



Centennial Coal



Annual Environmental Management Report

1st January 2011 to 31st December 2011

Clarence Colliery

CCL705, ML1353, ML1354 & ML1583



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1 Introduction

Clarence Colliery Pty Ltd (Clarence) operates an underground coal mine, a coal handling and preparation plant (CHPP), and water treatment plant in the Western Region of New South Wales (NSW). The operation is located approximately 10 kilometres east-north-east of Lithgow. A plan of the regional location and site layout of the mine and the surface mining leases is included in **Appendix 1**.

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 2**.

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 Infrastructure (DP&I), 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 2011 occurred within CCL705 and ML1583. The location of Clarence leases is shown on Plan CL315 (**Appendix 1**).

Clarence operates under four Development Consents. Approval to commence mining was originally granted in 1976 by the Blaxland Shire Council, now known as Lithgow City Council (LCC). The approval area partially encompassed CCL705. A variation to this approval was granted by the Greater Lithgow County Council (GLCC), now known as LCC in 1993. The approval amended the reject emplacement facilities and expanded the mining area to include all of CCL705. In 1994, another variation to this approval was granted by the GLCC to extend mining activities to the north encompassing ML1353 and ML1354.

In 2005 Clarence received approval from the Department of Infrastructure, Planning and Natural Resources now known as the Department of Planning and Infrastructure (DP&I) for Development Consent DA 504-00. ML1583 is wholly within the DA 504-00 area. A copy of Clarence Development Consents is attached in **Appendix 3**.

Clarence operates in accordance with Environmental Protection Licence (EPL) 726 issued by the Office of Environment and Heritage (OEH). A copy of EPL 726 is attached in **Appendix 3**. EPL 726 was amended in December 2011.

Clarence received Licence Variation Notice No. 1502867 on the 19th December 2011 from the Environment Protection Authority (EPA) to vary environment protection licence 726 at Clarence Colliery. A number of the contaminants had their concentration limits tightened following a review of the last 5 years Annual Returns and after taking into consideration the capability of the water treatment plant, historical performance of the water treatment plant and the quality of dewatered mine water, and the ANZECC Guidelines 2000, adopting a 99% level of protection for the Wollangambe River. In addition during 2010, the Office of Environment and Heritage commissioned Katestone Environmental Pty Ltd to prepare the *“NSW Coal Mining Benchmarking Study: International Best Practice Measures to Prevent and/or Minimise Emissions of Particulate Matter from Coal Mining”* (Katestone, June 2011). A key recommendation of the study was for existing coal mines to conduct site

specific Best Management Practice (BMP) determinations to identify the most technically and economically feasible options to reduce emissions. For existing Premises the BMP determination could be required through a Pollution Reduction Program (PRP) and the outcomes implemented through EPL conditions. The EPA has developed a program of progressive rollouts of this PRP and the PRP now applies to Clarence Colliery. Clarence must conduct a site specific Best Management Practice particulate determination to identify the most practicable means to reduce particle emissions from the premises. The study must be completed by the 28th September 2012.

Clarence's current Mining Operations Plan (MOP) 2007-2013 was approved in February 2007. Clarence requested an amendment in November 2010 for the development of Reject Emplacement Area IV, update of mine contact details of relevant personnel, and review of currently used mining equipment.

A 2nd SMP variation application for 700 Area (712 panel) submitted on 4th November 2010 was approved by DTIRIS on 28th January 2011.

An SMP application for the areas known as 700 West and 800 was submitted on 23rd November 2011 with a determination pending on the application.

Following approval to mine first workings within the Lithgow No.2 Dam Notification Area, Clarence submitted an application to the Dams Safety Committee and District Inspector of Coal Mines to mine second workings (partial extraction) for Panel 714 only on 7th October 2011. An Approval was issued by DTIRIS on 6th December 2011. No secondary extraction occurred within the Notification Area during 2011.

Additional approvals that relate to Clarence are detailed in **Table 1**. Additional approvals include water licences and reject emplacement area approvals.

Table 1 Clarence Colliery Licences, Consents and Approvals

Authority	Licence/Approval/Consent	Approval/ Licence No.	Valid/Key Date	
Lithgow City Council	Development Consent	DAM.08.76	Development Consent	
	Development Consent	None	Development Consent	
	Development Consent	None	Development Consent	
Department of Planning & Infrastructure	Development Consent	DA 504-00	19/12/2005	
Office of Environment and Heritage	Environmental Protection Licence	000726	10/09/2009-10/09/2014	
Office of Water	Surface Licence Main Dam	10SL039344	26/01/2008-25/01/2013	
	Bore licence 79 cut through mine dewatering	10BL165054	22/09/2006-21/09/2011	
	Bore licence 82 cut through mine dewatering	10BL165053	22/09/2006-21/09/2011	
	Bore licence CC114	10BL602819	09/03/2009-Perpetuity	
	Bore licence CC115	10BL602820	09/03/2009-Perpetuity	
	Bore licence CLRP1	10BL161964	13/08/2003-Perpetuity	
	Bore licence CLRP2	10BL161965	13/08/2003-Perpetuity	
	Bore licence CLRP3	10BL602213	10/12/2007-Perpetuity	
	Bore licence CLRP4	10BL161962	13/08/2003-Perpetuity	
	Bore licence CLRP5, CLRP7 & CLRP10	10BL602211	10/12/2007-Perpetuity	
	Bore licence CLRP6	10BL602212	10/12/2007-Perpetuity	
	Bore licence HV1, HV2, HVU1, HVU2	10BL603337	07/09/2009-Perpetuity	
	Radiation Licence	739, 740, 1120, 1121, 1122	Renewed Annually	
		Bore Licence CLRP 12	10BL604063	07/06/2010-Perpetuity
	Bore Licence CLRP 11, 13 & 14	10BL604099	05/07/2010-Perpetuity	
	Bore Licence CLRP 15 & 16	10BL604098	05/07/2010-Perpetuity	
Trade and Investment, Regional Infrastructure and Services	Consolidated Coal Lease	705	20/12/2006-20/12/2027	
	Mining Lease	1353	21/07/1994-21/07/2015	
	Mining Lease	1354	21/07/1994-21/07/2015	
	Mining Lease	1583	09/07/2006-09/07/2027	
	Mining Operations Plan (MOP)	-	01/01/2007-31/12/2013	
	Subsidence Management Plan	Eastern Area	10/2005-01/06/2013	
	Subsidence Management Plan	Outbye Area (402)	27/03/2009-01/01/2010	
	Subsidence Management Plan	Outbye Area (602)	30/01/2009-01/01/2010	
	Subsidence Management Plan	Outbye Area (302, 305, 306, 307, 400, 403 & 406)	08/05/2009-01/05/2014	
	Subsidence Management Plan Section 100	700 Area	08/05/2009-01/05/2014	
		Reject Emplacement Area II	24/05/1976 (Approval 19/06/1992)	
		Section 100	Reject Emplacement Area III	21/02/1990 (Approval 07/10/1993)
		Section 100	Reject Emplacement Area IV	Approved 28/03/2011
		Mine within Dam Notification Area (under the NSW Dam Safety Act 1978) (1 st Workings only)	Clarence-1	14/07/2010

Authority	Licence/Approval/Consent	Approval/ Licence No.	Valid/Key Date
	Mine within Dam Notification Area (under the NSW Dam Safety Act 1978) (Partial extraction 714 panel only)	Clarence-1	06/12/2011
Work Cover NSW	Dangerous Goods Licence	35/020999	15/03/2011
Rail Corp	Occupation Permit	Q648-100	10/07/1981-Life of Loop
Forests NSW	Occupation Permit		Renewed Annually

1.2 Mine Contacts

The contact details for key mine personnel are provided in **Table 2** below.

Table 2 Contact Details for Key Mine Personnel

Name	Title	Phone
Gregory Shields	Mine Manager	02 6353 8033
Gregory Brown	Environment and Community Coordinator	02 6353 8039
Enquiries and Complaints Line	Daytime Contact Afterhours Contact	02 6353 8039 02 6353 8010

1.3 Actions Required at Previous AEMR Review

A summary of actions identified at the 2011 AEMR review meeting held at Clarence Colliery on the 11th May 2011, and feedback from the DTIRIS on 5th July 2011 is provided in **Table 3** below.

Table 3 Actions required at previous AEMR review

Issue	Action	Where dealt with in this document
NPWS requested that communication is provided to NPWS about due diligence studies that have been completed over the pit top area. NPWS have increased their focus on cultural heritage artefacts since the original EIS was completed in 2000.	Provide NPWS with communication regarding due diligence studies on pit top.	3.12 Aboriginal Heritage
Modify environmental monitoring graphs (i.e. remove horizontal lines) to ensure trend lines and limits can be easily viewed. Correct the Y-axis label on LD02 Oil and Grease graph (Figure 9). Expand Figure 20L CLW02 Flora Monitoring graph to ensure the trend lines can be easily viewed.	Update environmental monitoring graphs.	3.4.2 Surface Water Pollution Monitoring
Disturbed area near wheel-wash bay is actively eroding.	Complete rehabilitation of this area to ensure erosion is controlled.	5.2.1 Pit Top
Pampas Grass observed near dam edges.	Continue to actively control weeds within the Clarence Colliery lease areas.	3.8 Weeds
Some erosion and sediment controls along unsealed roads were observed to be inadequate. The	Undertake a review of erosion and sediment control measures across the lease areas. Ensure	3.4.3 Erosion and Sediment

Issue	Action	Where dealt with in this document
camber of roads was incorrectly maintained and does not allow runoff to be diverted into drains. Drains should regularly be monitored to ensure sediment build-up does not lead to overtopping.	that erosion and sediment control strategies are implemented in accordance with the principles of Managing Urban Stormwater (2004) or latest version.	
Inclusion of good news stories	Include good news stories within Report	Section 2.6 Waste Management, Section 4.2.1 Save Our Swamps Program

1.4 Independent Environmental Audit

An Independent Environmental Audit for Clarence Colliery was undertaken from 11th January to 14th January 2011 in accordance with the requirements set out in Development Consent DA 504-00, Schedule 5, conditions 6 and 7. The Audit is required every 5 years and this was the first Audit under DA 504-00.

