolidated Coal Lease	CCL705	Department of Trade and Investment, Regional Infrastructure and Services	20/12/2006-20/12/2027
Mining Lease	ML1353	Department of Trade and Investment, Regional Infrastructure and Services	21/07/1994-21/07/2015
Mining Lease	1354	Department of Trade and Investment, Regional Infrastructure and Services	21/07/1994-21/07/2015
Mining Lease	1583	Department of Trade and Investment, Regional Infrastructure and Services	09/07/2006-09/07/2027
Mining Operations Plan			
Mining Operations Plan	N/A	Department of Trade and Investment, Regional Infrastructure and Services	01/01/2014 – 31/12/2017
Subsidence Management Plans			
Subsidence Management Plan	900 Area	Department of Trade and Investment, Regional Infrastructure and Services	22/01/2014 – 31/01/2019
Subsidence Management Plan	800 Area	Department of Trade and Investment, Regional Infrastructure and Services	01/11/2013 – 31/10/2018
Subsidence Management Plan	700 Area	Department of Trade and Investment, Regional Infrastructure and Services	08/05/2009-01/05/2014
Subsidence Management Plan	700 West Area	Department of Trade and Investment, Regional Infrastructure and Services	18/06/12-01/06/2017
Subsidence Management Plan	Eastern Area	Department of Trade and Investment, Regional Infrastructure and Services	10/2005-01/06/2013
Subsidence Management Plan	CCL705 Outbye Areas	Department of Trade and Investment, Regional Infrastructure and Services	08/05/2009-01/05/2014
Subsidence Management Plan	CCL705 Outbye Areas (Panels 302, 305, 306, 307, 400, 403 and 406)	Department of Trade and Investment, Regional Infrastructure and Services	08/05/2009-01/05/2014
Subsidence Management Plan	CCL705 Outbye Areas (Panels 314 & 316)	Department of Trade and Investment, Regional Infrastructure and Services	19/02/2010-01/02/2015
Subsidence Management Plan	CCL705 Outbye Areas (Panel 402 Only)	Department of Trade and Investment, Regional Infrastructure and Services	27/03/2009-01/01/2010

Subsidence Management Plan	CCL705 Outbye Areas (Panel 602 Only)	Department of Trade and Investment, Regional Infrastructure and Services	30/01/2009-01/01/2010
Access Agreement			
Access Agreement	Q648-100	State Rail Authority	10/07/1981-Life of Loop
Occupation Permit			
Occupation Permit		Forests NSW	Renewed Annually

* In approval process

1.2 Mine Contacts

Table 2. Contact Details for Key Mine Personnel

Name	Title	Phone
Brian Nicholls	Manager of Mining Engineering	02 6353 8033
Martin Howe	Environment and Community Officer	02 6353 8039
Enquiries and Complaints Line	Daytime Contact Afterhours Contact	02 6353 8000 02 6353 8010

1.3 Actions Required at Previous AEMR Review

No required actions were identified in feedback from DTRIS and DP&E or from the 2013 AEMR review meeting and presentation held on 9th April 2014. **Table 3** below summaries activities that were proposed for the 2014 AEMR Period.

Table 3. Actions Required from Previous AEMR

Action Required	Where dealt with in this AEMR
Seek a modification to DA-504.00 to allow the construction of a new Reject Emplacement Area (REA VI)	Section 1.1
Continued planning for progressive decommissioning and rehabilitation of Reject Emplacement Area III and Reject Emplacement Area IV	Section 5.2
Continued Ecosystem Function Analysis (EFA) rehabilitation monitoring	Section 5.3

Continued planning for life of mine reject emplacement	Section 2.6.1
Conduct a three hole exploration program within the '900 area' on the Newnes Plateau	Section 2.1
Complete required actions outlined in site specific Best Management Practice particulate determination to reduce particle emissions from the premises	Section 3.3.3
Gain final approval for the Mining Operations Plan covering 2014 - 2020	Section 5.4
Continue monitoring of shallow bore holes for Phase 2 Environmental Site Assessment Report	Section 3.8
Upgrade of Leachate Dam No. 2 from 3ML to 10ML	Section 2.8.1
Commission Primary Arrestor slurry pump	Section 2.8.1
Continued Water Strategy Team Meetings and Improvements to the Clarence Water Management System; and	Section 2.8.1
Internal operation of the Water Treatment Plant and continued improvement to operation, monitoring and maintenance systems.	Section 2.8.5

2. Operations During the Reporting Period

2.1 Exploration

In 2014 Clarence undertook the approval process for a three hole exploration program within the '900 Area' on the Newnes Plateau. The exploration drilling program began in Quarter 4, 2014. A Review of Environmental Factors (REF) was prepared which considered the environmental impacts of the exploration program and the mitigation measures that would be employed. A copy of the REF is available on Resources & Energy Website. The issuing of monitoring bore licences from NoW was a signed occupation permit with the Landholder Forests NSW in September 2014. Upon completion of the exploration activities, CLRP21 will be rehabilitated and sealed in accordance with the DTIRIS guideline '*EDG01 Environmental Management Guideline for Industry - Borehole Sealing Requirements on Land: Coal Exploration'* (Department of Mineral Resources 1997) and CLRP18 and CLRP 22 will be rehabilitated and monuments fitted for piezometers.

Table 4. Drilling Activities and Rehabilitation Progress

Borehole Number	License Number	Drilling Date	Drilling Site Rehabilitation Progress	Borehole Sealing Rehabilitation Progress
CLRP1	10BL161964	Aug-04	Complete	Multi Level Vibrating Wire Piezometer Grouted
CLRP2	10BL161965	Aug-04	Complete	Multi Level Vibrating Wire Piezometer Grouted
CLRP3	10BL602213	Dec-06	Complete	Multi Level Vibrating Wire Piezometer Grouted
CLRP4/MBN01	10BL161962	Aug-03	Complete	Standpipe Single Data Logger
CLRP5	10BL602211	May-08	Complete	Standpipe Single Data Logger
CLRP6	10BL602212	May-08	Complete	Multi Level Vibrating Wire Piezometer Grouted
CLRP7	10BL602211	Apr-08	Complete	Standpipe Single Data Logger
CLRP9	N/A	May-08	Complete	Sealed
CLRP10	10BL602211	May-08	Complete	Standpipe Single Data Logger
CLRP11	10BL604099	Sep-10	Complete	Multi Level Vibrating Wire Piezometer Grouted
CLRP12	10BL604063	Aug-10	Complete	Multi Level Vibrating Wire Piezometer Grouted
CLRP13	10BL604099	Sep-10	Complete	Multi Level Vibrating Wire Piezometer Grouted
CLRP14	10BL604099	Sep-10	Complete	Multi Level Vibrating Wire Piezometer Grouted
CLRP15a	10BL604098	Oct-10	Complete	Standpipe Single Data Logger
CLRP15	10BL604098	Oct-10	Complete	Multi Level Vibrating Wire Piezometer Grouted
CLRP16	10BL604098	Oct-10	Complete	Multi Level Vibrating Wire Piezometer Grouted
CLRP17	10BL605316	Aug-13	Complete	Multi Level Vibrating Wire Piezometer Grouted
CLRP 18	10BL605612	Oct-14	In Progress	Multi Level Vibrating Wire Piezometer Grouted
CLRP19	10BL605316	Jul-13	Complete	Multi Level Vibrating Wire Piezometer Grouted
CLRP20	10BL605316	Jul-13	Complete	Multi Level Vibrating Wire Piezometer Grouted
CLRP22	10BL605612	Oct-14	In Progress	Multi Level Vibrating Wire Piezometer Grouted
CC111	N/A	Aug-08	Complete	Sealed
CC112	N/A	Aug-08	Complete	Sealed

CC113	N/A	Oct-07	Complete	Standpipe Single Data Logger
CC114	10BL602819	Apr-09	Complete	Multi Level Vibrating Wire Piezometer Grouted
CC115	10BL602820	Apr-09	Complete	Multi Level Vibrating Wire Piezometer Grouted

2.2 Land Preparation

Land preparation for Reject Emplacement Area (REA) VI was completed during the reporting period. The total area cleared was approximately 4.5 hectare. A low permeability clay liner was constructed at the base of REAVI, with the clay material being entirely sourced from site. The construction of the clay liner was audited by an external geotechnical engineer to ensure design objectives and criteria were progressively met. The implementation of this clay liner maximises the percentage of leachate captured at the 10ML Leachate Dam, vastly reducing the potential for any ground water interference from the leachate. Cleared vegetation and stripped topsoil and subsoil were directly applied on the completed benches of REA IV and REA IVa for progressive rehabilitation. Rehabilitation activities are discussed in **Section 5**.

2.3 Construction

REA VI was constructed during the reporting period, located adjacent to the access road and rail loop to the south-west of the stockpile areas. The clay liner was completely covered with reject material to form a protective skin over the REA base to stop the clay material drying out to avoid potential cracking.

2.4 Mining

During 2014, the following mining activities took place:

- Extraction within 700 panel commenced on 27 November 2013 and finished 5th February 2014.
- Development commenced in 801S panel from 12th August 2013 and continued until the end of the reporting period.
- Development commenced in 810 panel from 11th November 2013 and finished 21st November 2014.
- Extraction within 810 panel commenced 25th November 2014 and continued until the end of the reporting period.
- Development commenced in 902 panel from 9th December 2013 and finished 31st October 2014.
- Extraction within 902 panel commenced 3rd November 2014 and continued until the end of the reporting period.
- Development commenced in 904 panel from 1st October 2013 and finished 21st Just 2014.
- Extraction within 904 panel commenced 24th July 2014 and finished 31st October 2014.

The 2014 mine plan with progress of development and extraction is included in **Appendix 2** and proposed 2015 mine plan is included in **Appendix 3**.

Table 5. Coal Production (Run of Mine) 2002 – 2014

Year	Coal Production (Run of Mine) Tonnes
2014	2,557,942
2013	2,360,066
2012	2,017,674
2011	2,006,738
2010	1,829,454
2009	1,978,214
2008	1,829,551
2007	1,474,944
2006	1,604,397
2005	1,626,414
2004	1,729,167
2003	1,529,667
2002	1,129,550

Table 6. Production and Waste Summary

	Cumulative Production (tonnes)		
	Start of Reporting Period	At end of Reporting Period	End of next reporting (estimated)
Topsoil Stripped	900	6000	0
Topsoil Used/Spread	3000	6000	0
Waste Rock	0	0	0
ROM	2,360,066	2,557,938	2,745,662
Processing Waste	280,676	151,204	165,900
Product Domestic	153,652	157,055	150,000
Product International	1,816,772	2,316,251	2,275,000

2.5 Mineral Processing

The CHPP is designed to operate at 650 tonnes per hour (tph). Product less than 50mm sizing is pushed into underground reclaim tunnels via a dozer. A medium is added to the water which aids the separation of the heavier material from the coal. Coal is screened to separate less than 0.05mm coal fines which report to the thickener and product coal is sent to the product stockpile. The fine material is pumped from the thickener to belt filter presses which were installed in 2009. The filter press compresses slurry into a cake and water is returned to the plant. The filter cake is transported to the product stockpile.

The washed coal is added to an export stockpile or sized in a screening plant into 50mm minus to plus 25mm, 25mm minus to plus 15mm or 15mm minus. Screened material is stockpiled and loaded for domestic sale via road haulage.
Coarse reject from the plant is transported via a belt from the CHPP to a reject bin and trucked to the reject emplacement area.

2.6 Waste Management

Waste is managed in accordance with Clarence Waste Management Plan. Waste management practices are based on the Waste Management Hierarchy whereby waste is minimised in the first instance, reused/recycled in the second instance and disposed of as a last resort.
Waste is segregated into the following different streams for management and recycling and/or disposal:

- General Waste;
- Paper and Cardboard Recycling;
- Scrap metal;
- Packaged Oily Waste;
- Liquid Oily Waste;
- Diesel Particulate Filters; and
- Other special hazardous wastes.

Clarence reviewed its Waste Management Plan in 2012 and updated the plan to include waste performance targets. Clarence has set the following targets to ensure continual improvement in site waste minimisation and management:

- 5% reduction in total waste volumes on a comparative year basis. Total waste volumes will be calculated on a kg of waste per ROM tonne produced; and
- 10% improvement in recycling rates on a comparative year basis. Recycling rates will be calculated as a percentage of total waste material.

For the reporting period, Clarence generated 0.00018 tonnes of waste for every tonne of ROM coal produced. When compared to 2013 production, this resulted in a 35% reduction of waste to coal production ratio, which exceeds the annual 5% reduction target. However, Clarence failed to meet the 10% recycling improvement target for the reporting period, recycling 26% of the total waste transported off site, which was a 45% reduction from 2013. Waste targets will be reviewed and modified as required to assist in improving waste minimisation and management procedures. Total waste and percentage of material recycled during the reporting period in presented in **Figure 1**.

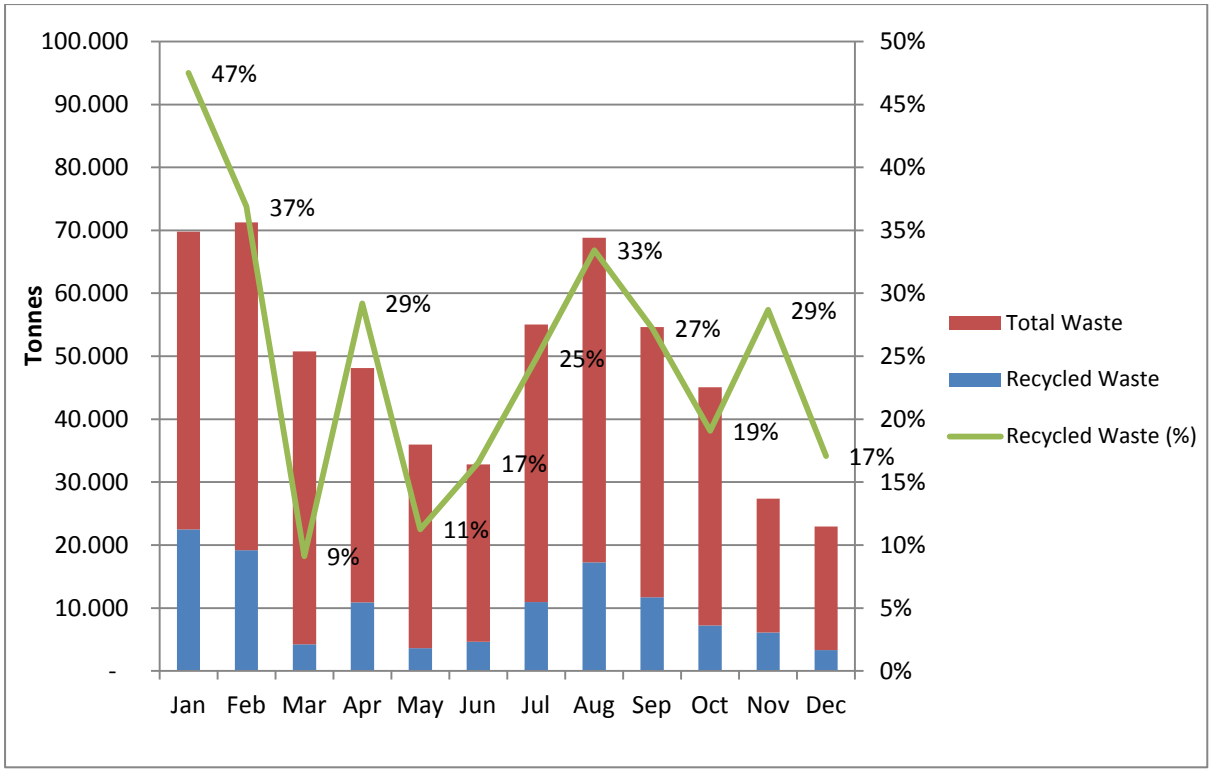


Figure 1 Total Waste and Recycling 2014

2.6.1 Reject Management

Reject material from the CHPP is produced when 'washing' coal to reduce ash content. Washing coal removes impurities in the coal (e.g. sedimentary rock, clay, and high-ash coal) to meet desired ash content in the final product. Washing is undertaken as required to meet market specifications.
During the reporting period all reject material was placed on Reject Emplacement Area (REA) IVa and VI. Fines are put through the belt press filters and placed on the final product stockpile. During thickener maintenance periods the fines are placed in REA III settling ponds.

During the reporting period, Clarence developed a Long Term Reject Emplacement Strategy in consultation with the Environment Protection Authority, Office of Environment and Heritage and Sydney Catchment Authority. The Strategy was submitted to the Department of Planning and Environment on November 27 and later approved, pending the submission of progress reports on the Strategy's implementation in the following years.

2.6.2 Sewage Treatment

A package sewage treatment plant is connected to a holding tank that receives raw sewage from the administration and CHPP buildings. Treated effluent is discharged to a twin pond system for maturation, from where it is then pumped to a spray irrigation area between the colliery access road and REA VI.

2.6.3 Oil and Grease Containment and Disposal

Clarence Colliery utilises oil and grease handling and recovery systems for oil evacuation at workshops to waste oil tanks which are emptied by a licensed contractor. The handling and recovery systems prevent the entry of waste oil into the water system. There were no changes to oil and grease handling during the reporting period.
Clarence collects liquid waste oil, oily rags and oil filters from the workshop and CHPP for recycling and disposal. Total quantities of packaged and liquid oily waste recycling in 2014 are presented in

Figure 2 and **Figure 3.** All oily waste was tracked in accordance with *Protection of the Environment Operation (Waste) Regulation.*

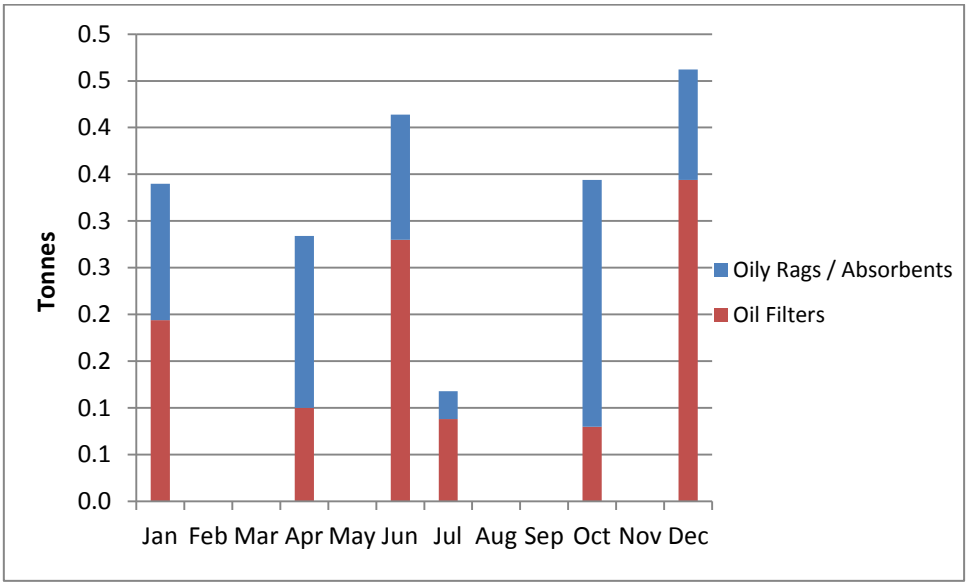


Figure 2 Packaged Oily Waste Recycling 2014

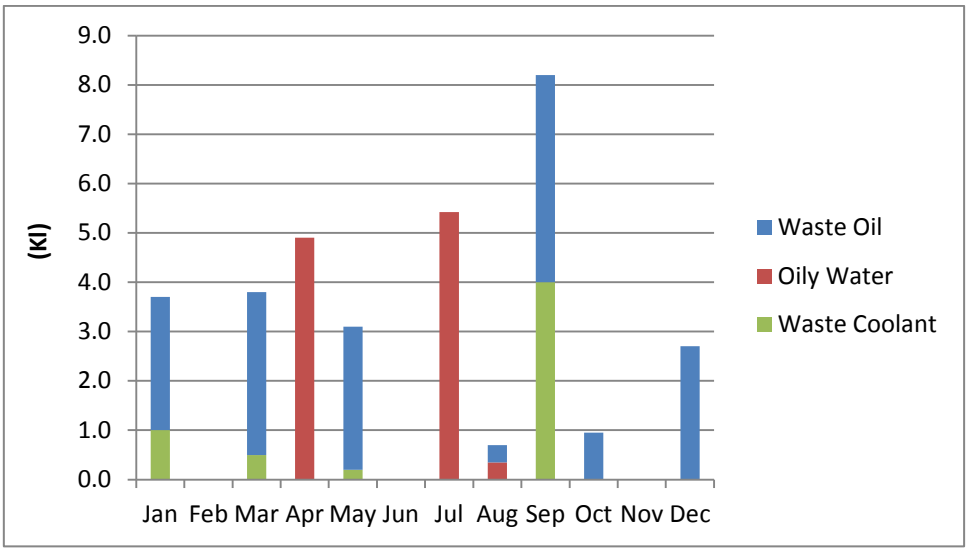


Figure 3 Liquid Oily Waste Recycling 2014

2.7 Product Stockpiles

Coal is delivered from the underground workings via a conveyor belt system, through the sizing plant and then feeds onto the ROM stockpile. The ROM stockpile area has a capacity of 300,000 tonnes. The eastern half of the ROM stockpile area contains an automatic understack coal reclaim system that can extract ROM coal from the stockpile and direct it to the train-loading bin. The western half of the ROM stockpile has an understack coal reclaim system which supplies coal to the CHPP as required. The washed/final product stockpile has a capacity of approximately 300,000 tonnes. This area is used for washed product and is also used for screened coal stockpiles. There were no changes to the management of product stockpiles during the reporting period.

2.8 Water Management

Water is managed at Clarence in accordance with the Clarence Colliery Water Management Plan, which was completed in consultation with relevant agencies and stakeholders. A schematic showing water flows around the Clarence site is attached in **Appendix 8**. Clarence reviewed the Water Management Plan during the reporting period. The review included updating the Plan in accordance with applications and approval conditions of the construction of REA VI. Clarence undertook specific changes to the water management system during the reporting period supporting continuous improvement. Changes made to the water management in 2014 are described throughout Section 2.8 below.

Clarence supplies water to the LCC through the water transfer scheme outlined in Section 2.8.6. Clarence continued to work with LCC during the reporting period.

2.8.1 Water Management Strategy Team

During the reporting period Clarence continued its Water Strategy Team established in 2012 to improve the Clarence Water Management System through a whole of mine approach. The team includes representatives from all departments and meet on a quarterly basis to identity, assess and schedule improvement projects. Significant improvements to the water management system were completed including:

- Continued monitoring of the quality and quantity of underground water and improved water accounting;
- Continued monitoring of the quality and quantity of surface water and improved water accounting;
- Commissioned the Primary Arrestor Slurry Pump;
- De silting of the Primary Arrestor;
- Optimisation and upgrades to the Clarence Mine Water Treatment Plan, including it's first major descaling in nearly 10 years;
- Completion of the Leachate Dam No. 2 upgrade to 10.3 ML;
- Descaling and upgrades to the water treatment plant to improve existing efficiencies;
- CHPP water recycling upgrades and commissioning; and
- Planning, design and construction of Leachate Dam 3 at the toe of REAVI. Water collected in LD3 connects into the existing leachate water management system.

Water Strategy Team Meetings will continue during the 2015 reporting period with focus on the following:

- Ongoing monitoring of surface and underground water quality and quantity;
- Continued improvements and optimisation of the Mine Water Treatment Plant;
- Improvements to underground water delivery and pumping systems; and
- Improvements to maintenance of Grit Trap and Pit Top water runoff management.

2.8.2 Water Supply and Use

Clarence is not connected to the Lithgow township potable water system. Water on site is captured in rain water tanks or treated mine water. Primary contact water is sourced from a number of treated water tanks located on the site. Site water usage and transfers is measured on a daily basis and the site water balance calibrated monthly. The consumption of process water (inclusive of water used in the mine, CHPP, WTP process water and for dust suppression) was 587ML in 2014. A breakdown of the total process water used in 2014 is outlined below in **Table 7**. Clarence has achieved significant water savings in 2014 through the continued implementation of the CHPP recycling project, developed ion 2013.

Table 7. Process Water Supply 2014

Area	Supply 2014 (ML)
Underground	170
CHPP	201

Other Surface (Pit Top, administration)	386
TOTAL	758

2.9 Groundwater Management

Clarence is licensed to dewater the mine for safety reasons under dewatering licences issued by the NSW Office of Water (NoW). The underground workings are dewatered via two boreholes on the northern extent of the surface infrastructure. Water is transported from the dewatering boreholes by an overland pipeline to the water treatment plant for treatment and release off site through Licensed Discharge Point 2.

The partial extraction technique used at Clarence ensures that impacts on the surrounding groundwater resources are minimised in accordance with Schedule 3, Condition 6, 9, 10 and 11 of DA 504-00, Clarence has developed a Groundwater Monitoring Program and Response Plan. This Plan forms part of the Site Water Management Plan and was developed in consultation with regulatory bodies including Lithgow City Council, Sydney Catchment Authority, Office of Environment and Heritage and the Department of Planning and Environment.

The objectives of this monitoring program are to monitor and manage any potential impacts resulting from operations at Clarence on both groundwater base flows and surface water flows in water bodies above the mine. These flows are critical to the protection of upland swamps and wetlands and supply a source of bore water to the residents of Clarence Village.

The program gathers baseline groundwater levels and quality data, develop groundwater impact assessment criteria, monitor the volume and quality of groundwater seeping into the underground mine workings and monitor regional groundwater levels in a number of geologic formations at the mine as follows:

I. Banks Wall Sandstone;
II. Burra-Moko Head Sandstone;
III. Caley Formation; and
IV. Katoomba Coal Seam.

Groundwater is also managed and monitored through the SMP process which includes risk assessment, performance monitoring and mitigation of residual risks.

2.9.1 Surface Water Management

Clarence surface water is managed in accordance with the site Water Management Plan (WMP) under DA 504-00. The WMP has been developed to meet the requirements of Development Consent DA504-00, specifically Conditions 5 to 11 of Schedule 3. The WMP describes the systems in place to manage surface and underground water associated with the mining activities at Clarence Colliery.

The principle objectives of the WMP include:

- Separation of clean, dirty and leachate water
- Capture and treatment of dirty and leachate water to ensure compliance with Clarence's Environmental Protection Licence
- Appropriate sediment control are maintained

The WMP also describes the monitoring program to measure the performance of the water management system and applies to all operations at Clarence Colliery. Run-off is collected within various dirty water and clean water management structures. A schematic of surface water is provided in **Appendix 8**.

All surface water runoff (excluding reject emplacement areas) is collected in the Polishing Lagoon prior to release off site through Licensed Discharge Point 2. Dirty water is settled in a series of structures including the Grit Trap, Primary Arrestor and "B" Thickener prior to release to the Polishing Lagoon. Runoff and leachate water from reject emplacement areas is collected in either Leachate No.1 Dam, Leachate No.2 Dam or Leachate No. 3 Dam. Leachate water is transferred to the underground water storage for mixing with underground mine water.

All water in the underground water storage (collected from mine water make and leachate water) is pumped through the 79 c/t and 82 c/t dewatering pumps to the Water Treatment Plant where the water is treated before being discharged through Licensed Discharge Point 2. The Water Treatment

Plant was designed specifically to remove manganese and iron from raw water. Details on the Water Treatment Plant are provided in **Section 2.8.5**.

2.9.2 Clarence Colliery Water Treatment Plant

The Clarence water treatment plant treats mine water through aeration, chemical dosing and dissolved air flotation (DAF).
The treatment plant operates primarily to reduce filterable manganese and iron levels in the water. Levels of manganese and iron are not process additives but are found naturally occurring in local groundwater and streams.
After recovery from the underground mine workings, raw mine water (along with leachate water) is directed into an aeration tank where lime and potassium permanganate are added immediately prior to aeration to raise the pH of the water and oxidise dissolved metals. This has the effect of precipitating iron and manganese. A surfactant and polymer are added for the coagulation/flocculation process on the way to the flocculation tank.
Water leaves the flocculation tank and enters the DAF tank. As the water enters the DAF tank, the flocculants are carried to the surface by small bubbles of air and forms a sludge blanket. The sludge blanket is automatically swept into a sludge tank/hopper that is located internally within the DAF. Sludge is then pumped to a drying pond within the Reject Emplacement Area. The treated water is then adjusted for pH with sulphuric acid and released off site through LD2.
Continued capital upgrades occurred during the reporting period including:

- Replacement of Permanganate Dosing Pumps;
- Replacement of Recycle Pumps;
- Complete shut down and clean out of tanks, mixing blades and pipework to remove scale build up;
- Replacement of some pipework to improve access for ongoing maintenance works;
- Optimisation of the Recycle and Saturation System to increase flotation of precipitated Iron and Manganese and
- Improved Maintenance Systems

Table 8. Stored Water

	Volumes held (ML)		
	Start of Reporting Period	End of Reporting Period	Storage Capacity
Clean Water	n/a	n/a	n/a
Polishing Lagoon	16.7	16.7	16.7
Main Dam	70.0	70.0	70.0
Processed Water Tank (1)	1.5	2	4.5
Dirty Water	n/a	n/a	n/a
Grit Trap	0.5	0.5	1.0
Settling Pond	3.2	3.2	3.2
Leachate Dam 1	1.0	1.0	3.0
Leachate Dam 2	<0.5	<0.5	10.0
Leachate Dam 3	n/a	<0.5	9.4
Primary Arrestor	<0.5	<0.5	3.0
A Thickener	1.8	1.8	1.8
B Thickener	1.8	1.8	1.8

2.9.3 Clarence Water Transfer Scheme

Clarence has an agreement with Lithgow City Council (LCC) to provide water from the Main Dam to supplement Lithgow's water supply. LCC pump water from the Main Dam at Clarence to a designated LCC tank following provision of water for the Colliery. LCC manage the pumping of water from the tank to settlement ponds on the Newnes Plateau which transfer water into the Lithgow No. 2 Dam (Farmers Creek Dam) under a Surface Authority held by LCC.

Throughout 2014, the LCC and Clarence Colliery worked very closely together to increase the capacity of the LCC Clarence Water Transfer Scheme. The completed upgrade allows for an increase in the supply of water from the Clarence Colliery to Farmers Creek Dam from 5 megalitres per day (ML/d) to 14 ML/d. The primary objective of the project is to drought proof Lithgow's water supply. The Commonwealth Government provided the funding for the upgrade which included:

- A new pump station at Clarence's Main Dam
- New pipework across the Clarence pit top to the existing LCC pumping station located on land owned by Clarence Colliery
- Upgrade to the pumping infrastructure within the LCC pumping station
- New pipework across the Newnes Plateau directly to the Lithgow No. 2 Dam

The upgraded system was commissioned in August 2014. The LCC Mayor, Councillor Maree Stratham stated in a LCC Media Release regarding the project:

> *"Huge support has also come from Centennial Coal who has been generous enough to allow Council to use its site and which has also provided valuable assistance in developing the project. Centennial has truly been a wonderful corporate citizen in this project."*

2.10 Hazardous Material Management

The Dangerous Goods Licence 35/020999 was renewed on 15th May 2014. The licence covered two above ground self-bunded diesel tanks and an above ground sulfuric acid tank. Clarence Colliery has implemented a Dangerous Goods and Hazardous Substances Management Plan. The primary objectives of this management plan include but are not limited to:

- Application of a suitable risk management process to identify hazards/risks and establish the appropriate controls;
- Establishing standards, procedures and the appropriate information and communication protocols;
- Ensuring as far as reasonably practicable that person(s) are sufficiently aware of their authority and responsibility;
- Providing means for induction and ongoing training for matters related to this management plan;
- Establishing a structured process for the identification, monitoring, assessment and control of changes associated to this management plan;
- Providing an effective measurement and monitoring process of the control measures including determination of compliance through audit and review; and
- Comply with the provisions of the operations Health and Safety Management System and relevant legislation, as a minimum.

This Hazardous Substances and Dangerous Goods Management Plan provides practical guidance for the purchase, storage, use, handling and disposal of Hazardous Substances at Clarence Colliery.

3. Environmental Management and Performance

This section summarises environmental management throughout the 2014 reporting period at Clarence Colliery. A plan of environmental monitoring locations is located in **Appendix 1.**

3.1 Environmental Protection Licence

Clarence is licenced by the EPA under the *Protection of the Environment Operations Act 1997* with EPL. 726. The licence was reviewed during the reporting period and a variation issued. The variation included decreasing the lower pH limit from 6.5 to 6, as well as decreasing the zinc limit from 2.5 to 1.5 mg/L. Following the completion of a successful Pollution Reduction Program in 2013, the licence also includes a heavy rainfall condition that waves stipulated concentration limits during a 5 day 95th percentile rainfall event. A copy of the latest licence can be found in **Appendix 11**.
Clarence is required to complete an Annual Return detailing compliance against EPL 726 conditions for the reporting period.

3.2 Meteorological Data

Meteorological data is obtained from the Clarence Colliery meteorological station. The station was installed in accordance with *Approved Methods for Sampling of Air Pollutants in New South Wales (DECCW 2007)* during 2010 and was serviced and calibrated in 2014. The meteorological station is calibrated every six months. Climate data is presented below.

3.2.1 Temperature

The temperatures throughout the reporting period ranged from a minimum average of 6.0^{o}C in the month of July to a maximum average temperature of 18.8^{o}C in January. Monthly average temperatures for 2014 are displayed below in **Table 9**.

Table 9. Average Temperature

Month	Average Temperature (˚C)
January	18.8
February	17.3
March	15.5
April	12.3
May	10.2
June	7.2
July	6.0
August	6.2
September	9.6
October	14.2
November	16.9
December	17.1

3.2.2 Rainfall

The monthly rainfall fluctuates throughout the year, with the highest rainfall occurring in December and the minimum occurring in May. Total annual rainfall for 2014 was 904.2mm compared with 892.8 mm in 2013 (**Table 10**).

Table 10. Monthly Rainfall Recorded at Clarence

Month	Rainfall (mm) Clarence Meteorological Station
January	36
February	83.2
March	175.2
April	63.4
May	11.4
June	49.6
July	25.8
August	99.2
September	47.4
October	71.4
November	48.0
December	194.4
Total	904.2

3.2.3 Wind Speed and Direction

The wind direction during 2014 was predominantly south-westerly. Average wind speed was 6.7km/h. The maximum wind speed at Clarence was 46.9km/h in July. Wind speed data is presented in **Figure 4.**

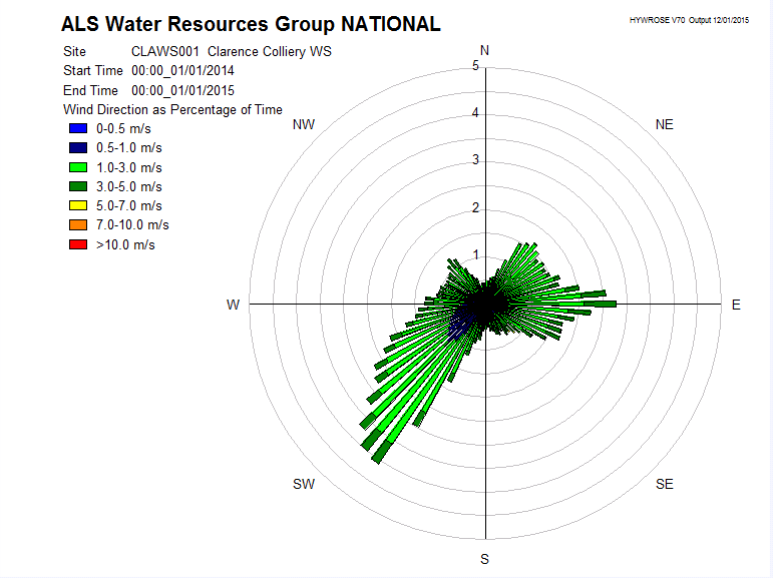


Figure 4 Yearly Windrose Plot 2014

3.3 Air Quality

Air quality in the locality surrounding Clarence Colliery is influenced by emissions generated by a range of sources including the existing operations, nearby extractive industries, vehicular traffic and regional emissions from more distant sources.

The primary components of Clarence Colliery which contribute air emissions include surface infrastructure such as the bathhouse and administration buildings, Water Treatment Plant, store warehouse, diesel refuelling station and storage shed, machinery washdown bay and workshop, stockpiles, equipment and materials storage areas.

On-site dust monitoring is undertaken at three locations around the periphery of the mine and a weather station is located near the administration building.

Deposited matter is measured monthly at the three locations using standing dust deposition gauges and records average dust deposition rates. This includes the contribution from Clarence Colliery together with background dust levels from surrounding extractive industries and regional sources.
Clarence Development Consent (DA 504-00) details the air quality criteria that are to be met by operational activities at Clarence Colliery. Clarence Environmental Air Quality Monitoring Program outlines how this is to be achieved by the operation.

Depositional dust gauges are collected on a monthly basis. Samples are analysed for insoluble solids with results reported in grams per square metre per month (g/m2/month). The depositional dust limit stated in the Development Consent is 4g/m2/month on an annual average basis. This criterion is also outlined in the Environmental Air Quality Monitoring Program.

Monitoring for PM_{10} (Particulate Matter less than 10 micrometres in size) and TSP (Total Suspended Particulates) was also undertaken during the reporting period.

Clarence Colliery operates in accordance with an Air Quality Management Plan which includes the use of a number of emission controls to minimise the impact of the operations on nearby sensitive receivers. This includes the use of water sprays within the coal handling areas, product stockpiles, reject emplacements and haul roads.

The Clarence Air Quality Management Plan was reviewed in July of the reporting period, following the completion of the Air Quality Impact Assessment for DA 504-00 MOD 3. A review of the Air Quality Management Plan occurs in the first quarter of each year during the preparation of the Clarence Colliery AEMR and the Annual Return for Environment Protection Licence No.726.

3.3.1 Dust Performance Against Environmental Impact Statement Prediction

The Environmental Assessment (2013) concluded that the proposed development, including the alternate truck routes and REA VI operation, would have no additional impact on air quality. No impact has been observed from the operation of Clarence Colliery. Annual average insoluble solids were below $4g/m^2$/month for all depositional dust gauges during 2014. Monitoring for TSP and PM_{10} also showed results well below the Development Consent criteria during 2014.

3.3.2 Review of Dust Monitoring Results

Air Quality is monitored at three locations around the perimeter of the site. The location of the monitoring sites is shown in **Appendix 4**. The locations of the air quality monitoring sites are:

1. Adjacent to the nearest residence, south of the Pit Top (TSP, PM_{10} and depositional Dust Gauge (DG) 1);
2. To the north of the Pit Top (DG2); and
3. On the entrance road to the south-west of the Pit Top (DG3).

3.3.2.1 Depositional Dust Gauges 1,2 and 3

Dust monitoring data indicated that monthly dust deposition results for 2014 ranged from below the detection limit to 0.1 g/m^2/month at DG 1 and DG 2 up to 2.4 g/m^2/month at DG 3. Depositional dust gauge results for 2014 are shown in **Figure 5**. The results are all below the annual average air quality criteria of 4 g/m^2/month.

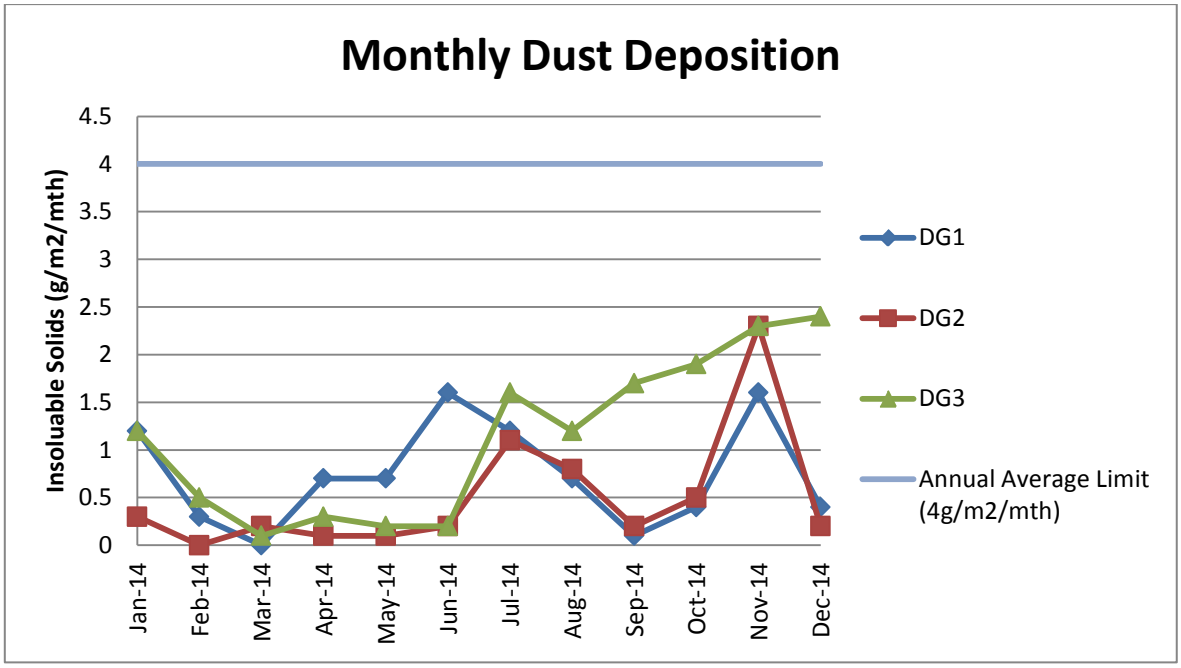


Figure 5 Depositional Dust Gauges 1, 2 and 3

3.3.2.2 TSP/PM_{10}

Monitoring for PM_{10} and TSP occurred during the reporting period generally as required under the Clarence Development Consent and the Environmental Air Quality Monitoring Program. Three of the twelve required daily PM_{10} averages were unable to be reported due to technical and calibration issues with the E-Sampler. As the nine recorded daily averages are well below the daily and annual PM_{10} limits, no further action was taken.