The Audit Report was submitted to DP&I on 16th March 2011 along with an Action Plan detailing Clarence Colliery's timeframe for implementing recommendations in the Audit Report. The Audit Report and proposed Action Plan were accepted by DP&I on 21st April 2011.

A full copy of the Audit report is available on the Centennial Coal website (www.centennialcoal.com.au).

2 Operations During the Reporting Period

2.1 Exploration

An Independent Audit of Exploration Licence EL5072 was undertaken on site at Clarence Colliery on the 5th and 6th October 2011. The audit was requested by the Department of Trade and Investment, Regional Infrastructure and Services (DTIRIS) as part of a state-wide audit of all coal and coal seam gas exploration licences as part of the staged implementation of the NSW Government Strategic Regional Land Use Policy.

The Audit Report was submitted to DTIRIS on the 14th October 2011 and an Action Plan was submitted on the 17th October 2011 detailing Clarence Colliery's timeframe for implementing recommendations in the Audit Report. Acknowledgement of the receipt of the Audit Report was provided by DTIRIS on the 14th November 2011.

No boreholes were drilled for exploration or groundwater monitoring during 2011.

The location of existing boreholes are shown on Plan CL315 in Appendix 1.

A summary of rehabilitation progress for previous Clarence drilling activities is included in **Table 4** below.

Table 4 Drilling activities 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	Sealed
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	Multi Level Vibrating Wire Piezometer Grouted
CLRP15	10BL604098	Oct-10	Complete	Multi Level Vibrating Wire Piezometer Grouted
CLRP16	10BL604098	Oct-10	Complete	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
Happy Valley Upper Swamp 1	10BL603337	Dec-10	Complete- Minimal disturbance	Standpipe Single Data Logger
Happy Valley Upper Swamp 2	10BL603337	Dec-10	Complete- Minimal disturbance	Standpipe Single Data Logger
Happy Valley Swamp 1	10BL603337	Dec-10	Complete- Minimal disturbance	Standpipe Single Data Logger
Happy Valley Swamp 2	10BL603337	Dec-10	Complete- Minimal disturbance	Standpipe Single Data Logger

2.2 Land Preparation

Land preparation for Reject Emplacement Area (REA) IV commenced on 5th May 2011. The total area cleared was 2.8 hectares.

2.3 Construction

An 18 metre by 7 metre shed was constructed near the administration building to house the new air compressor. The construction met the requirements of a shed under the Mining SEPP and no development application was required.

2.4 Mining

Mining was undertaken in the 700 SMP and 314-316 areas in 2011:

- Extraction occurred within 708 and 712 panels.
- Development occurred in 700, 701, 706, 707 and 714 panels.
- Extraction occurred within 314 and 316 panels.

The current mine plan with progress of development and extraction is included in **Appendix 1**. Also included in Appendix 1 is the proposed mine plan for 2012. It is noted that Panel 714, as shown in Appendix 1, extends beyond the 700 West/800 SMP Application Area boundary. A variation will be sought to mine the proposed Panel 714.

The coal production (run of mine) tonnes are presented in **Table 5** below. The production and waste summary for 2011 is presented in **Table 6** below.

Table 5 Coal Production (Run of Mine) 1999-2011

Year	Coal Production (Run of Mine) Tonnes
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
2001	1 384 162
2000	1 092 525
1999	920 680

Table 6 Production and Waste Summary 2011

Aspect	Volume (Tonnes)
Topsoil Stripped	3 500
Topsoil Used/Spread	0
Waste Rock	0
ROM	2 006 738
Processing Waste	183 095
Product Domestic	125 594
Product International	1 687 630

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.

Clarence implemented an auditing system during 2008 that measures the performance of housekeeping. Results of previous housekeeping audits are compared to provide a percentage close out rate of actions. The audit system received the winning title at the Centennial Coal Innovation Awards in 2009. The implementation of the system saw an improvement in waste management and segregation at the pit top facilities.

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, high-ash coal) to meet desired ash content in the final product. Washing is undertaken as required to meet market specifications.

At the commencement of the reporting period, Clarence placed all reject material in Reject Emplacement Area (REA) III. On 28th March 2011, Clarence received approval from DTIRIS under Section 100 of the *Coal Mine Health and Safety Act 2002* for REA IV. Land preparation works for REA IV commenced in May 2011. In July 2011, reject placement ceased in REA III and commenced in REA IV.

Prior to the installation of the belt press filters in 2008 Clarence placed fines within REA III. Clarence excavates fines which are mixed with coal product on the stockpile. During 2011 no fines were reclaimed from REA III. Material reclaimed in 2009 is still being mixed with the product stockpile.

2.6.2 Sewerage

A package sewerage 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 coal stockpiles and the rail-loading loop. Approximately 9 ML is applied to the irrigation area each year. There were no changes to current sewerage treatment methods during the reporting period.

Upgrades to the sewerage treatment plant were undertaken in 2011. The upgrades related to the installation of four new pumps and a tank for the irrigation system. The new pumps and tank will be commissioned during 2012.

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. Oil booms are also used as skimmers throughout the sites dirty water management system. There were no changes to oil and grease handling during the reporting period.

Clarence decreased the size of the floor of the waste oil shed during the previous reporting period. The size of the floor was reduced to ensure any potential spill would be captured in the bund underneath. The action was requested by OEH following a previous AEMR inspection.

During 2011, Clarence Colliery purchased a new emergency response spill trailer for the site. The trailer can be towed around site to provide fast access to a range of absorbents, mats, socks and other spill control equipment. The trailer is also suitable for use underground if required.

Following a review of spill kits around the site (including underground), Clarence Colliery replaced the existing spill control stations and added approximately 10 more stations. These spill control stations consist of a 'wheelie bin' with various spill control equipment similar to that contained in the trailer.

2.7 Ore and Product Stockpiles

Raw coal production from the underground mine is transported by conveyor to the 1000 tonne underground storage bin using covered and enclosed conveyor belts.

Coal is delivered from the underground storage bin to the surface by conveyor. Run of mine (ROM) coal is initially passed over a 100 mm vibrating scalping screen. Oversize from the scalping screen passes to the rotating Bradford Breaker where the coal is reduced in size to a nominal <100 mm size range and rock and timber are removed.

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 eastern 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 ore and product stockpiles during the reporting period.

2.8 Water Management

Water Management at Clarence is managed in accordance with an approved Water Management Plan. The Clarence water schematic is attached in **Appendix 1**.

Clarence reviewed the Water Management Plan during the previous reporting period. The review included updating the Plan in accordance with applications and approval conditions of the Outbye and 700 Area SMP's. Consultation with regulatory bodies commenced in March 2010. The consultation process with the NSW Office of Water (NoW) is continuing for the updated plan.

Clarence undertook specific changes to the water management system during the reporting period supporting continuous improvement. Changes made to the water management in 2011 are described throughout Section 2.8 below.

Clarence supplies water to the LCC through the water transfer scheme outlined in Section 2.8.5 below. Clarence continued to work with LCC during the reporting period.

2.8.1 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. Drinking water is sourced from a number of rainwater tanks located on the site. The approximate consumption of bathhouse water was 9ML.

In 2010, Clarence connected an existing line to the bathhouse water from the water treatment plant. Previously bathhouse water was collected from the mine water supply at the header tanks. The change in water supply reduced the pumping costs incurred to transfer the water.

The consumption of process water (inclusive of water used in the mine, CHPP and for dust suppression) is approximately 500 mega litres per year.

2.8.2 Groundwater Management

Clarence is licensed to dewater the mine for safety reasons under dewatering licences issued by the NSW Office of Water (NoW), formerly the Department of Water and Energy. The underground workings are dewatered via two borehole sites on the northern extent of the surface infrastructure. Water is transported from the dewatering boreholes by an overland pipeline for each borehole to the water treatment plant.

Previously, the volume of water pumped to the surface to the water treatment plant represented water make in the mine. The recent changes to the water management system mean that water collected in the underground water storage is now a mixture of mine water make and surface water runoff. By allowing the surface water and groundwater to mix in the underground water storage the water is of a consistent quality when pumped through the dewatering bores to the water treatment plant.

A hydrogeological model report was completed in October 2011. The report was completed to characterise groundwater inflow to the mine under existing and future conditions. The report was also used to review the Water Management Plan.

2.8.3 Surface Water Management

A Fault Modes and Effects Analysis (FMEA) risk assessment for surface water management at Clarence Colliery was completed in December 2011. The risk assessment was completed as a component of the review for the Water Management Plan.

Clarence surface water run-off is collected within dirty water and clean water management structures. A schematic of surface water bodies is provided in Plan CL5a and Plan CL126 in Appendix 1. A flow diagram water schematic is also included in Appendix 1. A detailed description of water management structures is provided in Sections 2.8.3.1 through to 2.8.3.3 below. A summary of the system is subsequently provided.