No exceedances were recorded during the reporting period for measured maximum 24 hour average PM_{10} concentrations (criteria limit of 50 µg/m^3) or the average annual TSP (90 µg/m^3). The location of the TSP and PM_{10} monitoring site is identified on the Clarence Colliery Pit Top Monitoring Locations figure, located in the document titled Environmental Monitoring Program under the Management Plans section of the Clarence Colliery area of the Centennial website. TSP and PM_{10} monitoring is required to take place two times per year with each sample taken on every 6th day for a period of a month.
The results of the monitoring program are displayed in **Figure 6**, **Figure 7**, **Figure 8** and **Figure 9**.

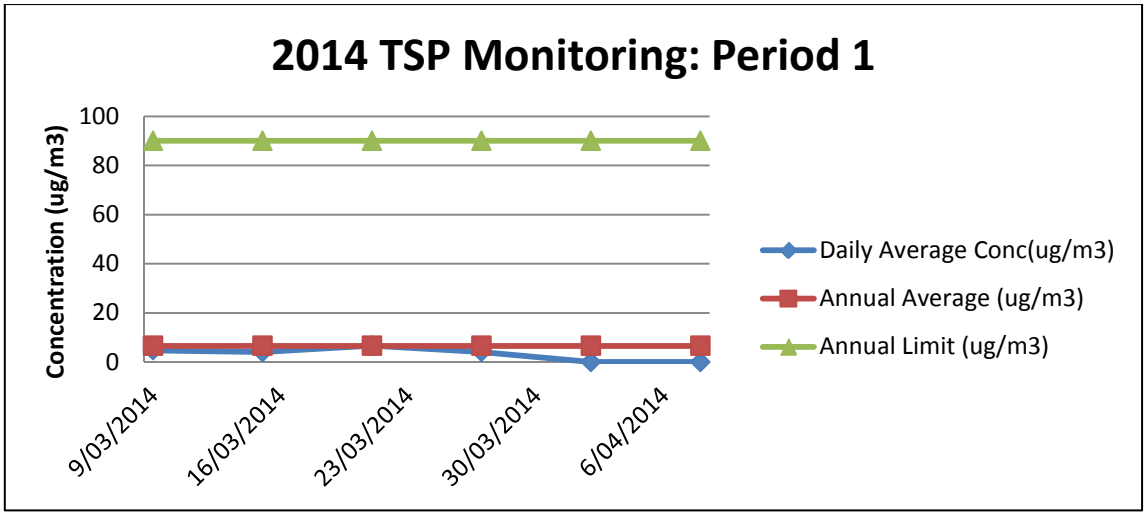


Figure 6 TSP Monitoring 2014 (1st Period)

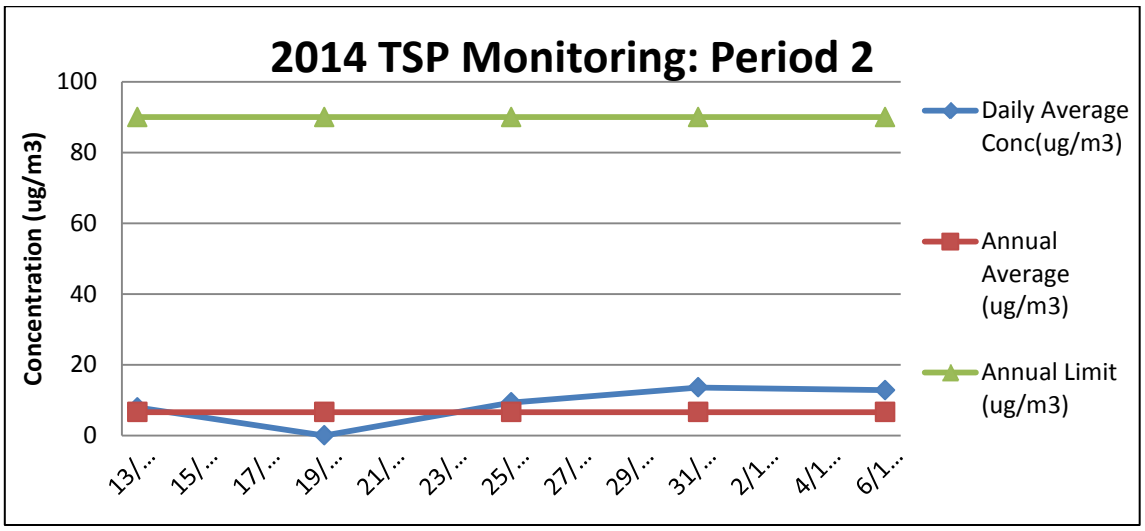


Figure 7 TSP Monitoring 2014 (2nd Period)

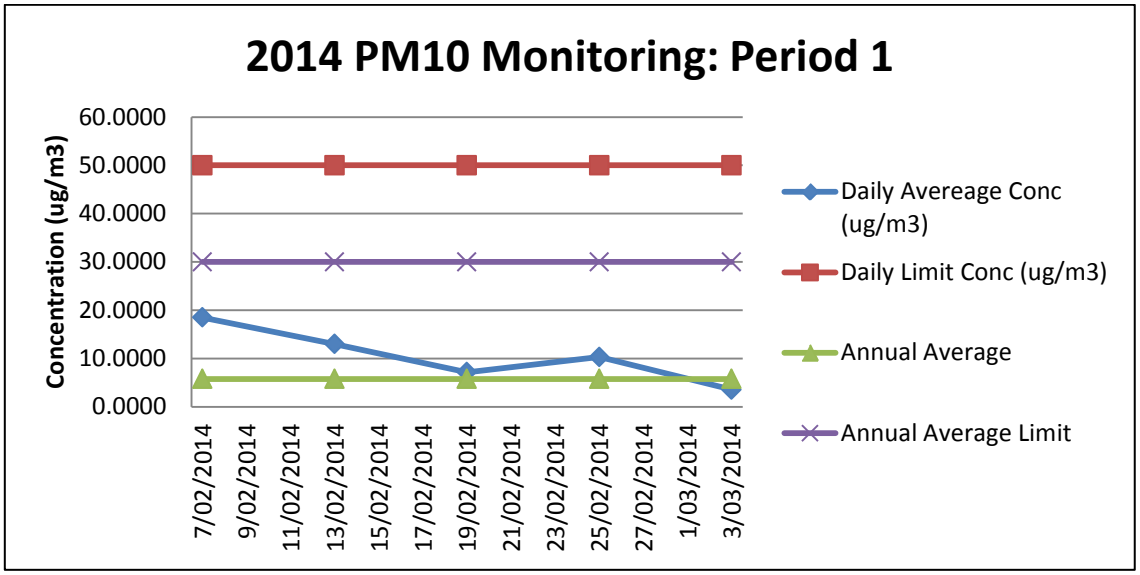


Figure 8 PM10 Monitoring 2014 (1st Period)

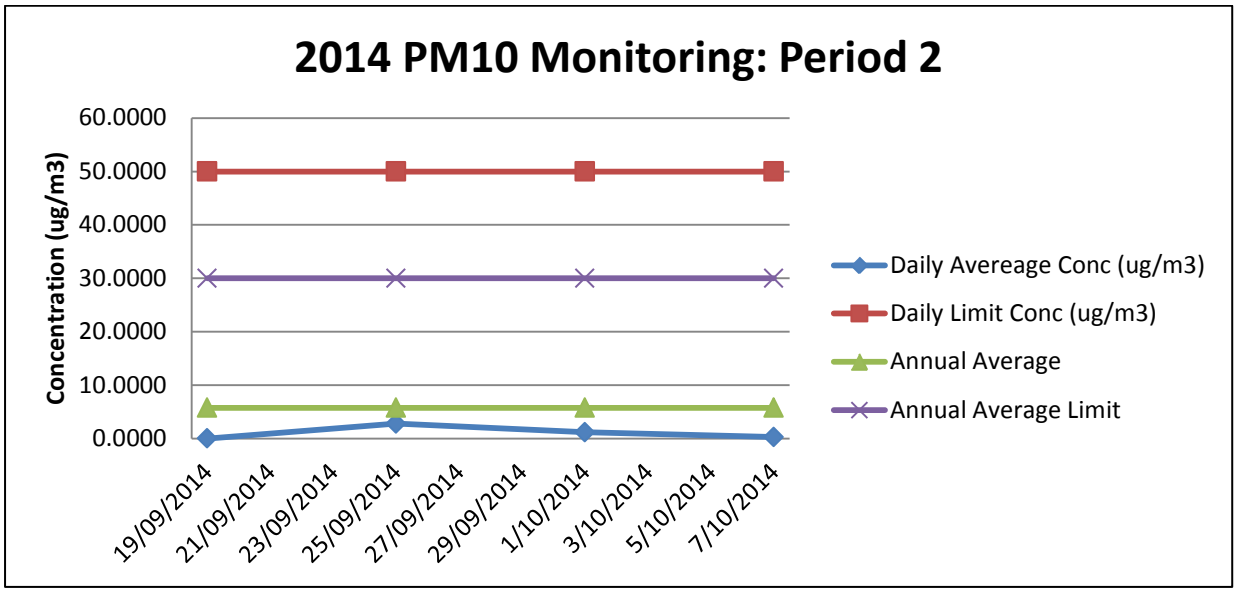


Figure 9 PM10 Monitoring 2014 (2nd Period)

3.3.3 Dust BMP Determination

In 2011, the EPA required through a Pollution Reduction Program, that Clarence Colliery provide a report which examines in detail the potential measures which could be employed to further reduce particulate emissions from the mine. This is part of a larger program which aims to reduce particulate emissions from the coal mining industry as a whole in NSW.
Clarence completed the Dust Best Practice Particulate Determination and submitted to the EPA on the 28th September 2012. In accordance with the commitments made in the BMP, Clarence Colliery continued the following actions during the reporting period:

- Watering of stockpile pads (no chemical suppressants);
- Continued water cart use on surface and implementation of water delivery infrastructure
- Further developed dust mitigation controls on REAIII and the newly rehabilitated REAIV and IVa.

3.4 Erosion and Sediment Management

The Erosion and Sediment Control Plan was reviewed as a part of the Revised Water Management Plan during the reporting period.

There are three areas of potential soil erosion and sediment transport within the Clarence Colliery lease area:

- Pit Top Surface Facilities (e.g. stockpile areas, conveyor belts, lay down areas, Reject Emplacement Area);
- Underground Workings; and
- Surface areas potentially affected by subsidence (areas above mine workings).

The greatest potential for erosion and sediment transport from disturbed areas comes from coal distribution and stockpiling.
The soils at Clarence have a moderate to high erosion potential due to their sandy nature and occurrence on moderate to steep slopes. Several types of erosion control measures have been implemented on the site with the aim of preventing soil erosion and the entry of sediments into the surrounding water bodies. The existing surface water management system includes a series of clean water diversion channels, sediment control structures and water treatment facilities. Erosion control measures are described below.

3.4.1 Drainage Channels

Drains are constructed with either a parabolic or trapezoidal cross section to minimise erosion. Where possible, channels have been constructed with an adjacent earth bank or in some cases have been completely concrete lined.
Flow channels in soil materials are limited to 0.5% gradient and where steeper gradients are unavoidable, concrete weirs, gabion weirs, concrete pipes and run-off control channels are installed to control the water flow.
All channels are inspected monthly during the environmental inspection. Maintenance is then initiated as required to repair damage caused by scour, sediment deposition or channel obstruction.
A clean water by-pass channel allows water from upstream of the site to pass through without coming into contact with disturbed areas. This reduces the quantity of water that has potential to cause erosion and require treatment.
All water emanating from disturbed areas flow through collection pipes/drains/channels to a number of sediment control structures.

3.4.2 Sediment Basins

Several sediment basins have been constructed within the dirty water system. The sediment control basins have been designed and located to contain dirty water from disturbed areas on site. The primary purpose of these basins is to contain sediment from normal rainfall events as well as reduce flow velocity during high rainfall events.
There are several sediment control structures on site. These include:

- Conveyor Sediment Traps;
- Pit top grit trap;
- Primary Arrestor and B Thickener;
- Polishing Lagoon;
- Leachate Dams; and
- Underground Settling Ponds.

These structures are regularly maintained and cleaned out once the capacity has reduced by approximately thirty percent. The structures are inspected after major rainfall events and any erosion of the spillway is remediated.
During the reporting period, construction on Leachate Dam No. 2 was completed, which increased the capacity from 3ML to 10ML, allowing retention of leachate and water runoff of a 1:50 year storm. Leachate Dam No. 3 was also completed during the reporting period, providing 9ML of leachate and runoff storage at the base of the newly constructed and now operational REA VI.

3.4.3 Maintenance

The Grit Trap and Primary Arrestor are checked for sediment on a twice weekly basis or following rainfall. All other sediment control structures and drainage lines are checked monthly or following rainfall. Sediment control structures are cleaned out when their capacity is reduced by 30% including the pit top grit trap and primary arrestor. Material is placed in the REA as either waste or where coal content is sufficiently high mixed with product. Channels are inspected on a monthly basis for blockage, scour, sediment deposition or channel obstruction. Repairs are initiated as required.
During the reporting period, the Primary Arrestor Slurry Pump was commissioned, enabling sediment to be directly pumped out of the Primary Arrestor in the form of a slurry to REA III settling pond. The implementation of this Slurry Pump has reduced the required maintenance effort on the Primary Arrestor and ensures that maximum capacity can be maintained at times of heavy rainfall.

3.5 Surface Water Quality

The Water Management Plan required under DA 504-00 was prepared in consultation with relevant government agencies and originally approved by the then Department of Planning on the 25th July 2007. The latest version was submitted to the regulators for review in 2014. No comments have been received on this reviewed document. The Environmental Impact Statement (2000) identified the process of water extraction from the underground treatment in the water treatment plant and discharge through LD2 as the main potential impact.

3.5.1 Monitoring and Performance Criteria

Clarence monitors surface water discharge from its licenced discharge points according to the conditions set out in EPL 726. The criteria for discharge water quality are outlined in Error! Reference source not found.**.** A copy of EPL 726 is available in **Appendix 11**.

Table 11. Environment Protection Licence Concentration Limits

Parameter	EPA Licence Limit
pH	6.0-8.5
Total Suspended Solids (mg/L)	30
Oil and Grease (mg/L	10
Arsenic (mg/L)	0.01
Boron (mg/L)	0.1
Cadmium (mg/L)	0.001
Chloride (mg/L)	25
Chromium VI (mg/L)	0.01
Copper (mg/L)	0.02
Filterable Iron (mg/L)	0.3
Filterable Manganese (mg/L)	0.5
Fluoride (mg/L)	1
Lead (mg/L)	0.005
Mercury (mg/L)	0.001
Selenium (mg/L)	0.01
Silver (mg/L)	0.001
Sulfate (mg/L)	250
Zinc (mg/L)	1.5

3.5.2 Results

Parameters required to be monitored by EPL 726 (**Table 11**) are provided in Sub Sections 3.5.2.1 – 3.5.2.18.

* Note that all results less than the detection limit are shown as zero in the graphs.

3.5.2.1 pH

pH results at LDP2 during the reporting period were within the 6 – 8.5 EPA licence limit (**Figure 10**).

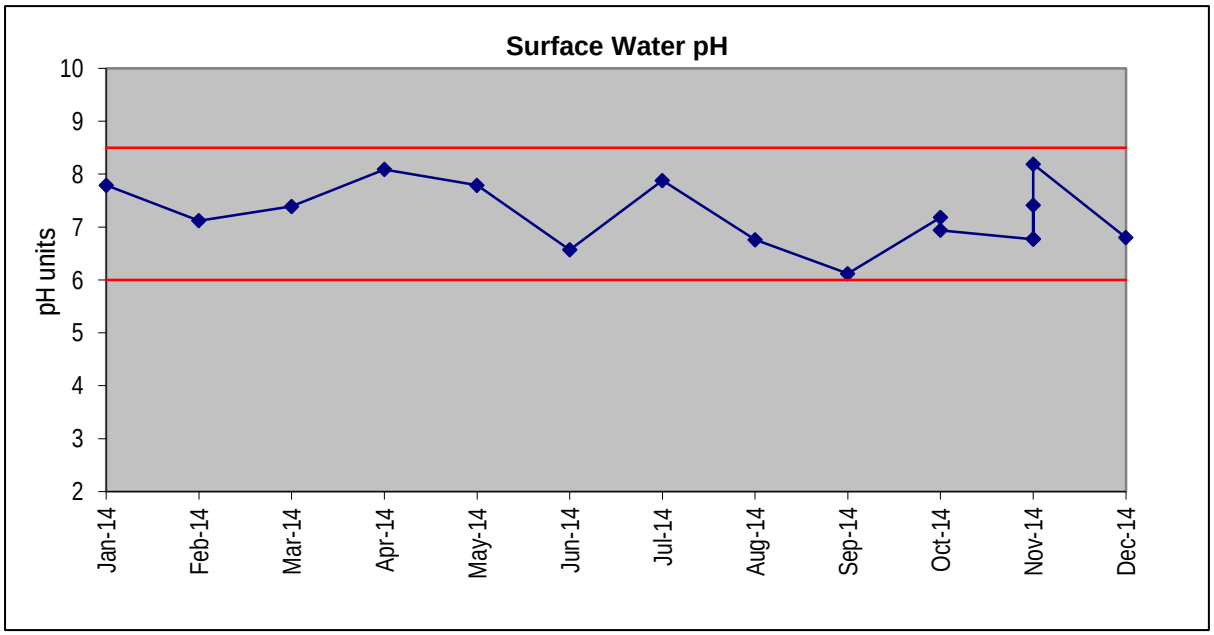


Figure 10 pH 2014 Monitoring Results for LDP2

3.5.2.2 Total Suspended Solids

TSS results at LDP2 during the reporting period were below the 30 mg/L EPA licence limit (**Figure 11**).

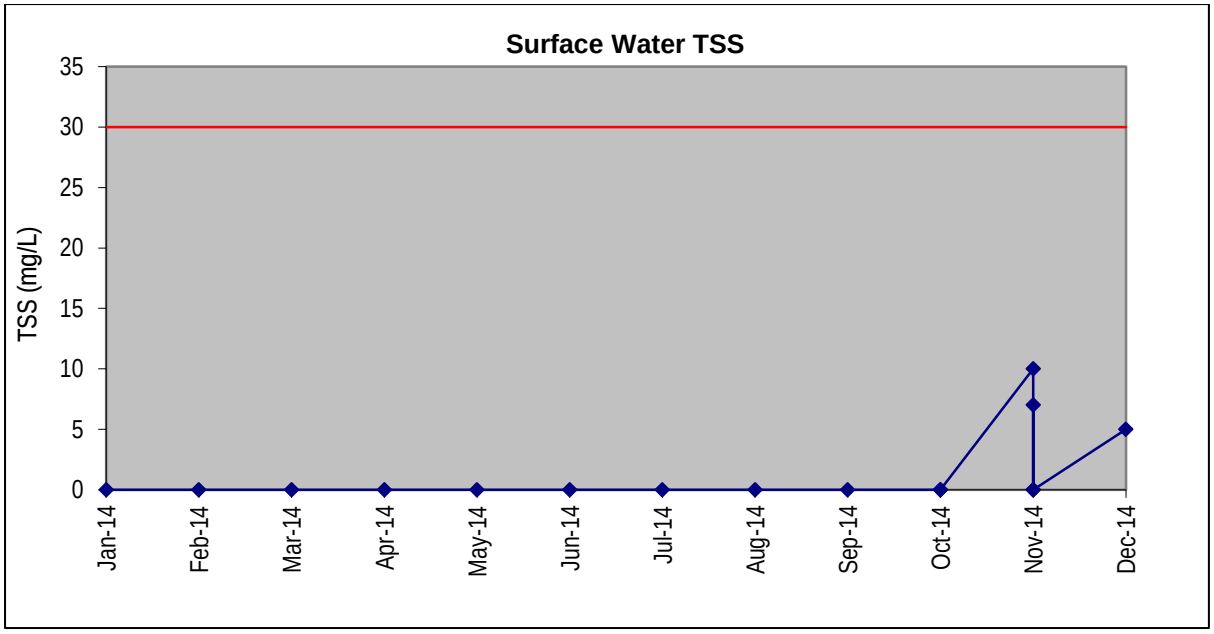


Figure 11 TSS 2014 Monitoring Results for LDP2

3.5.2.3 Oil and Grease

Oil and Grease results at LDP2 during the reporting were below the 10 mg/L EPA licence limit (**Figure 12**).

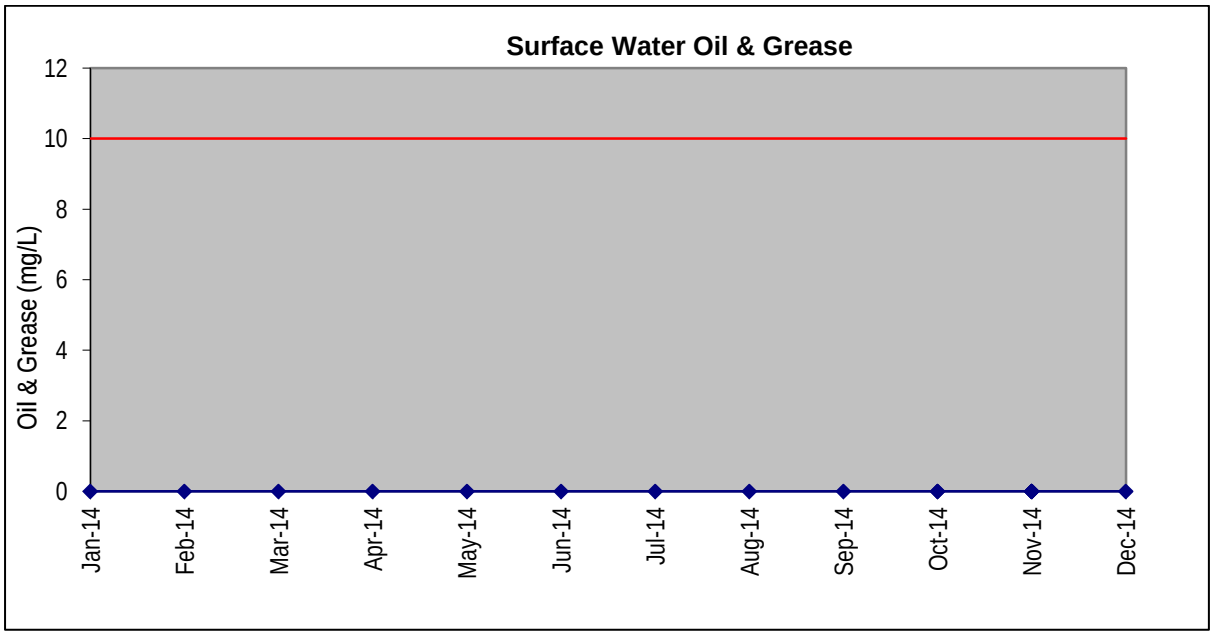


Figure 12 Oil and Grease 2014 Monitoring Results for LDP2

3.5.2.4 Filterable Manganese

Filterable Manganese results at LDP2 during the reporting we below the 0.500 mg/L EPA licence limit (**Figure 13**).

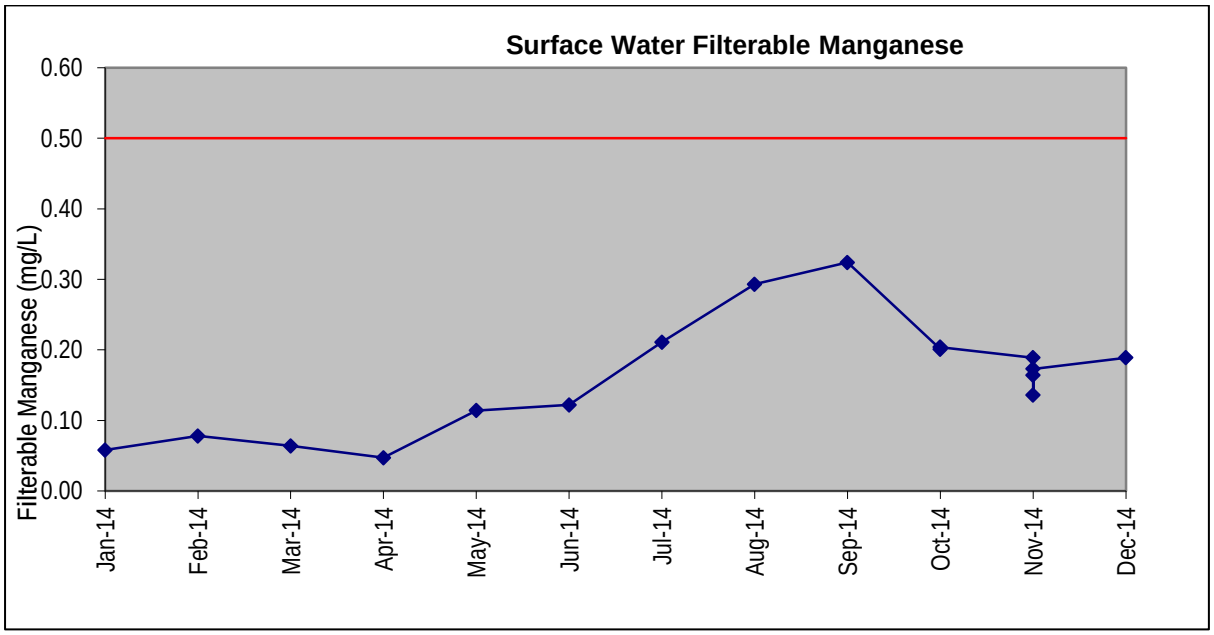


Figure 13 Filterable Manganese 2014 Monitoring Results

3.5.2.5 Total Arsenic

Total Arsenic results at LDP2 during the reporting period were below the 0.500 mg/L EPA licence limit (**Figure 14**).

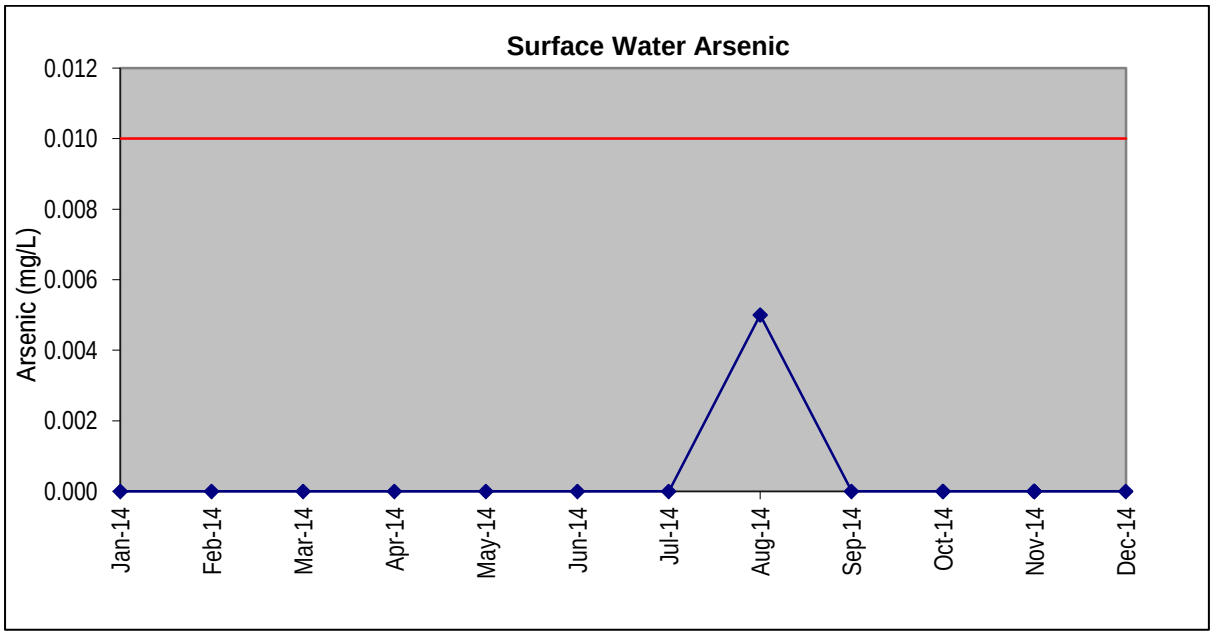


Figure 14 Total Arsenic 2014 Monitoring Results

3.5.2.6 Total Boron

Total Boron results at LD2 during the reporting period were below the 0.1 mg/L EPA licence limit (**Figure 15**).

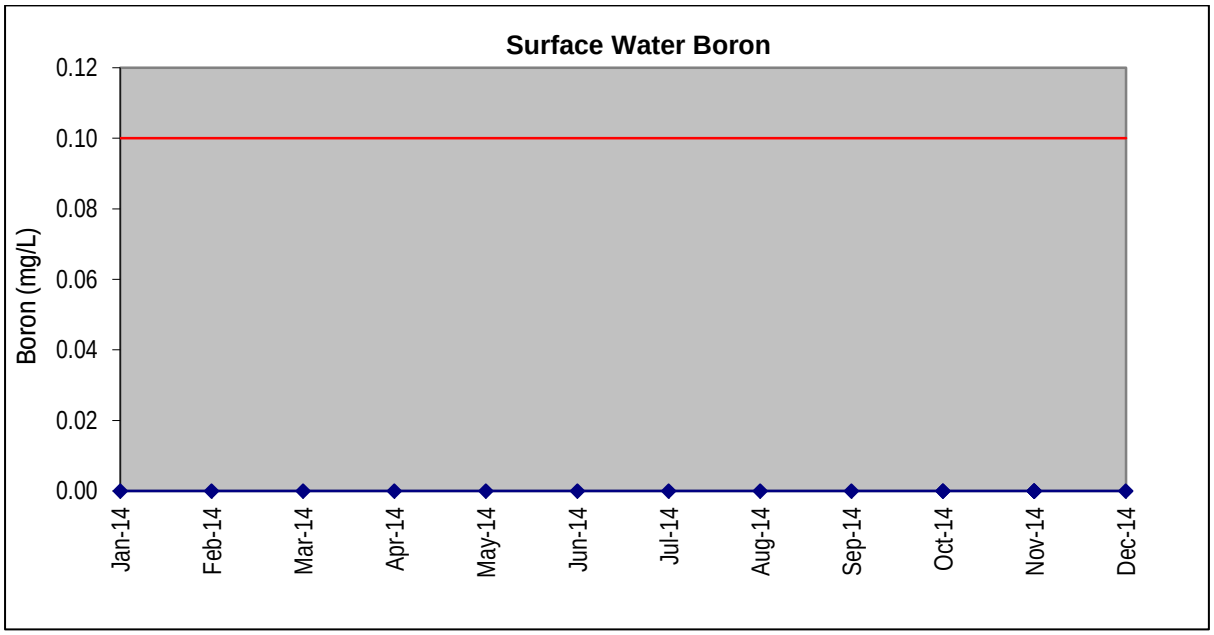


Figure 15 Total Boron 2014 Monitoring Results

3.5.2.7 Total Cadmium

Total Cadmium results at LD2 during the reporting period were below the 0.0001 mg/L EPA licence limit (**Figure 16**).

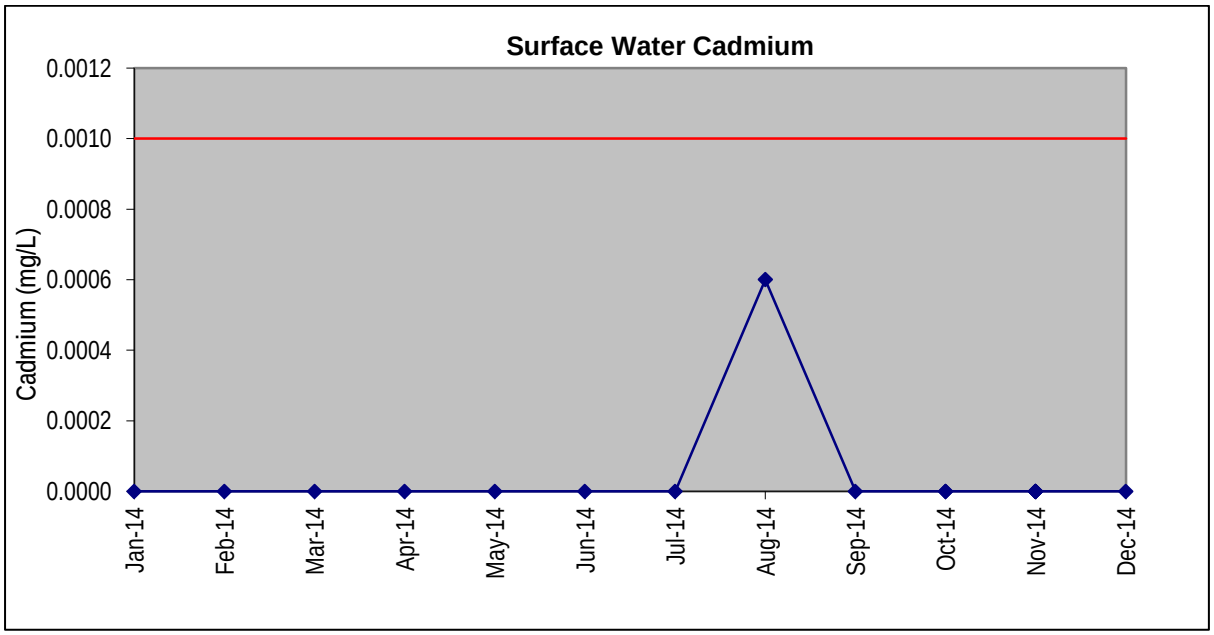


Figure 16 Total Cadmium 2014 Monitoring Results

3.5.2.8 Total Chloride

Total Chloride results at LD2 during the reporting period were below the 25 mg/L EPA licence limit (**Figure 17**).

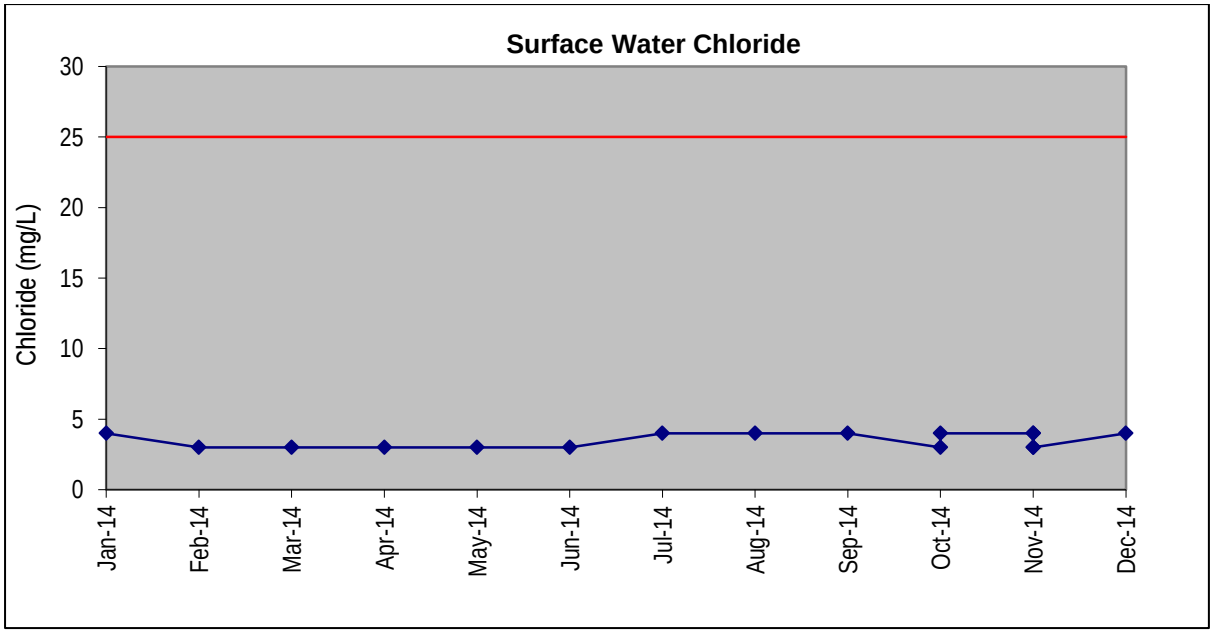


Figure 17 Total Chloride 2014 Monitoring Results

3.5.2.9 Total Chromium (Hexavalent)

Total Chromium (Hexavalent) results at LD2 during the reporting period were below the 0.01 mg/L EPA licence limit (**Figure 18**).

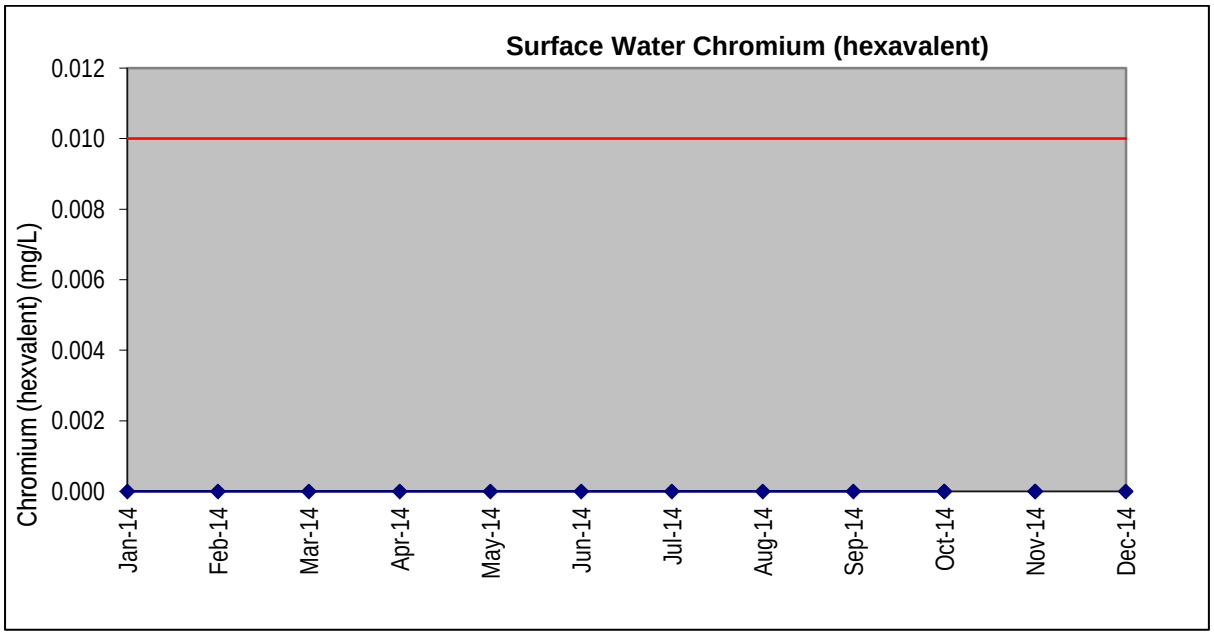


Figure 18 Total Chromium (Hexavalent) 2014 Monitoring Results

3.5.2.10 Total Copper

Total Copper results at LD2 during the reporting period were below the 0.02 mg/L EPA licence limit (**Figure 19**).

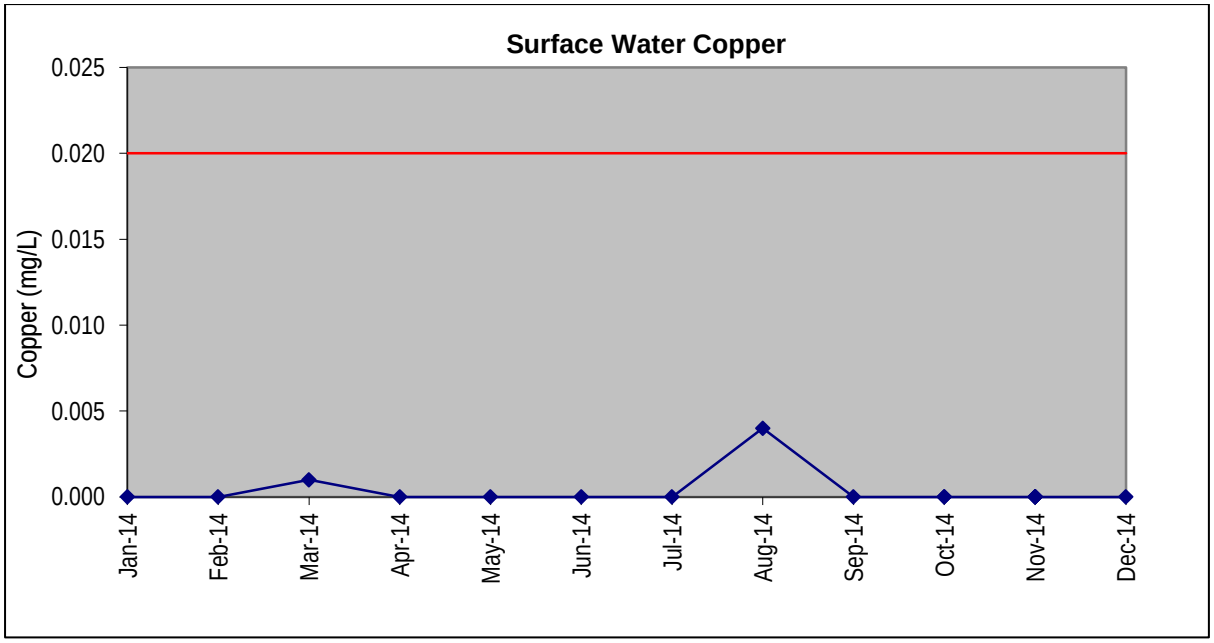


Figure 19 Total Copper 2014 Monitoring Results

3.5.2.11 Filterable Iron

Filterable Iron results at LD2 during the reporting period were below the 0.3 mg/L EPA licence limit (**Figure 20**).

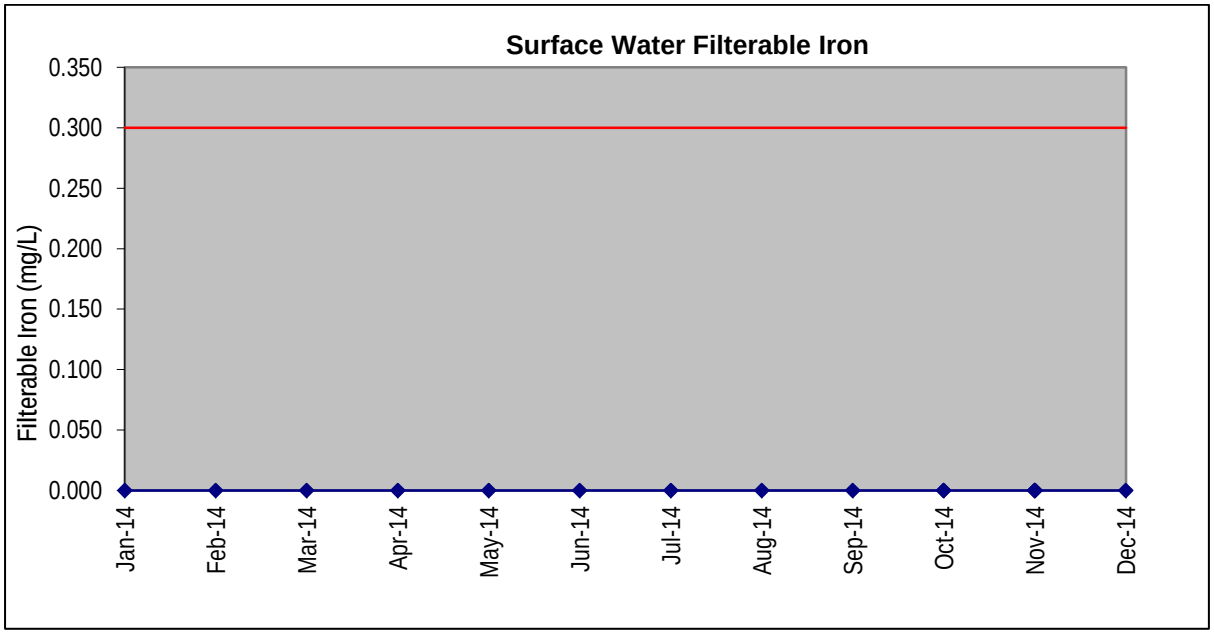


Figure 20 Filterable Iron 2014 Monitoring Results

3.5.2.12 Total Fluoride

Total Fluoride results at LD2 during the reporting period were below the 1 mg/L EPA licence limit (**Figure 21**).

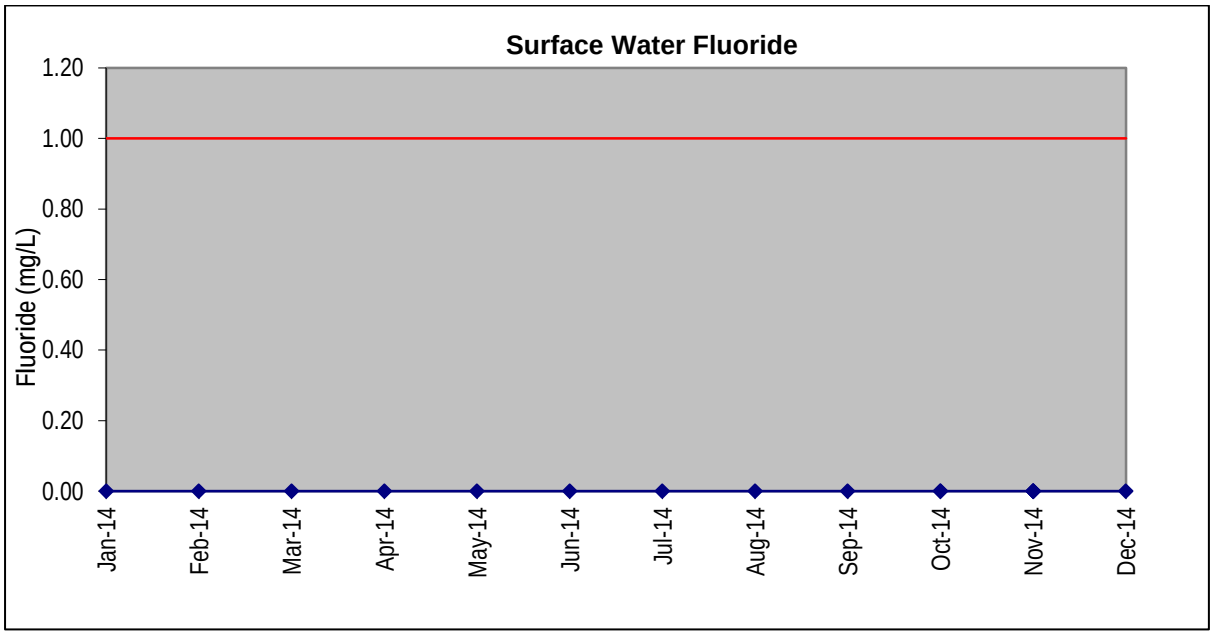


Figure 21 Total Fluoride 2014 Monitoring Results

3.5.2.13 Total Lead

Total Lead results at LD2 during the reporting period were below the 0.005 mg/L EPA licence limit (**Figure 22**).

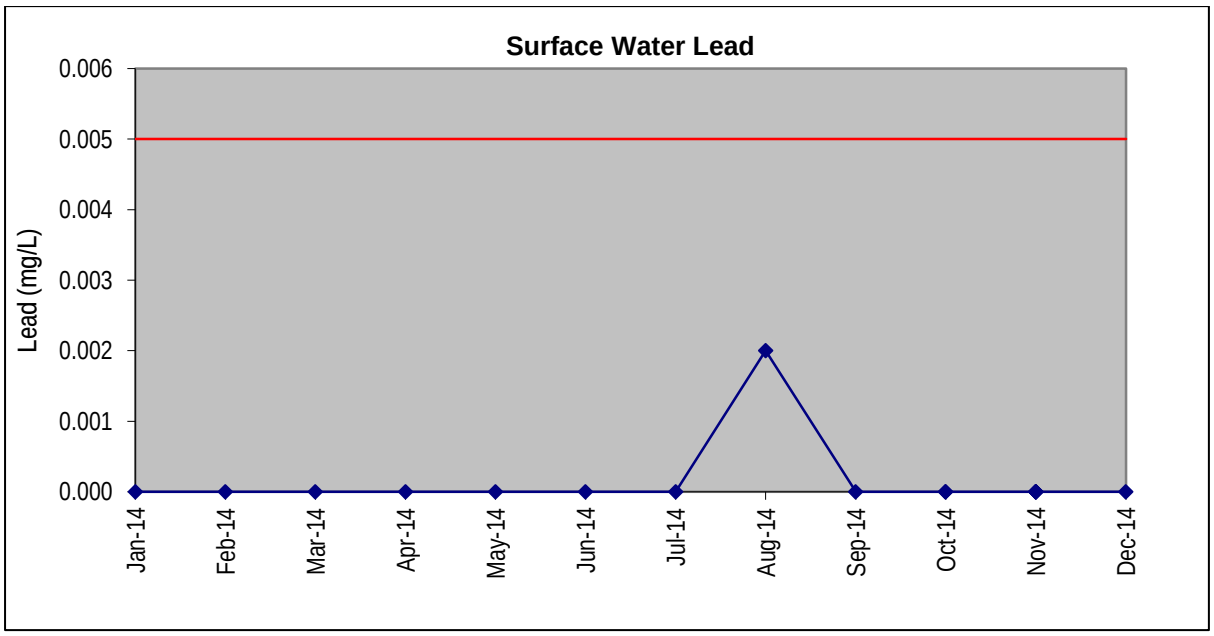


Figure 22 Lead 2014 Monitoring Results

3.5.2.14 Total Mercury

Total Mercury results at LD2 during the reporting period were below the 0.0001 mg/L EPA licence limit (**Figure 23**).

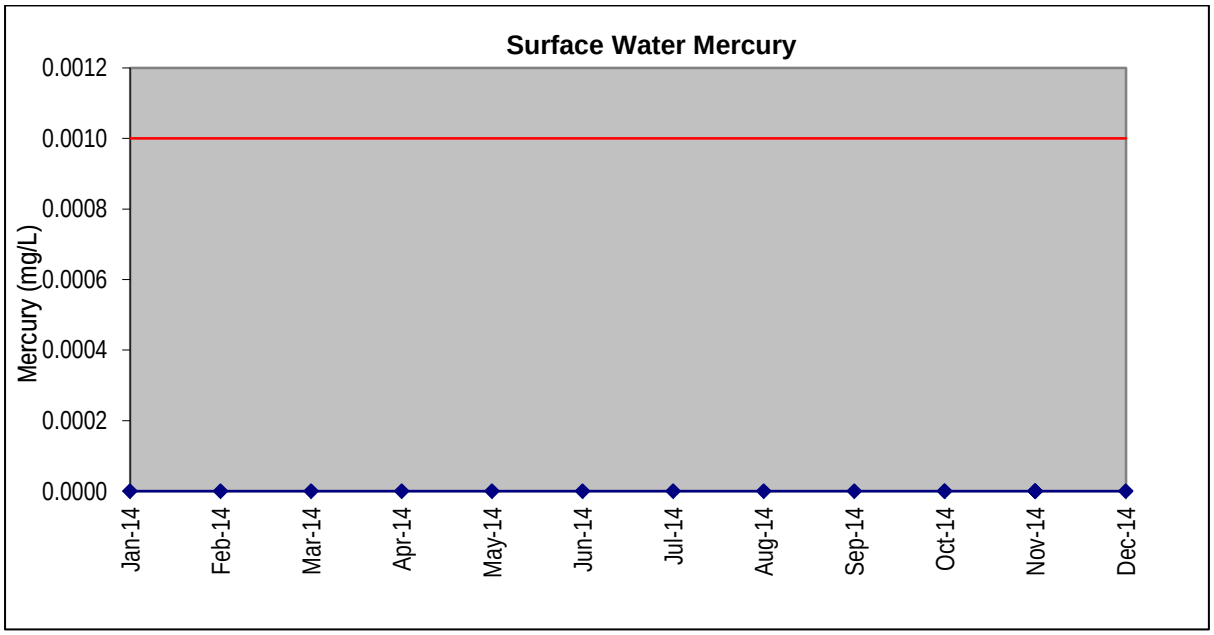


Figure 23 Total Mercury 2014 Monitoring Results

3.5.2.15 Total Selenium

Total Selenium results at LD2 during the reporting period were below the 0.01 mg/L EPA licence limit (**Figure 24**).

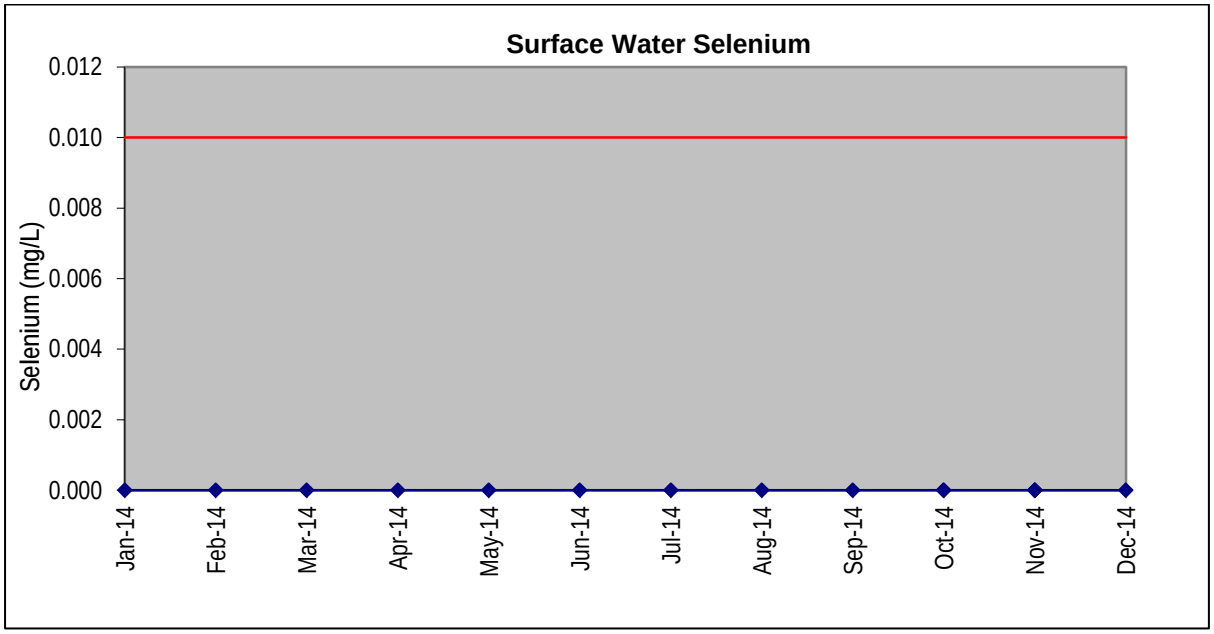


Figure 24 Total Selenium 2014 Monitoring Results

3.5.2.16 Total Silver

Total Silver results at LD2 during the reporting period were below the 0.001 mg/L EPA licence limit (**Figure 25**).

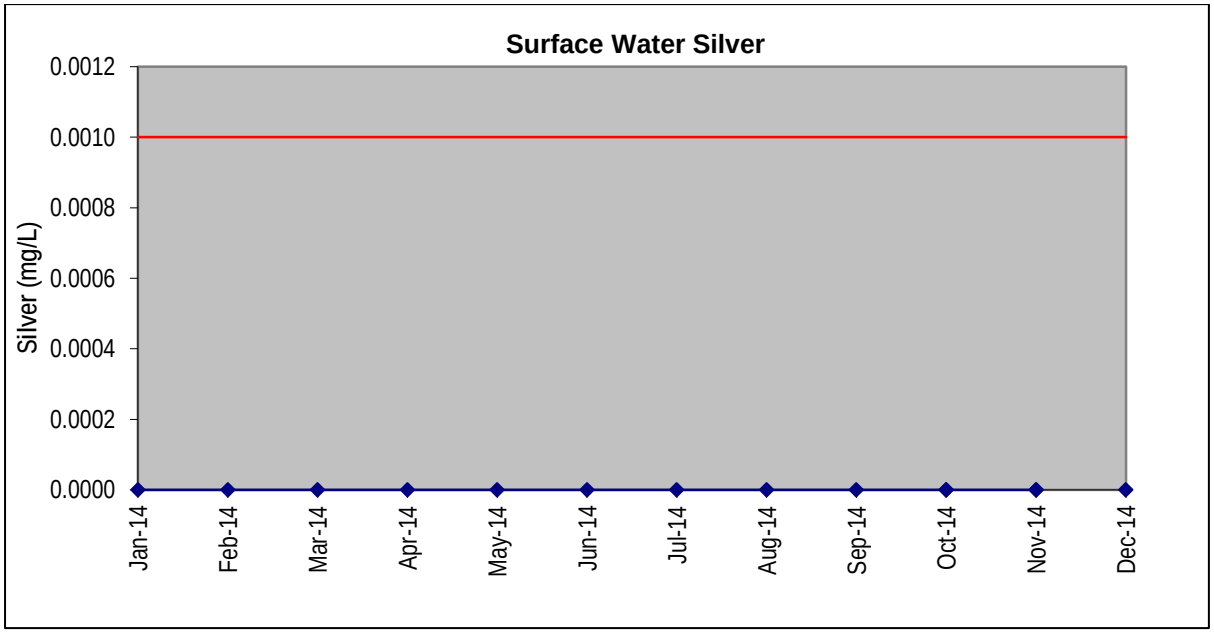


Figure 25 Total Silver 2014 Monitoring Results

3.5.2.17 Total Sulfate

Total Sulfate results at LD2 during the reporting period were below the 250 mg/L EPA licence limit (**Figure 26**).

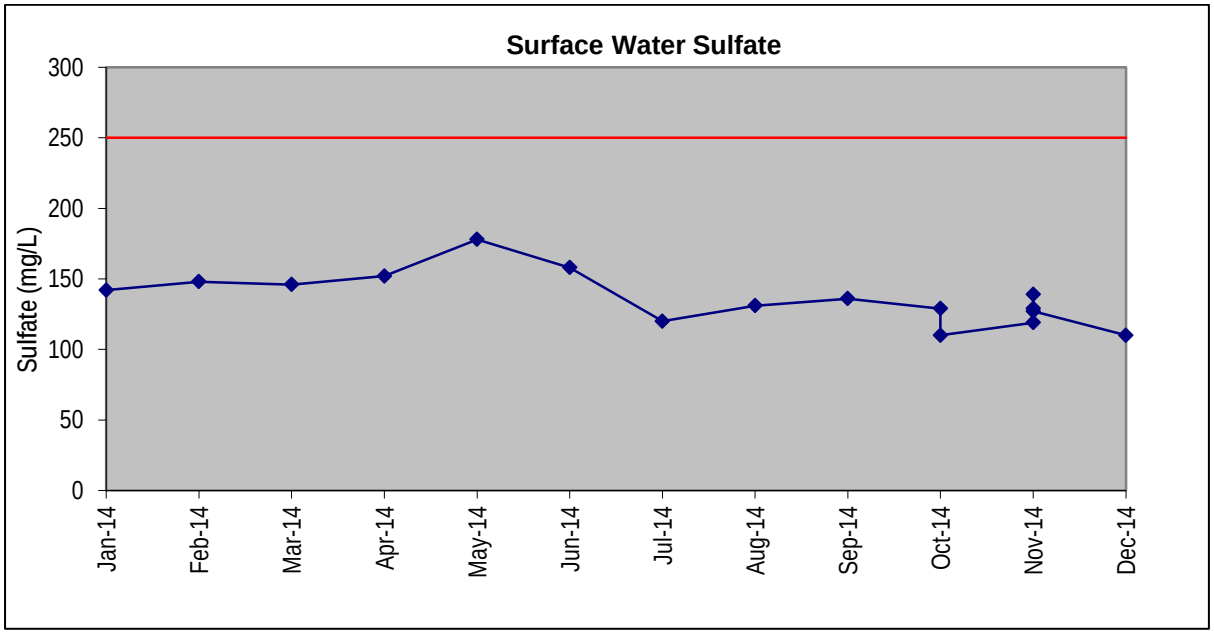


Figure 26 Total Sulfate 2014 Monitoring Results

3.5.2.18 Total Zinc

Total Zinc results at LD2 during the reporting period were below the 1.5 mg/L EPA licence limit (**Figure 27**).

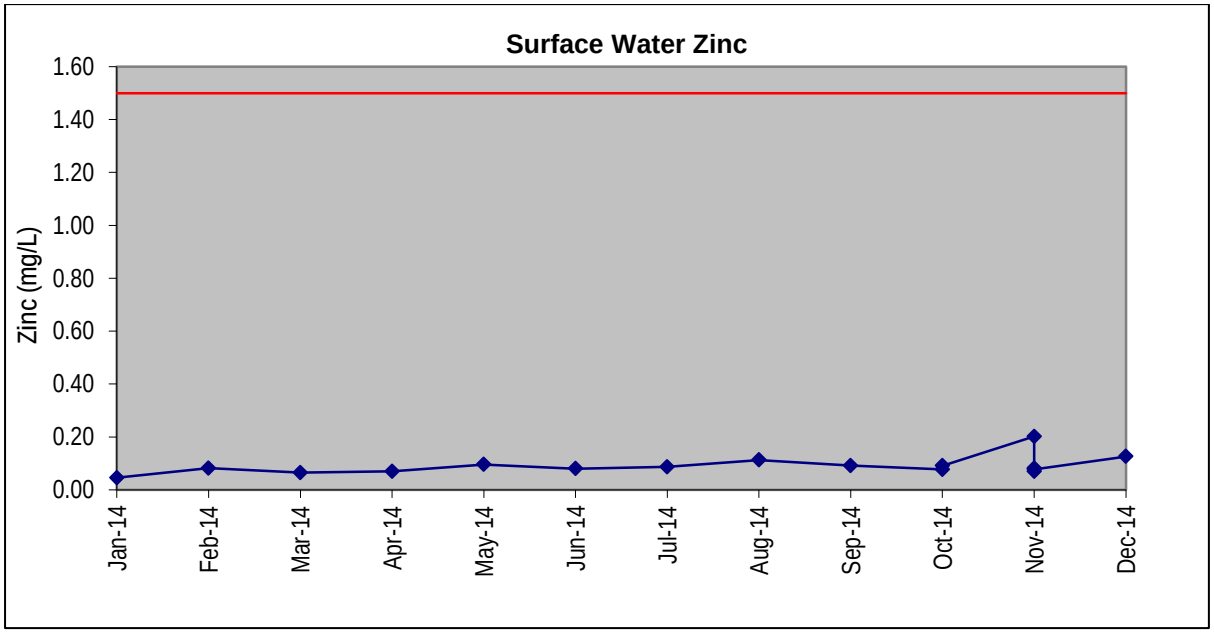


Figure 27 Total Zinc 2014 Monitoring Results

3.5.3 Licence Discharge Point 3 (LD3)

LD3 provides emergency discharge during periods of sustained heavy rainfall. LD3 did not discharge during the reporting period.

3.5.4 Licence Discharge Point 4 (LD4)

LD4 is the overflow spillway for Leachate Dam No. 2. During the reporting period, Leachate Dam No. 2 underwent a major upgrade, by its capacity was increased to 10ML. LD4 did not discharge during the reporting period.

3.6 Ground Water Monitoring

Clarence undertakes intensive ground water monitoring on the Newnes Plateau to detect any impacts from underground mining on the groundwater regime. Groundwater monitoring is undertaken specifically on the Newnes Plateau Shrub Swamps and the Clarence Aquifer, as well as the general hydrogeological regime above the workings. The Clarence Water Management Plan, and Environmental Monitoring Programs required by Subsidence Management Plans identify monitoring requirements. Currently measured groundwater monitoring sites are outlined in **Table 12**.

Table 12. Groundwater Monitoring Piezometers Summary

Piezometer	Installed	Area
CLRP1	2004	Eastern Area SMP, within 330 Area
CLRP2	2004	Eastern Area SMP, above 611E panel
CLRP3	2006	Eastern Area SMP, above 612 panel
CLRP4	2008	South of mining areas
CLRP5	2008	700 Area SMP, north of 700 area panels
CLRP6	2008	700 Area SMP, above 702/704 panels
CLRP7	2008	700 Area SMP, south of 700 area panels
CLRP10	2008	700 Area SMP, above 706 panel
CC113	2008	700 Area SMP, south of 700 area panels
CLRP8	2009	Clarence Township
CC114	2009	800 Area SMP Application Area
CC115	2009	800 Area SMP Application Area
HV1	2009	Happy Valley Swamp (700 Area SMP)
HV2	2009	Happy Valley Swamp (700 Area SMP)
HVU1	2009	Happy Valley Upper Swamp (700 Area SMP)
HVU2	2009	Happy Valley Upper Swamp (700 Area SMP)
CLRP11	2010	700 West SMP Area
CLRP12	2010	700 West SMP Area
CLRP13	2010	800 Area SMP Application Area
CLRP14	2011	800 Area SMP Application Area
CLRP15	2011	Lithgow No.2 Dam
CLRP16	2011	Lithgow No.2 Dam

CLRP17	2013	800 Area SMP Application Area
CLRP18	2014	900 Area SMP Application Area
CLRP19	2013	800 Area SMP Application Area
CLRP20	2013	800 Area SMP Application Area
CLRP22	2014	900 Area SMP Application Area

In August 2004, nested piezometer sites CLRP1 and CLRP2 were installed as baseline monitoring for the Eastern Area SMP. CLRP3 was then installed as an additional site in January 2006. CLRP1, CLRP2 and CLRP3 have been used to measure background groundwater levels and the subsequent impact from mining over a number of years.

CLRP4, CLRP5 CLRP6 CLRP7 CLRP10 and CC113 were installed to measure any potential impact from mining within the 700 Area. The first panel in the 700 Area (702 panel) completed extraction in early December 2009.

CLRP8 was an existing borehole located in the Clarence Township. Clarence Colliery installed a piezometer in the bore to measure potential impacts on the water supply for the Clarence village.
CC114 and CC115 were installed to collect background data for the 800 Area SMP application. These piezometers have not been undermined but do provide data with the potential to detect groundwater related impacts beyond the mining area.

Shallow piezometers were installed in Happy Valley Swamp (HV1 and HV2) and Happy Valley Upper Swamp (HVU1 and HVU2) in December 2009. The two piezometers in each Swamp directly measure any impact on groundwater base flows from undermining each swamp.

CLRP11, CLRP12 and CLRP13 were installed to collect further baseline data for the 700 West/800 Area SMP Application. Again, these piezometers have not been undermined but do provide data with the potential to detect groundwater related impacts beyond the mining area.
CLRP15 and CLRP16 are located either side of the Lithgow No.2 Dam and are used to monitor potential impact on the dam from mining (including the currently approved first workings) within the Dam Notification Area.

CLRP17, CLRP19 and CLRP20 were installed in 2013 to collect background data for the 800 Area SMP application. Within a few weeks of installation they were damaged by fire, along with CLRP14, CC115 and CLRP11. These remain out of service but some, if not all, will be restored in the shorter term.

CLRP19 and CLRP22 were installed at the end of the reporting period, to collect background data for the 900 SMP Application Area. No data is available for these boreholes at present.

The location of all piezometers is presented in **Appendix 4**.

3.6.1 Open Hole Piezometers

Groundwater levels in the open hole piezometers installed in the Clarence Aquifer are plotted in **Figure 28**. All holes showed a continuation of trends recorded previously.

Groundwater levels in all of these holes stand at or near historically high levels in the data record extending back to 2008, related to the generally wetter conditions between late 2010 and early 2013.
Minor noisy data and distinct small negative spikes in the record for CLRP8, in Clarence village, appear to be related to localised pumping of groundwater for domestic use. CLRP7 shows sporadic spikes related to groundwater sampling.

CLRP10 showed a drop of 1.2 m during the previous reporting period, but during the current period the groundwater level returned to trend. The changes in level both occurred on days that data were collected. This indicates that the observed change in level is due to incorrectly re-installing the

instrument, with the instrument being hung up in the hole. The observed drop and recovery is thus not significant.

There is no evidence of any mining-related impacts on any of these piezometers, based on the continuing uniform responses of the piezometers.

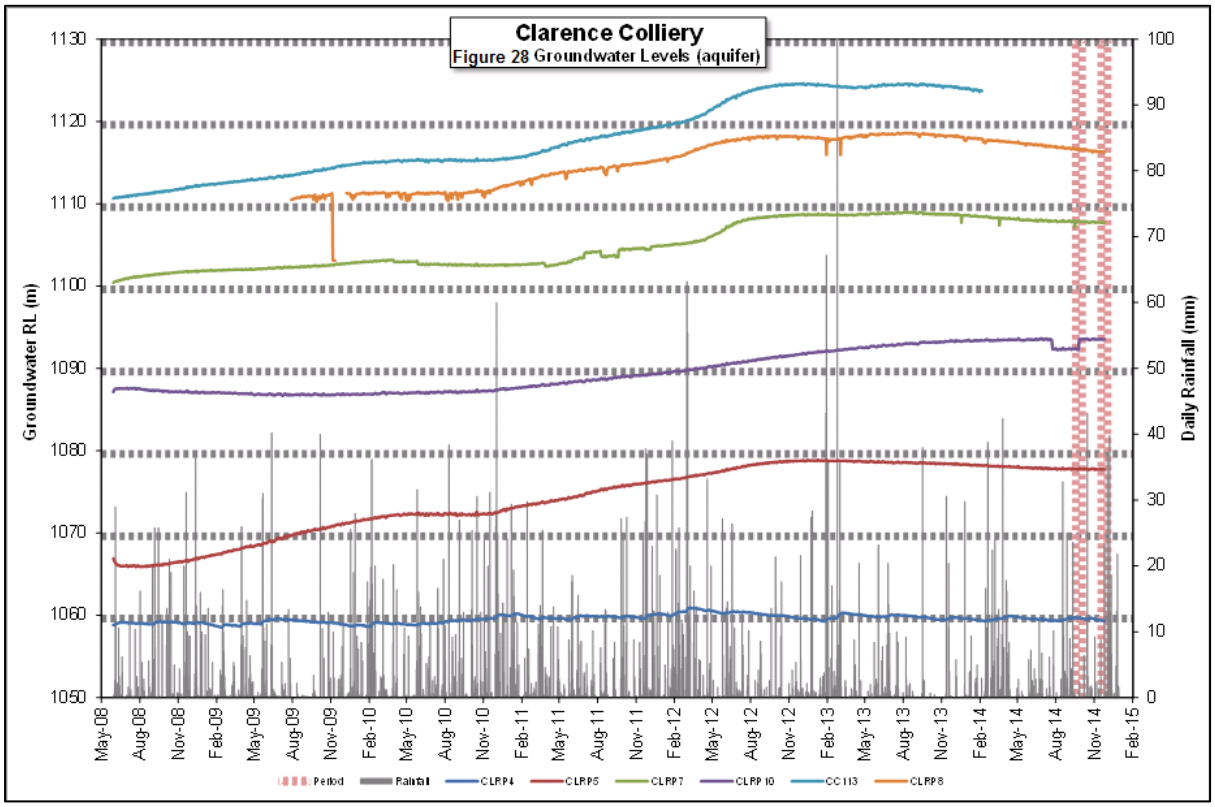


Figure 28 CLRP4, CLRP5, CLRP6, CLRP7, CLRP8, CLRP10 and CC113 Piezometric Height

3.6.2 Multi-Level Piezometers

3.6.2.1 CLRP1

All piezometers continued the trends seen previously over several years (**Figure 29**). There are no indications of any abnormal trends in the available data.

Pillar extraction occurred in Panel 803 during July 2014, with no apparent impact. Pressures recorded in the two Banks Wall Sandstone piezometers remained above pre-mining levels. During the current period, first workings were driven in the 800 area, between 1.8 – 2.2 km east of the hole, with no discernible impact on groundwater pressures.

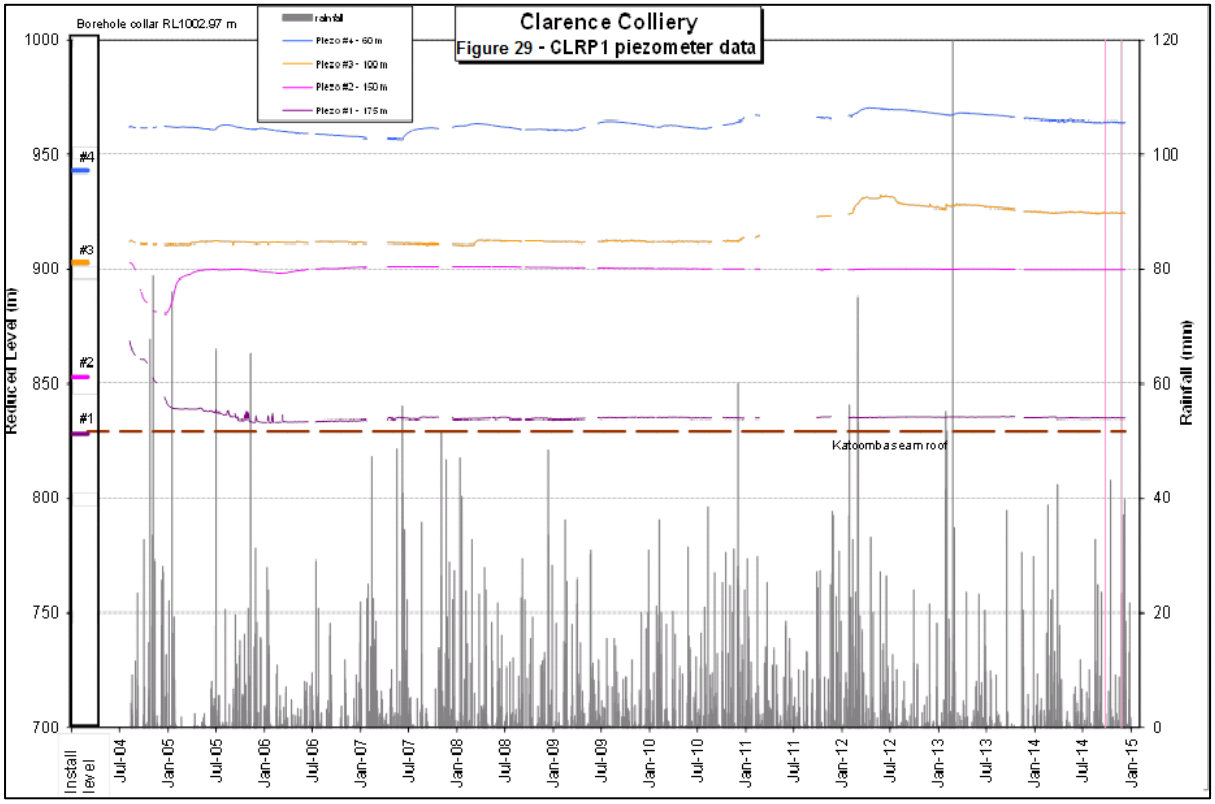


Figure 29 CLRP1 Piezometric Height

3.6.2.2 CLRP2

Previous data logger problems have been solved. The previous level trends, established over many years, have continued (**Figure 30**). All pressures remain above pre-mining levels.

Total depressurisation occurred in piezometer 1 in the coal seam in August 2007 after mining below the borehole, as would be expected. The other three piezometers showed no negative impact from mining at the time, and continue to show no impact from the mining.

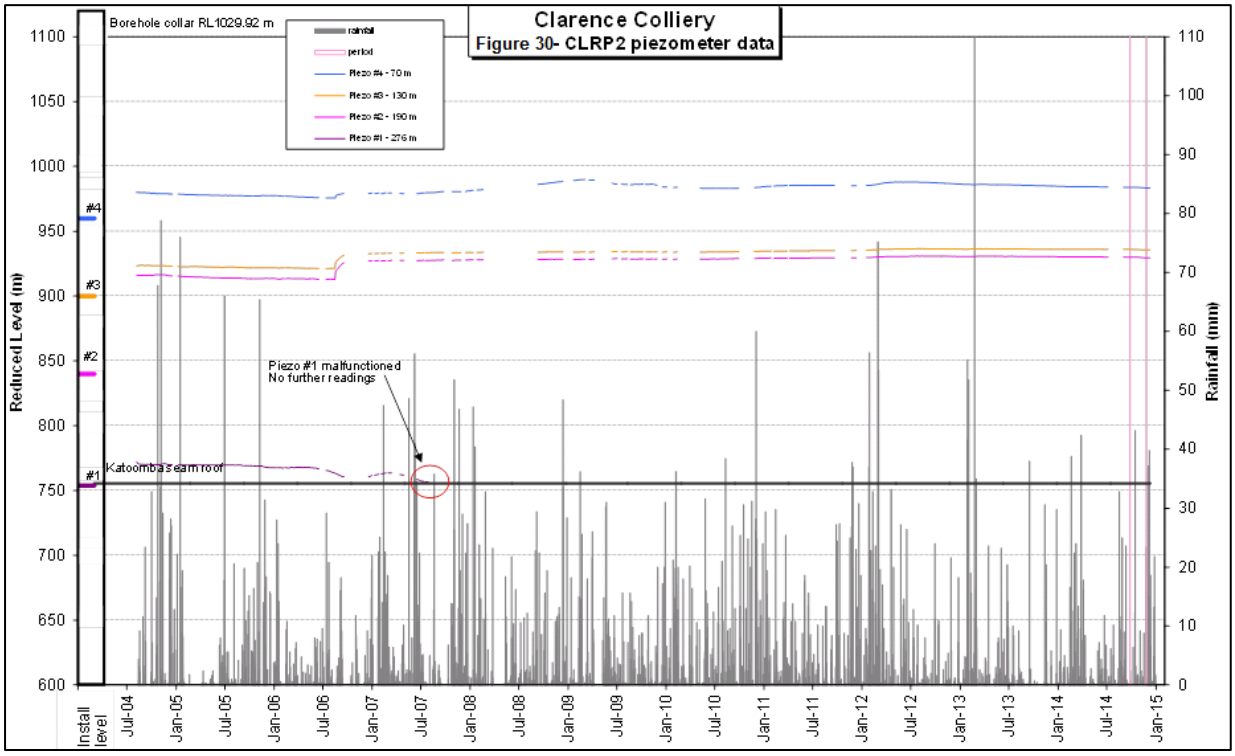


Figure 30 CLRP2 Piezometric Height

3.6.2.3 CLRP3

During the reporting period a complete data set was downloaded. The data show a continuation of the level, steady trends recorded previously (**Figure 31**).

This borehole was undermined shortly after it was installed in 2006, with no mining-related impacts evident in the data up to the present.

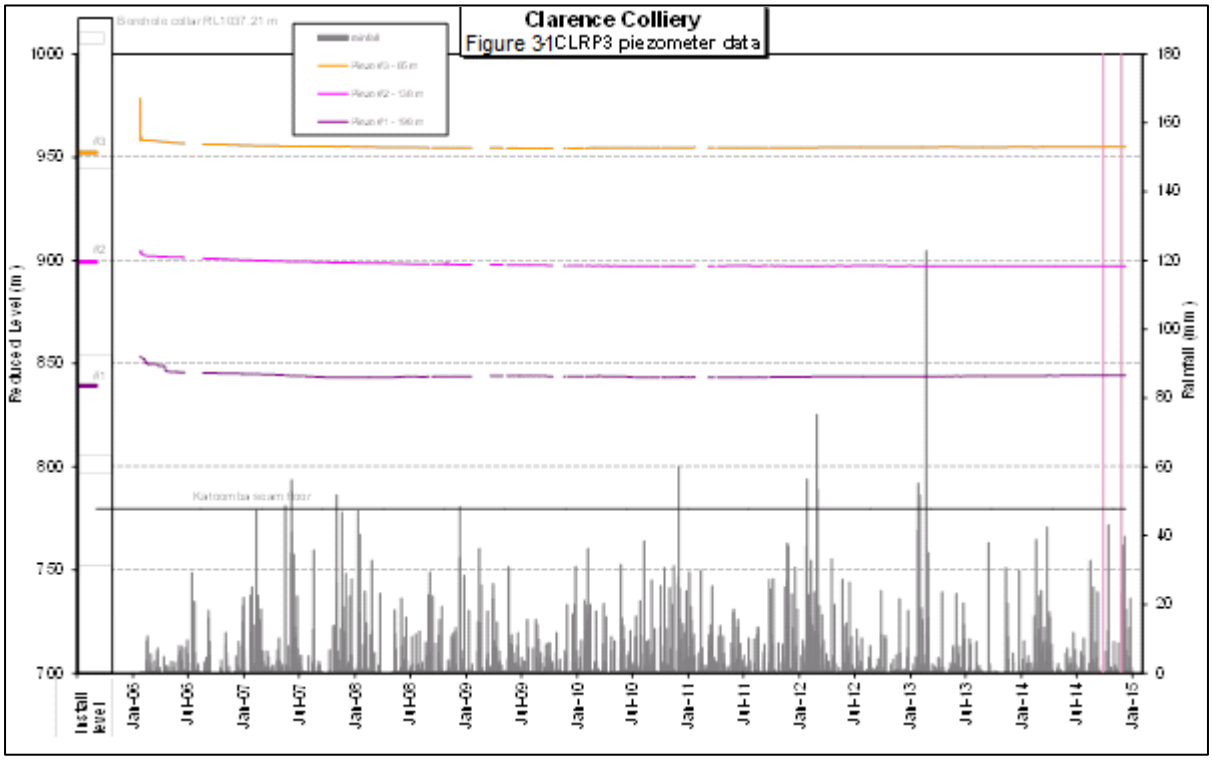


Figure 31 CLRP3 Piezometric Height

3.6.2.4 CLRP6

There are no data for this installation after 28 July 2014 (**Figure 32**), due to equipment failure. Data from the upper two piezometers generally continue the trends seen previously. Erratic behaviour in piezometer 2 was observed previously. The erratic behaviour is likely to be an instrumental effect and the data are most likely unreliable, especially given that the pressure is higher than in the overlying piezometer 3. Piezometer 3, the uppermost, showed stable pore pressure.