Clarence collects runoff and leachate water from current operational reject emplacement areas to the Leachate No.1 Dam or Leachate No.2 Dam. The Leachate No.2 Dam transfers water to the underground water storage. Leachate Dam No.1

also collects dirty water (water laden with sediment) from the Polishing Lagoon. Water from Leachate Dam No.1 is transferred to the underground water storage for mixing with underground mine water. All water in the underground water storage 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. This is primarily carried out through the adjustment of pH and the addition of permanganate which results in the precipitation of manganese and iron. The pH is then adjusted again to achieve the discharge criteria at Licensed Discharge Point 2.

During high rainfall events, when the leachate borehole reaches its capacity, water from the Polishing Lagoon can be released off site directly through Licensed Discharge Point 2 (LD2). However, under normal conditions, all water released through LD2 is treated water from the water treatment plant. Licensed Discharge Point 1 did not discharge during the reporting period. Licensed Discharge Point 3 and Licensed Discharge Point 4 discharged on one occasion each during the reporting period following rainfall events.

Clarence made improvements to the surface water management system during the previous reporting period. The changes involved construction of a diversion drain to link existing drains that directed runoff from REA areas to the Leachate No. 2 Dam. A contour drain and sediment basins were also constructed along the access road to the sewage treatment ponds and the Polishing Lagoon.

2.8.3.1 Leachate

Leachate water originates from REA's I, II III and the recently established REA IV. The leachate water is collected in open drainage lines at the toe of REA I, II, III and IV. Water is transferred from the open drainage lines to Leachate Dam No. 1 and Leachate Dam No. 2. Water from the leachate dam is transferred via a pipeline to the Leachate Borehole.

The Leachate Borehole is gravity fed receiving water from Leachate Dam No. 1 and Leachate Dam No. 2. The water mixes underground in the 79 c/t and 82 c/t water storage area. The water is mixed to provide consistent water chemistry for treatment at the water treatment plant on the surface. The leachate water and underground water have different chemical properties for which the water treatment plant cannot respond to adequately without mixing.

Water is pumped to the surface via the 79 c/t and 82 c/t dewatering boreholes. The water is treated at the water treatment plant described in Section 2.8.4. After the water is treated it is released through LD2.

2.8.3.2 Main Dam

The Main Dam is a storage dam located on the Wollangambe River and has a maximum holding capacity of approximately 70ML. Water received in the Dam is from two tributaries (an unnamed tributary and LD2). The dam is used as a source of water for underground operations, process water for the CHPP and it supplements Lithgow's water supply (described in Section 2.8.5 below).

2.8.3.3 Stored Water

The stored water at the beginning and end of the reporting period are presented in **0**. It should be noted that these values are estimates only.

Table 7 Water Storage 2011 Reporting Period

Area	Beginning of Reporting Period (ML)	End of Reporting Period (ML)	Capacity (ML)
Clean Water			
Polishing Lagoon	16.7	16.7	16.7
Main Dam	70.0	70.0	70.0
Processed Water Tank (1)	3.5	3.5	4.5
Dirty Water			
Grit Trap	1.0	0.5	1.0
Settling Pond	3.2	3.2	3.2
Leachate Dam	3.0	3.0	3.0
Leachate Dam 2	1.0	1.0	1.0
Primary Arrestor	1.5	3.0	3.0
A Thickener	1.8	1.8	1.8
B Thickener	1.8	1.8	1.8

2.8.4 Clarence Colliery Water Treatment Plant

The Clarence Colliery Water Treatment Plant was upgraded in 2004. Monitoring has shown that water quality has been significantly improved since the upgrade. The water treatment plant treats the mine water through 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 is directed into a mixing tank where potassium permanganate, lime and a coagulant are added to raise the pH of the water. This has the effect of precipitating iron and manganese. Water is then directed into a 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. The treated water is then adjusted for pH with sulfuric acid and released off site through LD2.

2.8.5 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.

LCC is working to upgrade the water transfer scheme in accordance with terms of an agreement with the Federal Government. Clarence provided assistance to LCC during the reporting period by attending meetings with LCC to discuss information and design requirements for the pumping station and pipelines for the water transfer scheme.

2.9 Hazardous Material Management

The Dangerous Goods Licence 35/020999 was renewed on 15th March 2011. The licence covered two underground diesel tanks and an above ground sulfuric acid tank. During the reporting period the existing below ground diesel tank at the Coal Handling Preparation Plant was decommissioned and a new above ground diesel tank was commissioned. Two existing below ground diesel tanks adjacent to the storage sheds at pit top were also decommissioned. Two new above ground diesel tanks are proposed to be installed adjacent to the storage sheds at the pit top during 2012.

Clarence Dangerous Goods and Hazardous Substances Management Plan provides guidance for the purchase, storage, use, handling and disposal of Hazardous Substances at Clarence Colliery. A dangerous goods audit of the dangerous goods stored on site in accordance with the current Australian Standards was also completed during the reporting period.

2.10 Other Infrastructure Management

2.10.1 Facility Alterations

No other facility alterations were undertaken at the site in 2011. The current surface layout and facilities are shown in **Appendix 1**.

2.10.2 Transport Alterations

There have been no changes to the product transport system from Clarence in 2011.

2.10.3 Changes in Mining Equipment or Method

Clarence implemented the fourth generation Flexible Conveyor Train (FCT) in 2010. The FCT replaced shuttle cars in one of the mining panels at Clarence. The FCT is a 110m conveyor belt that can move on track and bend to go around corners while conveying coal. An operator steers the FCT up or down the panel roadways with a radio remote control. The receiving hopper of the FCT follows the continuous miner as it cuts the coal and takes the coal through a crusher before loading it onto the flexible conveyor. The coal travels to the panel conveyor where it commences its journey to leave the mine on a series of conveyor belts.

Clarence requested an amendment for the inclusion of the FCT as new mining equipment in the 2007-2013 MOP during November 2010.

There were no changes in mining equipment or method during 2011.

3 Environmental Management and Performance

This section summarises environmental management throughout the 2011 reporting period at Clarence Colliery. A plan of environmental monitoring locations is located in **Appendix 1**.

3.1 Environment Protection Licence

Clarence is licenced by the OEH under the *Protection of the Environment Operations Act 1997* with EPL 726. As outlined in **Section 1.1** the licence was reviewed during the 2011 reporting period and a variation issued on the 19th December 2011. The variation had reduced concentration limits for arsenic, boron, cadmium, chloride, chromium (hexavalent), copper, fluoride, lead, oil and grease, silver and zinc for water discharged from licensed discharge points. In addition the licence stated that Clarence must conduct a site specific Best Management Practice (BMP) particulate determination to identify the most practicable means to reduce particle emissions from the premises. A copy of the latest licence can be found in **Appendix 3**.

Clarence is required to complete an Annual Return detailing compliance against EPL 726 conditions for the reporting period. Clarence has provided a summary report of compliance within **Section 3.4** below and in **Appendix 4**. Please note that during 2011 all monthly and quarterly monitoring required by EPL 726 was undertaken under the previous licence and therefore compliance is assessed against the limits within the licence at the time.

3.2 Meteorological Data

Meteorological data is obtained from the Clarence Colliery meteorological station. A new onsite meteorological station was installed in October 2010. The new station was installed in accordance with *Approved Methods for Sampling of Air Pollutants in New South Wales (DECCW 2007)*. Clarence notified the OEH and the DP&I in September 2010 of the installation. The meteorological station is calibrated every six months. Climate data is presented below.

3.2.1 Temperature

Temperatures during 2011 ranged from -1.8°C in June to 29.4°C in January and February. A summary by month of temperature for 2011 is presented in **Table 8** below.

Table 8 Average Minimum and Maximum Temperature Data

Month	Average Minimum Temperature	Average Maximum Temperature
January	14.4	23.8
February	14.1	23.9
March	12.0	19.5
April	8.0	14.9
May	4.7	12.2
June	3.5	8.8
July	2.3	8.4
August	4.5	12.4
September	5.2	15.4
October	7.2	15.9
November	10.8	21.2
December	9.1	17.2

3.2.2 Rainfall

Total annual rainfall for 2011 was 1062.4mm compared with 968.4mm in 2010. Rainfall data is presented in **Table 9** below.

Table 9 Rainfall recorded at Clarence

Month	Rainfall (mm) Clarence Meteorological Station
January	130.8
February	57.8
March	116.0
April	59.8
May	45.0
June	104.8
July	33.8
August	60.4
September	82.2
October	68.4
November	187.8
December	115.6
Total	1062.4

3.2.3 Wind Speed and Direction

The wind direction during 2011 was predominantly southerly. Average wind speed ranged from 6km/h to 10km/h in June. The maximum wind speed at Clarence was 67km/h in July, at the time severe storms were experienced in the Blue Mountains region. Wind speed data is presented in **Table 10** below.

Table 10 Average Wind speed and Direction

Month	Average Wind speed(km/h)	Max Wind speed(km/h)	Average Wind direction (deg)
January	7	42	SE
February	6	42	S
March	6	37	S
April	6	45	S-SE
May	6	53	SW
June	10	59	S
July	8	67	S-SW
August	6	60	S-SW
September	7	61	S-SW
October	6	42	S
November	6	48	S
December	7	36	E-SE

3.3 Air Pollution

Clarence Development Consent (DA 504-00) details the air quality criteria that is 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 ($\text{g/m}^2/\text{month}$). The depositional dust limit stated in the Development Consent is $4\text{g/m}^2/\text{month}$ on an annual average basis. This criteria 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.

A review of the Air Quality Monitoring 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.

In 2012 Clarence must conduct a site specific Best Management Practice (BMP) particulate determination to identify the most practicable means to reduce particle emissions from the premises. A variation was applied to EPL 726 during December 2011 to include a PRP which outlined the requirement to complete a BMP.

3.3.1 Dust performance against Environmental Impact Statement Prediction

The Environmental Impact Statement (2000) concluded that the proposed development 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 $4\text{g/m}^2/\text{month}$ for all depositional dust gauges during 2011. Monitoring for TSP and PM_{10} also showed results well below the Development Consent criteria during 2011.

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 on the Monitoring Plan in **Appendix 1**. 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).

DG3 is actually located further south-west along the entrance road, closer to Clarence village. Clarence Colliery have also commenced negotiations to relocate DG3 to private property within Clarence village itself to measure any dust impacts on nearby residences. Once the final location is agreed, the Environmental Air Quality Monitoring Program will be revised accordingly.

3.3.2.1 Dust Depositional Gauges 1, 2 and 3

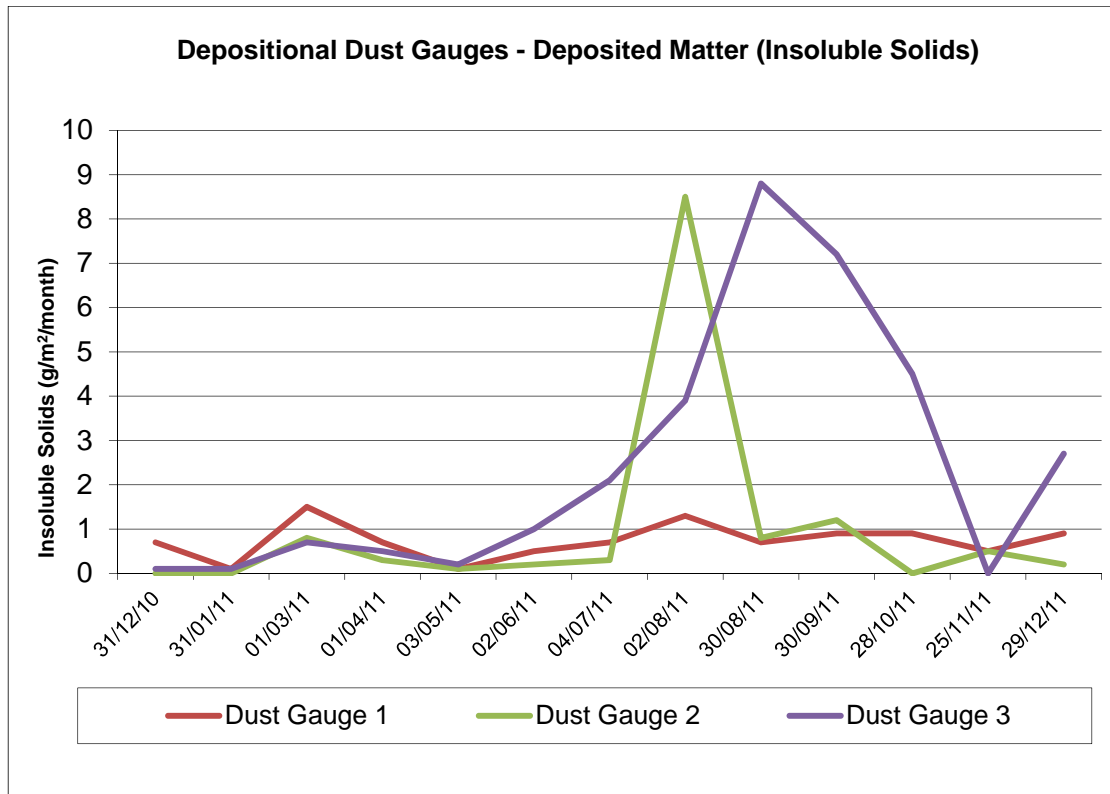


Figure 1 Depositional Dust Gauges 1, 2 and 3, 2011

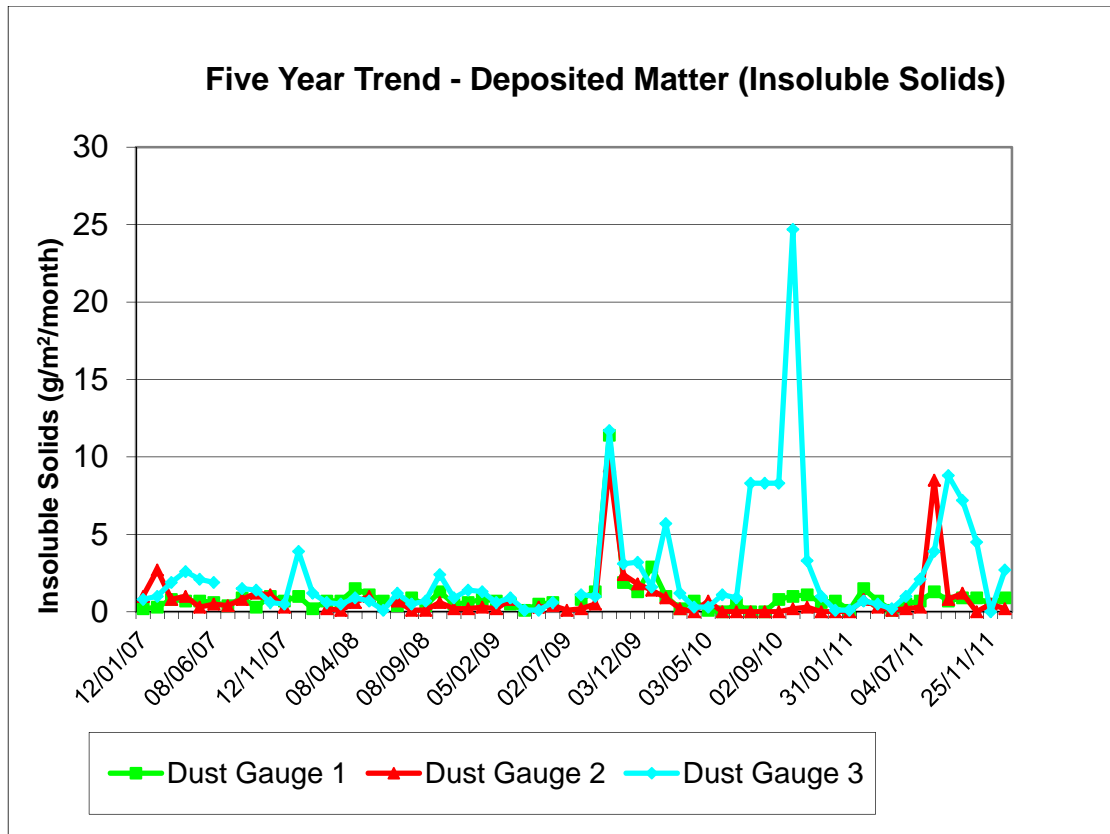


Figure 2 Depositional Dust Gauges - Five Year Trend

Dust monitoring data indicated that monthly dust deposition results for 2011 ranged from 0.1 g/m²/month to 1.5 g/m²/month at DG 1. At DG 2 the results ranged from below detection limits to 8.5 g/m²/month; and at DG 3 the results ranged from 0.1 g/m²/month to 8.8 g/m²/month. The samples for DG 3 for August and September were determined to be contaminated with bird droppings and plant and insect debris which explained the higher monthly results (**Figure 1**).

The annual average at the end of 2011 was 0.7 g/m²/month at DG 1, 0.5 g/m²/month at DG 2 and 2.9 g/m²/month at DG 3. The results are all below the annual average air quality criteria of 4 g/m²/month. The location of the dust gauges are identified as dust monitoring sites (DM1, DM2 and DM3) on the Clarence Colliery Pit Top Monitoring Locations figure, located in the document titled Environmental Monitoring Program.

3.3.2.2 TSP/PM₁₀

Monitoring for PM₁₀ (Particulate Matter less than 10 micrometres in size) and TSP (Total Suspended Particulates) occurred during the reporting period as required under the Clarence Development Consent and the Environmental Air Quality Monitoring Program. A summary of monitoring results is provided below. No exceedances were recorded during the reporting period for measured maximum 24 hour average PM₁₀ concentrations (criteria limit of 50 µg/m³) or the average annual TSP (90 µg/m³). The location of the TSP and PM₁₀ 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 PM₁₀ 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 3**, **Figure 4**, **Figure 5** and **Figure 6**.