First workings in Panel 902 and 904 were approximately 1.4 – 2.5 km north of the piezometer in September – October 2014, and 1.5 – 1.8 km northwest in Panel 903. There is no evidence from the data of any adverse mining-related impacts on the strata containing the two functional piezometers during any of the mining.

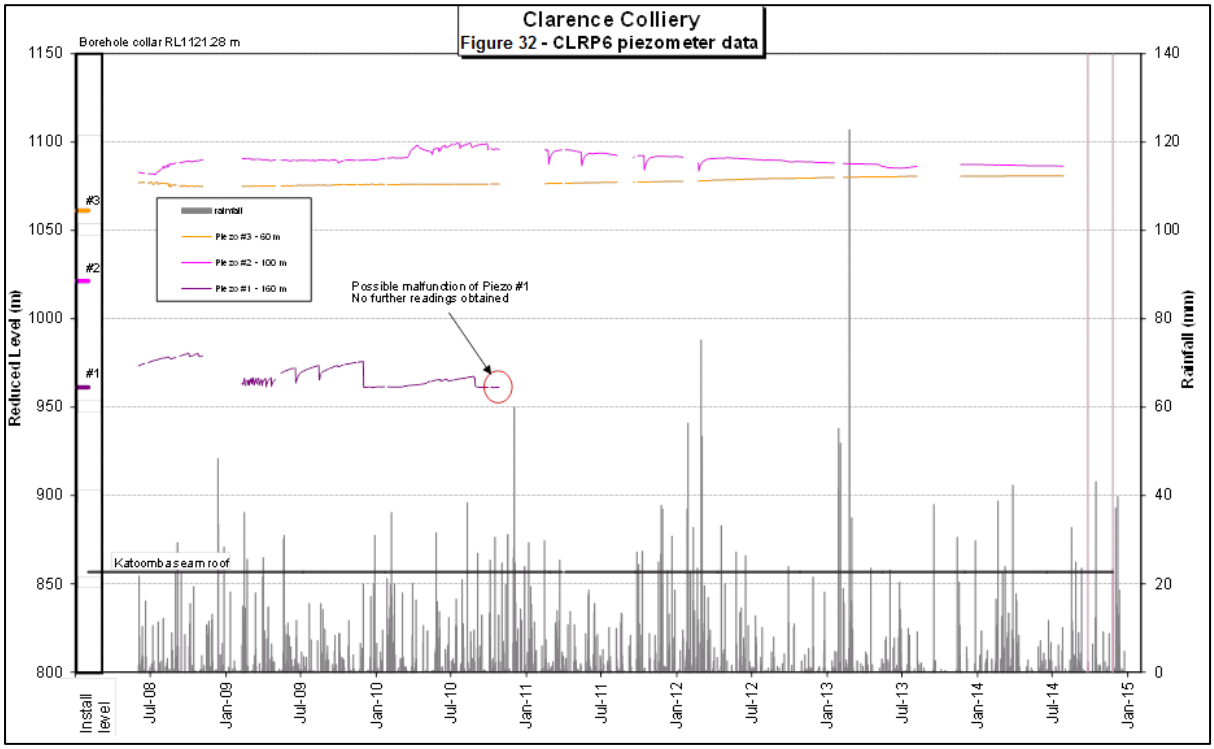


Figure 32 CLRP6 Piezometric Height

3.6.2.5 CC114

CC114 was vandalised on 23 January 2014, and repaired on 2 April. Data from piezometer 1 subsequently showed some bad records during April and May; later data appear to be error-free. Previously observed trends continued (**Figure 33**), with piezometer 1 and 2 showing a generally flat trend. There are no indications of any abnormal trends in the available data.

During April – May, first workings and pillar extraction occurred in the 800 area, approximately 1 – 4.25 km to the east. There is no indication of mining impact in the data.

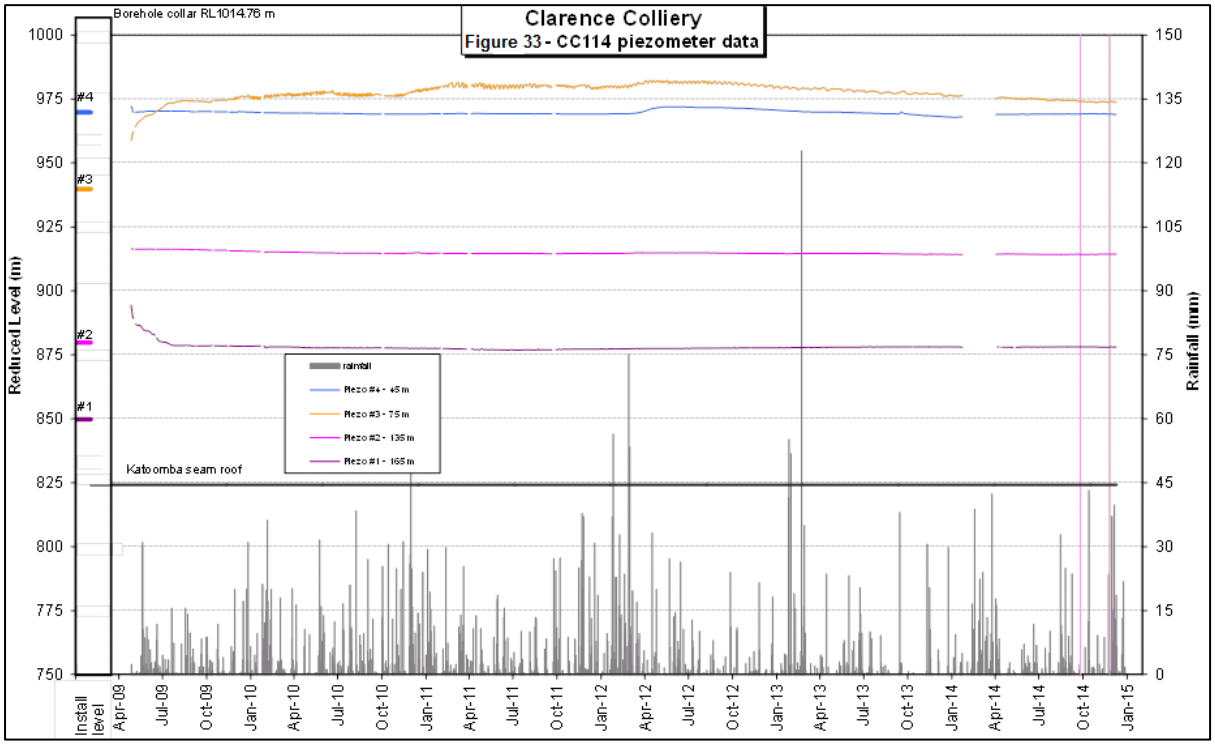


Figure 33 CC114 Piezometric Height

3.6.2.6 CC115

CC115 was damaged by bushfire, and consequently, no data were available after October 2013. The installation was repaired on 23 March 2014. The repairs included an upgrade of data logger to a Campbell Scientific model.

Trends in the data after repair are broadly consistent with those seen previously, although at lower absolute levels than before. The difference in pressure heads are 30 – 50 m, which is highly unlikely to be a real groundwater phenomenon. The most likely reason is a possible calibration difference between the old and new data loggers. Trends observed in CC115 generally continued during the current period (**Figure 34**), in the upper piezometers.

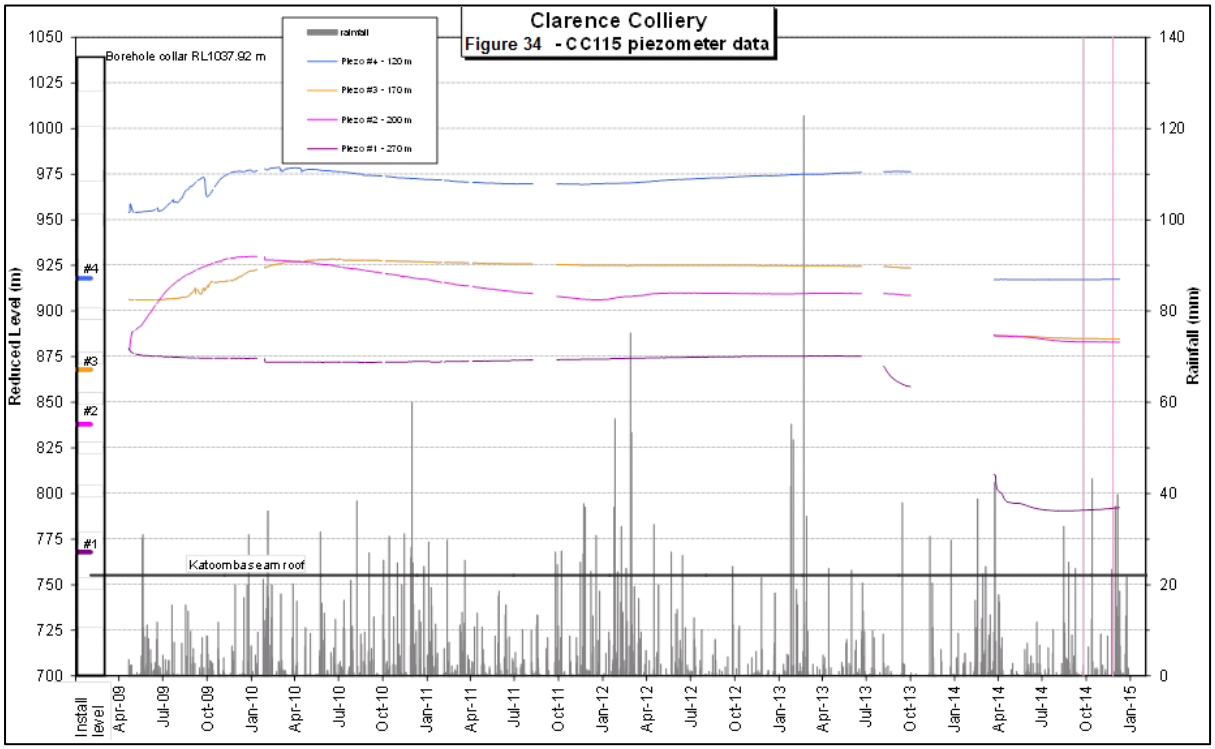


Figure 34 CC115 Piezometric Height

3.6.2.7 CLRP11

Following damaged during the State Mine bushfire in October 2013, the installation was repaired on 13 May 2014 and produced 10 days of data before failing again. Data logging recommenced again on 6 June 2014, and there is a complete data set for the current period, showing a continuation of previously recorded trends (**Figure 35**). However, piezometer 1 has pore pressures higher than the overlying piezometer 2, which appears to be unlikely, and suggests that this instrument may be unreliable.

None of the data indicate any mining impact.

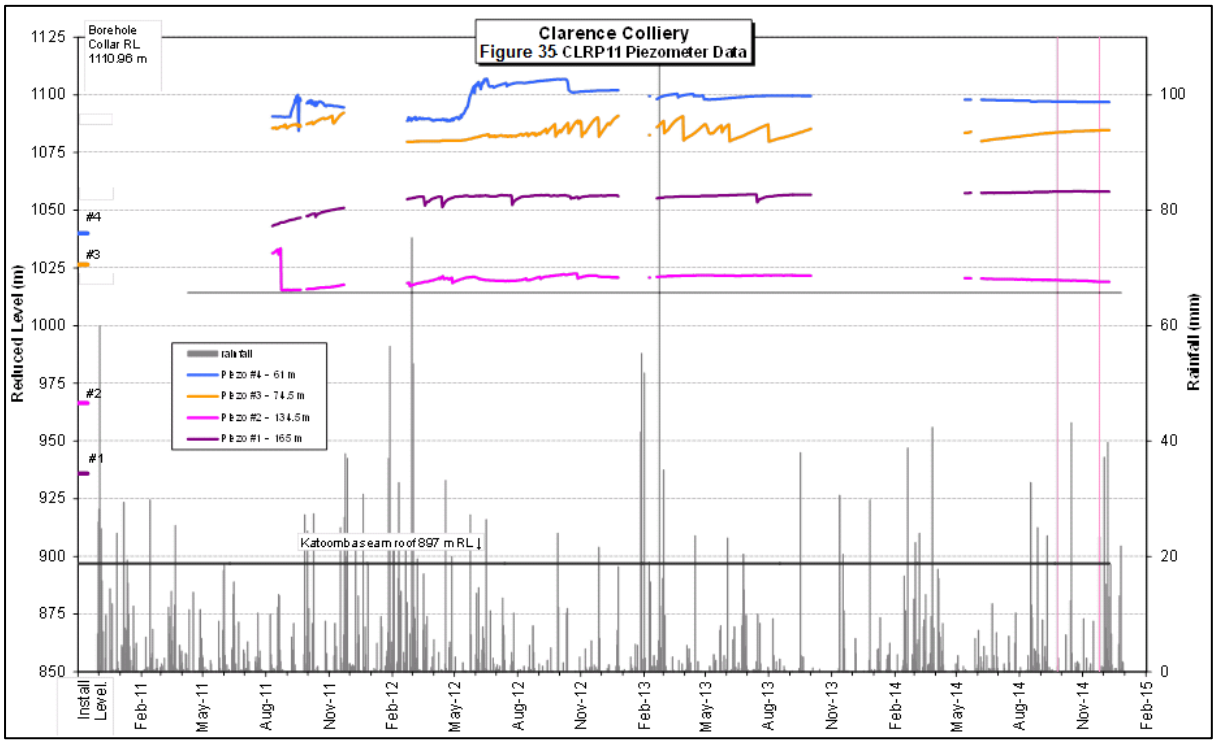


Figure 35 CLRP11 Piezometric Height

3.6.2.8 CLRP12

Data recovered from CLRP12 on 7 April 2014 consisted of unintelligible noise. The installation was serviced, and data from the subsequent download on 6 June 2014 appear coherent. There is an incomplete data record for the current period — the latest record is from 31 October 2014. The logger failure may be due to lighting strike and/or vandalism. The available data continue previously observed trends (**Figure 36**). Pressure trends in the uppermost piezometer have been unchanged, and it is clear that mining is having no impact on the near-surface unconfined aquifer.

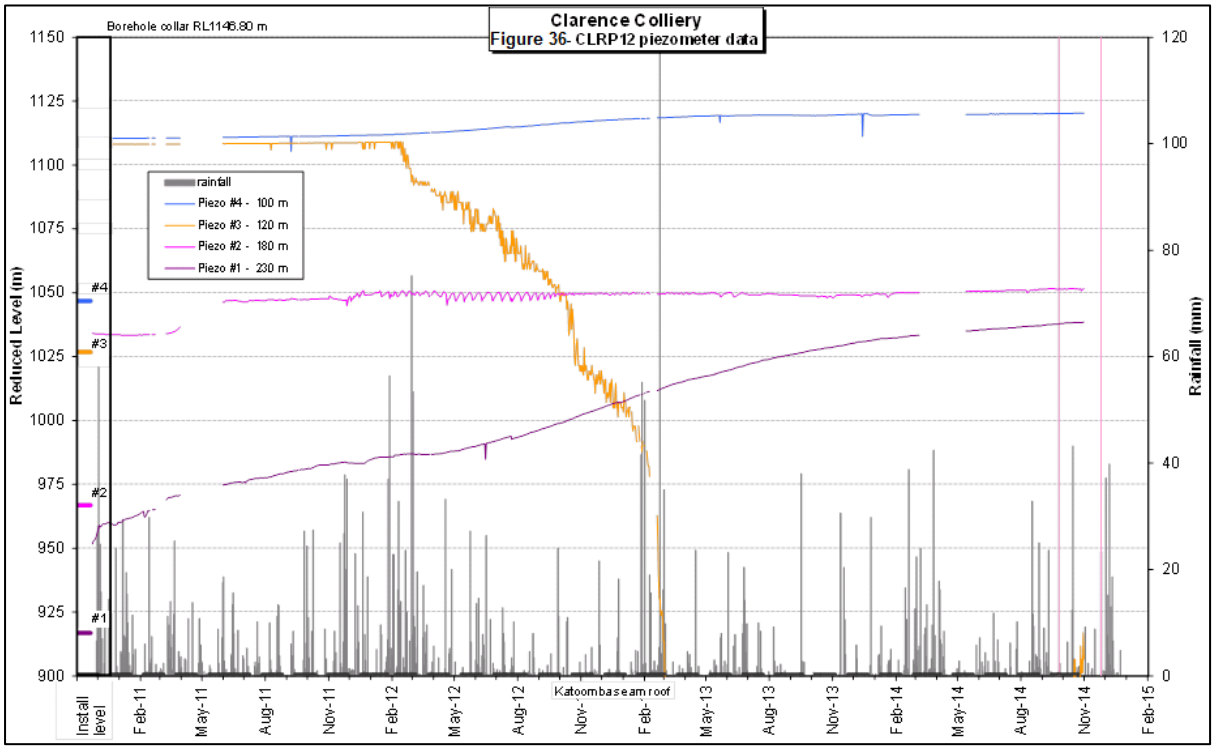


Figure 36 CLRP12 Piezometric Height

3.6.2.9 CLRP13

The installation was damaged by the 16 October 2013 State Mine bush fire. The piezometer was repaired in late November 2013, but subsequently failed again on 7 March 2014, with only sporadic data recovered after that time. Data logging commenced again on 6 June 2014. There are no data available after 28 July 2014. Lightning strike is suspected for the data logger failure. The limited available data appear to be consistent with previous trends (**Figure 37**).

Previously observed pressures in the uppermost reliable piezometer showed no mining impact.

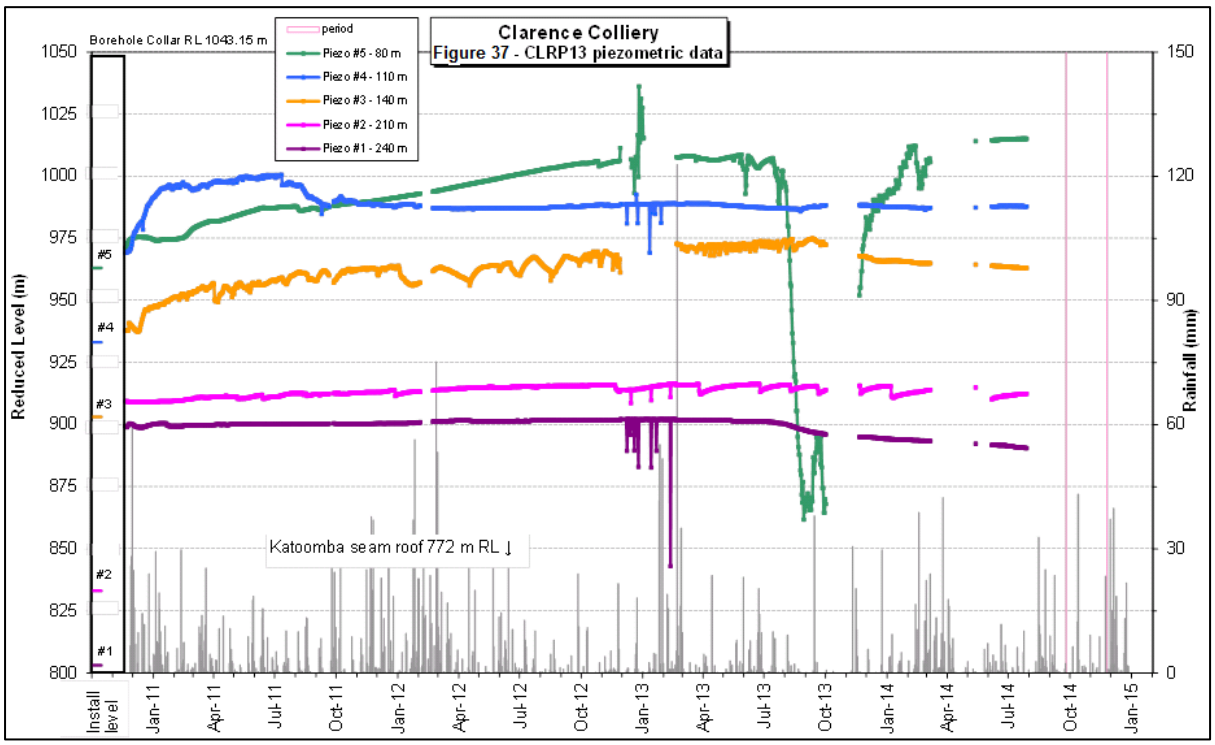


Figure 37 CLRP13 Piezometric Height

3.6.2.10 CLRP14

Following damage during the State Mine bushfire, the installation was repaired in late March 2014. The repairs included an upgrade of datalogger to a Campbell Scientific model. During the current period, there are no data for piezometers 2 and 3 after 25 August 2014 (**Figure 38**).

Pillar extraction in the 800 area has occurred previously under the piezometers; first workings were up to 3.5 km to the east. The data record shows no mining impact.

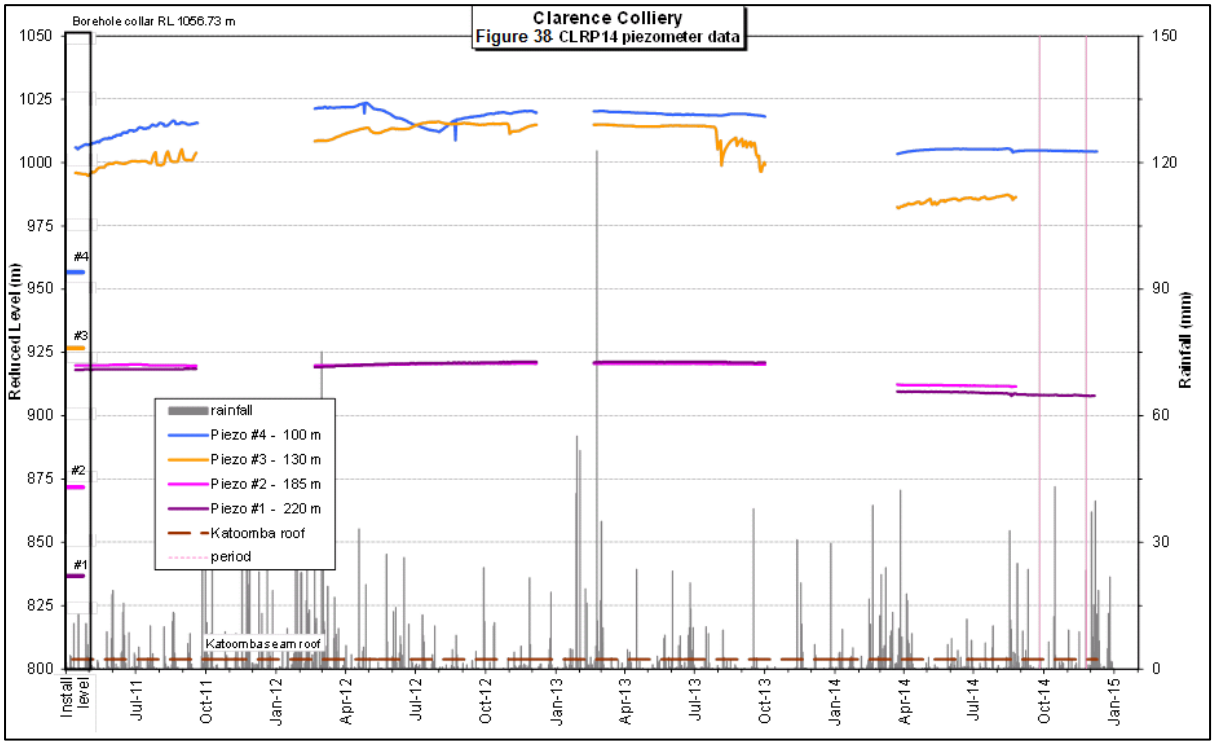


Figure 38 CLRP 14 Piezometric Height

3.6.2.11 CLRP15

The data record continues to have gaps in it, presumably caused by data logger failures. There are only data available for the period 31 October – 19 November 2014. Available data for the period mainly continue the same levels and trends seen previously (**Figure 39**).

Since CLRP15 is located between the reservoir and the mine workings, the presence of a flow direction towards the dam is significant. This situation represents the normal pre-mining hydrogeological regime, and indicates that mining has had no impact on the groundwater regime between the dam and the mine workings.

Pillar extraction in 700 Panel occurred over 1.3 km the east during March 2014. First workings in Panel 903 during the period were over 2.8 km to the north. The level trends and evidence of flow towards the reservoir indicate that there is no recognisable impact from mining.

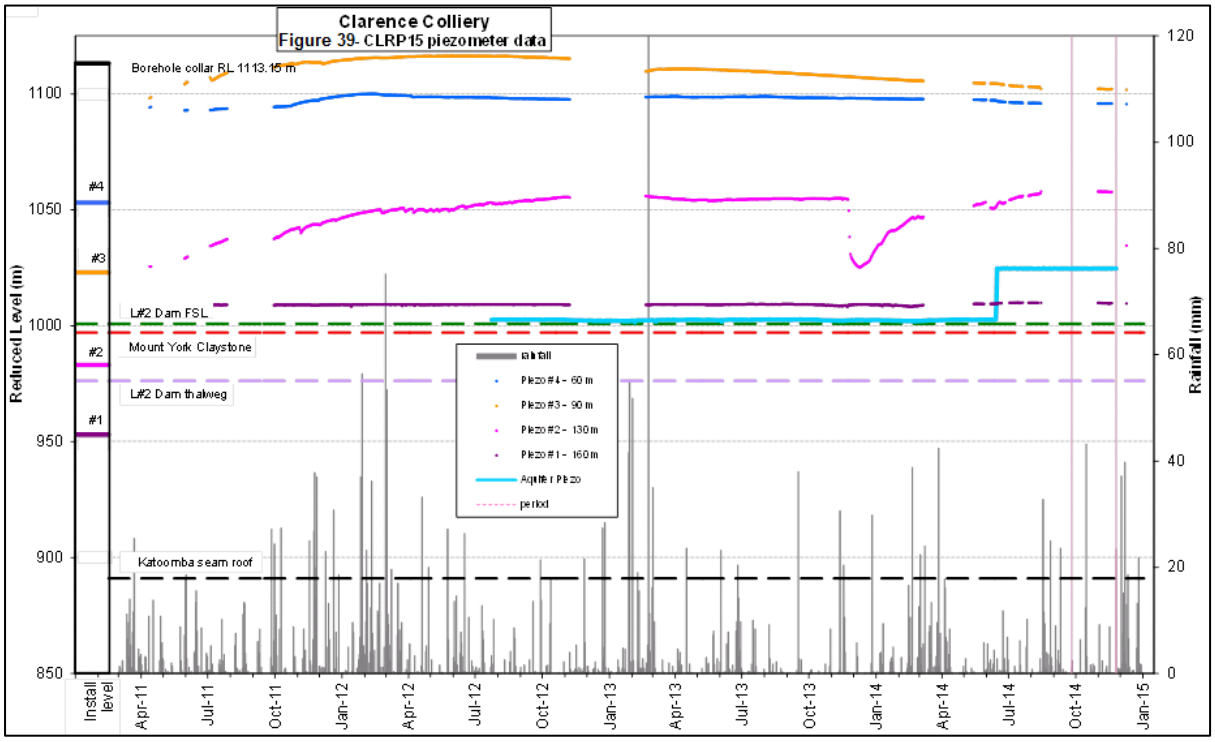


Figure 39 CLRP15 Piezometric Height

3.6.2.12 CLRP16

Throughout the reporting period data, data recorded at this location was irregular and sporadic (**Figure 40**).

Piezometer 1, located in the cover sequence approximately 35 m above the level of the mine workings, continued the previous trend during the period. The head measured by piezometer 1 remains well above the values seen in the overlying piezometer. The overall pressure trend does not appear to be natural. It is possible that there are instrumental effects in these data or that the instrument has failed.

Pillar extraction in 700 Panel occurred over 1.8 km m the east during March 2014. First workings in Panel 903 during the period were over 2.8 km to the north. There is no evidence of mining impact in the groundwater record.

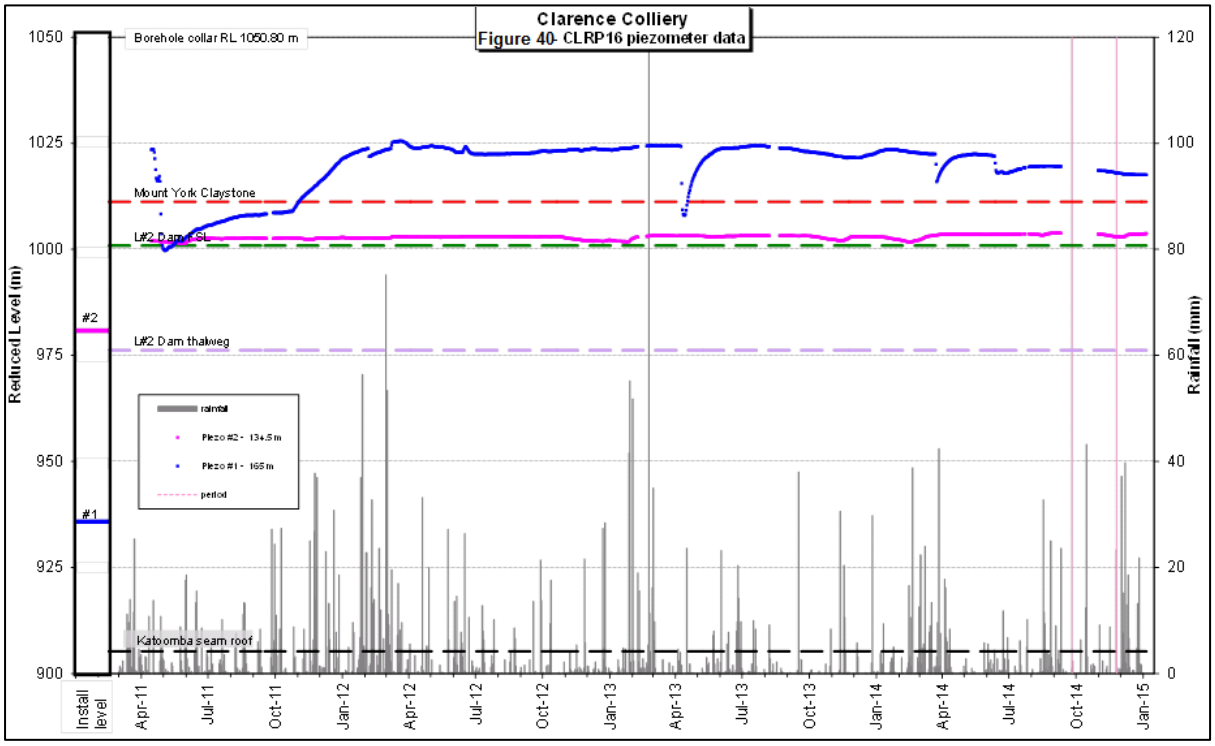


Figure 40 CLRP16 Piezometric Height

3.6.2.13 CLRP17

CLRP17 commenced logging on 23 March 2014. The available data show steady trends with positive groundwater pressures (**Figure 41**).Piezometers 1 and 2, installed lower in the sequence below the Mount York Claystone, show a very slowly, uniformly declining pressure trend. Piezometer 3, in the upper part of the sequence, has a very uniform, level pressure trend. First workings in the 800 area were 0.4 – 2.3 km from the piezometer. The very slow decline in the lower piezometers may be due to stabilisation of the piezometers after installation, or may reflect gradual dewatering of strata as a result of mining first workings. In the upper aquifer, there is no evidence of mining impact in the groundwater record.

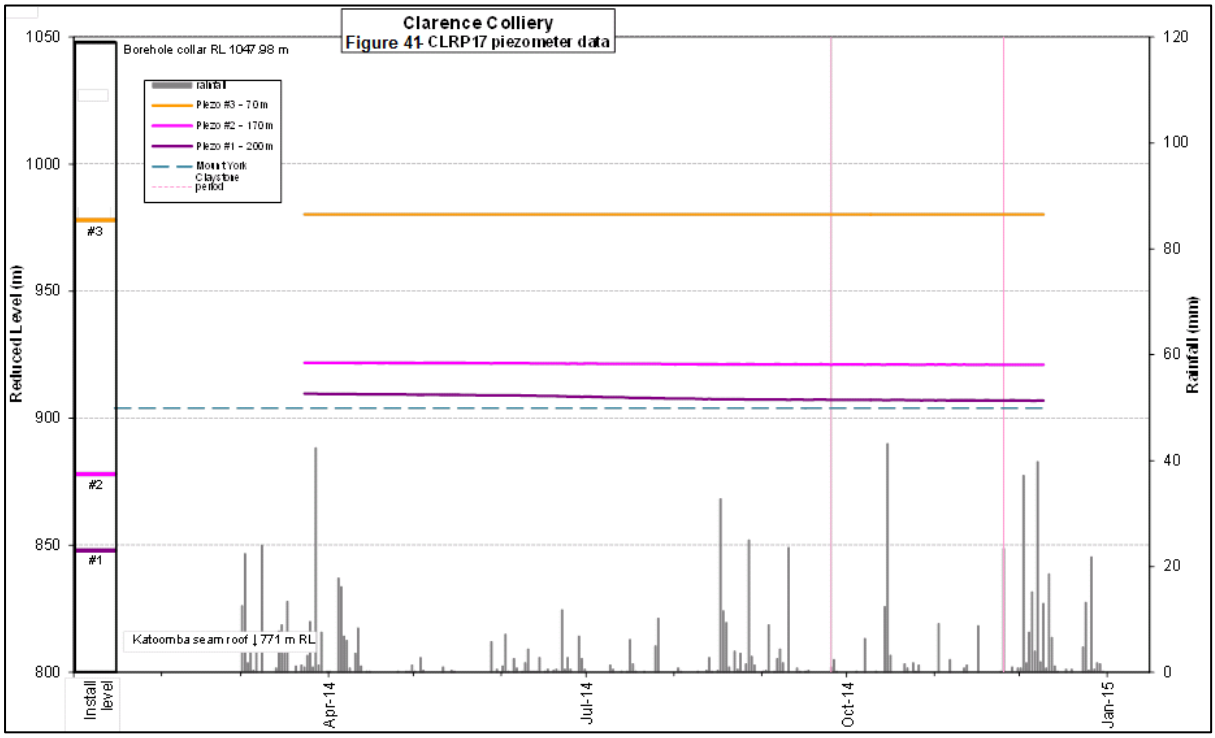


Figure 41 CLRP17 Piezometric Height

3.6.2.14 CLRP19

CLRP19 commenced logging on 23 March 2014. The available data available previously showed a very slow decline in pressure in piezometer 1, and similarly slow increases in pressure in piezometers 2 and 3 (**Figure 42**). During the current period, the trends levelled off and show stable groundwater pressures. All piezometers record positive groundwater pressures.

First workings in the 900 area were 0.2 – 0.5 km from the piezometer. Observed changes may be due to stabilisation of the piezometers after installation. Alternately, previous changes may reflect depressurisation during mining at seam level, with increased pressures higher in the roof due to a beam effect. The magnitude of the pressure changes is very small.

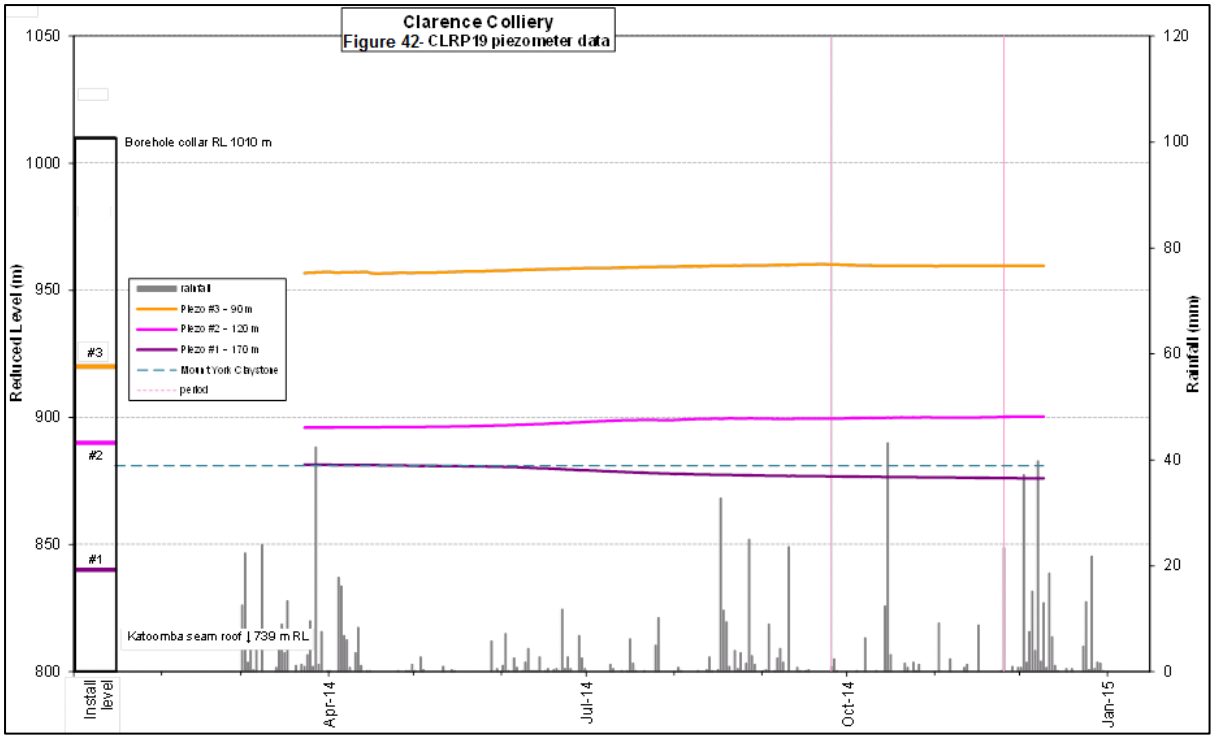


Figure 42 CLRP19 Piezometric Height

3.7 Threatened Flora

3.7.1 Swamps

The swamp vegetation monitoring undertaken was conducted in a manner which allows assessment against a number of indicators which may provide evidence of an effect of subsidence. These indicators include:

- Species richness - allows for a quick measure of a site's complexity and can be compared across both season and year;
- Species composition - shows the movement of sites in relation to their species composition across the seasons within 2014;
- Exotic species - exotic plant species, or weeds, can be used as indicators of ecosystem change as they generally only occur in vegetation that has had some level of disturbance (particularly human mediated); and
- Relationship between condition and abundance for selected species - compares the condition of dominant species with scores recorded in previous monitoring and with time since undermining.

Swamp monitoring data is collected from permanently marked with 20 x 20m plots within which vegetation abundance and condition are measured. At each site, researchers record all species

within the plot; estimate cover/abundance using a modified Braun-Blanquet scale; and estimate condition of common species using a pre-determined condition scale. Ten long term swamp monitoring sites have been established at within the Clarence mining lease including (**Figure 43**):

- BNS01 – Bungleboori North 1, not undermined;
- BNS02 – Bungleboori North 2, not undermined;
- CLA01 – Banksia Swamp, not undermined;
- CLA02 – Banksia Swamp, not undermined;
- CLA03 – Prickly Swamp, not undermined;
- CLA04 – Prickly Swamp, not undermined;
- CLAW02 – Happy Valley Upper Swamp, undermined March and October 2010;
- CLAW03 – Happy Valley Swamp, undermined December 2010;
- CLAW04 – Swamp, not undermined; and
- CLAW05 – Pine Swamp, not undermined

3.7.1.1 Species Richness

At Clarence in spring 2014 the highest level of species richness was recorded at the burnt plots CLA03. Species richness appeared to have stabilised at the other burnt plots. At one site, CLA01, previously reported as supporting a low level of plant diversity, species richness was higher than pre-fire levels with 23 species recorded in autumn 2014 and 21 species recorded in spring 2014. On the Clarence lease, ten of the twelve plots were burned in the mid-October bush fire (nine of which completely burned and one partially burned). In 2014 there was no consistent seasonal trend among these sites.