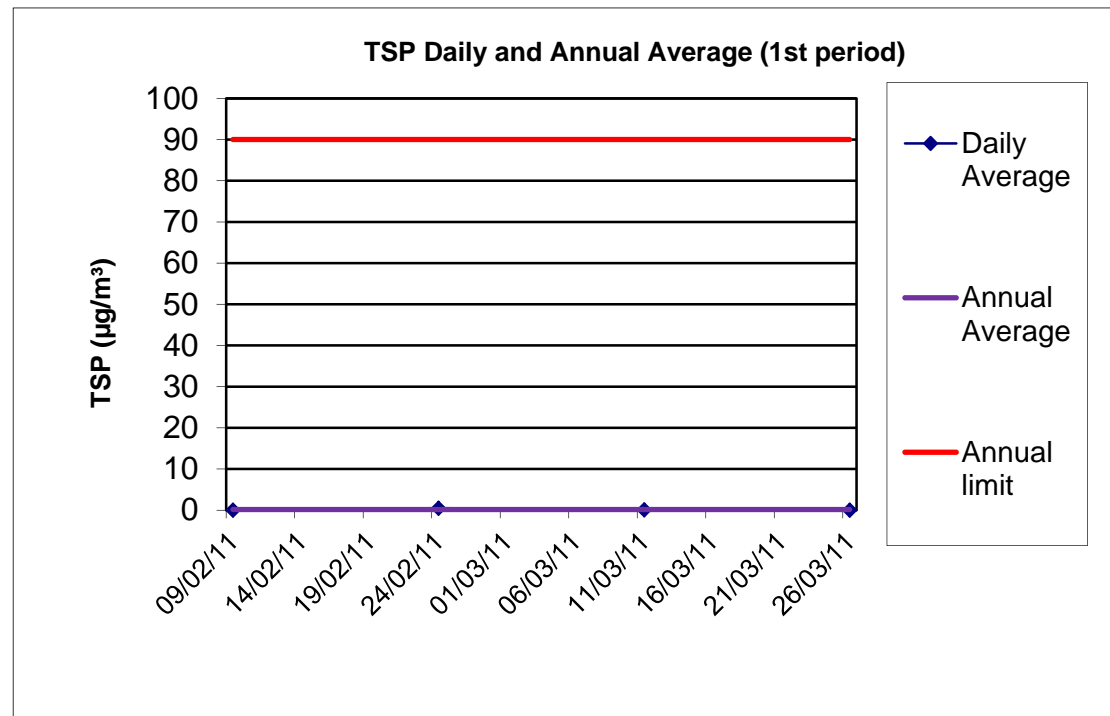


Figure 3 TSP daily and annual average, 1 period

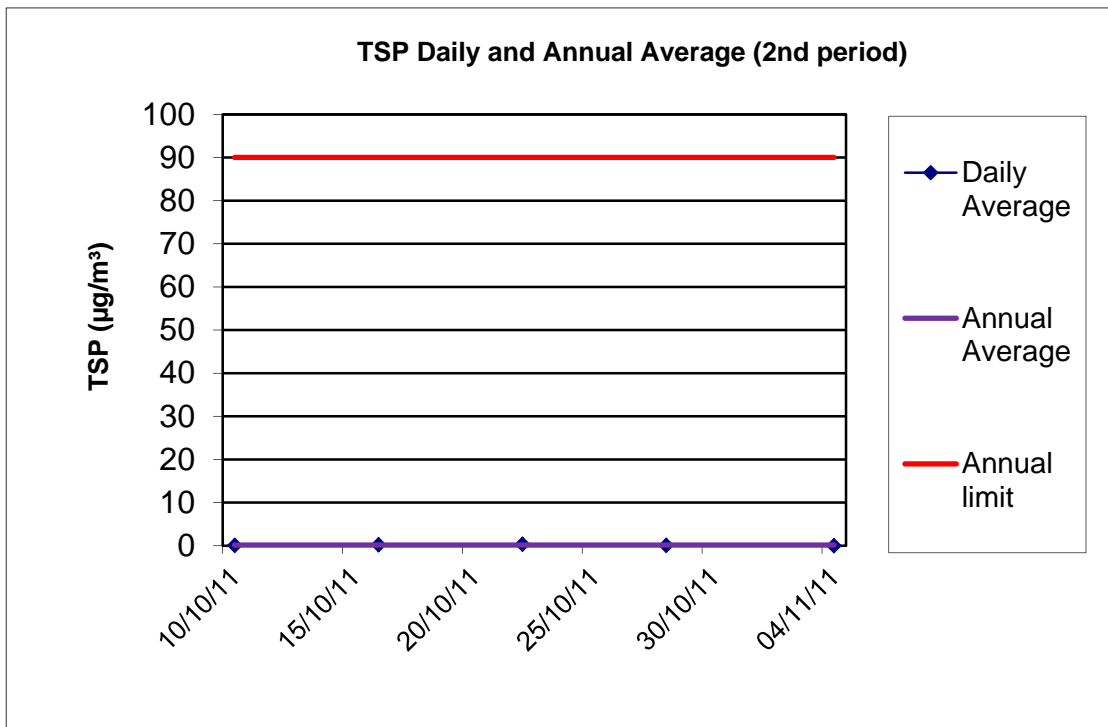


Figure 4 TSP daily and annual average, 2 period

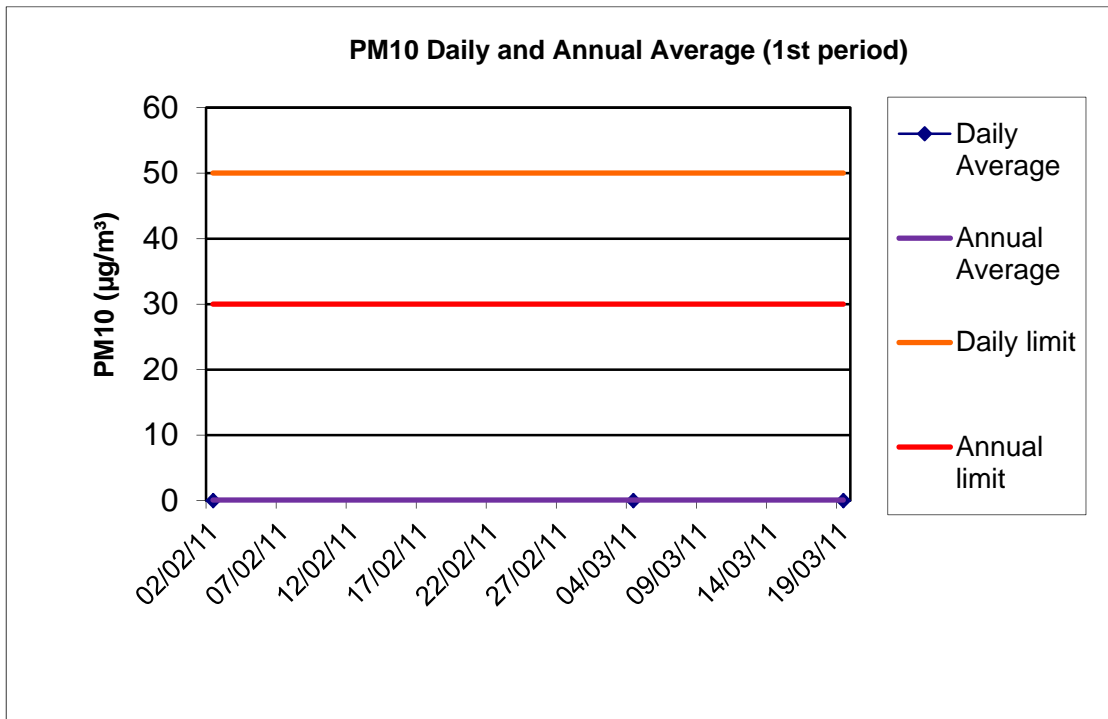


Figure 5 PM10 daily and annual average, 1 period of monitoring 2011

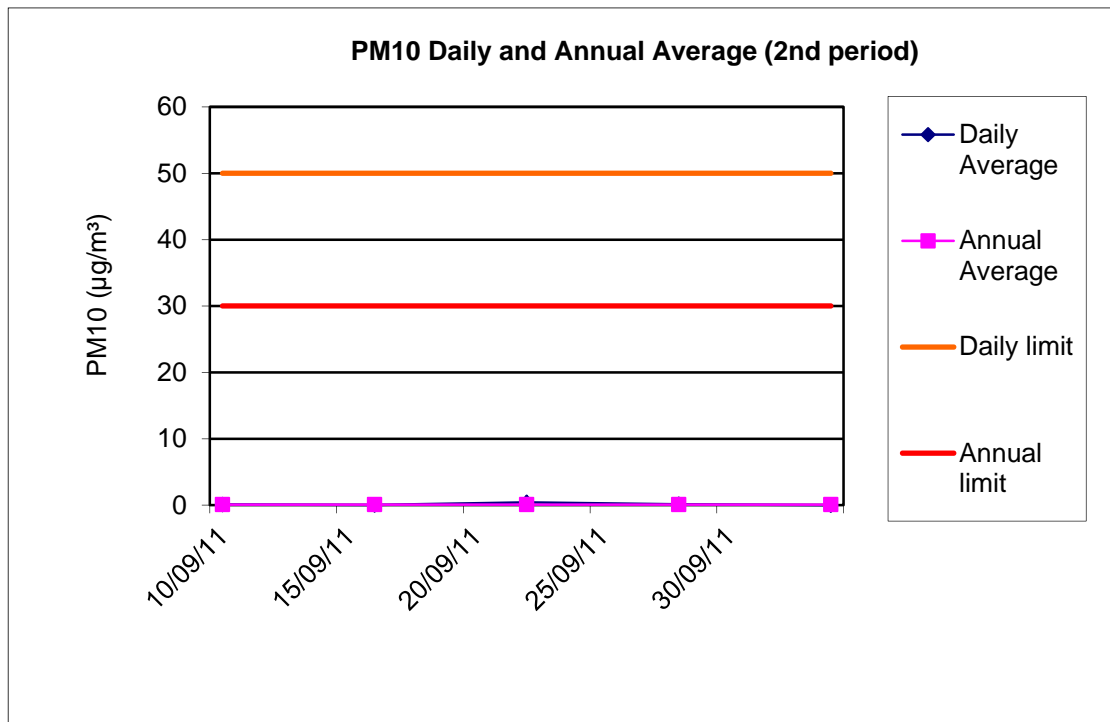


Figure 6 PM10 daily and annual average, 1 period of monitoring 2011

3.3.3 Control Measures

Conveyors from the underground coal workings are enclosed to prevent dust generation on route to the main stockpile at the Coal Handling Preparation Plant (CHPP). Sprinklers are positioned on gantry's above the main stockpile and are used if conditions are windy to suppress dust on stockpile areas.

Dust generation around the CHPP and stockpile areas are managed using a water cart and/or water cannons. Throughout the reporting period, this control strategy has proved to be adequate to manage dust emissions.

Dust generation from the CHPP and stockpile areas was considered a medium environmental risk, particularly, during dry and windy days. Dust suppressants are used during hot dry conditions to reduce dust emissions.