3.7.1.2 Species Composition

Recruitment of seedlings post-fire resulted in a number of new records for species at Clarence plots. Acacia ulicfolia, Arrhenecthites mixta, Arthropodium milleflorum, Banksia serrata were recorded at CLA03. Dillwynia elegans and Dodonaea triquetra were recorded at CLA01 and CLA03. In spring Tricoryne elatior was recorded at CLA01. Phragmites australis was a new record for CLW03.

At CLA02, a burnt site, new species detected included Amperea xiphoclada, Boronia microphylla, Bossiaea lenticularis, Lomandra filiformis subsp. coriacea, Monotoca scoparia, Rhytidosporum procumbens and Stylidium graminifolium. At CLA04, also a burnt site, new species detected since the fire have included Acacia longifolia, Acacia myrtifolia, Amperea xiphoclada, Drosera binata, Galium gaudichaudii and Platysace linearifolia.

There were no other notable new records for the Clarence swamp plots.

The results of the spring 2014 survey do not indicate a difference in species composition patterns between undermined and control plots.

Many of the changes in species composition detected between 2013 and earlier years at individual plots (both undermined and non-undermined controls), appear to have been driven by changes in species richness recorded over successive monitoring surveys. During 2009 to 2013 there were small increases in the detection frequency of a wide variety of herb, grass, and even shrub species. These included both wetland and non-wetland species. The most likely explanation for this is a response to climatic conditions. During the 2009 to 2013 period a number of grass species were detected, these species were not evident or occurred at lower abundance prior to 2009, when conditions were drier.

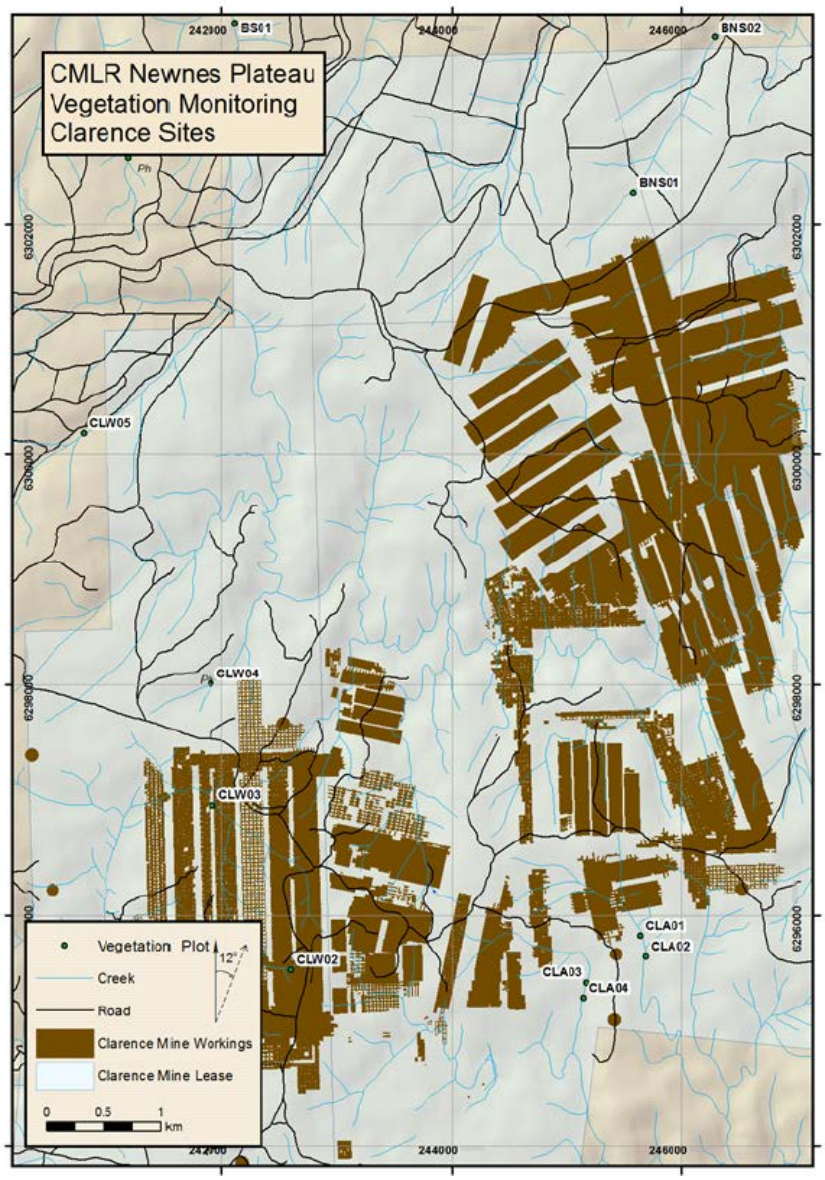


Figure 43 Location of Monitoring Sites within Clarence Mining Lease

3.7.1.3 Plant Condition

There were no plots at Clarence where two or more species were suffering from plant disease in either autumn or spring 2014.

3.7.1.4 Exotic Species

Two sites were discovered to have a higher level of weed species richness; CLW03 and CLW05. CLW03 is close to a vehicle track and a smaller track used by trail bikes. CLW05 is adjacent to a pine plantation and a vehicle track. It is close to an area disturbed for recreational purposes and camping. The weed species richness at each of these sites increased in early 2014 as there was seed germination following the October 2013 bush fire and rainfall events in November 2013 and February-March 2014 Only two weed species were recorded at CLW05 in spring 2015 as rapid regrowth of native sedges and shrubs limited weed growth.

All other sites generally were weed free or on occasions a single species, Catsear (Hypochaeris radicata), was detected.

3.7.1.5 Conclusion

The results presented in this report show trends in plant species richness, plant condition and weed distribution which are consistent with previous annual reports.

3.7.2 Eastern SMP and Western SMP Area

3.7.2.1 Plant Condition

Plants were generally in good condition with plants at the burnt sites continuing to show a vigorous post fire recovery response. Competition for nutrients and water had led to decline of a small number of plants. Gonocarpus teucrioides plants were suffering from water stress at PAG_05 as were Rytidosperma racemosum plants at PAG_02.

There were no other instances of poor plant health at the other Clarence East sites.

3.7.2.2 Species Richness

Species richness in summer 2014 was within the previously recorded range at the two unburnt sites, PAG_04 and PAG_06. At the burnt sites species richness increased in spring 2014 at four sites and was stable at the other two sites. Species richness at all burnt sites continues to be significantly greater than that recorded in spring 2013 in the immediate aftermath of the fire.

3.7.2.3 Exotic Species

No exotic species were recorded at any of the Clarence East and Clarence West sites in 2014.

3.7.2.4 Increaser and Decreaser Species

The effect of fire at the six burnt sites was dramatic with an initial steep decline in species richness followed by recovery to pre-fire levels within 120 days of the fire. The recovery process continued through 2014.

Some species (resprouters) respond by regeneration from above and below ground plant structures, whilst in other species plants are killed outright by the fire and recruitment from seed is necessary fore the species to persist at a particular location (obligate seeders). Some species may persist in the soil seed bank for long periods. For these species fire may trigger a new germination event and these species will appear to be colonising the fireground.

3.7.3 Outbye SMP Area

3.7.3.1 Plant Condition

No observations of plant disease were recorded at Outbye sites in spring 2014. The area continued to show steady recovery from the impacts of the October 2013 bush fire.

3.7.3.2 Species Richness

In the four years preceding the bush fire average species richness across sites ranged from 30.25 to 34.25 species. In spring 2013, the average across the four sites in the Outbye area was 8.3 species.

By summer 2014 the average was 23.5 species per quadrat reflecting post-fire recovery, including germination of obligate seeders. This is 68.6% of the level recorded for Outbye heath sites in spring 2012.

In spring 2014 average species richness had increased to 28.5 species or 83% of the spring 2012 level.

The recovery rate at these sites continues to track lower than for other heath sites at Clarence, possibly reflecting higher fire intensity at the Outbye sites.

3.7.3.3 Exotic Species

No exotic species were recorded at any of the Clarence Outbye sites in 2014.

3.7.3.4 Increaser and Decreaser Species

There are no clear long term trends indicating a change in abundance of the more common shrub or ground layer species present at each site.

3.7.4 800 SMP Area

3.7.4.1 Plant Condition

Plants were generally in good condition with plants at the burnt sites continuing to show a vigorous post fire recovery response. Competition for nutrients and water had led to decline of a small number of plants. Insect predation was also impacting on some plants.

At CLAE_01 Pimelea linifolia and Hovea linearis plants had damage consistent with leaf miner predation. At CLAE_07 leaf predators were causing damage to Leptospermum polygalifolium leaves.

There were no records of plant disease at the other six 800 Area sites.

3.7.4.2 Species Richness

Species richness in summer 2014 was within the pre-fire range with 277 records. This indicates a rapid post-fire recovery as the survey took place 112 days after the fire. Subsequent germination of seedlings in the post-fire environment has seen species richness exceed pre-fire levels with 324 records in autumn 2014 and 317 records in spring 2014.

3.7.4.3 Exotic Species

No exotic species were recorded at any of the Clarence 800 sites in 2014.

3.7.5 900 SMP Area

Two sites were established along an arm of Paddys Swamp in the Clarence 900 area in November 2014. This survey establishes baseline data for this area.

Site PSB_01 supported 37 species including one exotic species, Catsear (Hypochaeris radicata).

Site PSB_02 supported 23 species also including the exotic species, Catsear.

There are a range of disturbance factors already operating in the vicinity of these sites. This includes drainage works associated with the abandoned sand mine 600 metres to the south, a trail bike track to the north of PSB_01 and the impacts of the 2013 bush fire.

3.8 Threatened Fauna

Fauna monitoring at Clarence Colliery was undertaken by Biodiversity Monitoring Services. Fieldwork for the 700 Area (Eastern, Western and Outbye), 800 Area (Eastern Portion) and 900 Area was completed. In 2008 sites were established within both the Outbye and 700 SMP Application Areas and in 2009 sites were established to commence baseline surveys within the '800 Area' to identify impacts (if any) of mining induced subsidence on native fauna. During the reporting period, sites were also established within the 900 area. Locations of the fauna monitoring sites can be seen in **Appendix 4.**

3.8.1 Criteria Used to Monitor Fauna

A set of criteria that is used to monitor and compare fauna populations within the SMP areas over time includes:

- Species richness of faunal groups;
- Diversity indices of faunal groups;
- Capture rates of individual species;
- Population status of species;
- Contribution to the faunal assemblages by threatened species, species dependent upon woodland and by species declining in the Central West;
- Habitat complexity scores; and
- Comparisons between Treatment and Control sites.

3.8.2 Results

3.8.2.1 700 Western SMP Area

Six long term fauna monitoring sites have been established at within the Western Subsidence Management Plan (SMP) areas including (**Figure 44**):

- *CLW01* – Control site, not undermined, pagoda landscape;
- *CLW02* – Undermined November 2009, swamp landscape;
- *CLW03* – Undermined October 2010, swamp landscape;
- *CLW04* – Control site, not undermined, swamp landscape;
- *CLW05* – Control site, not undermined, swamp landscape; and
- *CLW06* – Undermined November 2011, pagoda landscape.

A total of 71 bird, nine reptile, eight amphibian and 24 native (plus six introduced) mammal species were located within the Clarence Colliery Western SMP Application areas during the 2014 surveys. A total of 115 bird, 23 reptile, 34 native mammal and 10 amphibian species have been recorded from the areas. The diversity of all species was higher than previously, and the biodiversity values were well within the range measured at Newnes Plateau. A number of new species were located within the SMP area in 2014. This is indicative of the increased productivity in this part of Newnes Plateau. Additions to the listings are the Nankeen Kestrel, Turquoise Parrot, Horsefield's Bronze Cuckoo, White-browed Wood-swallow, Keferstein's Tree Frog, Smooth Toadlet and Southern Rainbow Skink. The number of species located has increased over the years, as expected with continued surveys. It is expected that a number of new species located each year will continue to occur as the surveys continue.

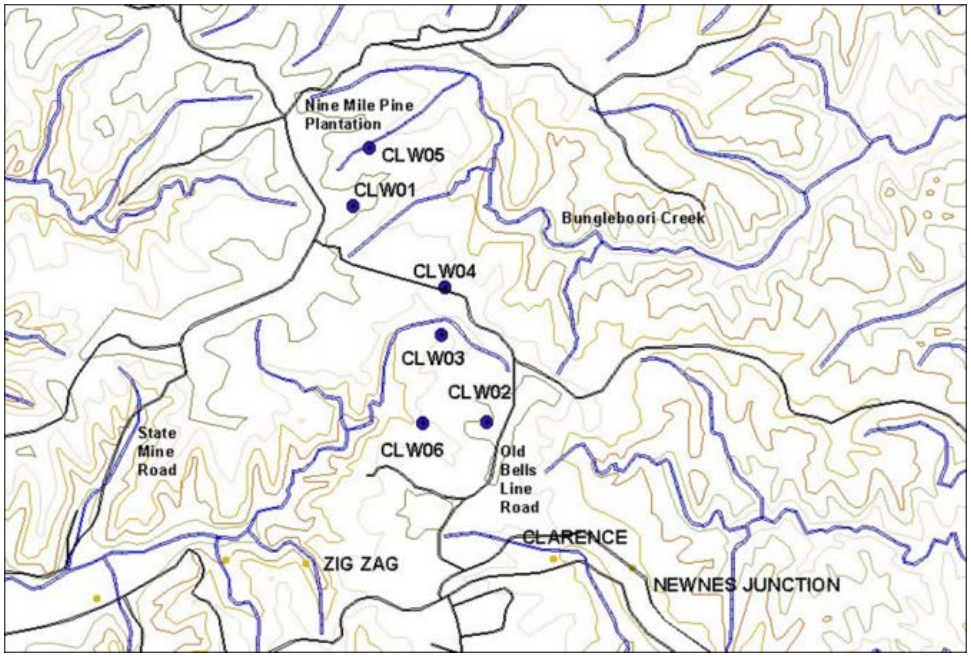


Figure 44 Locations of Fauna Monitoring Sites in 700 Western SMP Area

Twenty-one threatened species have been located within Clarence Colliery Western SMP Application areas as a result of the surveys up to 2014. These are the Gang-gang Cockatoo, Glossy Black-cockatoo, Turquoise Parrot, Brown Treecreeper, Hooded Robin, Scarlet Robin, Flame Robin, Varied Sittella, Masked Owl, Powerful Owl, Squirrel Glider, Eastern Pygmy-possum, Large-eared Pied Bat, Greater Broad-nosed Bat, Large-footed Myotis, Eastern False Pipistrelle, Eastern Bentwing Bat, Little Pied Bat, Blue Mountains Water Skink, Giant Burrowing Frog and the Giant Dragonfly . Some of these species are dependent upon large areas of native woodland for populations to survive. In the Newnes Plateau region woodland habitat has been retained (albeit logged), and these threatened species are still to be located. Several of the threatened species are found in most years e.g. Gang-gang Cockatoo, Flame and Scarlet Robins and Eastern Bent-wing Bat.

Few of the threatened species would be directly affected by subsidence-induced changes to their preferred habitat, with exception of the Large-eared Myotis, Eastern Bent-wing Bat, Blue Mountains Water Skink and Giant Dragonfly. The bats can roost in caves and overhangs and the Blue Mountains Water Skink and Giant Dragonfly are associated with wet swamps. Both habitats can be directly affected by subsidence effects (cliff collapse and swamp drainage) but there is no evidence of such impacts occurring in the Clarence West SMP areas. A single sighting of a Turquoise Parrot occurred at CLW06. This species is associated with edges of woodland and open grassland and the Turquoise Parrot may have been attracted to the area because of the loss of middle storey cover as a result of the State Mine fire.

Despite searching preferred habitats during the warmer months in 2014, there was no evidence of the presence of the Blue Mountains Water Skink and Purple Copperwing Butterfly in the area, but the Giant Dragonfly was located at CLW02, CLW03, CLW04 and CLW05. Six threatened species were located during 2014.

The configuration of survey sites established in 2006 adequately samples the two major environments within Clarence Colliery Western SMP Application areas i.e. pagoda and wetland (swamp). These sites will provide the best possible data for the long-term monitoring of terrestrial vertebrates. The survey techniques used have been successful in locating a wide range of species, including new records for the Newnes Plateau region. The pagoda habitat mainly comprises low heath that is characteristic of pagoda and hilltop environments at Newnes Plateau.

The Western SMP areas appear to be productive, in terms of fauna diversity values. At this stage twenty one threatened species are known to occur within the area and there are several species that have been located that are considered as being of conservation concern in this region e.g. Beautiful

Firetail, Rufous Fantail, Long-nosed Bandicoot. The area can be considered to be heavily disturbed by recreational activities, particularly trail bikes, and this must be brought into consideration when assessing any changes in the future.

The major influence upon the fauna populations (and vegetation) within Clarence West has been the State Mine fire that burnt out all the sites in the area. Fire is a natural part of Australian ecosystems and the State Mine fire that burnt prior to the survey of the Clarence West area is typical of a high intensity burn. It has been observed that this fire appeared to be of greater intensity than that which occurred in 1997 (Roger Lembit pers. comm). The effects from the fire will last for many years.

Although species richness and biodiversity indices have remained constant or risen over the years and do not appear to be affected by the State Mine fire, habitat characteristics and animals numbers, particularly small ground mammals have declined in 2013 and 2014. Some habitat characteristics have recovered whilst others are still lower than before the fire.

3.8.2.2 Outbye SMP Area

Three sites surveyed in 2014 have been established within the Outbye SMP Area including (**Figure 45**):

- *Heath North (Site 1)* – Sandstone Plateaux Tea Tree – Dwarf Sheoak – Banksia Rock Heath Sandstone Plateau and Ridge Scribbly Gum Silvertop Ash Shrubby Woodland;
- *Gully (Site 2)* – Pagoda Rock Sparse Shrubland and Newnes Sheltered Peppermint – Brown Barrel Shrubby Forest; and
- *Heath South (Site 3)* - Exposed Blue Mountains Sydney Peppermint – Silvertop Ash Shrubby Woodland.

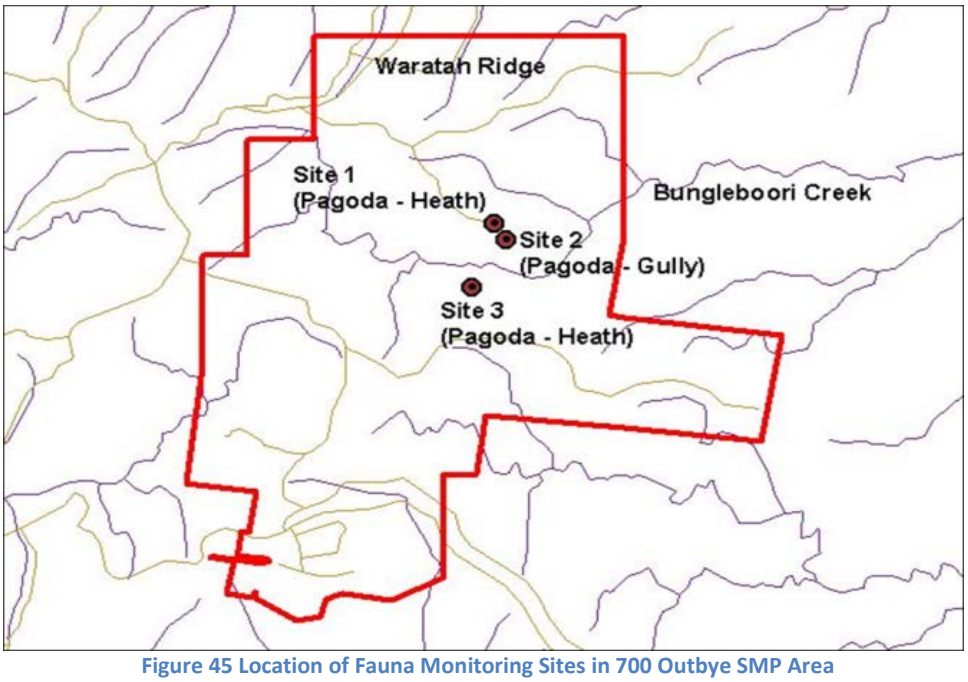


Figure 45 Location of Fauna Monitoring Sites in 700 Outbye SMP Area

A total of 47 bird, nine reptile, three amphibian and 16 native (plus two introduced) mammal species were located within Clarence Colliery Outbye SMP Application area during the 2014 surveys.

Although the number of amphibian species has been low over the years (possibly due to the cold conditions during most surveys), bird, reptile and mammal species diversities were typical of that expected from the Central Tablelands. A total of 81 bird, 24 native mammal, 17 reptile and four amphibian species have been located within the Clarence Colliery Outbye SMP Application area since 2008.

In 2014, four new bird species (Galah, White-throated Gerygone, Sacred Kingfisher, and White-throated Nightjar), one new native mammal species (Little Forest Bat), two new reptile species (Small-eyed Snake, Mustard-bellied Snake) and two frog species (Eastern Banjo Frog, Peron's Tree Frog)

were recorded. All of these species have been located within the Newnes Plateau area over the years. It is likely that new species will be added each year as the surveys progress over time.

Three threatened species have been located within the Clarence Colliery Outbye SMP Application Area as a result of the surveys in 2014. These were the Flame Robin, Eastern Pygmy-possum, and Eastern False Pipistrelle. The threatened bird and mammal species are dependent upon large areas of native woodland for populations to survive. In the Newnes Plateau region woodland habitat has been retained (albeit logged), and these threatened species are still located there.

None of the threatened species should be directly affected by subsidence-induced changes to their preferred habitat and there is no indication that underground mining at Clarence Colliery has affected the population status of this threatened species or any other species.

Despite searching preferred habitats during the warmer months, there was no evidence of the presence of the Giant Dragonfly and Purple Copperwing Butterfly in the area, nor of the Blue Mountains Water Skink.

At present, there appears to be no evidence of potential effects from subsidence upon the fauna diversity at Clarence Colliery. The major effects have been from the State Mine fire that burnt through the Clarence 800 area and resulted in the loss of habitat and possibly fauna.

3.8.2.3 700 Eastern SMP Area

The sites sampled in 2014 were the same as that surveyed in previous years i.e. BNS02, PAG01/02 and PAG03/04. The locations of these sites are shown in **Figure 46**. The summer surveys concentrated on the swamp site, as this survey targeted threatened species associated with wetter habitats. The sites are described as:

- BNS02 (Bungleboori North 1) – a swamp located within the pine forest east of Waratah Ridge Road. The swamp supports a mix of Newnes Shrub Swamp and Blue Mountains Sandstone Plateau Forest.
- PAG01/02 – a pagoda and steep hill overlooking Bungleboori Creek. This site samples Pagoda Complex and Blue Mountains Sandstone Plateau Forest vegetation, as well as habitats unique to the cliff line environment.
- PAG03/04 – a pagoda and steep hill overlooking Bungleboori Creek, similar to PAG01/02.

A total of 51 bird, five reptile, two amphibian and 13 native (plus four introduced) mammal species were located within the Clarence Colliery Eastern SMP Application area during the 2014 surveys. A total of 101 bird, 26 reptile, 31 native mammal and five amphibian species have been recorded from the Area since 2004. Twelve threatened species have been located within the Clarence Colliery Eastern SMP Application Area as a result of the surveys between 2004 and 2014. These are the Gang-gang Cockatoo, Glossy Black-cockatoo, Powerful Owl, Brown Treecreeper, Hooded Robin, Flame Robin, Scarlet Robin, Varied Sittella, Large-eared Pied Bat, Eastern False Pipistrelle, Eastern Bentwing Bat and the Large-footed Myotis. Most of these species are dependent upon large areas of native woodland for populations to survive. In the Newnes Plateau region woodland habitat has been retained (albeit logged), and these threatened species are still located. Some threatened species have been located consistently over the years e.g. Eastern Bentwing Bat, Flame and Scarlet Robins and Gang-gang Cockatoo. In 2014, four threatened species were located – Glossy Black-cockatoo, Flame Robin, Scarlet Robin and the Varied Sittella.

None of the threatened species would be directly affected by subsidence-induced changes to their preferred habitat, except for the Large-footed Myotis. This species roosts within rock shelters, such as caves and rocky overhangs, and hunts over water. Both of these habitats are found in the Clarence Eastern SMP Area but, at this stage, there is no indication that underground mining at Clarence Colliery has affected the population status of this threatened species or any other species. Mining activities at Clarence result in 3 – 10cm of subsidence and ongoing surveys have shown that this amount of subsidence (including tilts and strains) is not sufficient to cause negative consequences on rock shelters, pagodas and cliff lines.

Despite searching preferred habitats during the warmer months, there was no evidence of the presence of the Giant Dragonfly, Giant Burrowing Frog and Purple Copperwing Butterfly in the area, nor of the Blue Mountains Water Skink.

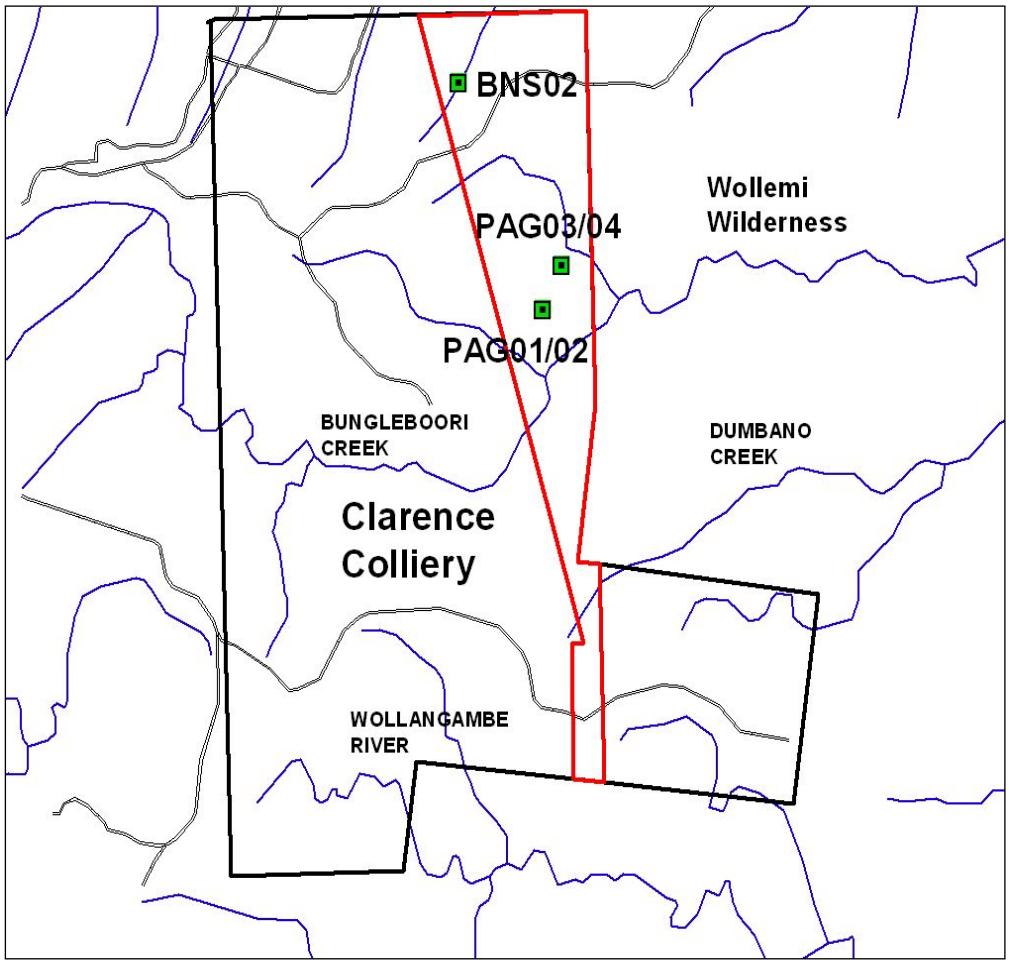


Figure 46 Locations of all survey sites within Clarence Colliery Eastern SMP Application Area used during 2014.

The configuration of survey sites established in previous years adequately samples the two major environments within the Clarence Colliery Eastern SMP Application Area i.e. pagoda and wetland (swamp). These sites provide the best possible data for the long-term monitoring of terrestrial vertebrates. The survey techniques used have been successful in locating a wide range of species, including new records for the Newnes Plateau region. However, it is recommended that the BNS02 site be moved to another nearby site to ensure the continuation of control data.

As extraction in the Eastern SMP Area was completed early in 2009, it is evident from the above analyses that there have been no significant differences in the indices measured over the years. At present, there is no evidence of potential effects from subsidence upon the fauna diversity at Clarence Colliery.

3.8.2.4 800 Eastern Area

Three sites were established in the 800 Area during 2009 and fauna surveys were undertaken in autumn, spring and summer in that year, and annually up to 2014. The sites are:

- 800 Swamp 1 Site samples Newnes Plateau Shrub Swamp in the central part of the 800 Area.
- 800 Heath Site samples Montane heath vegetation south of Dumbano fire trail.
- 800 Swamp 2 Site samples the woodland and gully vegetation in the eastern part of the 800 Area.

Selection of these areas complement flora and fauna survey sites elsewhere across the Clarence Colliery area. Existing control sites would be suitable as control sites for these new sites. These three sites are mapped in the **Figure 47**.

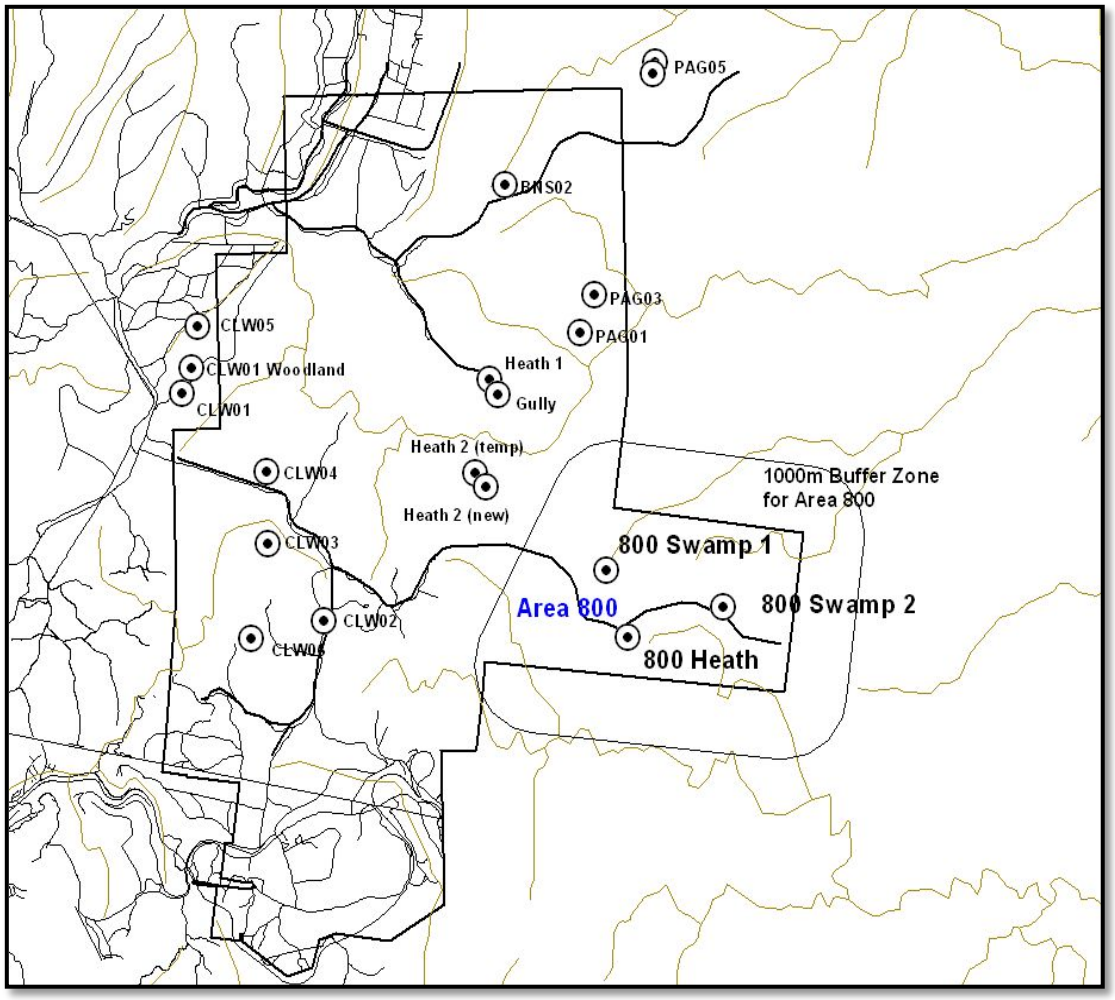


Figure 47 Location of Fauna Monitoring Sites in 800 SMP Area

A total of 43 bird, 15 native mammal (plus three introduced mammal), seven reptile and two amphibian species were located during the surveys. Seven threatened species were located during the 2014 surveys. These were the Giant Dragonfly, Eastern False Pipistrelle, Eastern Bent-wing Bat, Powerful Owl, Varied Sittella, Flame Robin and the Scarlet Robin. The Giant Dragonfly was observed during the summer surveys at several locations and in relatively high numbers (13 seen). The higher numbers than usual may be due the more open nature of the swamps post-fire.

The fauna monitoring surveys of 800 Area in 2014 have shown that the choice of survey sites was successful, in terms of the number of individuals and diversity of species within the main fauna groups surveyed. Also, there were sufficient numbers and diversities of these fauna groups to be able to calculate a set of diversity indices that form part of the baseline monitoring database.

Given the low levels of subsidence from previous mining at Clarence Colliery, and the predicted low levels (3–10cm) of subsidence for Area 800, the risk of adverse impacts on fauna within this area is considered to be low.

3.8.2.5 900 Areas (913 and 917 Panels)

With the expansion of mining into Area 900 at Clarence Colliery it is necessary to monitor fauna populations within the area, particularly within any swamps considered as Endangered. Two sites have been selected in the north and south of the area and their locations are shown in **Figure 48**.

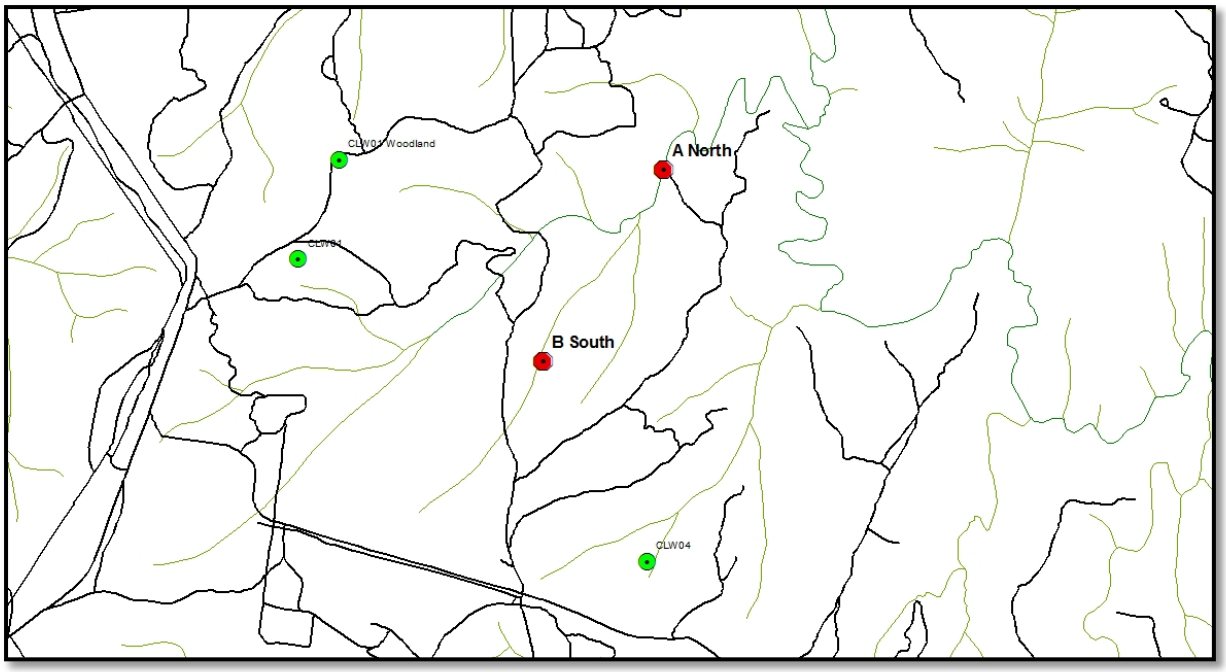


Figure 48 Locations of Two Survey Sites in Clarence 900 Areas.

Site A North is located along Paddys Creek, a tributary to Bungleboori Creek. The site covers the creek line and surrounding woodland and low heathy shrub. Along the western edge of the site is a cliff line about 50 m high. The site was burnt in the 2013 State Mine fire and the vegetation is still recovering. Consequently, little of the original shrub cover exists at present. The burnt remains of a pipeline run beside the creek, possibly connected with the nearby quarry.

Site B South is also located along Paddys Creek, but further towards the headwaters. The site covers the creek line and associated riparian area, as well as the surrounding woodland. A deep trench had been dug beside the creek, presumably to drain the area. The site was burnt in the 2013 State Mine fire and the vegetation is still recovering. Consequently, little of the original shrub cover exists at present. The burnt remains of a pipeline run beside the creek, possibly connected with the nearby quarry.

A total of 40 bird, five native mammal, one reptile and one amphibian species were located during the surveys.

The fauna monitoring survey of the 900 Area i.e. panels 913 and 917, has shown that the choice of survey sites was successful, in terms of the number of individuals and diversity of species within the main fauna groups surveyed. Also, there were sufficient numbers and diversities of these fauna groups to be able to calculate a set of diversity indices that form part of the baseline monitoring database. However, as with that found in other sites within Clarence Colliery that have been affected by the 2013 State Mine fire, fauna numbers and diversity were low, particularly concerning mammals. It is anticipated that populations will build up over time. Three threatened species were located during the surveys, the Gang-gang Cockatoo, Flame Robin and Giant Dragonfly. All three species were located within 900 Site B South. Some threatened bat species may also occur, but the analysis is not complete.

Given the low levels of subsidence from previous mining at Clarence Colliery, and the predicted low levels (30-100mm) of subsidence for the 900 Area, the risk of adverse impacts on fauna within this area is considered to be low.

3.9 Weeds

Weed control operations are undertaken at Clarence in accordance with the Noxious Weeds Act 1993 (NWA) which provides that occupiers of land have responsibility for controlling noxious weeds. Under Section 8 of the NWA, noxious weeds can be grouped into five classes, as follows:
Class 1 – State Prohibited Weeds;
Class 2 – Regionally Prohibited Weeds;
Class 3 – Regionally Controlled Weeds;
Class 4 – Locally Controlled Weeds;
Class 5 – Restricted Plants.

Pampas grass (Cortaderia selloana) (Class 3), Blackberry (Rubus fructicosus) (Class 4) and St Johns Wort (Hypericum perforatum) (Class 3) have been recorded at Clarence with weed control measures carried out as required to control the spread of these noxious weeds around the pit top including the CHPP, administration buildings, water storages, drainage lines, access roads and rehabilitation areas. Weeds are managed across Clarence mine through a series of control measures, including:

- Designated light vehicle roads and track delineated around the site;
- Herbicide spraying or scalping weeds off topsoil stockpiles prior to re-spreading;
- Inspections of rehabilitated areas to identify potential weed infestations; and
- Identifying and spraying existing weed populations on-site together with on-going weed spraying over the life of the operation.

Weed spraying is completed monthly in a manner that minimised soil disturbance. Any use of herbicides was carried out in accordance with appropriate requirements to minimise the risk of impact on downstream water quality. Records will be maintained of weed infestations, and control programs will be implemented according to accepted management practice for the weed species concerned. The appropriate noxious weed control or eradication method and program will be undertaken in consultation with the Local Council and/or the local Noxious Weeds Inspector.

All weed management personnel have been trained in the use of herbicides. Herbicides listed under international conventions, such as the World Health Organisation and the Stockholm Convention, would only be used according to the requirements of those conventions.

3.10 Blasting

No blasting on the surface is undertaken at Clarence Colliery. Some shot firing is undertaken in the underground workings to excavate material to establish ventilation for the underground roadways.

3.11 Operational Noise

Clarence Environmental Impact Statement (2000) predicted no additional noise impacts from the operation would occur giving consideration to the underground extraction of coal, pit top and CHPP operation, and haulage by road or rail. Clarence monitoring to date has indicated that the Colliery has not impacted on noise in the environment. The Clarence Colliery Noise Management Plan was modified during the reporting period in order to address modifications made to DA 504-00 in May. Noise monitoring results for 2014 is provided in Section 3.10.2.

3.11.1 Control Measures

Measures employed to control and limit noise emissions from the site include:

- Correct and efficient operation of all surface machinery;
- Regular servicing and maintenance of all machinery;
- Education of all drivers hauling materials through residential areas; and
- Registering all noise related complaints to identify any actions that may be necessary to further reduce noise emissions from the site.