A road sweeper from Lithgow City Council is utilised to sweep the pit top fortnightly, reducing the volume of material potentially available to be mobilised to form airborne dust.

3.4 Surface Water Pollution

The Water Management Plan required under DA 504-00 and prepared in consultation with relevant government agencies, was approved by the Department of Planning on the 25th July 2007 and was then modified and subsequently approved on the 6th November 2007. Consultation was sought with the NSW Office of Water in March 2010. Feedback was received from the NSW Office of Water in January 2011. Since that time, further works have been undertaken on the water management system at Clarence. A Hydrogeological Model was completed in October 2011 and a Failure Modes and Effects Analysis (FMEA) risk assessment undertaken in December 2011. The outcomes of these assessments will be fed into a revised Water Management Plan for further consultation and submission to DP&I for approval.

In 2011, Clarence had an incident where coal fines were identified within a man-made drainage channel connected to the south eastern most portion of the washed coal stockpile area. Clarence made an informal self-report to the Department of Environment, Climate Change and Water (DECCW, now OEH) on the 11th March 2011. An Official Caution was issued by DECCW on the 16th March 2011.

In response to the incident Clarence immediately installed a rock drain at the coal stockpile and sediment fences were installed downstream of the rock drain. Inspections take place twice-weekly to assess the operation of the sediment fences, and identify any deposits of coal fines and water flow in the general area. The twice-weekly inspections are created and recorded in the Clarence work order system. Any maintenance works are undertaken as required, again using the Clarence work order system.

Further construction activity was undertaken in May 2011 diverting the drainage line entering the hanging swamp to direct water to Leachate No.2 Dam in accordance with the development of Reject Emplacement Area (REA) IV. A Pit Top ecological due diligence survey was completed in December 2011 to identify the location and condition of other swamps around the Pit Top areas.

Clarence engaged a consultant to undertake remediation works in the swamp. A proposal has been developed and Clarence is now in the process of preparing a referral to the Department of Sustainability, Environment, Water, Population and Communities (SEWPaC) to determine if a formal assessment and approval under the *Environment Protection and Biodiversity Conservation Act 1999* is required for the works.

Clarence Colliery has four licensed discharge points (LD). LD2 discharges water offsite regularly as it is the discharge point for treated water from the Water Treatment Plant. Leachate Dam No.1 (LD3) and Leachate Dam No.2 (LD4) discharged on one occasion each during rainfall events in the reporting period. LD1 did not discharge during the reporting period. Monitoring results for water sampling completed at the licensed discharge points are described below.

3.4.1 Water performance against Environmental Impact Statement Prediction

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. Clarence had two exceedances at LD2 during 2011 that were associated with the process of treating mine water prior to discharge offsite through LD2. On the 31st January 2011 the pH at LD2 was below pH 6.5 and on the 15-16th November 2011 the pH at LD2 was above 8.5. On both occasions the exceedances were caused by mechanical failure of equipment at the water treatment plant.

There was also an exceedance of the Total Suspended Solids (TSS) limit at LD2 during a rainfall event on the 23rd November 2011.

There was one discharge event at LD3. The Total Suspended Solids (TSS) limit was exceeded during a rainfall event on the 31st May 2011.

LD4 had one discharge of water which occurred during a rainfall event. The discharged water exceeded the prescribed limits in EPL 726 for pH, iron (filterable), manganese (filterable), zinc, lead and sulfate during a discharge event on the 28th November 2011.

3.4.2 Surface Water Pollution Monitoring

Environmental monitoring results for water samples collected at LD2, LD3 and LD4 are presented below. LD2 discharged treated water regularly during 2011 and the

monitoring results are presented in graphs for the reporting period. LD3 and LD4 discharged water on only one occasion each; hence the monitoring results are presented in a table.

As discussed in Section 3.1, a variation to EPL 726 was issued by OEH on 19th December 2011. The variation reduced concentration limits for arsenic, boron, cadmium, chloride, chromium (hexavalent), copper, fluoride, lead, oil and grease, silver and zinc for water discharged from licensed discharge points. As all monthly and quarterly monitoring required by EPL 726 was undertaken under the previous licence, compliance is assessed against the limits within the licence at the time.

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

3.4.2.1 pH LD2

Monitoring of pH at LD2 during the reporting period identified two exceedances. Both exceedances were identified from the control system at the water treatment plant. On the 31st January 2011 there was a low pH of 5.7 and on the 15-16th November 2011 there was a high pH of 9.1. Remaining pH results for discharged water sampled through the reporting period were within the prescribed range identified in EPL 726 of pH 6.5 – 8.5.

There were several remedial actions taken in response to the exceedances. An escalation process for alarm notification to Clarence personnel and water treatment plant operators was developed. There was re-establishment of automatic and remote communication to the water treatment plant operators. A meeting with the Water Treatment Plant operators was held to determine the process for ensuring failures in the Water Treatment Plant were addressed.

Clarence proposes to review the management system of the Water Treatment Plant in collaboration with the Water Treatment Plant operator. Clarence also proposes to complete a review of the telephone communication system hardware at the Water Treatment Plant to identify any opportunities to improve the design of the system.

Monitoring results for pH at LD2 are presented in **Figure 7**. The long term trend (**Figure 8**) indicates pH generally within the 6.5-8.5 pH range.

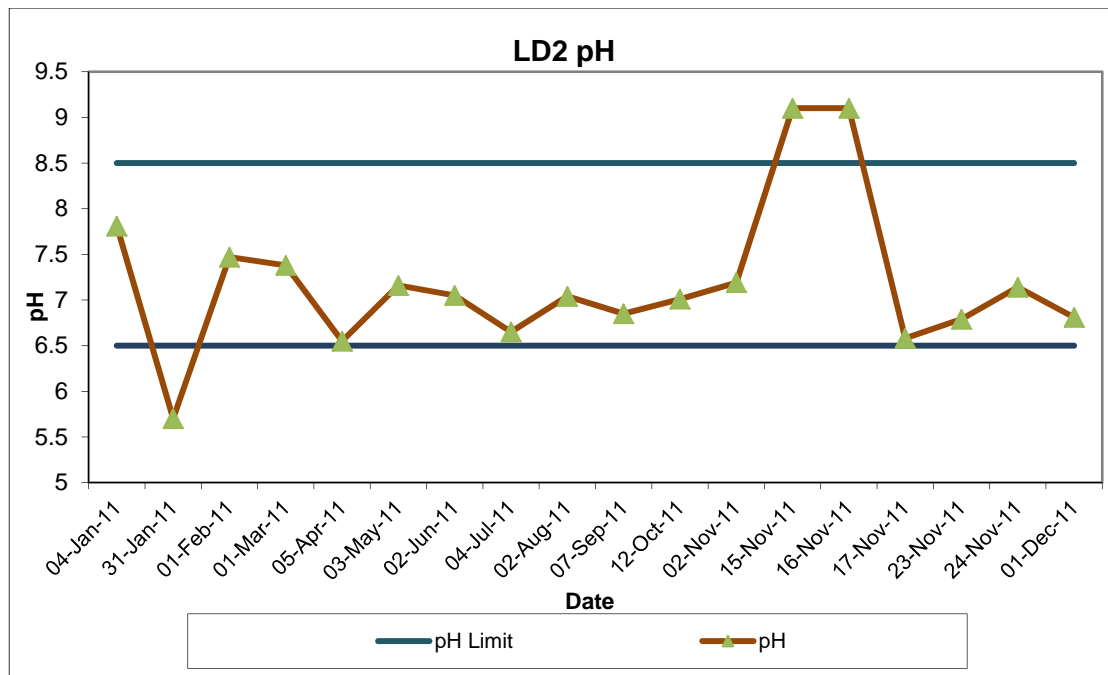


Figure 7 pH LD2 2011

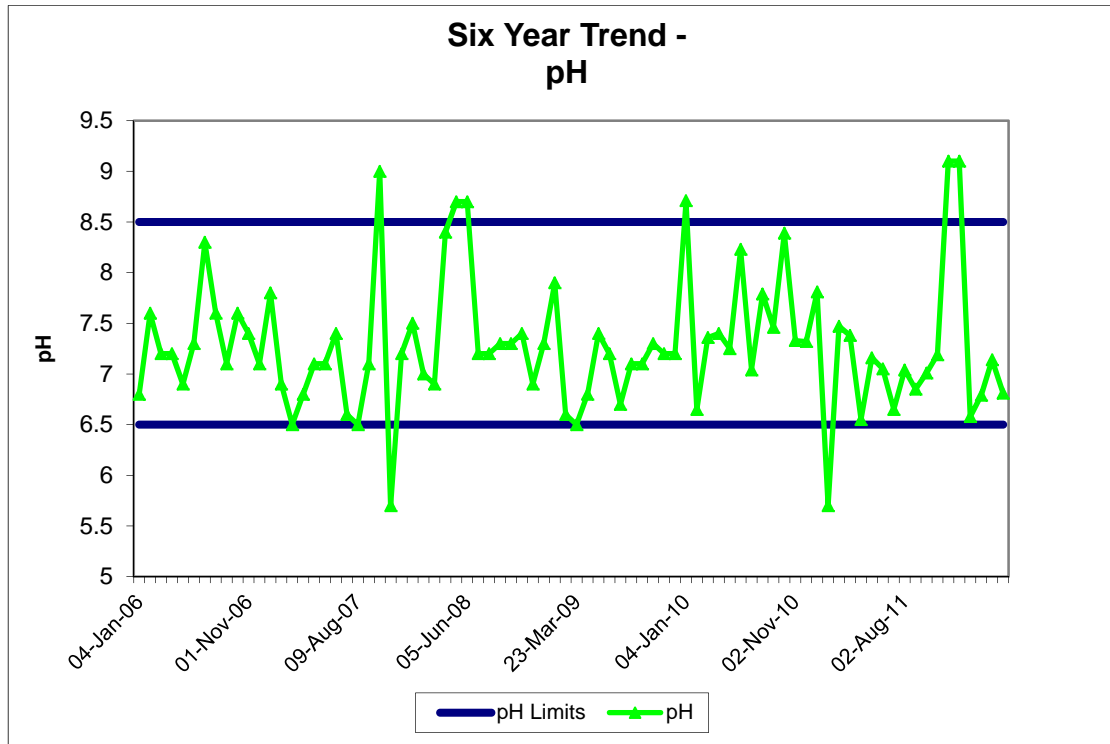


Figure 8 pH LD2 Six year trend

3.4.2.2 Total Suspended Solids LD2

Monitoring of Total Suspended Solids (TSS) at LD2 during the reporting period identified a trend where TSS results were typically low. However, during a discharge of water on the 23rd November 2011 a high TSS result was recorded.