Several options to minimise noise associated with rail loading and rail operations on the Clarence Colliery loop have been developed and implemented. These include:

- Scheduling coal train movements within day time hours where practical (this can be achieved for approximately 70% of trains);

- Scheduling coal train movements within evening hours is preference to night hours (this can be achieved for approximately 20% of trains);
- Instructing coal train operators to decelerate and accelerate slowly and smoothly when approaching rounding and departing the rail loop;
- Filling the train loading bin during daylight hours and maintaining the bin at greater than 60% during train loading operations (so as not to create excess noise from filling the bin); and
- Maintaining the train loading infrastructure by including weekly inspections on the coal loading conveyor belt system to detect wearing and noisy rollers, monthly inspections on the drive motors and belts for early detection of failing parts and yearly structural inspections on the belt gantry and associated infrastructure to detect and repair loose components potentially leading to noise. Corrective action required as a result of these inspections is managed through the mine planning corrective action system.

3.11.2 Results

Condition 15 of Schedule 3 of DA 504-00 states that, noise generated by the development, excluding train-loading facilities and rail operations, should not exceed the noise impact assessment criteria (**Table 13**) at any residence on privately owned land.
Noise monitoring results to date indicate that noise levels from the colliery operations are below those stated in Condition 15 of Schedule 3 of DA 504-00. The noise monitoring results for 2014 (attended) is presented in **Table 14** and results for 2014 (unattended) in **Table 15.**.

Table 13. Noise Impact Assessment Criteria

Frequency	Receptor	Duration	Outcome
Annual (March of each Year)	Closest potentially affected residences	1 Day Attended, 1 Evening Attended, 1 Night Attended. 5 Day Unattended 5 Evening Unattended 5 Night Unattended.	LAeq, LA90, LA10, LA1 and LAeq,15min (dB(A)) for day, evening and night. LAeq, LA90, LA10, LA1 and LAeq,15min (dB(A)) for day, evening and night.

Table 14. Short Term Noise Monitoring Results 2014 (Attended)

Day	LA_{eq}	Estimated Mine Contribution LA_{eq} (15 minute)	DA Consent Limit (Daytime)	Description of Noise Emissions
3:55 PM	39	38	38	-Distant Traffic noise 41 - 45 -Bird song 42 -45 -Trees in wind 40-43 -Insect 39 -Train Passby 49 - 55 -Clarence Colliery general operations audible up to 38 -Clarence Colliery Reversing Alarm 46
4:13 PM	41	38	38	-Traffic noise from Sandham -Road 61 -Distant Traffic noise 46 - 47 -Bird song 41 -44 -Trees in wind 40-41 -Insect 38-39 -Clarence Colliery general operations audible up to 38

				-Clarence Colliery Reversing Alarm 43-44
5:02 PM	35	36	38	-Distant Traffic noise 38 – 45 -Traffic noise from Sandham -Road 46-60 -Bird song 42 -56 -Trees in wind 38-40 -Insect/frogs 43-45 -Clarence Colliery general operations audible up to 36 -Clarence Colliery Reversing Alarm 36-37
5:17 PM	34	35	38	-Distant Traffic noise 36 – 47 -Traffic noise from Sandham Road 40-64 -Bird song 39 -48 -Trees in wind 34-35 -Insect/frogs 35-38 -Clarence Colliery general operations audible up to 35 -Clarence Colliery Reversing Alarm 36
6:00 PM	33	35	36	-Distant Traffic noise 35 - 50 -Trees in wind 36-37 -Insect/frogs 38 - 41 -Train Passby 46 - 57 -Clarence Colliery general operations audible up to 35
6:15 PM	35	34	36	-Distant Traffic noise 40 – 46 -Bird song 36 -Insect/frogs 39 - 43 -Clarence Colliery general operations audible up to 35 -Clarence Colliery Reversing Alarm 35-36
7:00 PM	39	36	36	-Distant Traffic noise 43 – 47 -Bird song 45 -46 -Train Passby 49 - 54 -Trees in wind 38-39 -Insect/frogs 40-42 -Dog Barking 44 -Clarence Colliery general operations audible up to 36 -Clarence Colliery Reversing Alarm 37
7:15 PM	41	36	36	-Distant Traffic noise 45 – 48 -Bird song 45 -46 -Traffic noise from Sandham Road 60-62 -Insect/frogs 40-46 -Clarence Colliery general operations audible up to 36 -Clarence Colliery Reversing Alarm 44
10:00 PM	35	34	35	-Distant Traffic noise 43-45 -Train Passby 45-50 -Insect (Constant) 41- 43 -Clarence Colliery general operations audible (constant) up to 34.
10:15 PM	37	35	35	-Distant Traffic noise 45-50 -Insect (Constant) 44- 45 -Clarence Colliery general operations audible (constant) up to 35. -Clarence Colliery Reversing Alarm 36-37
11:00 PM	28	Not Audible	35	-Distant Traffic noise 35 – 47 -Insects/frog 38 -40 -Train Passby 52 - 64 -Dog Barking 43 -Clarence Colliery Not Audible
11:15 PM	35	Not Audible	35	-Distant Traffic noise 47 – 53 -Insects/frog 36 -37 -Train Passby 46 - 58 -Clarence Colliery Not Audible

Table 15. Long Term Noise Monitoring Results 2014 (Unattended)

Date	ABL Day L90	ABL Evening L90	ABL Night L90	Leq Day	Leq Evening	Leq Night
Monday-17-Mar-14		34	23		45	43
Tuesday-18-Mar-14	34	33	26	44	43	41
Wednesday-19-Mar-14	32	32	24	42	48	39
Thursday-20-Mar-14	31	33	29	41	42	38
Friday-21-Mar-14	33	34	25	43	43	43
Saturday-22-Mar-14	32	26	23	46	39	32
Sunday-23-Mar-14	28	33	23	52	43	39
Date	L10 Day	L10 Evening	L10 Night	L1 Day	L1 Evening	L1 Night
Monday-17-Mar-14		46	43		48	48
Tuesday-18-Mar-14	44	42	41	49	49	46
Wednesday-19-Mar-14	42	45	36	49	52	43
Thursday-20-Mar-14	41	44	40	48	47	42
Friday-21-Mar-14	43	41	36	49	44	43
Saturday-22-Mar-14	43	41	28	49	45	35
Sunday-23-Mar-14	44	43	37	51	49	41

Note: Daytime is 7am to 6pm. Evening is 6pm to 10pm. Night-time is 10pm to 7am.

3.12 Visual or Stray Light

Clarence Colliery's nearest neighbour is approximately 1.5 kilometres from the mine and is separated from the Colliery by a ridge. Consequently the risk of off-site visual or lighting impacts from the operation is extremely low. Nevertheless, in accordance with Condition 22 of DA 504-00, all external lighting associated with operations at Clarence complies with Australian Standard AS4282 (INT) 1995 – Control of Obtrusive Effects of Outdoor Lighting.

No community complaints were recorded regarding light annoyance at Clarence during the reporting period.

3.13 Aboriginal Heritage

Aboriginal sites in the area are generally situated in rock shelters although some open sites associated with hanging swamps have been found. No archaeological sites have been recorded within the Pit Top area. Seven aboriginal sites have been recorded in ML1353 of which six are located on or adjacent to Mt. Horne within ML 1354. The seventh site is located in CCL 705.
Two major site complexes have been identified within ML1353 & ML1354; one at Mt Horne (Site 1) and one south of Waratah Ridge Road (Site 2) approximately 300m west of Mt Horne.
An archaeological survey was conducted for the Clarence Colliery Lease Extension Environmental Impact Statement (EIS) (International Environmental Consultants 2000) and included a search of the DEC-NPWS database and the Native Title Register as well as a field survey of the lease extension areas. The desktop search identified 63 Aboriginal sites in the vicinity of the mine. Of these sites, 44 sites are within the lease areas. The 44 sites include:

- Twelve rock shelters with art;
- Eleven rock shelters with deposits;
- Six axe grinding groove sites;

- Fourteen open camp sites; and
- One scarred tree.

The archaeological field survey identified nine indigenous heritage sites and two isolated artefacts. The sites included six open campsites, two rock shelters with deposits and one group of three scarred trees which were recorded as one site. Six sites consisting of four open campsites and two rock shelters were located in the western section of ML1583. Three sites consisting of two open camp sites and 1 group of three scarred trees, as well as two isolated artefacts, were located in the eastern part of ML1583.

As described above, a number of aboriginal sites have been recorded in the Clarence Colliery lease areas. However, underground mining as proposed by Clarence will have no impact on Indigenous open scatter sites, scarred trees or isolated artefacts within the lease area because the mining method used does not result in any significant direct surface impacts (International Environmental Consultants 2000).

Archaeological assessments for each SMP have been carried out in accordance with NSW Office of Environment and Heritage (OEH) Aboriginal Cultural Heritage Consultation requirements.

A Cultural Heritage Assessment was undertaken in 2013 for preparation of the establishment of REA VI. No archaeological sites were disturbed during the reporting period. With subsidence levels less than 100mm using the partial extraction mining method, no impacts on Aboriginal Heritage sites are expected from underground mining.

An agreement with the Gundungurra Tribal Council has been reached with regards to future mining and prospecting activities at Clarence. The Gundungurra Tribal Council is to be involved in all aboriginal heritage surveys for any exploration, surface development and subsidence planning activities.

A Western Regional Aboriginal Cultural Heritage Management Plan was approved by the Department of Planning and Environment during the reporting period.

3.14 European Heritage

A number of European heritage items have been identified in the Clarence Colliery lease areas include:

- A section of the Zig Zag Railway and associated buildings;
- The old Newnes railway route, which crosses the existing lease near the ventilation fan and the north western portion of ML1583. The Newnes rail link was constructed across the Newnes plateau between Newnes Junction in the south and Newnes in the north. The railway was completed in 1907, but was later abandoned with the cessation of mining at Newnes;
- The Old Bells Line of Road that passes across the western section of the Clarence Colliery lease areas; and
- A large disused corrugated iron and cement water storage tank located in the north-western section of the lease areas, above Bungleboori Creek. This tank was identified in the Clarence EIS in 2000, and may have been associated with the Newnes Railway activities in the area.

The literature review conducted as part of the archaeological investigations for the 2000 Clarence Colliery EIS also identified Happy Valley Springs as the site of a Drovers Camp from the 1820s. However, no physical evidence of this camp was identified during the field survey.

As is the case with all surface features, the major potential threat to heritage items from the underground mining operations is from potential subsidence related impacts. The partial extraction underground mining method used at Clarence and the resulting minimal surface disturbance means that there will be no direct impact on items of heritage significance in the vicinity of Clarence Colliery.

Clarence's lease area partially abuts the Blue Mountains National Park (BMNP), Wollemi Wilderness Area (WWA) and the Greater Blue Mountains World Heritage Area (GBMWHA) to the east and Newnes State Forest to the north. The BMNP, WWA and GNMWHA contain large pristine areas of great scenic and aesthetic value as well as providing primary habitat to a number of threatened and protected species (Clarence Colliery 2005, 2011 & 2013).

Partial extraction of coal is extremely unlikely to affect the BMNP, WWA and the GBMWHA. This is due to the fact that the level of subsidence will not exceed and that subsidence impacts will not occur outside the mining area (Clarence Colliery 2005, 2011 & 2013).

There is no overlap between the mining leases and the BMNP, WWA and the GBMWHA.

Review of the environmental sensitivity of land occupied by Clarence Colliery is undertaken.

There has been no impact to European heritage during the reporting period.

3.15 Natural Heritage

Newnes State Forest occupies a large portion of the area above the Clarence coal leases. The natural heritage values of the area have been reviewed and characterised as inputs for the subsidence management planning process. The significant values consisted of swamps, creeks and endangered flora and fauna. There was no impact to natural heritage during the reporting period.

3.16 Spontaneous Combustion

Clarence Colliery has not had any incidences of spontaneous combustion either underground or within surface emplacements, a therefore considered a low risk. However, through the mine's telemetric monitoring system Clarence has the ability to continuously monitor and respond to any evidence of spontaneous combustion, in the unlikely event that the situation should arise. This system monitors both conveyor belt roadways as well as return roadways of working sections and outbye areas for ventilation flow, methane and carbon monoxide. The monitoring system has a readout and alarm at the surface as well as systems in place defining alarm levels and appropriate responses should they be triggered.

Clarence Colliery mines coal from the Katoomba seam, which is known to have a low propensity for spontaneous combustion. The low propensity for spontaneous combustion is identified from coal self-heating laboratory testing and a historical absence of spontaneous combustion at Clarence Colliery.
No incidents of spontaneous combustion occurred during the reporting period. Clarence has no record of a heating event at the CHPP or in the underground.

3.17 Bushfire

Clarence maintains an Asset Protection Zone (APZ) around all assets situated within the Clarence Mining Lease where possible. Asset Protection Zones act as a buffer between the development and the hazard and are the principal fire protection mechanism.
Fire prevention strategies employed on site include the following:

- Maintaining all mobile equipment in good working order with efficient exhaust systems and ensuring fire extinguishers are installed;
- Ensuring clearing operations are not undertaken during periods of extreme fire danger;
- Clarence Colliery's earthmoving equipment is available for fire fighting purposes in the event of a fire approaching the Pit Top; and
- Fire fighting water is reticulated around the Pit Top.

3.18 Mine Subsidence

The location of environmental monitoring sites related to subsidence is shown in **Appendix 4**.

3.18.1 SMP Applications and Variations

During the reporting period, the following SMP applications and variations occurred:

900 Area

- Submission of the 900 Area SMP Application (11th September 2013). The 900 Area was approved on 21 January 2014.
- Notification letters regarding the approval were circulated on the 30th January 2014.
- The 900 Area Variation 1 was submitted on the 24th February 2014 and was approved on 7th May 2014.
- The 900 Area Variation 2 was submitted on the 4th December 2014 and was approved on 10th February 2015.
- The 900 Area Subsidence Monitoring Program was submitted on 24th February 2014 and was approved on 7th July 2014.

- The 900 Area Public Safety Management Plan was submitted on 24th February 2014 and was approved on 23rd April 2014.
- The 900 Area Environmental Monitoring Program was submitted on 21st May 2014 and was approved on 19th June 2014.
- **800 Area**
- The 800 Area Variation 1 was submitted on the 14th March 2014 and approved on 7th May 2014.
- The 800 Area Variation 2 was submitted on 25th August 2014 and approved on 29th September 2014.
- The 800 Area Subsidence Monitoring Program was submitted on the 13th January 2014 and was resubmitted again on the 30th May 2014. Approval for 803 Panel was granted on 4th July 2014 and approval for 810 panel was granted on 21st October 2014. Presently, subsidence monitoring is only approved for the 810 panel.
- The 800 Area Public Safety Management Plan was submitted on 21st October 2014 and was approved on 23rd April 2014
- The 800 Area Environmental Subsidence Monitoring program was submitted on 21st May 2014 and was approved on 19th June 2014

3.18.2 Summary of Subsidence Monitoring

The 700A line results from 2014 were all less than 50mm.

- Maximum subsidence over 702 panel was recorded to be 47mm, very similar to the 2013 result of 43mm,
- Maximum subsidence over 704 panel was recorded to be 45mm, very similar to the 2013 result of 42mm,
- maximum subsidence over 708 panel was recorded to be 35mm, which is lower than the 2013 result of 27mm, but similar to the 2012 survey of 31mm,
- Maximum subsidence over 710 panel was recorded to be 39mm (in the July 2014 survey), which is lower than the 2013 and the January 2014 result of 25mm,
- Maximum subsidence over 712 panel was recorded to be 43mm which is lower than the 2013 result of 37mm.
- Measured subsidence over the first two headings of 714 panel were recorded to be 35mm which is lower than that recorded in 2013 at 24mm.

All subsidence results are less than the 100mm performance criteria. Strain results mirror that recorded in 2013, 2012 and 2011 which indicates that any ongoing settlement since 2011 has not likely induced additional strains. All tilt results remaining less than +/- 1mm/m.

The 700B line results from 2014 are all generally less than 50mm.

- Maximum subsidence over 702 panel was recorded to be 34mm, almost the same as the 2013 result of 33mm,
- Maximum subsidence over 704 panel was recorded to be 32mm, almost the same as the 2013 result of 30mm,
- Maximum subsidence over 708 panel was recorded to be 33mm, slightly less that the 43mm recorded in 2013,
- Maximum subsidence over 710 panel was recorded to be 38mm over the panel and 43mm adjacent to the barrier, which is similar to the 41mm recorded in 2013,
- Maximum subsidence over 712 panel was recorded to be 46mm, similar to the 53mm recorded in 2013; and
- Maximum subsidence recorded over 714 panel was recorded to be 40mm, which is quite different to the 61mm result recorded in 2013. The two surveys recorded over the 2014 period show very different results to the previous year.

The 2014 results align with expected behaviour and predictions, however ongoing surveys will confirm results.

Resurvey of the 707 line occurred on the 28th May 2014 as the 3 months post 700 Mains extraction and again on the 26th November 2014 as the annual survey. It is noted that some of the pegs along the 707 line (pegs 1 – 69) were affected by the October 2013 bushfires. Whilst some of the pegs were affected by the fire (dropped pins from melted components of the feno marker), they were not destroyed therefore, these pegs will continue to be surveyed.

Maximum subsidence along the 707 line measuring subsidence from the 707 panel was 18mm above the spine pillars.

The 900A line overlies the 904 panel. The three monthly post extraction subsidence survey recorded a maximum of 12mm of movement above the spine pillars.

All subsidence results are less than the 100mm performance criteria.

3.18.3 Subsidence Results

All subsidence monitoring results for 2014 were within the 100mm maximum predicted in the SMP for all panels and within the elastic limit of the overburden strata (100±25mm, Strata Engineering Australia 2005). The subsidence monitoring results are in accordance with those predicted in the Environmental Impact Statement (2000).

3.18.4 Flora and Fauna Results

Flora and fauna monitoring has shown no measurable impact from mining during 2014. Results for flora and fauna monitoring can be found in Section 3.7 and Section 3.8 respectively.

3.18.5 Groundwater Monitoring

Groundwater monitoring results during 2014 did not indicate any adverse impact on the near-surface aquifers. Full details on groundwater monitoring are provided in Section 3.6.

3.19 Contaminated Land

The following monitoring was completed during the 2014 reporting period:

- Bi-annual Groundwater Water Quality Analysis and measurement of Standing Water Levels (SWLs) at the nine installed bore holes. Samples are to be analysed for Heavy Metals (As, Cd, Cr, Cu, Pb, Hg, Ni and Zn), TPH, BTEX and PAH; and
- Bi-annual Surface Water Quality Assessment at the Clarence Main Dam (in addition to monthly compliance sampling). Samples are to be analysed for Heavy Metals (As, Cd, Cr, Cu, Pb, Hg, Ni and Zn), TPH, BTEX and PAH.

Nine bore holes (monitoring wells) and Clarence Main Dam were sampled quarterly in 2014 including:

- MW01;
- MW02;
- MW03;
- MW04;
- MW05;
- MW06;
- MW07;
- MW08;
- MW09; and
- Dam01.

Monitoring results have recorded below 'trigger' levels for chemicals within water using the assessment criteria endorsed by NSW EPA to evaluate groundwater analytical results based on the ANZECC/ARMCANZ (2000) *Australian and New Zealand Guidelines for Fresh and Marine Water*

Quality (ANZECC [2000]) and Clarence's EPL 726 concentration limits. Monitoring and sampling will continue and results will be analysed and trended to identify any potential groundwater contamination.

3.20 Methane Drainage

Methane has not been detected by any of Clarence's gas monitoring systems. This suggests that the region of the Katoomba coal seam that Clarence operates in is void of Methane gas. The monitoring systems include hand held gas detectors, real time gas monitoring throughout the mine, and routine monthly gas bag sampling of the underground environment with analysis by a gas chromatograph.
Methane drainage is not required at the Clarence Colliery.

3.21 Public Safety

Public safety risks associated with the mine are largely from public trespass on land around the Pit Top area. The site is fenced and sign posted and security gates operated by personal pin numbers are on both roads into the Pit Top area.
The main access areas to the site are fully fenced with six foot man proof fencing. The fencing runs along the southern boundary of the site beside the rail loop and up the western side of the pit top to the main car park area. All visitors to site are required to sign in at the main office, under the site representative they are visiting.

3.22 Other Issues and Risks

3.22.1 Risk Management

Environmental risks were considered within the Clarence Environment and Community Risk Assessment in 2013. The Risk Assessment is reviewed biennially inclusive of the current Environmental Risk Register (ERR) 22.

3.22.2 Feral Animals

Clarence Colliery continued its feral cat trapping program around the surface operations area. Trapping was conducted by Biodiversity Monitoring Services from 12-16 May 2014. A total of 24 traps were set around the site for three nights (a total of 96 trap nights). Traps were placed near the washplant, around pipes and buildings in the storage complex, and under dongas next to the offices. All trapping was conducted using NPWS Scientific Licence No. S10282, ACEC Approval No. AW96/033. A total of two feral cats were removed from site. All were taken to a Veterinary clinic in Lithgow where they were euthanized in a humane manner.

3.22.3 Greenhouse Gases

Clarence undertakes monitoring of greenhouse gas emissions for reporting under the National Greenhouse and Energy Reporting (NGER) Program. Under the Program Clarence reports on:

- Greenhouse gas emissions;
- Energy production; and
- Energy consumption.

Of the six greenhouse gases identified in the Kyoto Protocol, Clarence Colliery produces one of these, carbon dioxide (CO_2).
Greenhouse gas emissions reported through the NGER reporting program for the 2014 financial year reporting period (as reported) are listed in **Table 16**.
Scope 1 emissions refer to direct emission sources from Clarence. Scope 2 emissions refer to indirect emissions from the consumption of energy or heat produced by another organisation.

Table 16. Greenhouse Gas Emissions 2014 Reporting Period (CO_2 –e T)

Financial Year 2014	Financial Year 2013	Financial Year 2012	Financial Year 2011	Financial Year 2010	Scope
9 876	9 289	8 925	7 133	15 418	Scope 1
39 287	38 380	33 007	31 764	27 413	Scope 2

4. Community Relations

4.1 Environmental Complaints

Clarence did not receive any environmental or community complaints during the reporting period. A summary of community complaints over the last five years is provided in **Table 17**.

Table 17. Community Complaints at Clarence over a Five Year Period

	2010	2011	2012	2013	2014
Complaints	1	0	1	5	0
Type	Coal fallen from truck	NA	Dust	Noise	NA

4.2 Community Liaison

Clarence undertakes community engagement through planned and unplanned activities outlined in the Clarence Stakeholder Engagement Plan and below.
During 2014 Centennial Coal contributed through monetary and in kind donations to local community events and organisations. During the 2014 period community events and organisations supported are outlined below;

- Lithgow Show Society
- Kandos Centenary Celebration
- Portland Art Purchase Society
- Daffodils at Rydal
- Bathurst Thoroughbred Racing
- St Joseph's School P&F Association
- Lithgow Hockey Association
- Central West Vision Camp
- Mingaan Wiradjuri Aboriginal Corporation
- Lithgow High School
- Cooerwull Public School
- Portland Central School
- Ironfest
- Wallerawang – Lidsdale P & C Association
- Rydal A,H & P Association
- SDN Child & Family Service Lithgow
- Australian Roof Bolting & Coal Shovelling Titles
- Portland Development Association
- Wallerawang Public School

The Clarence Colliery Community Consultative Committee (CCC) was established in 2006. Committee meeting minutes are available online at the Centennial Coal website (www.centennialcoal.com.au). The Clarence CCC met four times during 2014. Information present in the meetings include operational, environmental and community performance updates.
Specific items discussed during committee meetings in 2014 include:

- The Subsidence Management Plan Development for 900 Area;
- Construction and operation of Reject Emplacement Area VI;
- Rehabilitation Activities;
- Water Management Activities and Improvements;
- REA VI construction and operations performance;
- 900 Area Exploration Program;
- Community Activities and Involvement;
- Environmental monitoring and performance; and

- Environmental incidents/complaints.

5. Rehabilitation

5.1 Buildings

No buildings were removed during the reporting period.

5.2 Rehabilitation of Disturbed Land

To allow the development of Reject Emplacement Area (REA) VI, 4ha was cleared during the reporting period. According to best management rehabilitation practices, stripped topsoil and subsoil was applied directly on the completed REA Iva, allowing maximum biological availability and reducing double handling. Locals seeds collected from site were propagated at the Lithgow Community Nursery and planted across the newly rehabilitated REAIV and REA IVa. In total 3000 Eucalypts, Casurinas, Tea Tree and Acacia were planted. Further benching and drainage works were completed on REA IV during the reporting period to ensure water readily drains from the surface and does not cause erosion. Upslope of the newly constructed REA VI, the clean water diversion bund was also seeded, ensuring maximum soil stability and minimising the potential for erosion and wash outs. EFA monitoring will be employed to monitor the progress of rehabilitation and compare with analogue, ensuring the final landform is compatible with the requirements set out in Clarence's Mine Closure and Rehabilitation Plan and it's recent approved Mining Operations Plan.

A rehabilitation plan is shown in **Appendix 7** and a rehabilitation summary is given **in Table 18** and **Table 19**.

Table 18. Rehabilitation Summary

MINE LEASE AREA	Area Affected/Rehabilitated (hectares)			
	To Date	Last Report	Next Report (estimated)	
A1: Mine Lease(s) Area	7740			
B: Disturbed Areas				
B1: Infrastructure area (other disturbed areas to be rehabilitated at closure including facilities, roads)	39	39	39	
B2: Active Mining Area, (excluding items B3-B5 below)	0	0	0	
B3: Waste emplacements (active/unshaped/in or out-of-pit)	16.7	11.9	16.7	
B4: Tailings emplacements, (active/unshaped/in or out-of-pit)	0	0	0	
B5: Shaped waste emplacement (awaits final vegetation)	14	14	14	
ALL DISTURBED AREAS	69.7	64	69.7	F1
C: REHABILITATION PROGRESS				
C1: Total Rehabilitated Area	26	26	26	F2

(except for maintenance)			
D: REHABILITATION ON SLOPES			
D1: 10 to 18 degrees	0	0	0
D2: Greater then 18 degrees	0	0	0
E: SURFACE OF REHABILITATED LAND			
E1: Pasture and grasses	0	0	0
E2: Native forest/ecosystems	22.5	22.5	22.5
E3: Plantations and crops	0	0	0
E4: Other (include non vegetative outcomes)	0	0	0

Table 19. Maintenance Activities on Rehabilitated Land

NATURE OF TREATMENT	Area Treated (ha)		
	Report Period	Next Period	Comment/control strategies/ treatment detail
Additional erosion control (drains re-contouring, rock protection)	0.8	0	Re-contouring of REA IV drains, installation of additional sediment control structures, installation of mesh and seeding.
Re-covering (detail-further topsoil, subsoil sealing etc)	0.9	0	Progressive Rehabilitation of complete REA IV Batters.
Soil Treatment (detail-fertiliser, lime, gypsum etc)	0	0	
Treatment/Management (detail-grazing, cropping, slashing etc)	0	0	
Re-seeding/Replanting (detail-species density, season etc)	3.9	0	Cover crop and native seed applied
Adversely Affected by Weeds (detail-type and treatment)	19.5	19.5	Hand spraying for all environmental and noxious weeds.
Feral animal control (detail – additional fencing, trapping, baiting etc)	N/A	N/A	Feral Cat Trapping

5.3 Rehabilitation Monitoring

The rehabilitation monitoring program at Clarence was developed by AECOM in 2012, first implemented in 2012, and subsequently implemented in 2013. This is the third year of data acquisition and interpretation. Although it is too early to perform meaningful trend analysis at this stage of the monitoring program, the data collected thus far constitutes baseline data and the premise that will be essential in determining the performance trajectory of the monitored rehabilitated sites against target analogue sites in the future. Overall, the data derived from the monitoring program provides a scientifically robust platform against which the effectiveness of post-mining rehabilitation techniques can be assessed and, where applicable, amended. This is done with the aim of achieving

sustainable post-mining vegetation communities, which are aligned to the proposed post-mining land use for the Clarence mining lease area.

The suite of monitoring sites making up the monitoring program and studied in 2014 is listed in **Table 20**. The locations of the monitoring sites within Clarence (as well as the orientation of the study transects) and the REA boundaries are shown on **Figure 49**.

Table 20. Study Transects of Rehabilitation Monitoring Program

Transect	Type	Location	Rehabilitation Works Completion
Transect 1 (RHB1)	Rehabilitation	REA I	2002
Transect 2 (RHB2)	Rehabilitation	REA II	1996
Transect 3 (RHB3)	Rehabilitation	REA III	2002
Transect 4 (RHB 4)	Rehabilitation	REA IV	2012/13
Transect 5 (ANA1)	Analogue	South-east of Transect 2	NA
Transect 6 (ANA 2)	Analogue	Directly downslope of Transect 3	NA
Transect 7 (ANA 3)	Analogue	North-west of Transect 3	NA

Figure 49 REA's and Monitoring Transect Locations

The 2014 monitoring results and overall sites performances have clearly been impacted by the effects of the State Mine Bushfire that proceeded through the site in October 2013. Both rehabilitated and analogue sites experienced a clear decrease in scores from the 2013 monitoring results. Particularly, the bushfire has had the following effects on the vegetation communities:

- Ground cover (including basal grass cover, organic litter and woody debris) has been removed at all sites, leading to a marked increase in bare ground. This can be seen through the results of the photographic monitoring (**Appendix 12**);
- The removal of the ground cover has favoured the germination and establishment of ground shrubs, and for most sites there has been an increase in the number of shrubs in the lower stratum. However, the amount of individuals in the mid and upper storeys has decreased for all sites;
- Crown foliage has also been removed and canopy cover was absent at all rehabilitation sites and very low at all analogue sites. However most canopy species have survived the fire and were observed as re-sprouting at the time of the survey, and canopy should redevelop in the coming years as vegetation recovers; and
- Species diversity has decreased at all sites, with different species showing various responses to the fire. In particular, species including Petrophylle pulchella and Hakea decurrens which were common at all sites in previous years were all observed as dead during this survey, whilst most acacias responded more slowly than other common species (such as Leptospermum and Eucalypt species) and were only starting to resprout at the time of the survey.

As a result, LFA indicators have decreased at all sites, since all indices are strongly driven by the amount of vegetation and litter cover. This has led to lower overall performances for all sites, and rehabilitation performance was 'poor' in REA I, 'satisfactory' in REA II and 'very poor' in REA III and REA IV. However, it is noted that the performance of analogue sites have also decreased following the fire, and proportionally the observed drops in scores were not higher in rehabilitation areas than in analogue areas.

The removal of the ground cover has uncovered large areas of bare ground in rehabilitated areas, exposing the soils to the effect of erosion. Active erosion was observed at most rehabilitated sites with its impacts being more severe than recorded in previous years. REA III and REA IV are the most affected with severe gullies occurring in places, and tunnelling erosion occurring at REA IV. The lack of ground cover and woody vegetation at these sites is a concern to achieve stability of the landform. Erosion at REA I and REA II is more controlled with higher vegetation densities providing soil stability.

All rehabilitated areas perform very well in relation to the potential impacts from vertebrate pests and weeds. Feral animals do not appear to be an issue on site, while the incidence of weeds is minimal and has reduced from the levels observed during the previous monitoring event. This indicates the success and efficiency of the weed spraying control program implemented at Clarence. Monitoring of pests and weeds should continue and the weed control program maintained as required to promote rehabilitation success. This will be particularly important following the fire, as the increase in exposed areas may promote weed incursion.

Overall, future monitoring events will be crucial to determine the level of resilience of the rehabilitated vegetation communities, and to assess how quickly they can recover from an intense and widespread disturbance event. In comparison, the recovery rate of the analogue sites is expected to be far greater than in rehabilitated areas. Indeed, natural regeneration in analogue areas will be promoted by a healthy seed bank present in the soil and by the presence of mature (i.e. reproducing) trees and shrubs. In rehabilitated areas, this may need to be compensated by manual interventions.

5.4 Mine Closure

During the reporting period, the Clarence Colliery Mining Operations Plan (MOP) was approved by the Department of Trade and Investment – Division of Resource and Energy on November 25 2014 for the period 2014 through to December 31, 2017. At the end of each reporting period, Clarence will review its performance against the MOP and report the outcome in the AEMR. As the MOP was finalised at the end of this reporting period, there were no differences between what was completed during the period and the operations that were proposed. Clarence submitted a revised Rehabilitation Cost Estimate (RCE) concurrently with the Mining Operations Plan, and therefore will not be supplying the same RCE as a part of this AEMR submission.

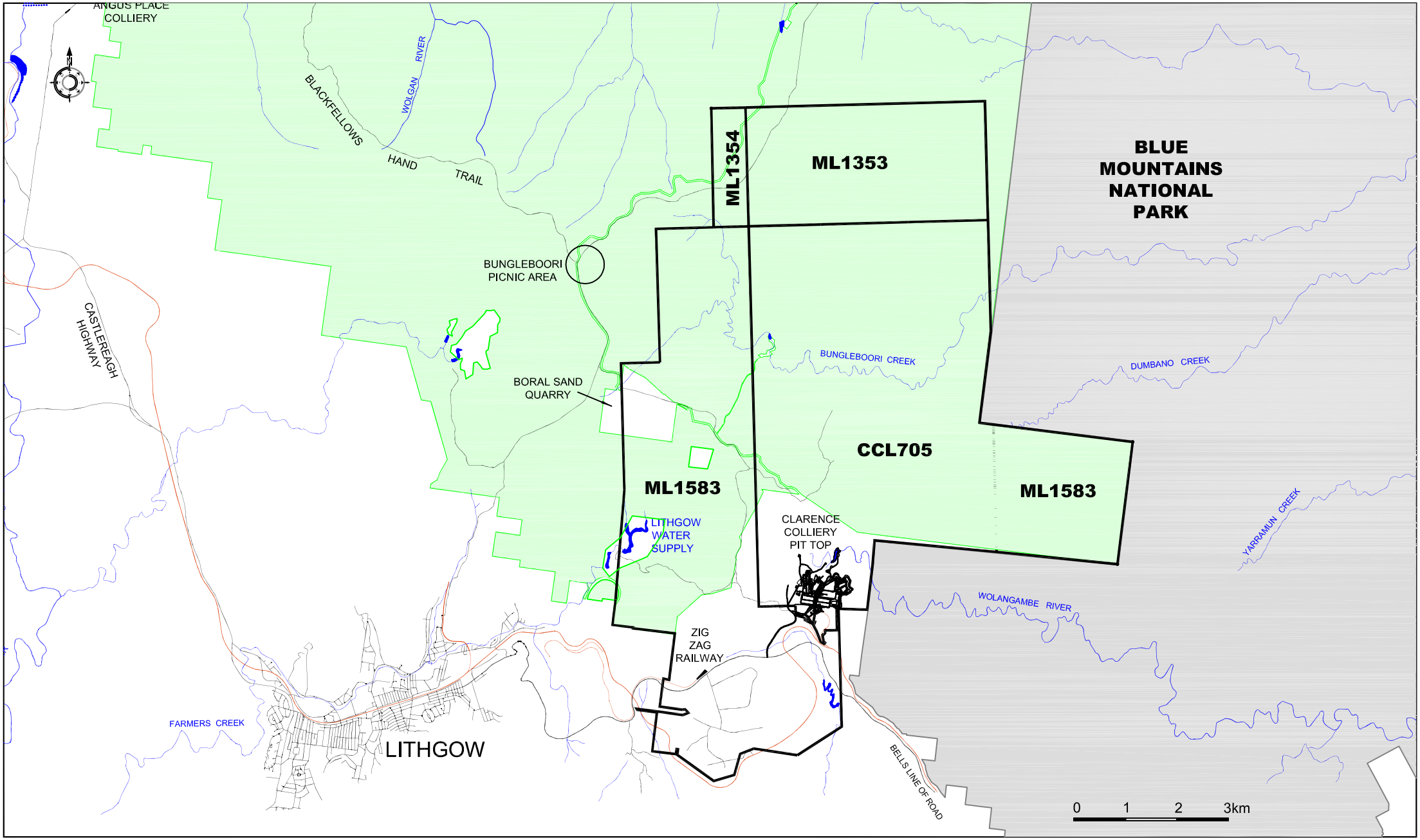
6. Activities Proposed in the Next AEMR Period

The activities proposed for 2015 are generally in accordance with the current MOP, and include;

- Continued Ecosystem Function Analysis (EFA) rehabilitation monitoring
- Continued planning for life of mine reject emplacement
- Continued ground and surface water monitoring
- Continued Water Management Strategy Team meeting
- Continue Exploration Program

Regional Location Plan

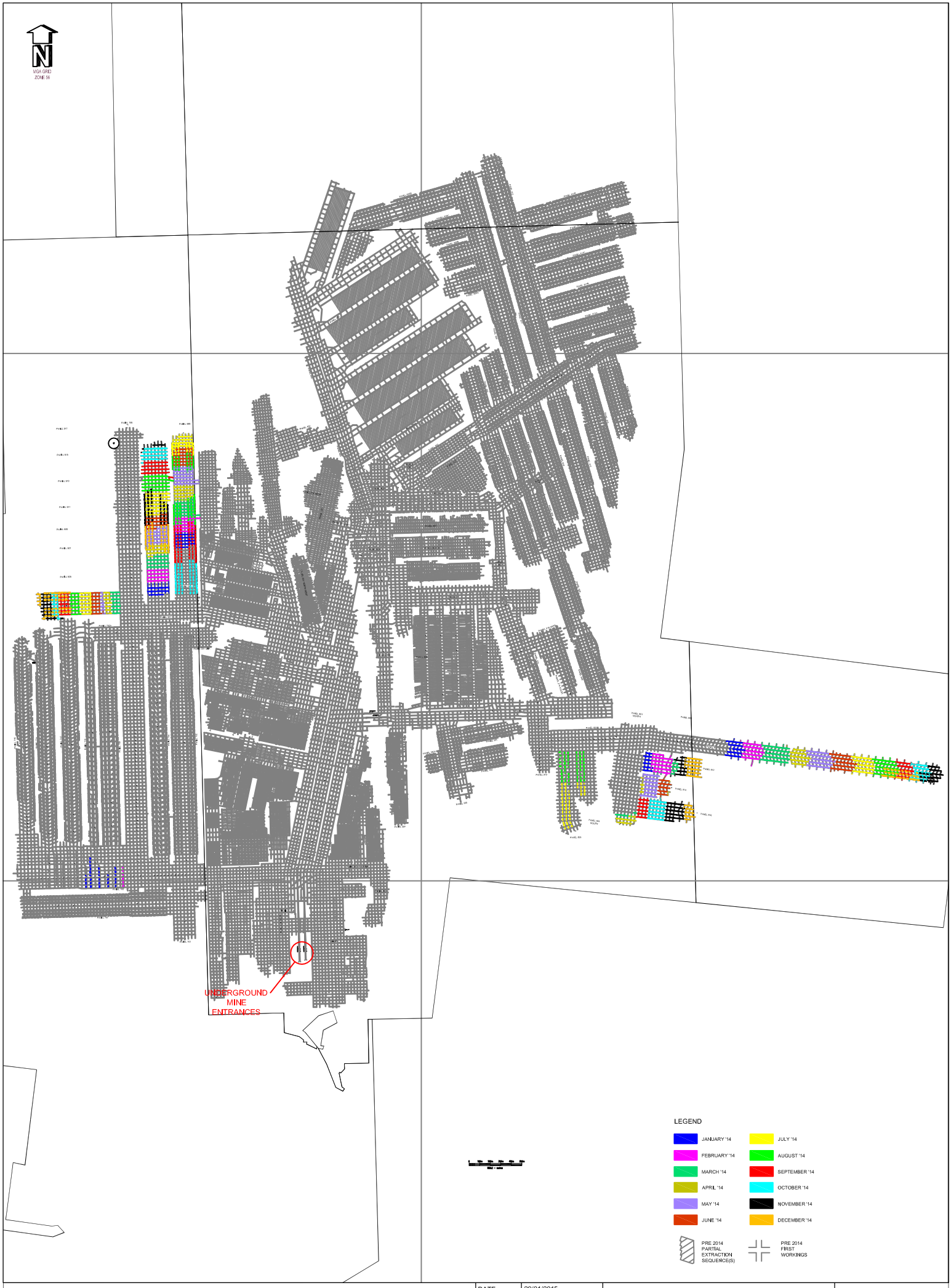
Appendix 1



PLAN 1 – LOCATION PLAN

2014 Workings

Appendix 2



NOTE: The workings and scale shown on this plan are indicative only
Mine workings pre 2005 - refer to hard copy Mine Working Plan (in I.S.G.format)
Current mine workings - refer to digital mine working plan

DATE	29/01/2015
REFERENCE	
N:\SHARED\PLANS\ENVIRONMENTAL\AEMR\2015\PLAN 2-DEVELOPMENT AND EXTRACTION WORKINGS FOR 2014	
SCALE	AS SHOWN

PLAN 2
DEVELOPMENT AND EXTRACTION WORKINGS FOR 2014

Centennial Coal
Clarence

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DRG. No. CLE1183

2015 Proposed Workings

Appendix 3

LEGEND

DEVELOPMENT ONLY

DEVELOPMENT & EXTRACTION

PRESCRIBED DAM BOUNDARY

FIRST WORKINGS ONLY DSC APPROVAL BOUNDARY

NOTE: The workings and scale shown on this plan are indicative only
Mine workings pre 2005 - refer to hard copy Mine Working Plan (in I.S.G.format)
Current mine workings - refer to digital mine working plan

FAULT

STRIKE/SLIP FAULT

DATE	29/01/2015
REFERENCE	N:\SHARED\PLANS\ENVIRONMENTAL\ AEMR\2015\PLAN 3-PROPOSED DEVELOPMENT AND EXTRACTION WORKINGS FOR 2015
SCALE	AS SHOWN

PLAN 3
PROPOSED DEVELOPMENT AND EXTRACTION WORKINGS FOR 2015

Centennial Coal
Clarence

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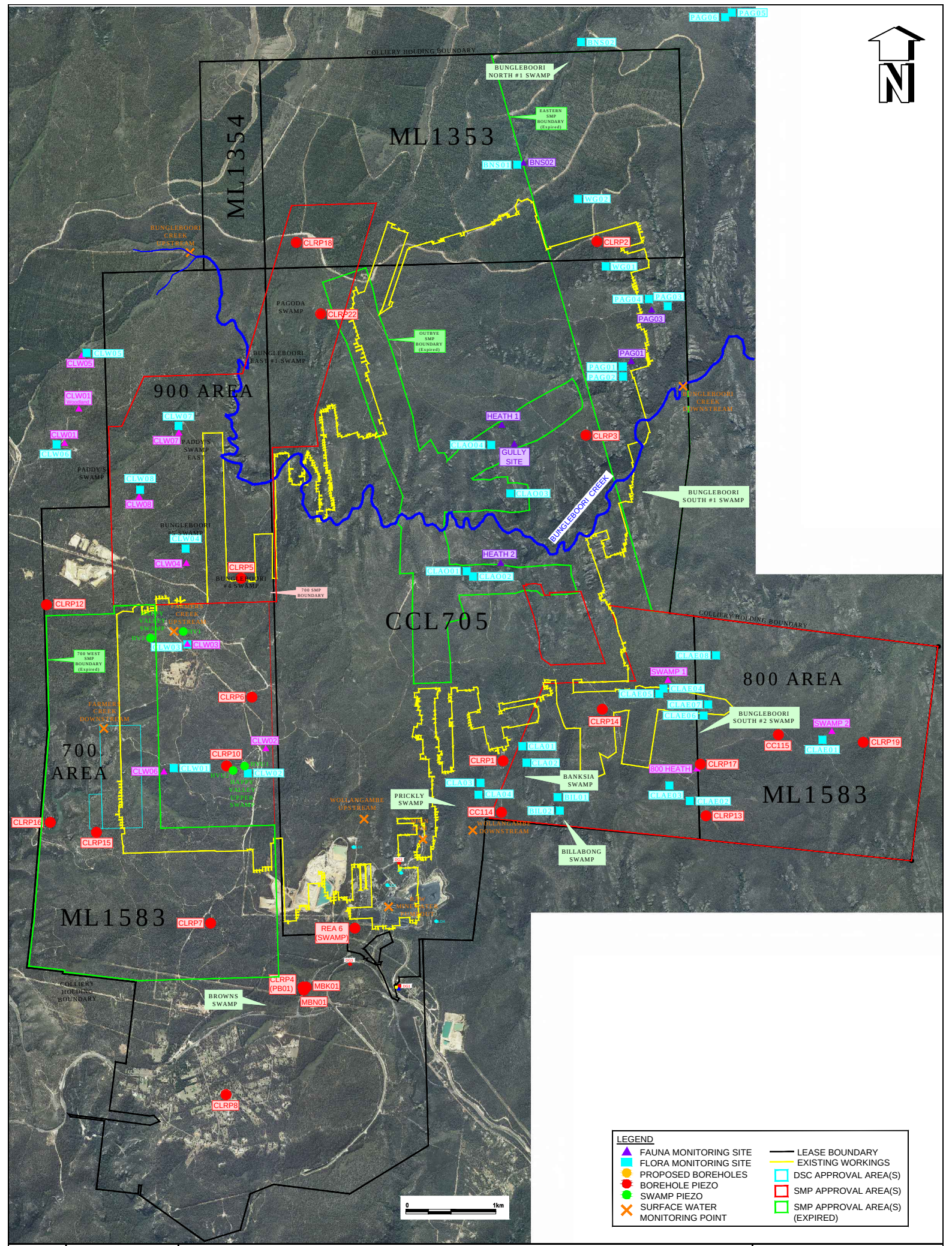
DRG. No. CLE1184

Combined Surface Monitoring Points

Appendix 4



DATE	30/01/2015
REFERENCE	
N:\SHARED\PLANS\ENVIRONMENTAL\AEMR\2015\PLAN 4-COMBINED SURFACE MONITORING POINTS 2015	
SCALE	AS SHOWN

PLAN 4
COMBINED SURFACE MONITORING POINTS

Centennial Coal
Clarence

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DRG. No. CLE1185

Pit Top Monitoring Locations

Appendix 5

DATE	29/01/2015
REFERENCE	
N:\SHARED\PLANS\ENVIRONMENTAL\ AEMR\2015\PLAN 5-CLARENCE COLLIERY PIT TOP MONITORING LOCATIONS	
SCALE	AS SHOWN

PLAN 5
CLARENCE COLLIERY PIT TOP MONITORING LOCATIONS

Clarence Colliery

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DRG. No. CLE1063

Aerial View of Surface Facilities

Appendix 6

DATE	29/01/2015
REFERENCE	
N:\SHARED\PLANS\ENVIRONMENTAL\AEMR\2015\PLAN 6-AERIAL VIEW OF SURFACE FACILITIES	
SCALE	AS SHOWN

PLAN 6

AERIAL VIEW OF SURFACE FACILITIES

Clarence Colliery

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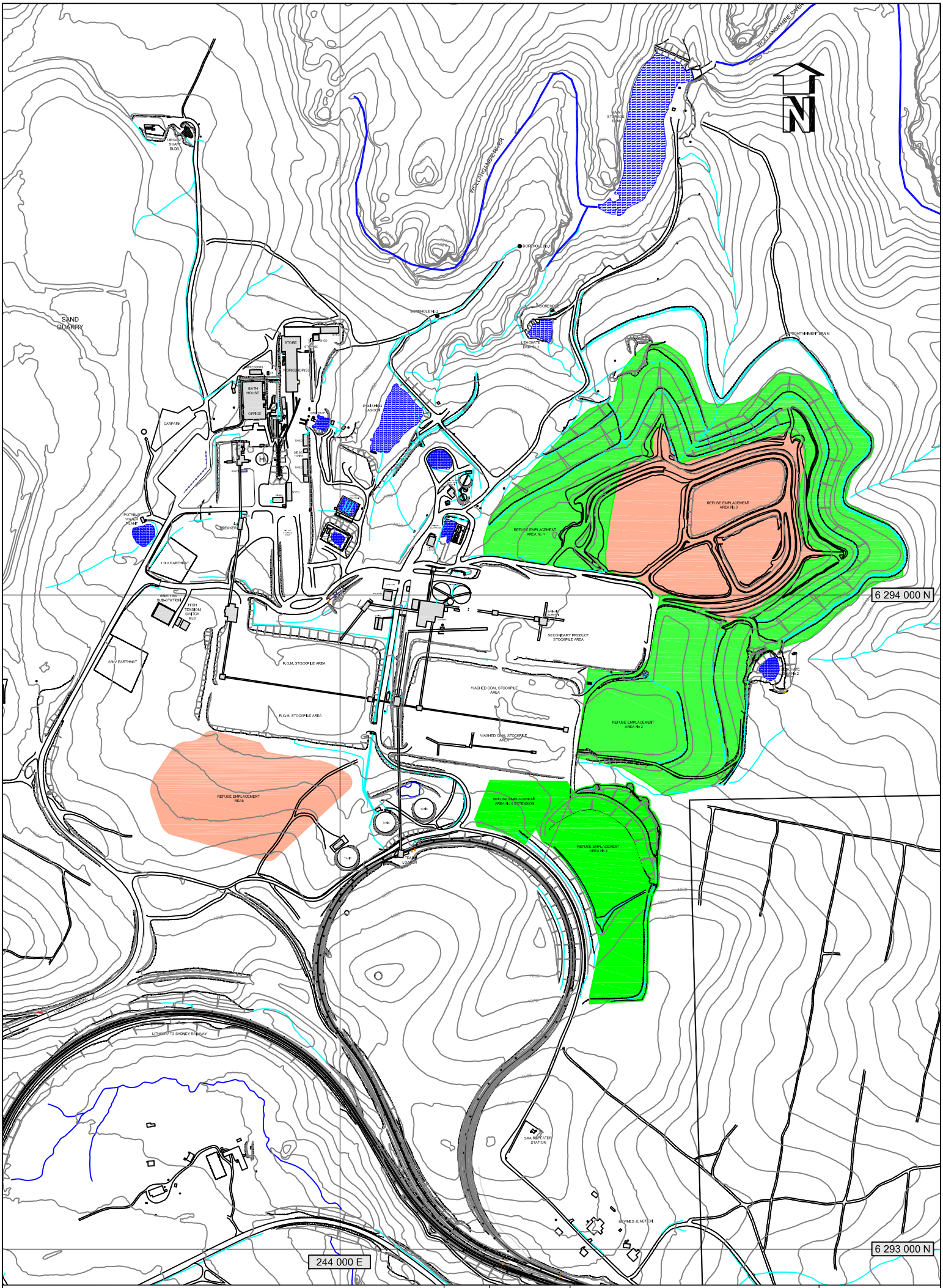
DRG. No. CLE1087

Surface Rehabilitation 2014

Appendix 7



LEGEND

- REHABILITATED
- ACTIVE REJECT EMPLACEMENT AREA
- COLLIERY HOLDING BOUNDARY

NOTE:

1. Surface features - digital plan from previous MOP
2. Sand Quarry - boundary indicative only
3. Co-ordinates - M.G.A. Zone 56 / Contours - A.H.D.
4. Scale shown indicative only - do not scale from plan
5. REA No4 area shown has been surveyed by colliery surveyors

DATE 29/01/2015

N:\SHARED\PLANS\ENVIRONMENTAL\AEMR\2015\PLAN7-PLAN SHOWING REHABILITATION FOR 2014

0 50m 100m

SCALE 1:2,500

PLAN 7
PLAN SHOWING REHABILITATION FOR 2014

Centennial Coal
Clarence

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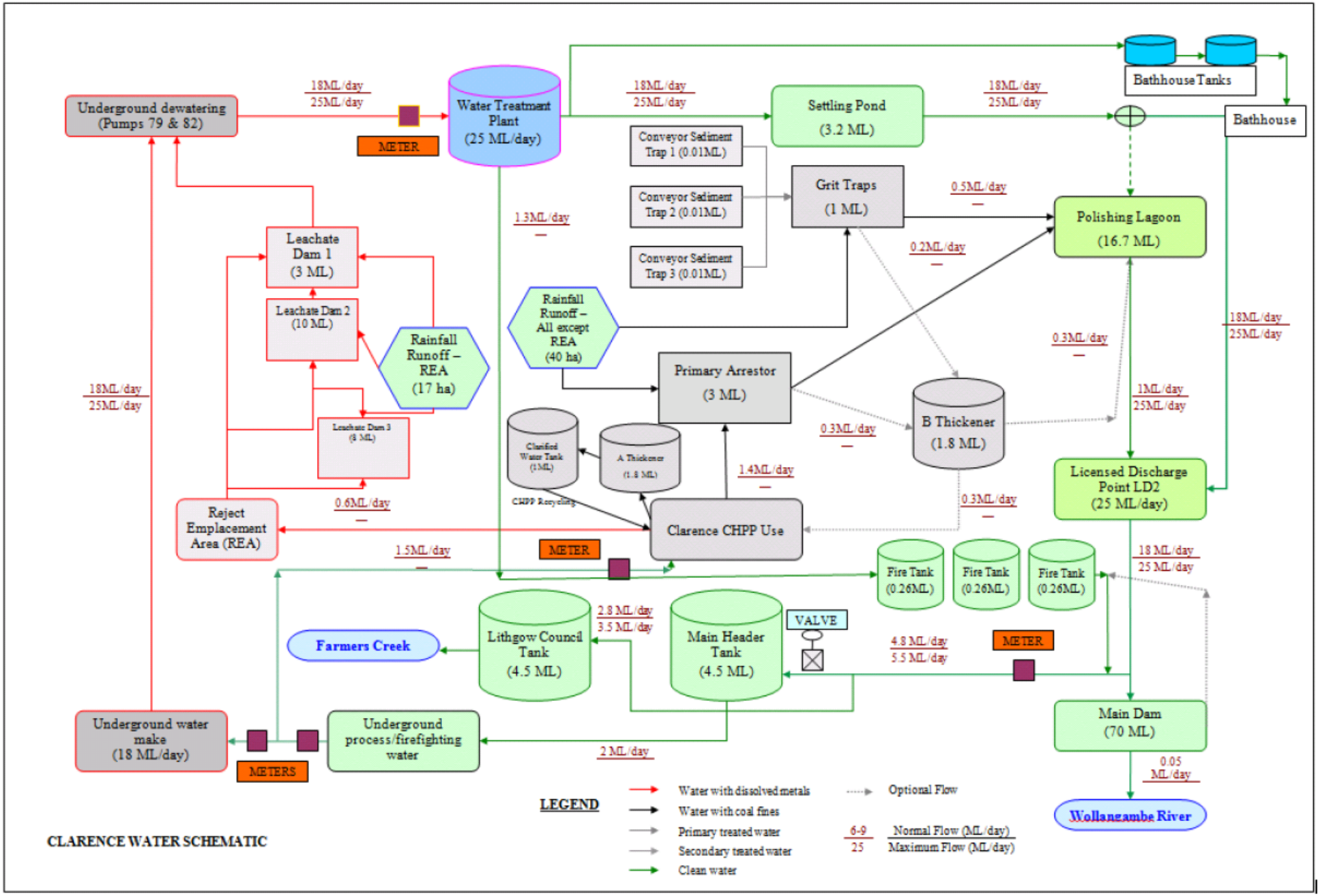
DRG. No. CLE1088

Clarence Water Schematic

Appendix 8


Underground dewatering (Pumps 79 & 82)
18ML/day
25ML/day
METER
Water Treatment Plant (25 ML/day)
18ML/day
25ML/day
Settling Pond (3.2 ML)
18ML/day
25ML/day
Bathhouse Tanks
Bathhouse
Conveyor Sediment Trap 1 (0.01ML)
Conveyor Sediment Trap 2 (0.01ML)
Conveyor Sediment Trap 3 (0.01ML)
Grit Traps (1 ML)
0.5ML/day
Polishing Lagoon (16.7 ML)
1.3ML/day
0.2ML/day
Leachate Dam 1 (3 ML)
Leachate Dam 2 (10 ML)
Leachate Dam 3 (8 ML)
Rainfall Runoff – REA (17 ha)
Rainfall Runoff – All except REA (40 ha)
Primary Arrestor (3 ML)
0.3ML/day
B Thickener (1.8 ML)
1ML/day
25ML/day
18ML/day
25ML/day
18ML/day
25ML/day
Clarified Water Tank (1ML)
A Thickener (1.8 ML)
CHPP Recycling
1.4ML/day
0.3ML/day
Licensed Discharge Point LD2 (25 ML/day)
Reject Emplacement Area (REA)
0.6ML/day
Clarence CHPP Use
1.5ML/day
METER
Fire Tank (0.26ML)
Fire Tank (0.26ML)
Fire Tank (0.26ML)
18 ML/day
25 ML/day
Farmers Creek
Lithgow Council Tank (4.5 ML)
2.8 ML/day
3.5 ML/day
Main Header Tank (4.5 ML)
VALVE
4.8 ML/day
5.5 ML/day
METER
Underground water make (18 ML/day)
METERS
Underground process/firefighting water
2 ML/day
Main Dam (70 ML)
0.05
ML/day
Wollangambe River
LEGEND
Water with dissolved metals
Water with coal fines
Primary treated water
Secondary treated water
Clean water
Optional Flow
6-9
25
Normal Flow (ML/day)
Maximum Flow (ML/day)
CLARENCE WATER SCHEMATIC

Centennial Coal Environment and Community Policy

Appendix 9

Centennial Coal

Environment and Community Policy

Our Vision

To conduct our business in an efficient and environmentally responsible manner, that is compatible with the expectations of our shareholders, government, employees and the community.

Beliefs

Everyone has a responsibility for minimising impact to the environment

Environmental performance can always be improved

Respecting our stakeholders is essential to business success

Guiding Principles

P1 Appropriate decisions are made
P2 Risk management strategies are implemented based on clear science and valid data
P3 Stakeholders are identified and respected
P4 Environmental impacts are recognised and minimised
P5 Legal obligations are known and respected
P6 Environmental management is integrated into our business
P7 Environmental performance is continually improved
P8 Natural resources are used efficiently
P9 Performance is assessed and reported

Catherine Brenner
Director

Bob Cameron
Managing Director

Ken Moss
Chairman

Paul Moy
Director

Richard Grellman
Director

Bruce Allen
Director

General Manager

Mine Manager

18 August 2009

Development Consent DA 504-00

Appendix 10

Development Consent

Section 80 of the *Environmental Planning and Assessment Act 1979*

I, the Minister for Planning, approve the Development 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 on-going environmental management of the development.

Frank Sartor, MP
Minister for Planning

Sydney, 2005

MODs 2 & 3 (27 May 2014) – red

SCHEDULE 1

Development Application:	DA 504-00.
Applicant:	Centennial Coal Company Limited.
Consent Authority:	Minister for Planning.
Land:	See Appendix 1.
Proposed Development:	Extension of the Clarence Underground Coal Mine.
State Significant Development:	The proposal is classified as State significant development, under section 76A(7) of the *Environmental Planning and Assessment Act 1979*, because it involves coal-mining related development that requires a new mining lease under section 63 of the *Mining Act 1992*.
Integrated Development:	The proposal is classified as integrated development, under section 91 of the *Environmental Planning and Assessment Act 1979*, because it requires additional approvals under the: • *Protection of the Environment Operations Act 1997*; and • *Water Act 1912*.
Designated Development:	The proposal is classified as designated development, under section 77A of the *Environmental Planning and Assessment Act 1979*, because it is for an underground coal mine, and consequently meets the criteria for designated development in schedule 3 of the *Environmental Planning and Assessment Regulation 2000*.

Notes:
- *To find out when this consent becomes effective, see section 83 of the Environmental Planning and Assessment Act 1979 (EP&A Act);*
- *To find out when this consent is liable to lapse, see section 95 of the EP&A Act; and*
- *To find out about appeal rights, see section 97 of the EP&A Act.*

TABLE OF CONTENTS

ADMINISTRATIVE CONDITIONS 4

SPECIFIC ENVIRONMENTAL CONDITIONS 6

- Subsidence 6
- Surface & Ground Water 6
- Biodiversity 8
- Air Quality 8
- Noise 9
- Meteorological Monitoring 10
- Traffic & Transport 10
- Visual Impact 10
- Greenhouse Gas 10
- Waste Minimisation 10
- Reject Emplacement 10
- Hazards Management 11
- Bushfire Management 11
- Mine Closure Strategy 11
- Rehabilitation 11
- Heritage 11

ADDITIONAL PROCEDURES 12

- Notification of Landowners 12
- Independent Review 12

ENVIRONMENTAL MANAGEMENT, MONITORING, AUDITING & REPORTING 13

- Environmental Management Strategy 13
- Environmental Monitoring Program 13
- Reporting 13
- Independent Environmental Audit 14
- Community Consultative Committee 14
- Access to Information 15

APPENDIX 1: SCHEDULE OF LAND 16

APPENDIX 2: MINE PLAN AND SUBSIDENCE PROTECTION ZONES 17

APPENDIX 3: STATEMENT OF COMMITMENTS 18

APPENDIX 4: LOCATION OF REJECT EMPLACEMENT AREA VI, NEWNES PLATEAU HANGING SWAMP AND EFFLUENT IRRIGATION AREA 20

DEFINITIONS

AEMR	Annual Environmental Management Report
Applicant	Centennial Coal Company Limited
BCA	Building Code of Australia
Bore	Any bore or well or excavation or other work connected or proposed to be connected with sources of sub-surface water, and used or proposed to be used or capable of being used to obtain supplies of such water whether the water flows naturally at all times or has to be raised whether wholly or at times by pumping or other artificial means
CCC	Community Consultative Committee
Council	Lithgow City Council
DA	Development Application
Day	Day is defined as the period from 7am to 6pm on Monday to Saturday, and 8am to 6pm on Sundays and Public Holidays
Department	NSW Department of Planning & Environment
Development	The development described in the 2000 EIS, as amended by EA Mod 2 and EA Mod 3
DRE	Division of Resources and Energy (within the Department of Trade and Investment, Regional Infrastructure and Services)
EIS	Environmental Impact Statement
EA Mod 2	Environmental Assessment – *Reject Emplacement Area (REA) VI, November 2013,* as modified by the associated Response to Submissions, dated 27 March 2014
EA Mod 3	Environmental Assessment – *Road Haulage Modification, November 2013,* as modified by the associated Response to Submissions, dated 18 February 2014
EIS	Environmental Impact Statement titled *Clarence Colliery – Lease Extension Environmental Impact Statement*, dated October 2000
EPA	Environment Protection Authority
EP&A Act	*Environmental Planning and Assessment Act 1979*
EP&A Regulation	*Environmental Planning and Assessment Regulation 2000*
Executive Director, Mineral Resources	Executive Director, Mineral Resources (within the Department of Trade & Investment, Regional Infrastructure and Services)
Evening	Evening is defined as the period from 6pm to 10pm
GTA	General Term of Approval
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 consent
Land	As defined in the EP&A Act, except for where the term is used in the noise and air quality conditions in Schedules 3 and 4 of this consent where it is defined to mean 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 consent
Material harm to the environment	Actual or potential harm to the health or safety of human beings or to ecosystems that is not trivial
Minister	Minister for Planning, or delegate
MSB	Mine Subsidence Board
Night	Night is defined as the period from 10pm to 7am on Monday to Saturday, and 10pm to 8am on Sundays and Public Holidays
NOW	NSW Office of Water
Privately-owned land	Land that is not owned by a public agency or a mining or power generation company (or its subsidiary)
ROM Coal	Run-of-mine coal
RMS	Roads and Maritime Services
SCA	Sydney Catchment Authority
Secretary	Secretary of the Department, or nominee
Site	Land to which the DA applies
Statement of Commitments	The Applicant's commitments in Appendix 4
Supplementary Report	Report titled *Variation to Development Application No.504-00 and Supplementary Information*, dated May 2005, prepared by Centennial Coal Company Limited

SCHEDULE 2
ADMINISTRATIVE CONDITIONS

Obligation to Minimise Harm to the Environment

1. The Applicant shall 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.

Terms of Approval

2. The Applicant shall carry out the development generally in accordance with the:
   (a) DA 504/00;
   (b) EIS titled *Clarence Colliery – Lease Extension Environmental Impact Statement*, dated October 2000;
   (c) Supplementary Report titled *Variation to Development Application No.504-00 and Supplementary Information*, dated May 2005;
   (d) EA Mod 2;
   (e) EA Mod 3;
   (f) Statement of Commitments; and
   (g) conditions of this consent.

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 consent shall prevail to the extent of any inconsistency

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

Limits on Approval

5. This consent shall lapse on 31 December 2026.

   Note: Conditions of this consent may require activities to be carried out by the Applicant beyond the period of approval.

6. The Applicant shall not extract more than 3 million tonnes of ROM coal per year from the mine.

7. The Applicant may transport up to 200,000 tonnes of coal by road per calendar year in total, with a maximum of 100,000 tonnes per calendar year transported to the west, via the Darling Causeway and Great Western Highway haulage route shown in EA Mod 3.

7A. Other than via the haulage route shown in EA Mod 3, the Applicant shall not cause any coal truck movements through the City of Lithgow without the prior approval of the Council.

7B. Haulage of coal to the west shall only take place between the hours of 7 am to 10 pm Monday to Saturday and between 8 am to 10 pm on Sunday and public holidays.

Structural Adequacy

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

   Notes:
   - *Under Part 4A of the EP&A Act, the Applicant is required to obtain construction and occupation certificates for any building works.*
   - *Part 8 of the EP&A Regulation sets out the requirements for the certification of development.*

Demolition

9. The Applicant shall ensure that all demolition work is carried out in accordance with *AS 2601-2001: The Demolition of Structures*, or its latest version.

Protection of Public Infrastructure

10. The Applicant shall:
    (a) repair, or pay the full costs associated with repairing, any public infrastructure that is damaged by the development; and

(b) relocate, or pay the full costs associated with relocating any public infrastructure that needs to be relocated as a result of the development.

Operation of Plant and Equipment

11. The Applicant shall ensure that all plant and equipment used at the site, or used in connection with the development, are:
    (a) maintained in a proper and efficient condition; and
    (b) operated in a proper and efficient manner.

SCHEDULE 3
SPECIFIC ENVIRONMENTAL CONDITIONS

SUBSIDENCE

Note: The development will generally be regulated under the approval process for managing the impacts of coal mining subsidence under the Mining Act 1992.

Subsidence Impact Assessment Criteria

1. The Applicant shall ensure that surface subsidence generated by the development does not exceed the criteria listed in Table 1.

Table 1: Subsidence Impact Assessment Criteria

Level of Extraction	Subsidence	Tilt	Horizontal Strain (compressive and tensile)
First Workings	20 mm	1.0 mm/m	1.0 mm/m
Partial Extraction	100 mm	3.0 mm/m	2.0 mm/m

Note: The first workings and partial extraction areas refer to those areas shown conceptually on Figure 5.6 (revised) of the Supplementary Report, as reproduced in Appendix 2.

Subsidence Management Plan

2. Before carrying out any underground mining operations that will potentially lead to subsidence of the land surface, the Applicant shall prepare a Subsidence Management Plan for those operations in accordance with the following DRE documents (or the most current and updated versions of these documents):
   (a) *New Approval Process for Management of Coal Mining Subsidence - Policy*; and
   (b) *Guideline for Applications for Subsidence Management Approvals*,
   to the satisfaction of the Director-General of DRE.

   In addition to the above each Subsidence Management Plan shall:
   (a) describe how the subsidence impact assessment criteria will be monitored over time;
   (b) provide for the notification of relevant authorities, including DRE, SCA and the Secretary in the event of any exceedance of the impact assessment criteria; and
   (c) detail measures to reduce, mitigate and remediate any impacts.

   During the preparation of each Subsidence Management Plan the Applicant shall consult with the Department, Council, SCA, EPA, NOW and the CCC, and have regard for any comments provided by these agencies/committees.

SURFACE & GROUND WATER

Note: The Applicant is required to obtain licences for the development under the Water Act 1912 and the Protection of the Environment Operations Act 1997.

Pollution of Waters

3. Except as may be expressly provided by an Environment Protection Licence, the Applicant shall comply with section 120 of the *Protection of the Environment Operations Act 1997* during the carrying out of the development.

Water Discharge Pollution Limits

4. Except as may be expressly provided by an Environment Protection Licence, the Applicant shall ensure that the discharges from any licensed discharge points comply with the limits in Table 2:

Table 2: Water Discharge Pollution Limits

Pollutant	Units of Measure	100 percentile concentration limit
pH	pH	6.5 ≤ pH ≤ 9.0
Non-filterable residue	mg/litre	NFR ≤ 120

Note: This condition does not authorise the pollution of waters by any other pollutants.

Water Resources Impact Assessment Criteria

5. The Applicant shall ensure that the development does not result in any:
   (a) significant inflows to mine workings;
   (b) reduction in pumping yield in privately-owned groundwater bores;
   (c) reduction in surface flows and groundwater baseflow to upland swamps (Newnes Plateau Shrub Swamps) and wetlands; and
   (d) reduction in surface flows and groundwater baseflow to waterbodies including Marrangaroo Creek, Farmers Creek, Dargans Creek, Wolgan River, Dumbano Creek, Bungleboori Creek, and Wollangambe River (excluding reduction in flows associated with the proposed water transfer scheme),

   to the satisfaction of the Secretary.

   Note: Each of these impact assessment criteria must be quantified in the respective sub-plans of the Water Management Plan (see condition 6 below), to the satisfaction of the Secretary.

Water Management Plan

6. Within 12 months of the date of this consent, the Applicant shall prepare and subsequently implement a revised Water Management Plan for the mine in consultation with Council, SCA, EPA, NOW and to the satisfaction of the Secretary. This plan must be prepared by a qualified hydrogeologist/hydrologist and include:
   (a) a Water Balance;
   (b) an Erosion and Sediment Control Plan;
   (c) a Surface Water Monitoring Program;
   (d) a Ground Water Monitoring Program; and
   (e) a Surface and Ground Water Response Plan, to address any potential adverse impacts associated with the development.

   Note: The Water Management Plan may be prepared in a staged manner in accordance with the staging of the development.

6A. The Applicant shall prepare and implement a revised Water Management Plan for the development, taking into account the construction of Reject Emplacement Area VI and protection of the adjacent Newnes Plateau Hanging Swamp (see Appendix 5), and the relocation of the effluent irrigation area, to the satisfaction of the Secretary. This plan must be prepared in consultation with Council, SCA, EPA and NOW, and be submitted to the Secretary for approval by 31 October 2014.

6B. The Applicant shall design, construct and operate Reject Emplacement Areas V and VI to ensure that:
   (a) its commitments in Appendix 3 are implemented;
   (b) the base of the emplacement is suitably lined to comply with a permeability standard of less than 1x10-9 metres per second over a minimum thickness of 0.5 metres, or equivalent performance; and
   (c) there are no discharges from the emplacement to surface waters.

7. The Water Balance shall:
   (a) include details of all water extracted, dewatered, transferred, used and/or discharged by the mine; and
   (b) provide for the annual re-calculation of the water balance and reporting of the review in the AEMR.

8. The Erosion and Sediment Control Plan shall:
   (a) be consistent with the requirements of the Department of Housing's *Managing Urban Stormwater: Soils and Construction* manual;
   (b) identify activities that could cause soil erosion and generate sediment;
   (c) describe measures to minimise soil erosion and the potential for the transport of sediment to downstream waters;
   (d) describe the location, function, and capacity of erosion and sediment control structures; and
   (e) describe what measures would be implemented to maintain the structures over time.

9. The Surface Water Monitoring Program shall include:
   (a) detailed baseline data on surface water flows (including ground water baseflows) and quality in waterbodies and wetlands above the mine;
   (b) surface water impact assessment criteria;
   (c) a program to monitor surface water flows (including ground water baseflows) and quality; and
   (d) a protocol for the investigation, notification and mitigation of identified exceedances of the surface water impact assessment criteria; and
   (e) a program to monitor the effectiveness of the Erosion and Sediment Control Plan.

10. The Ground Water Monitoring Program shall include:
   (a) detailed baseline data on ground water levels and quality, based on statistical analysis, to benchmark the pre-mining natural variation in ground water levels and quality;
   (b) ground water impact assessment criteria;
   (c) a program to monitor the volume and quality of ground water seeping into the underground mine workings; and
   (d) a program to monitor regional ground water levels and quality in the following geologic formations:
      (i) Banks Wall Sandstone;
      (ii) Burra-Moko Head Sandstone;
      (iii) Caley Formation; and
      (iv) Katoomba Coal Seam.
   (e) a protocol for the investigation, notification and mitigation of identified exceedances of the ground water impact assessment criteria.

11. The Surface and Ground Water Response Plan shall include:
   (a) the procedures that would be followed in the event of any exceedance of the surface or ground water impact assessment criteria, or other identified impact on surface or ground water; and
   (b) measures to mitigate, remediate and/or compensate any identified impacts.

Reporting

12. Each year, the Applicant shall:
   (a) review the Water Management Plan;
   (b) update each sub-plan; and
   (c) report the results of this review in the AEMR, including;
   (d) the results of monitoring;
   (e) details of the review for each sub-plan;
   (f) amendments to the sub-plans; and
   (g) details of the measures undertaken/proposed to address any identified issues.

BIODIVERSITY

Biodiversity Offset Strategy

12A. By the end of December 2016, the Applicant shall, in consultation with OEH, and to the satisfaction of the Secretary:
   (a) provide a suitable offset to satisfactorily offset clearing 4.1 hectares of *Newnes Plateau Narrow-leaved Peppermint – Silver-top Ash Layered Open Forest* and the loss of related biodiversity values, including for threatened species; and
   (b) make suitable arrangements to manage, protect and provide long-term security in perpetuity for this area, consistent with the relevant NSW Offsets policy.

AIR QUALITY

Impact Assessment Criteria

13. The Applicant shall ensure that the air pollution generated by the development does not exceed the criteria listed in Tables 3, 4, and 5 at any privately-owned land.

Table 3: Long term impact assessment criteria for particulate matter

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

Table 4: Short term impact assessment criterion for particulate matter

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

Table 5: Long term impact assessment criteria for deposited dust

Pollutant	Averaging period	Maximum increase in deposited dust level	Maximum total deposited dust level
Deposited dust	Annual	2 g/m^2/month	4 g/m^2/month

Note: Deposited dust is assessed as insoluble solids as defined by Standards Australia, 1991, AS 3580.10.1-1991: Methods for Sampling and Analysis of Ambient Air - Determination of Particulates - Deposited Matter - Gravimetric Method.

Air Quality Monitoring Program

14. Within 6 months of the date of this consent, the Applicant shall prepare and subsequently implement an Air Quality Monitoring Program for the development, in consultation with EPA, and to the satisfaction of the Secretary. This program must include an air monitoring protocol for evaluating compliance with the air quality criteria in this consent.

NOISE

Noise Impact Assessment Criteria

15. The Applicant shall ensure that the noise generated by the development, excluding train-loading and rail operations, does not exceed the noise impact assessment criteria presented in Table 6 at any residence on privately owned land.

Table 6: Noise impact assessment criteria dB(A) $L_{Aeq\ (15\ min)}$

Location	Day	Evening	Night
Residences on privately owned land	38	36	35

Notes:

(a) For the purpose of these noise criteria, 5dB(A) must be added to the measured level if the noise is substantially tonal or impulsive in character.

(b) The noise criteria do not apply where the Applicant and the affected landowner have reached a negotiated agreement in regard to noise, and a copy of the agreement has been forwarded to the Secretary and EPA.

(c) Noise from the development is to be measured at the most affected point or within the residential boundary, or at the most affected point within 30 metres of a dwelling (rural situations) where the dwelling is more than 30 metres from the boundary, to determine compliance with the $L_{Aeq(15\ minute)}$ noise limits in the above table. Where it can be demonstrated that direct measurement of noise from the development is impractical, the EPA may accept alternative means of determining compliance (see Chapter 11 of the NSW Industrial Noise Policy). The modification factors in Section 4 of the NSW Industrial Noise Policy shall also be applied to the measured noise levels where applicable.

(d) The noise criteria apply under prevailing meteorological conditions (winds up to 3m/s), except under conditions of temperature inversions. Noise impacts that may be enhanced by temperature inversions must be addressed by:

- *documenting noise complaints received to identify any higher level of impacts or patterns of temperature inversions; and*
- *where levels of noise complaints indicate a higher level of impact then actions to quantify and ameliorate any enhanced impacts under temperature inversion conditions shall be developed and implemented.*

Noise Management Plan

16. Within 6 months of the date of this consent, the Applicant shall prepare and subsequently implement a Noise Management Plan for the development, in consultation with EPA, and to the satisfaction of the Secretary. The plan shall include:

(a) a noise monitoring protocol for evaluating compliance with the noise impact assessment criteria;

(b) a plan for the management and minimisation of noise emissions associated with train-loading and rail operations, including consideration of all feasible and reasonable noise mitigation measures; and
(c) a protocol for the investigation, notification, and mitigation of identified exceedances of the noise impact assessment criteria.

16A. The Applicant shall prepare and implement a revised Noise Management Plan for the development, with a particular focus on reducing rail noise, to the satisfaction of the Secretary. This plan must be prepared in consultation with EPA, provide for the implementation of the Applicant's commitments in Appendix 4, and be submitted to the Secretary for approval by 31 October 2014.

METEOROLOGICAL MONITORING

17. Within 6 months of the date of this consent, the Applicant shall establish and subsequently maintain a suitable meteorological station operating in the vicinity of the development in accordance with the requirements in *Approved Methods for Sampling of Air Pollutants in New South Wales*, and to the satisfaction of the EPA and the Secretary.

TRAFFIC & TRANSPORT

Road Haulage

18. The Applicant shall ensure that all vehicles loaded with coal leaving the site are covered and remain covered throughout the duration of their journey.

19. The Applicant shall ensure all loaded vehicles leaving the site are cleaned of materials that may fall on the road before they are allowed to leave the site.

Use of Wallerawang Power Station Intersection

19A. The Applicant shall not utilise the intersection of the Castlereagh Highway and Wallerawang Power Station Haul Road for haulage of coal until the intersection has been upgraded in accordance with Austroads standards, to the satisfaction of RMS.

VISUAL IMPACT

20. The Applicant shall minimise the visual impacts of the development to the satisfaction of the Secretary.

Lighting Emissions

21. The Applicant shall take all practicable measures to mitigate off-site lighting impacts from the development to the satisfaction of the Secretary.

22. All external lighting associated with the development shall comply with *Australian Standard AS4282 (INT) 1995 – Control of Obtrusive Effects of Outdoor Lighting*.

GREENHOUSE GAS

23. The Applicant shall:
(a) monitor the greenhouse gas emissions generated by the development;
(b) investigate ways to reduce greenhouse gas emissions on site; and
(c) report on these investigations in the AEMR,
to the satisfaction of the Secretary.

WASTE MINIMISATION

24. The Applicant shall minimise the amount of waste generated by the development to the satisfaction of the Secretary.

REJECT EMPLACEMENT

24A. The Applicant shall prepare and implement a long term Reject Management Strategy for the project to the satisfaction of the Secretary. This plan must be:
(a) prepared in consultation with SCA, EPA and OEH;
(b) consider alternatives to reject emplacement, including beneficial re-use and underground disposal; and
(c) be submitted to the Secretary for approval by the end of November 2014.

HAZARDS MANAGEMENT

Spontaneous Combustion

25. The Applicant shall take the necessary measures to prevent, as far as is practical, spontaneous combustion on the site.

Dangerous Goods

26. The Applicant shall ensure that the storage, handling, and transport of dangerous goods is done in accordance with the relevant *Australian Standards*, particularly *AS1940* and *AS1596*, and the *Dangerous Goods Code*.

BUSHFIRE MANAGEMENT

27. The Applicant shall:
(a) ensure that the development 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 on-site during the development.

MINE CLOSURE STRATEGY

28. At least 3 years prior to the cessation of mining, the Applicant shall prepare a Mine Closure Strategy for the development, in consultation with Council, DRE, SCA and EPA, and to the satisfaction of the Secretary. The plan must:
(a) define the objectives and criteria for mine closure;
(b) investigate options for the future use of the site, including the pit top and surface facilities area;
(c) investigate ways to minimise the adverse socio-economic effects associated with mine closure, including reduction in local employment levels;
(d) define a strategy for the ongoing management of water inflow to the mine;
(e) describe the measures that would be implemented to minimise or manage the ongoing environmental effects of the development; and
(f) describe how the performance of these measures would be monitored over time.

REHABILITATION

29. Prior to the commencement of construction of Reject Emplacement Areas V or VI, the Applicant shall revise the Mining Operations Plan for the development to include detailed rehabilitation objectives and completion criteria for Reject Emplacement Areas V and VI, to the satisfaction of the Executive Director, Mineral Resources.

HERITAGE

Heritage Management Plan

30. The Applicant shall prepare and implement a Heritage Management Plan for the development to the satisfaction of the Secretary. This Plan must:
(d) be prepared in consultation with relevant Aboriginal stakeholders;
(e) be submitted to the Secretary for approval prior to 31 October 2014;
(f) include consideration of the Aboriginal and non-Aboriginal cultural context and significance of the site;
(g) detail the responsibilities of all stakeholders; and
(h) include programs/procedures and management measures for appropriate identification, management, conservation and protection of both Aboriginal and non-Aboriginal heritage items identified on the site.

SCHEDULE 4
ADDITIONAL PROCEDURES

NOTIFICATION OF LANDOWNERS

1. If the results of monitoring required in schedule 3 identify that impacts generated by the development are greater than the relevant impact assessment criteria in schedule 3, then the Applicant shall notify the Secretary and the affected landowners and/or existing or future tenants (including tenants of mine owned properties) accordingly, and provide quarterly monitoring results to each of these parties until the results show that the development is complying with the criteria in schedule 3.