The water discharged from the licensed discharge point flowed along a drainage line before entering the Main Dam. The discharge of water at LD2 and the Main Dam were sampled during the discharge event. The discharge event exceeded the Total Suspended Solids (TSS) limit of 30 mg/L in EPL 726, with a result of 108 mg/L. The Main Dam sample had a result of 8 mg/L. The meteorological station at Clarence Colliery recorded 100.2 mm of rainfall between the 16th and 23rd November 2011. The rainfall had reduced the settlement time for sediment to fall out within the sediment structures on site prior to reaching the Polishing Lagoon and being released through LD2. The rainfall run-off exceeded the capacity of the Polishing Lagoon containment dam.

In response to the TSS exceedance surface water management structures on the pit top area will be reviewed to confirm their capacity is consistent with Type D sediment retention basins for mines and quarries as defined in the publication *Managing Urban Stormwater: Soils and Construction* (Landcom 2006). The assessment will contribute to a review of the water balance for the pit top facilities which is proposed to be completed by May 2012.

Monitoring results for TSS at LD2 are presented in **Figure 9** below. The long term trend (**Figure 10**) indicates TSS generally remains well below 30mg/L but with an occasional spike related to rainfall events.

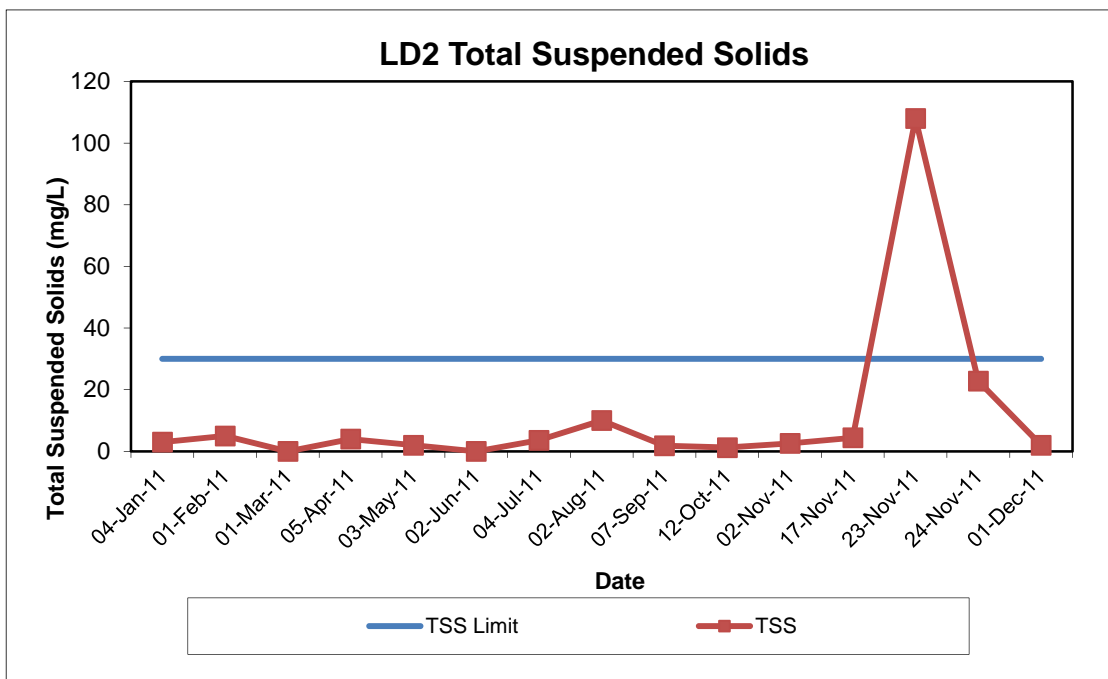


Figure 9 Total Suspended Solids LD2 2011

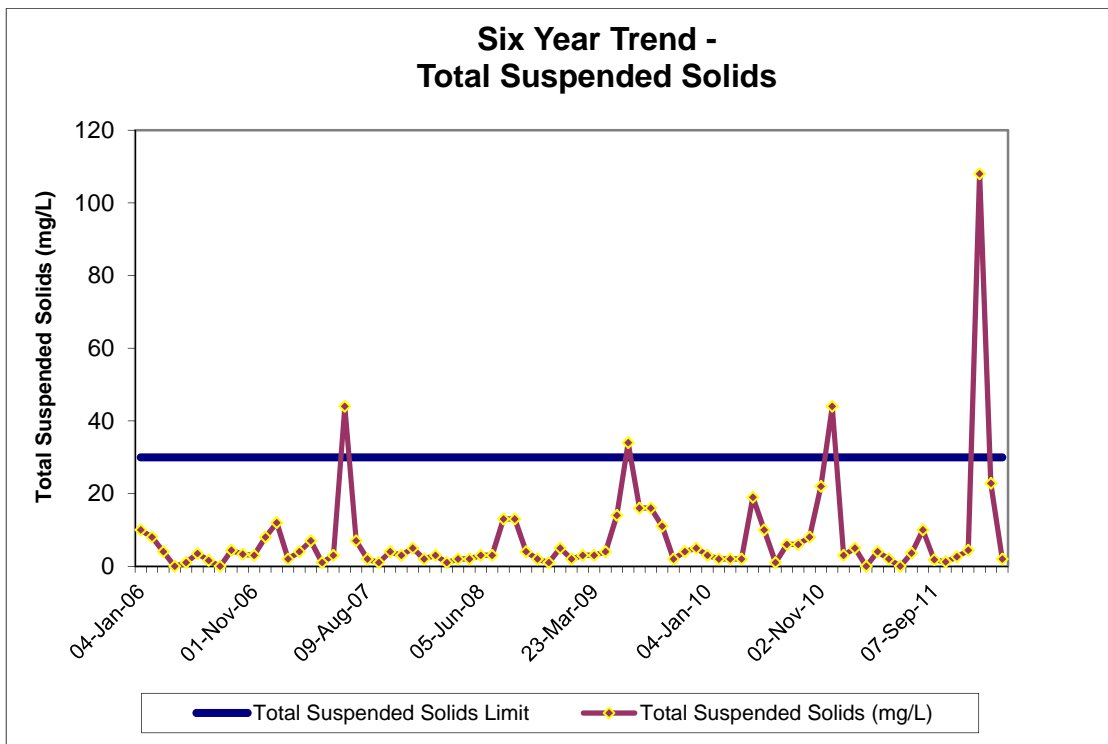


Figure 10 Total Suspended Solids LD2 Six year trend

3.4.2.3 Oil and Grease LD2

Oil and Grease results for discharged water sampled at LD2 during the reporting period were below the prescribed limit (20mg/L) in EPL 726 and below the detection limit (5mg/L) on all occasions.

Monitoring results for oil and grease at LD2 are presented in **Figure 11** below. The long term trend (**Figure 12**) indicates Oil and Grease has remained below the 20mg/L limit.