INDEPENDENT REVIEW

2. If a landowner (excluding mine owned properties) considers that the development is exceeding the impact assessment criteria in schedule 3, then he/she may ask the Applicant in writing for an independent review of the impacts of the development on his/her land.

   If the Secretary is satisfied that an independent review is warranted, the Applicant shall within 3 months of the Secretary advising that an independent review is warranted:

   (a) consult with the landowner to determine his/her concerns;

   (b) commission a suitably qualified, experienced and independent person, whose appointment has been approved by the Secretary, to conduct monitoring on the land, to determine whether the development is complying with the relevant criteria in schedule 3, and identify the source(s) and scale of any impact on the land, and the development's contribution to this impact; and

   (c) give the Secretary and landowner a copy of the independent review.

SCHEDULE 5
ENVIRONMENTAL MANAGEMENT, MONITORING, AUDITING & REPORTING

ENVIRONMENTAL MANAGEMENT STRATEGY

1. Within 12 months of the date of this consent, the Applicant shall prepare and implement an Environmental Management Strategy for the development to the satisfaction of the Secretary. This strategy must:
   (a) provide the strategic context for environmental management of the development;
   (b) identify the statutory requirements that apply to the development;
   (c) describe in general how the environmental performance of the development would be monitored and managed during the development;
   (d) describe the procedures that would be implemented to:
      - keep the local community and relevant agencies informed about the operation and environmental performance of the development;
      - receive, handle, respond to, and record complaints;
      - resolve any disputes that may arise during the course of the development;
      - respond to any non-compliance;
      - manage cumulative impacts; and
      - respond to emergencies; and
   (e) describe the role, responsibility, authority, and accountability of all the key personnel involved in environmental management of the development; and
   (f) be updated within 3 months of the completion of each Independent Environmental Audit.

2. Within 14 days of the Secretary's approval for the strategy, the Applicant shall:
   (a) send copies of the approved strategy to the relevant agencies, Council, and the CCC; and
   (b) ensure the approved strategy is publicly available during the development.

ENVIRONMENTAL MONITORING PROGRAM

3. Within 12 months of the date of this consent, the Applicant shall prepare an Environmental Monitoring Program for the development in consultation with the relevant agencies, and to the satisfaction of the Secretary. This program must consolidate the various monitoring requirements in schedule 3 of this consent into a single document.

4. Within 3 months of the completion of each Independent Environmental Audit, the Applicant shall review, and if necessary update, the Environmental Monitoring Program to the satisfaction of the Secretary.

REPORTING

Annual Reporting

5. The Applicant shall prepare and submit an AEMR to the Secretary and the relevant agencies. This report must:
   (a) identify the standards and performance measures that apply to the development;
   (b) describe the works carried out in the last 12 months;
   (c) describe the works that will be carried out in the next 12 months;
   (d) include a summary of the complaints received during the past year, and compare this to the complaints received in previous years;
   (e) include a summary of the monitoring results for the development during the past year,
   (f) include an analysis of these monitoring results against the relevant:
      - impact assessment criteria;
      - monitoring results from previous years; and
      - predictions in the EIS;
   (g) identify any trends in the monitoring results over the life of the development;
   (h) identify any non-compliance during the previous year; and
   (i) describe what actions were, or are being taken to ensure compliance.

Incident Reporting

5A. The Applicant shall immediately notify the Secretary and any other relevant agencies of any incident. Within 7 days of the date of the incident, the Applicant shall provide the Secretary and any relevant agencies with a detailed report on the incident, and such further reports as may be requested.

Regular Reporting

5B. The Applicant shall provide regular reporting on the environmental performance of the development on its website, in accordance with the reporting arrangements in any plans or programs approved under the conditions of this consent, and to the satisfaction of the Secretary.

INDEPENDENT ENVIRONMENTAL AUDIT

6. Within 5 years of the date of this consent, and every 5 years thereafter, unless the Secretary directs otherwise, the Applicant shall commission and pay the full cost of an Independent Environmental Audit of the development. This audit must:
   (a) be conducted by a suitably qualified, experienced, and independent person whose appointment has been endorsed by the Secretary;
   (b) be consistent with *ISO 19011:2002 – Guidelines for Quality and/or Environmental Systems Auditing*, or updated versions of this guideline;
   (c) assess the environmental performance of the development, and its effects on the surrounding environment;
   (d) assess whether the development is complying with the relevant standards, performance measures, and statutory requirements;
   (e) review the adequacy of the Applicant's Environmental Management Strategy and Environmental Monitoring Program; and, if necessary,
   (f) recommend measures or actions to improve the environmental performance of the development, and/or the environmental management and monitoring systems.

7. The Independent Environmental Audit shall include a detailed audit of the subsidence, surface water, and ground water impacts of the development. The audit shall:
   (a) review the monitoring data for the development;
   (b) identify any trends in the monitoring data;
   (c) examine the subsidence, surface water, and ground water impacts of the development;
   (d) compare these impacts against the relevant impact assessment criteria; and, if necessary,
   (e) recommend measures to reduce, mitigate, or remediate these impacts

   If the independent audit determines that the subsidence, surface water, and/or ground water impacts resulting from the underground mining operations are greater than those predicted in the EIS/Supplementary Report or the relevant impact assessment criteria, the Applicant shall:
   (a) assess the significance of these impacts;
   (b) investigate measures to minimise these impacts, including modifying subsequent mine plans; and
   (c) describe what measures would be implemented to reduce, minimise, mitigate or remediate these impacts in the future;

   to the satisfaction of the Secretary.

8. Within 3 months of commissioning the Independent Environmental Audit, the Applicant shall submit a copy of the audit report to the Secretary, with a response to the recommendations contained in the audit report.

COMMUNITY CONSULTATIVE COMMITTEE

9. Within 3 months of the date of this consent, the Applicant shall establish a Community Consultative Committee to oversee the environmental performance of the mine. The CCC shall:
   (a) be comprised of:
      - 2 representatives from the Applicant, including the person responsible for environmental management at the mine;
      - at least 1 representative from Council (if available); and
      - at least 3 representatives from the local community,

      whose appointment has been approved by the Secretary in consultation with the Council;
   (b) be chaired by an independent chairperson, whose appointment has been approved by the Secretary;
   (c) meet at least twice a year; and
   (d) review and provide comment on the environmental performance of the development, including any environmental management plans, monitoring results, audit reports, or complaints.

10. The Applicant shall, at its own expense:
   (a) ensure that 2 of its representatives attend the Committee's meetings;
   (b) provide the Committee with regular information on the environmental performance and management of the development;
   (c) provide meeting facilities for the Committee;
   (d) arrange site inspections for the Committee, if necessary;
   (e) take minutes of the Committee's meetings;
   (f) make these minutes available to the public;

(g) respond to any comments or recommendations the Committee may have in relation to the environmental management or performance of the development;
(h) forward a copy of the minutes of each Committee meeting, and any responses to the Committee's recommendations to the Secretary within a month of acceptance of the minutes by the Committee.

ACCESS TO INFORMATION

11. Within 1 month of the approval of any management plan/strategy required under this consent (or any subsequent revision of these management plans/strategies), the completion of the independent audits required under this consent, or the completion of the AEMR, the Applicant shall:
(a) provide a copy of the relevant document/s to the Council, relevant agencies and the CCC;
(b) ensure that a copy of the relevant documents is made publicly available at the mine; and
(c) put a copy of the relevant document/s on the Applicant's website,
to the satisfaction of the Secretary.

12. During the life of the development, the Applicant shall:
(a) make a summary of the results of all monitoring required under this consent publicly available both at the mine and on the Applicant's website; and
(b) update these results on a regular basis (at least every 3 months),
to the satisfaction of the Secretary.

Note: The Applicant's environmental management plans/protocols should specify the reporting provisions for each environmental aspect.

APPENDIX 1
SCHEDULE OF LAND

This Appendix to be completed by an officer of the local office of the Department of Land and Water Conservation, a Registered Surveyor, Survey Drafting Officer or Property Officer.

ITEM	PARTICULARS REPORTED
Nature of the land (i.e, Freehold, occupied or vacant Crown land).	**Freehold** : Parish: Marrangaroo : County: Cook Lots Pt 20, 47, 50 139, Pt 94, Pt 19, 200 & 17 DP 751655 Lot 1 DP 576152 — Lot 1 DP 113040 Lot 1 DP 574704 — Lot 2 DP 787403 Lot 1 DP 911661 — Lot Pt 1 DP 4330 Lot 19 DP 661122 — Lots A & B DP 377435 Lots Pt A & Pt B DP 400049 — Lots A & B DP 410209 Lots Pt 2, Pt 3, Pt 4, Pt 5 & Pt 6 DP 834082 Lots Pt 1 & Pt 2 DP 514250 Lots 1-14, 17 & 18 DP 7199 Shown by Orange Edge **Freehold** : Parish: Lett : County: Cook Lots Pt81, Pt 274, Pt 275, 16, 218, 4 & 134 DP 751650 Lots 1-35, 37-95, 97 & 98 DP 237413 Lots 14, 15, 16 & 17 Section 4 DP 2018 Lots 3, 4, 5, 7, 8, 9 & 10 Section 2 DP 2018 Lots 2-6 & 11 Section 1 DP 2018 Lots A & B DP 350637 — Lots A & B 440786 Lot 369 DP 726995 — Pt 1 & Pt 20 DP 5083 Lots 8,9 & 9A DP 981609 — Lots 10-13 DP 852373 Lots A & B DP 440786 — Lots 1 & 2 DP 575422 Lot 1 DP 871022 — Lots 8 & 5 DP 788554 Lot 1 DP 105037 — Lot 1 DP 982496 Lots 191 & 192 DP 875912 — Lot 4 DP 251935 Lots 1 & 2 DP 719201 — Lots 1 &2 DP 823423 Lots 1 & 2 DP 823390 — Lot 1 DP 47648 Lot 3 DP 601456 — Lot 3 DP 778317 Lots A & B 345465 Shown by Orange Edge **Freehold** : Parish: Clywdd : County: Cook Lots 45, Pt23, 37, 38, 39, 40, 54 & 59 DP 751631 Lot 167 DP 821851 — Lot Pt 165 DP 751631 Lots 1 &2 DP 606571 — Lot 1002 DP 843871 Lots 361 & 363 DP 209982 — Lot 1 DP 579474 Lot Pt 1 DP 741138 Shown by Orange Edge **Leasehold Land** : Parish: Lett : County: Cook Lot 339 DP 720625 Special Lease 1963/32 Lithgow (73420) Shown by Brown

APPENDIX 2
MINE PLAN AND SUBSIDENCE PROTECTION ZONES

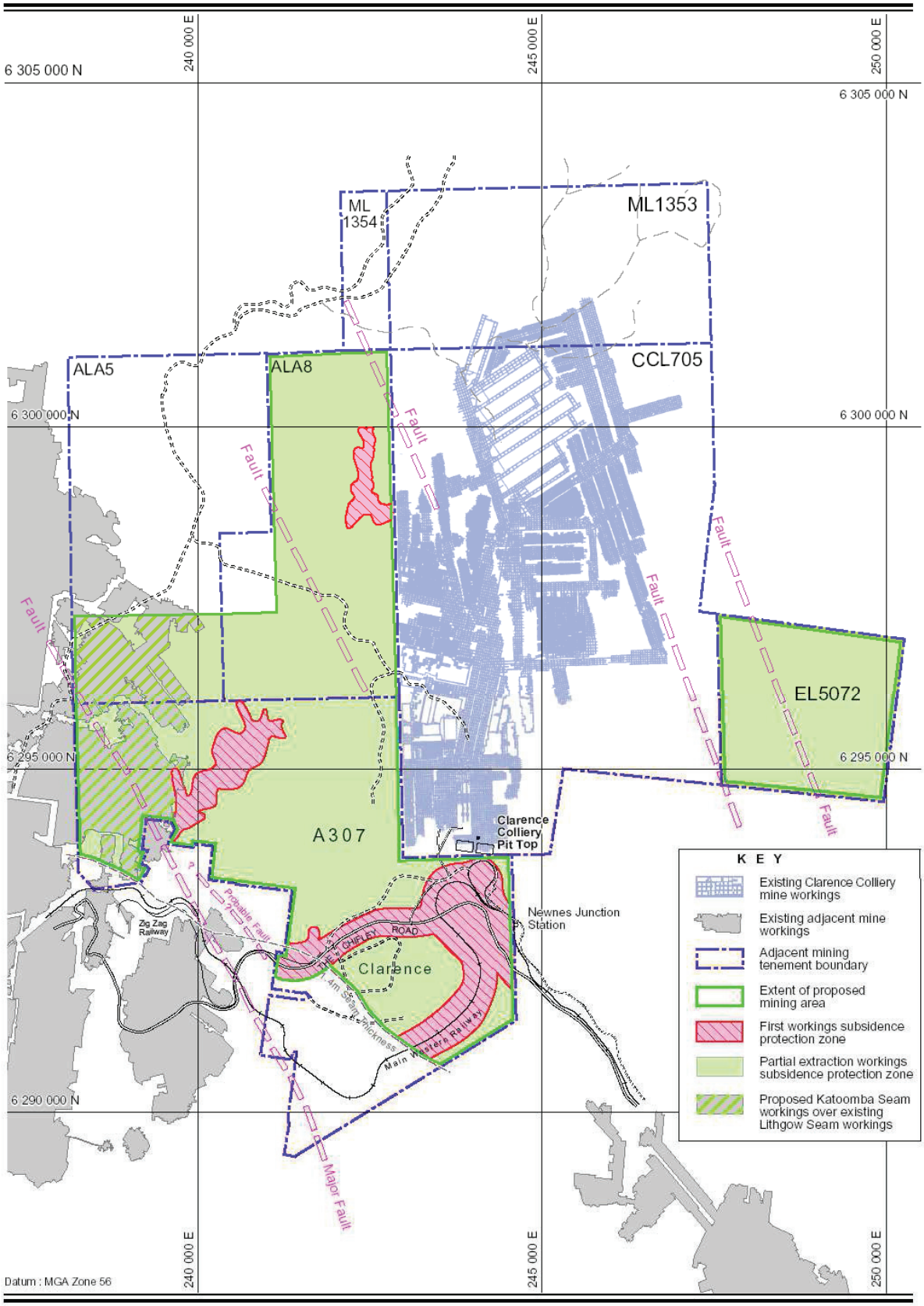


FIGURE 5.6 (revised)
Clarence Colliery - Lease Extension Area and Subsidence Protection Zones

APPENDIX 3
STATEMENT OF COMMITMENTS

Issue	Commitment
Construction Phase	
General REA VI Construction Management	Prior to construction, develop a Construction Environmental Management Plan incorporating: • Construction of REA VI generally in accordance with the design plans contained within **Attachment 2** of the Response to Submissions. • Capacity of the REA VI will not exceed 390,000m^3. • Construction of water management infrastructure as described in **Section 7**. • REA VI will remain outside of the modelled surface water catchment associated with the Hanging Swamp (as per Figure 1 within this Response to Submissions). • A Construction Groundwater Monitoring Program including the installation of an additional monitoring well used to determine the existing groundwater level. • Excavation for the preparation of the proposed REA VI will not occur within 2 metres of the perched water table. • Clay lining and compacting the base of REA VI to prevent migration of any leachate seepage into groundwater aquifers. • A Construction Noise Management Plan.
Operational Phase	
Soil and water management	Manage and treat all leachate from REA VI in accordance with the existing Water Management Plan and additional water management infrastructure included as part of the proposal.
Effluent Irrigation	Undertake irrigation in accordance with the Effluent Irrigation Operational Environmental Management Plan.
Water Monitoring	Update the Water Management Plan to include monitoring of the additional monitoring well. Undertake surface water and groundwater monitoring in accordance with the updated Water Management Plan.
TPHSS Monitoring	Annually undertake, in summer months, a rapid assessment on established cross-sections within the THPSS community to monitor the integrity of the swamp.
Heritage	Development of a Cultural Heritage Management Plan for Clarence Colliery.

Issue	Commitment
Traffic and transport	Undertake line marking to delineate the required parking spaces.
Rail noise and vibration	Development of a Noise Management Plan (within 6 months of approval) which will include the following with regard to train loading operations: • Within 3 months of approval, and in consultation with Pacific National and Sydney Trains, review operational and rail loading practices to reduce noise, including review of the location of relief points and signals on the departure side of the rail loop to minimise idling noise near residential receivers to the satisfaction of the Director General. • Implementation of acoustical mitigation at receivers as agreed to with relevant property owner for residential receivers labelled R1 to R6. • Where acoustical mitigation at receivers is insufficient to meet compliance with relevant noise criteria, negotiated agreements will be pursued with residential receivers labelled R1 to R6 following the process outlined Section 7 and Section 8 of the Industrial Noise Policy.
Visual amenity	Undertake rehabilitation of REA VI in accordance with the Conceptual Rehabilitation and Closure Plan (2012).
Socio-economic	Undertake community consultation in accordance with **Section 16.4**.

APPENDIX 4
LOCATION OF REJECT EMPLACEMENT AREA VI, NEWNES PLATEAU HANGING SWAMP AND EFFLUENT IRRIGATION AREA

Environment Protection Licence No. 726

Appendix 11

Section 58(5) Protection of the Environment Operations Act 1997

Licence Variation

Licence - 726

CLARENCE COLLIERY PTY LTD

Trading as CLARENCE COLLIERY PTY LIMITED

ABN 19 001 680 584

LEVEL 18, BT TOWER, 1 MARKET STREET

SYDNEY NSW 2000

Attention: Mr Greg Shields

Notice Number	1521882
File Number	EFEF13/5179
Date	12-Jun-2014

Dear Mr Shields

NOTICE OF VARIATION OF LICENCE NO. 726

BACKGROUND

A. CLARENCE COLLIERY PTY LTD, trading as CLARENCE COLLIERY PTY LIMITED ("the licensee"), is the holder of Environment Protection Licence No. 726 ("the licence") issued under the *Protection of the Environment Operations Act 1997* ("the POEO Act"). The licence authorises the carrying out of activities at Clarence, NSW ("the premises").

B. On 21 February 2014, the Environment Protection Authority ("EPA") received the 2013 Annual Return for the premises.

C. The EPA has reviewed this Annual Return as well as the past 10 years of monitoring data and seeks to make changes to the concentration limits for pH and Zinc.

D. Furthermore, the licensee has, during the 2013 Reporting Period, completed and complied with Pollution Studies and Reduction Program U1.1. (Basin Sizing) to ensure all sediment basins utilised at the premises meet Type D specifications as per the EPA endorsed "Blue Book".

E. The EPA therefore varies the licence to ensure concentration limits are appropriate in light of ongoing data and due to the completion of condition U1.1, having due regard for Section 45 of the POEO Act.

F. These changes are detailed as follows:

1. Vary the concentration limit for pH from 6.5-8.5 to 6-8.5 at condition L2.1/L2.4 to account for naturally occurring sandstone bedrock in the area influencing pH;

2. Vary the concentration limit for Zinc from 2.5 mg/L to 1.5 mg/L at condition L2.1/L2.4 (with the EPA previously advising the licensee that such reductions would occur);

3. Update condition G2.1;

4. Remove condition U1.1; and

5. Include relevant limit and operating conditions surrounding the operation of stormwater control structures.

G. These changes are detailed by this Notice.

VARIATION OF LICENCE NO. 726

By this Notice the EPA varies licence No. 726. The attached licence document contains all variations that are made to the licence by this Notice.

.....

Darryl Clift

Head Regional Operations Unit

South - Bathurst

(by Delegation)

INFORMATION ABOUT THIS NOTICE

- This Notice is issued under Section 58(5) of the POEO Act.
- Details provided in this Notice, along with an updated version of the licence, will be available on the EPA's Public Register (http://www.environment.nsw.gov.au/prpoeo/index.htm) in accordance with Section 308 of the POEO Act.

Appeals against this decision

- You can appeal to the Land and Environment Court against this decision. The deadline for lodging the appeal is 21 days after you were given notice of this decision.

When this notice begins to operate

- The variations to the licence specified in this Notice begin to operate immediately from the date of this Notice, unless another date is specified in this Notice.
- If an appeal is made against this decision to vary the licence and the Land and Environment Court directs that the decision is stayed the decision does not operate until the stay ceases to have effect or the Land and Environment Court confirms the decision or the appeal is withdrawn (whichever occurs first).

Environment Protection Licence

Licence - 726

Licence Details	
Number:	726
Anniversary Date:	01-January

Licensee
CLARENCE COLLIERY PTY LTD
LEVEL 18, BT TOWER, 1 MARKET STREET
SYDNEY NSW 2000

Premises
CLARENCE COLLIERY
OFF BELLS LINE OF ROAD
NEWNES JUNCTION NSW 2790

Scheduled Activity
Coal Works
Mining for Coal

Fee Based Activity	Scale
Coal works	> 2000000-5000000 T handled
Mining for coal	> 2000000-3500000 T produced

Region
South - Bathurst
Lvl 2, 203-209 Russell Street BATHURST NSW 2795
Phone: (02) 6332 7600
Fax: (02) 6332 7630
PO Box 1388 BATHURST
NSW 2795

Environment Protection Licence

Licence - 726

INFORMATION ABOUT THIS LICENCE ---- 4
Dictionary ---- 4
Responsibilities of licensee ---- 4
Variation of licence conditions ---- 4
Duration of licence ---- 4
Licence review ---- 4
Fees and annual return to be sent to the EPA ---- 4
Transfer of licence ---- 5
Public register and access to monitoring data ---- 5
1 ADMINISTRATIVE CONDITIONS ---- 6
A1 What the licence authorises and regulates ---- 6
A2 Premises or plant to which this licence applies ---- 6
A3 Information supplied to the EPA ---- 6
2 DISCHARGES TO AIR AND WATER AND APPLICATIONS TO LAND ---- 7
P1 Location of monitoring/discharge points and areas ---- 7
3 LIMIT CONDITIONS ---- 8
L1 Pollution of waters ---- 8
L2 Concentration limits ---- 8
L3 Volume and mass limits ---- 10
L4 Waste ---- 10
L5 Noise limits ---- 10
4 OPERATING CONDITIONS ---- 11
O1 Activities must be carried out in a competent manner ---- 11
O2 Maintenance of plant and equipment ---- 11
O3 Dust ---- 12
O4 Other operating conditions ---- 12
5 MONITORING AND RECORDING CONDITIONS ---- 12
M1 Monitoring records ---- 12
M2 Requirement to monitor concentration of pollutants discharged ---- 12
M3 Testing methods - concentration limits ---- 14
M4 Environmental monitoring ---- 14
M5 Weather monitoring ---- 15
M6 Recording of pollution complaints ---- 15
M7 Telephone complaints line ---- 15

Environment Protection Licence

Licence - 726

M8 Requirement to monitor volume or mass ---------- 16

6 REPORTING CONDITIONS ---------- 16

R1 Annual return documents ---------- 16

R2 Notification of environmental harm ---------- 17

R3 Written report ---------- 18

7 GENERAL CONDITIONS ---------- 18

G1 Copy of licence kept at the premises or plant ---------- 18

G2 Signage ---------- 18

DICTIONARY ---------- 19

General Dictionary ---------- 19

Environment Protection Licence

Licence - 726

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);
- 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:

CLARENCE COLLIERY PTY LTD
LEVEL 18, BT TOWER, 1 MARKET STREET
SYDNEY NSW 2000

subject to the conditions which follow.

Environment Protection Licence

Licence - 726

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	> 2000000 - 5000000 T handled
Mining for Coal	Mining for coal	> 2000000 - 3500000 T produced

A2 Premises or plant to which this licence applies

A2.1 The licence applies to the following premises:

Premises Details
CLARENCE COLLIERY
OFF BELLS LINE OF ROAD
NEWNES JUNCTION
NSW 2790
CCL705, ML 1353, ML 1354 & ML 1583

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.

A3.2 Any other document and/or management plan is not to be taken as part of the documentation in condition A3.1, other than those documents and/or management plans specifically referenced in this licence.

Environment Protection Licence

Licence - 726

2 Discharges to Air and Water and Applications to Land

P1 Location of monitoring/discharge points and areas

P1.1 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.

P1.2 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
1	Discharge to waters Discharge quality monitoring	Discharge to waters Discharge quality monitoring	Discharge and monitoring point identified as LDP1 on drawing CL126 and titled "Clarence Colliery Pit Top Monitoring Locations" and dated 02/2012
2	Discharge to waters Discharge quality monitoring	Discharge to waters Discharge quality monitoring	Discharge and monitoring point identified as LDP2 on drawing CL126 and titled "Clarence Colliery Pit Top Monitoring Locations" and dated 02/2012
3	Discharge to waters Discharge quality monitoring	Discharge to waters Discharge quality monitoring	Discharge and monitoring point identified as LDP3 on drawing CL126 and titled "Clarence Colliery Pit Top Monitoring Locations" and dated 02/2012
4	Discharge to waters Discharge quality monitoring	Discharge to waters Discharge quality monitoring	Discharge and monitoring point identified as LDP4 on drawing CL126 and titled "Clarence Colliery Pit Top Monitoring Locations" and dated 02/2012

P1.3 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
5	Dust monitoring		Dust Deposition Gauge identified as DM1 on drawing CL126 and titled "Clarence Colliery Pit Top Monitoring Locations" and dated 02/2012
6	Dust monitoring		Dust Deposition Gauge identified as DM2 on drawing CL126 and titled "Clarence Colliery Pit Top Monitoring Locations" and dated 02/2012

7	Dust monitoring	Dust Deposition Gauge identified as DM3 on drawing CL126 and titled "Clarence Colliery Pit Top Monitoring Locations" and dated 02/2012
8	Meteorological monitoring	Meteorological monitoring identified as Weather Station on drawing CL126 and titled "Clarence Colliery Pit Top Monitoring Locations" and dated 02/2012

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 1,2,3,4

Pollutant	Units of Measure	50 percentile concentration limit	90 percentile concentration limit	3DGM concentration limit	100 percentile concentration limit
Arsenic	milligrams per litre				0.01
Boron	milligrams per litre				0.1
Cadmium	milligrams per litre				0.001
Chloride	milligrams per litre				25

Chromium (hexavalent)	milligrams per litre	0.01
Copper	milligrams per litre	0.02
Filterable iron	milligrams per litre	0.3
Filterable manganese	milligrams per litre	0.5
Fluoride	milligrams per litre	1
Lead	milligrams per litre	0.005
Mercury	milligrams per litre	0.001
Oil and Grease	milligrams per litre	10
pH	pH	6-8.5
Selenium	milligrams per litre	0.01
Silver	milligrams per litre	0.001
Sulfate	milligrams per litre	250
Total suspended solids	milligrams per litre	30
Zinc	milligrams per litre	1.5

L2.5 The concentration limits stipulated by condition L2.1/L2.4 for EPA identification points 1, 3 and 4 are deemed not to apply when the discharge from the stormwater control structures occurs solely as a result of rainfall measured at the premises which exceeds:
a) a total of 56 millimetres of rainfall over any consecutive 5 day period.

Note: A 56mm rainfall event is defined by the EPA endorsed publication "Managing urban stormwater: soils and construction" (Landcom 2004) as the rainfall depth in millimetres for a 95th percentile 5 day rainfall event for Sydney/Blue Mountains which is also consistent with the storage capacity (recommended minimum design criteria) for Type D sediment basins for mines and quarries (see "Managing urban stormwater: soils and construction, Volume 2E, mines and quarries" (DECC, 2008)).

Environment Protection Licence

L3 Volume and mass limits

L3.1 For each discharge point or utilisation area specified below (by a point number), the volume/mass of:
a) liquids discharged to water; or;
b) solids or liquids applied to the area;
must not exceed the volume/mass limit specified for that discharge point or area.

Point	Unit of Measure	Volume/Mass Limit
2	kilolitres per day	25000

Note: The total volume discharged from point 2 may exceed 25,000 kL/day on any day where greater than 10 mm of rainfall is recorded at the premises, for that day.

L4 Waste

L4.1 The licensee must not cause, permit or allow any waste to be received at the premises, except the wastes expressly referred to in the column titled “Waste” and meeting the definition, if any, in the column titled “Description” in the table below.
Any waste received at the premises must only be used for the activities referred to in relation to that waste in the column titled “Activity” in the table below.
Any waste received at the premises is subject to those limits or conditions, if any, referred to in relation to that waste contained in the column titled “Other Limits” in the table below.
This condition does not limit any other conditions in this licence.

Code	Waste	Description	Activity	Other Limits
NA	General or Specific exempted waste	Waste that meets all the conditions of a resource recovery exemption under Clause 51A of the Protection of the Environment Operations (Waste) Regulation 2005	As specified in each particular resource recovery exemption	NA

L5 Noise limits

L5.1 Noise generated from the premises, excluding train loading and rail operations, must not exceed the noise limits specified in the table below.

Location	Day (LAeq 15 min)	Evening (LAeq 15 min)	Night (LAeq 15 min)
Any residence on privately owned land not subject to an agreement with the licensee	38	36	35

Note: For the purposes of condition 5.1:
a) Day is defined as:
i. the period from 7am to 6pm Monday to Saturday; and
ii. the period from 8am to 6pm Sundays and Public Holidays.
b) Evening is defined as: the period from 6pm to 10pm.
c) Night is defined as:
i. the period from 10pm to 7am Monday to Saturday; and
ii. the period from 10pm to 8am Sundays and Public Holidays.
d) The morning shoulder period is a subset of the night period between 6am to 7am Monday to Saturday.

L5.2 To determine compliance with condition L5.1, noise from the premises is to be measured at the most affected point within the residential boundary, or at the most affected point within 30 metres of the residence where the residence is more than 30 metres from the residential boundary to determine compliance with the noise levels in condition L5.1

L5.3 To determine compliance with condition L5.1, the modification factors in Section 4 of the NSW Industrial Noise Policy (EPA, 2000/2001) must be applied, as appropriate, to the noise levels measured by any monitoring equipment.

L5.4 The noise limits stipulated by condition L5.1 apply under all meteorological conditions except for the following:
a) wind speeds greater than 3 metres per second at ground level; and
b) temperature inversions as outlined in Section 5 of the NSW Industrial Noise Policy (EPA, 2000/2001).

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.

Note: Plant is defined in the Dictionary. The type of plant and equipment that should be considered includes, but is not limited to, drainage systems; infrastructure and pollution control equipment such as (but not limited to) spill containment and clean-up equipment; dust screens and collectors; sediment collection systems, traps and sumps; waste collection, storage and disposal equipment.

O3 Dust

O3.1 Activities occurring in or on the premises must be carried out in a manner that will minimise the generation, or emission from the premises, of wind-blown or traffic generated dust.

O3.2 All trafficable areas, coal storage areas and vehicle manoeuvring areas in or on the premises must be maintained, at all times, in a condition that will minimise the generation, or emission from the premises, of wind-blown or traffic generated dust.

O3.3 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.

O4 Other operating conditions

O4.1 The stormwater control structures identified at EPA identification points 1, 3 and 4 must be drained or pumped out as necessary to maintain each structures design storage capacity within 5 days following rainfall.

O4.2 The licensee must undertake maintenance as necessary to desilt any stormwater control structure identified at EPA identification points 1, 3 and 4 in order to retain each structures design storage capacity.

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.

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 5,6,7

Pollutant	Units of measure	Frequency	Sampling Method
Particulates - Deposited Matter	grams per square metre per month	Monthly	Australian Standard 3580.10.1-2003

M2.3 Water and/ or Land Monitoring Requirements

POINT 1,2,3,4

Pollutant	Units of measure	Frequency	Sampling Method
Arsenic	milligrams per litre	Monthly during discharge	Grab sample
Boron	milligrams per litre	Monthly during discharge	Grab sample
Cadmium	milligrams per litre	Monthly during discharge	Grab sample
Chloride	milligrams per litre	Monthly during discharge	Grab sample
Chromium (hexavalent)	milligrams per litre	Monthly during discharge	Grab sample
Copper	milligrams per litre	Monthly during discharge	Grab sample
Filterable iron	milligrams per litre	Monthly during discharge	Grab sample
Filterable manganese	milligrams per litre	Monthly during discharge	Grab sample
Fluoride	milligrams per litre	Monthly during discharge	Grab sample
Lead	milligrams per litre	Monthly during discharge	Grab sample
Mercury	milligrams per litre	Monthly during discharge	Grab sample
Oil and Grease	milligrams per litre	Monthly during discharge	Grab sample
pH	milligrams per litre	Monthly during discharge	Grab sample
Selenium	milligrams per litre	Monthly during discharge	Grab sample
Silver	milligrams per litre	Monthly during discharge	Grab sample
Sulfate	milligrams per litre	Monthly during discharge	Grab sample

Environment Protection Licence

Total suspended solids	milligrams per litre	Monthly during discharge	Grab sample
Zinc	milligrams per litre	Monthly during discharge	Grab sample

M3 Testing methods - concentration limits

M3.1 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.

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 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.

M4 Environmental monitoring

M4.1 The licensee must undertake yearly (in-line with the reporting period) noise monitoring as outlined below, to determine compliance with the noise limits stipulated by condition L5.1:
a) 1 day attended noise monitoring covering the day, evening and night time periods; and
b) 5 days unattended noise monitoring (monitor and logger) covering each days day, evening and night time periods.

M4.2 The results of the noise monitoring required by condition M4.1, and an interpretation of these results, must be provided as an attachment to each corresponding years Annual Return.

M4.3 The licensee, following the receipt of a noise related complaint and if required by the EPA, must undertaken noise monitoring as required by the EPA to determine compliance with the noise limits stipulated by condition L5.1.

M4.4 The results of the noise monitoring required by condition M4.3, and an interpretation of these results, must must be provided to the EPA within 21 days of the completion of the noise monitoring.

M5 Weather monitoring

M5.1 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 8

Parameter	Units of Measure	Frequency	Averaging Period	Sampling Method
Air temperature	°C	Continuous	1 hour	AM-4
Wind direction	°	Continuous	15 minute	AM-2 & AM-4
Wind speed	m/s	Continuous	15 minute	AM-2 & AM-4
Sigma theta	°	Continuous	15 minute	AM-2 & AM-4
Rainfall	mm	Continuous	15 minute	AM-4
Relative humidity	%	Continuous	1 hour	AM-4

M6 Recording of pollution complaints

M6.1 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.

M6.2 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.

M6.3 The record of a complaint must be kept for at least 4 years after the complaint was made.

M6.4 The record must be produced to any authorised officer of the EPA who asks to see them.

M7 Telephone complaints line

M7.1 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.

M7.2 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.

M7.3 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.

M8 Requirement to monitor volume or mass

M8.1 For each discharge point or utilisation area specified below, the licensee must monitor:
a) the volume of liquids discharged to water or applied to the area;
b) the mass of solids applied to the area;
c) the mass of pollutants emitted to the air;
at the frequency and using the method and units of measure, specified below.

POINT 1

Frequency	Unit of Measure	Sampling Method
Daily during any discharge	kilolitres	Estimate

POINT 2

Frequency	Unit of Measure	Sampling Method
Daily	kilolitres	Special Method 1

POINT 3

Frequency	Unit of Measure	Sampling Method
Daily during any discharge	kilolitres	Estimate

POINT 4

Frequency	Unit of Measure	Sampling Method
Daily during any discharge	kilolitres	Estimate

Note: "Special Method 1" means: inline bubble metre instrumentation.

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.

Environment Protection Licence

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

R2.1 Notifications must be made by telephoning the Environment Line service on 131 555.

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.

R2.2 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.

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.

G2 Signage

G2.1 The location of EPA identification points 1 to 8 must be clearly marked by a sign that indicates the EPA identification points used in this licence and be located as close as practical to these points.

Environment Protection Licence

Licence - 726

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

Environment Protection Licence

Licence - 726

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*.

Environment Protection Licence

Licence - 726

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

Ms Debbie Maddison

Environment Protection Authority

(By Delegation)

Date of this edition: 06-September-2000

Environment Protection Licence

Licence - 726

End Notes

1	Licence varied by change to Contact details, issued on 23-May-2001, which came into effect on 23-May-2001.
2	Licence varied by notice 1008022, issued on 24-May-2001, which came into effect on 18-Jun-2001.
3	Licence varied by notice 1016572, issued on 17-Apr-2002, which came into effect on 12-May-2002.
4	Licence varied by notice 1032803, issued on 16-Dec-2003, which came into effect on 30-Dec-2003.
5	Licence varied by notice 1033920, issued on 16-Jan-2004, which came into effect on 10-Feb-2004.
6	Licence varied by notice 1037161, issued on 23-Jun-2004, which came into effect on 18-Jul-2004.
7	Licence varied by notice 1052141, issued on 18-Oct-2005, which came into effect on 12-Nov-2005.
8	Licence varied by notice 1053964, issued on 06-Dec-2005, which came into effect on 31-Dec-2005.
9	Licence varied by notice 1055391, issued on 18-Jan-2006, which came into effect on 20-Jan-2006.
10	Licence varied by notice 1057157, issued on 09-Mar-2006, which came into effect on 17-Mar-2006.
11	Licence varied by notice 1079419, issued on 30-Oct-2007, which came into effect on 30-Oct-2007.
12	Condition A1.3 Not applicable varied by notice issued on <issue date> which came into effect on <effective date>
13	Licence varied by notice 1102926, issued on 09-Sep-2009, which came into effect on 09-Sep-2009.
14	Licence varied by notice 1115584, issued on 05-Jul-2010, which came into effect on 05-Jul-2010.
15	Licence varied by notice 1122407, issued on 10-Dec-2010, which came into effect on 10-Dec-2010.
16	Licence varied by notice 1502867 issued on 19-Dec-2011
17	Licence varied by notice 1514358 issued on 02-Jul-2013

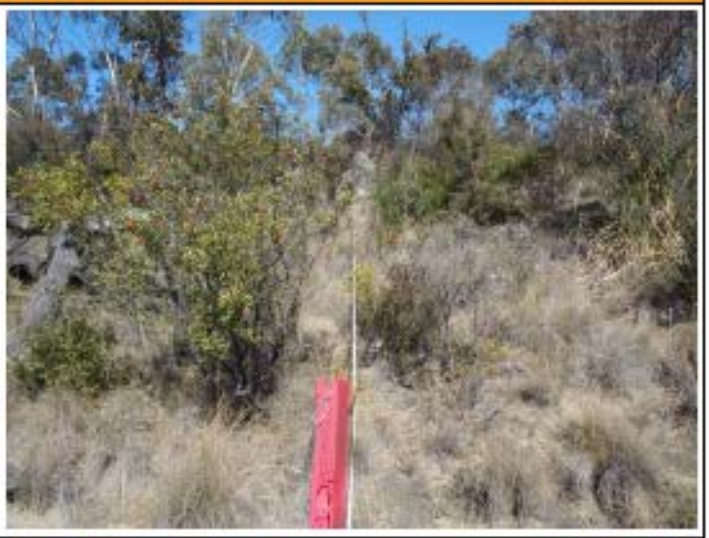
2014 Rehabilitation Photo Monitoring

Appendix 12

RHB 1 – Photographic Monitoring Record

	View from start of transect	View from end of transect
2012		
2013		
2014		

RHB 2 – Photographic Monitoring Record

	View from start of transect	View from end of transect
2012		
2013		
2014		

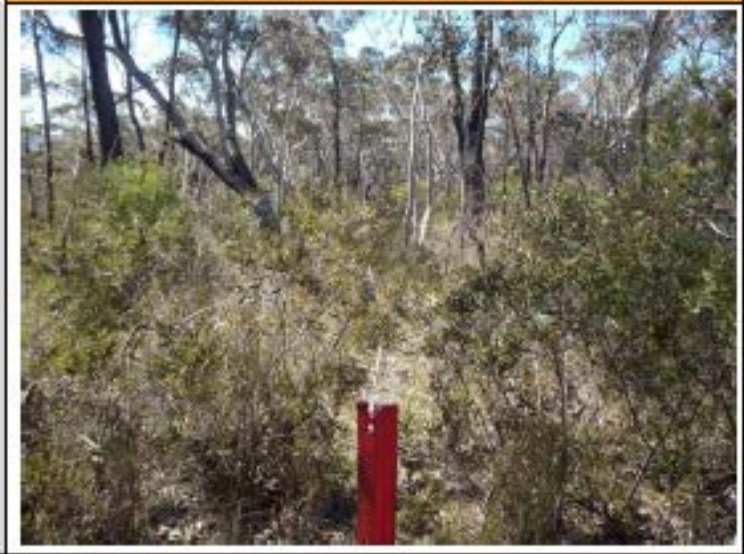
RHB 3 – Photographic Monitoring Record

	View from start of transect	View from end of transect
2012		
2013		
2014		

RHB 4 – Photographic Monitoring Record

	View from start of transect	View from end of transect
2012	*N/A* *(site established in 2013)*	*N/A* *(site established in 2013)*
2013		
2014		

ANA 1 – Photographic Monitoring Record

	View from start of transect	View from end of transect
2012		
2013		
2014		

ANA 2 – Photographic Monitoring Record

	View from start of transect	View from end of transect
2012		NO PHOTOGRAPH AVAILABLE
2013		
2014		

ANA 3 – Photographic Monitoring Record

	View from start of transect	View from end of transect
2012		
2013		
2014		

Centennial Coal