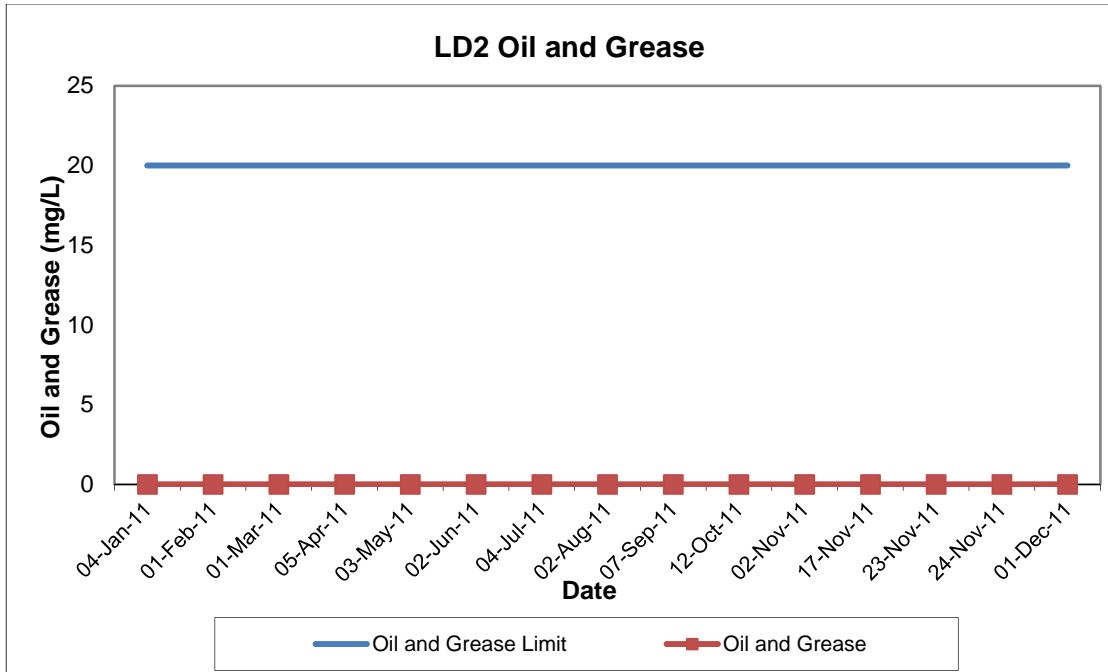


Figure 11 Oil and Grease LD2 2011

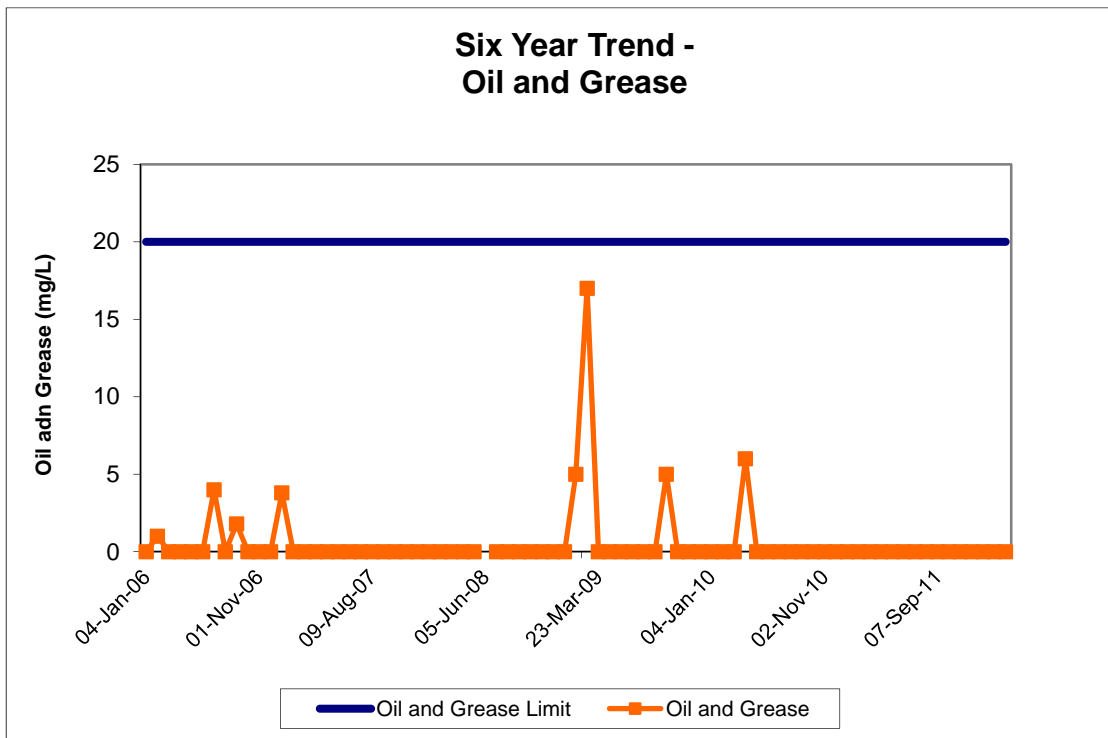


Figure 12 Oil and Grease LD2 Six year trend

3.4.2.4 Filterable Manganese LD2

Filterable manganese remained well below the limit of 0.5mg/L for discharged water sampled during the reporting period.

The results for 2011 showed consistency for filterable manganese levels in discharged water with all results less than 0.1mg/L.

Monitoring results for filterable manganese at LD2 are presented in **Figure 13** below. The long term trend (**Figure 14**) highlights the improved consistency with filterable manganese levels in discharged water. Note that the filterable manganese limit was varied in the EPL on 10th December 2010, hence the limit change on the graph.

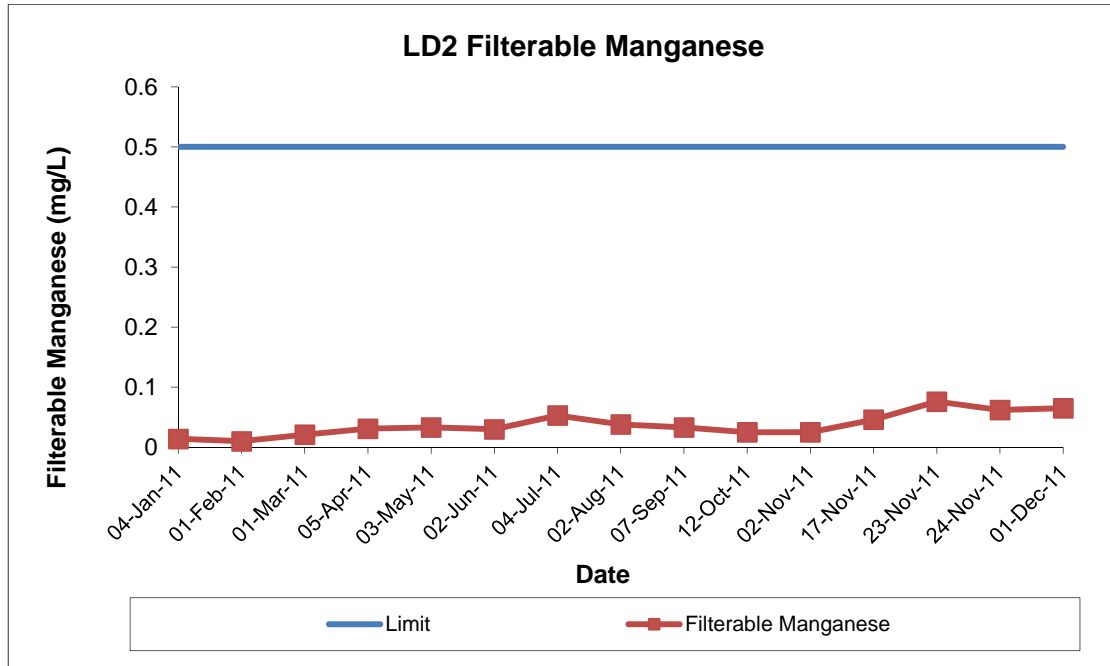


Figure 13 Filterable Manganese LD2 2011

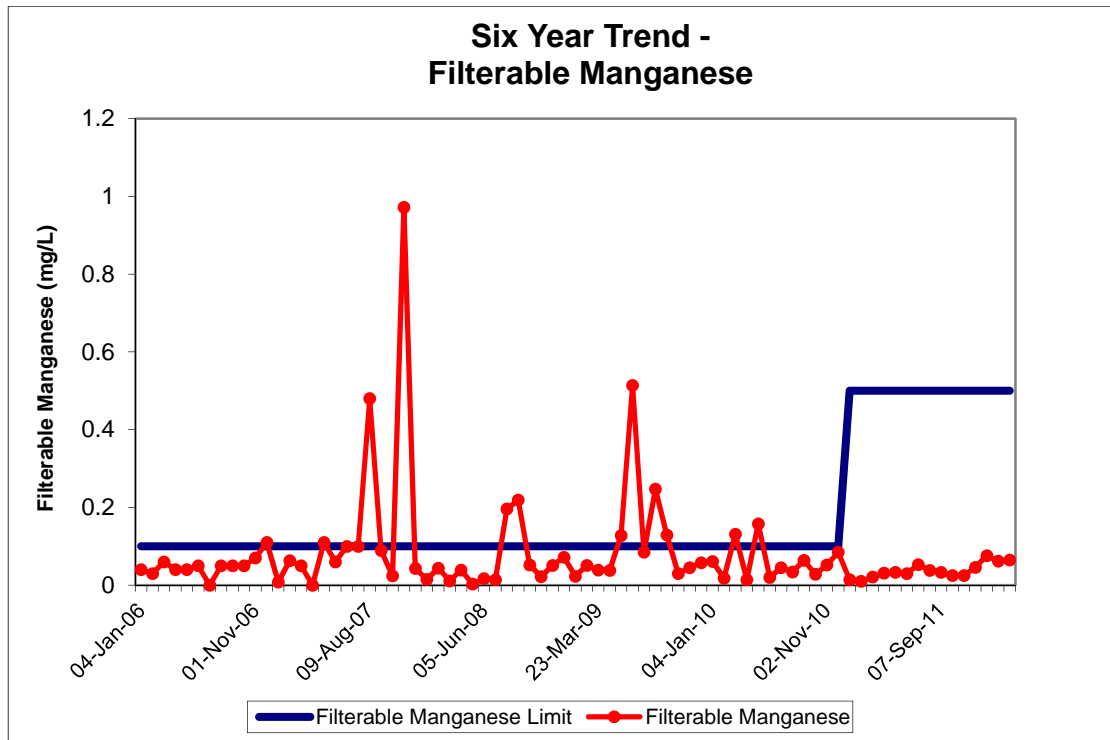


Figure 14 Filterable Manganese LD2 Six year trend

3.4.2.5 Total Manganese LD2

The maximum total manganese result for 2011 was 0.387mg/L recorded on the 23rd November 2011. There is no total manganese limit for discharged waters at licensed discharge points in EPL 726. However, all total manganese results for 2011 are below the filterable manganese limit of 0.5mg/L.

Monitoring results for total manganese at LD2 are presented in **Figure 15** below. Long term monitoring (**Figure 16**) indicates that total manganese levels in 2011 are in line with previous results.

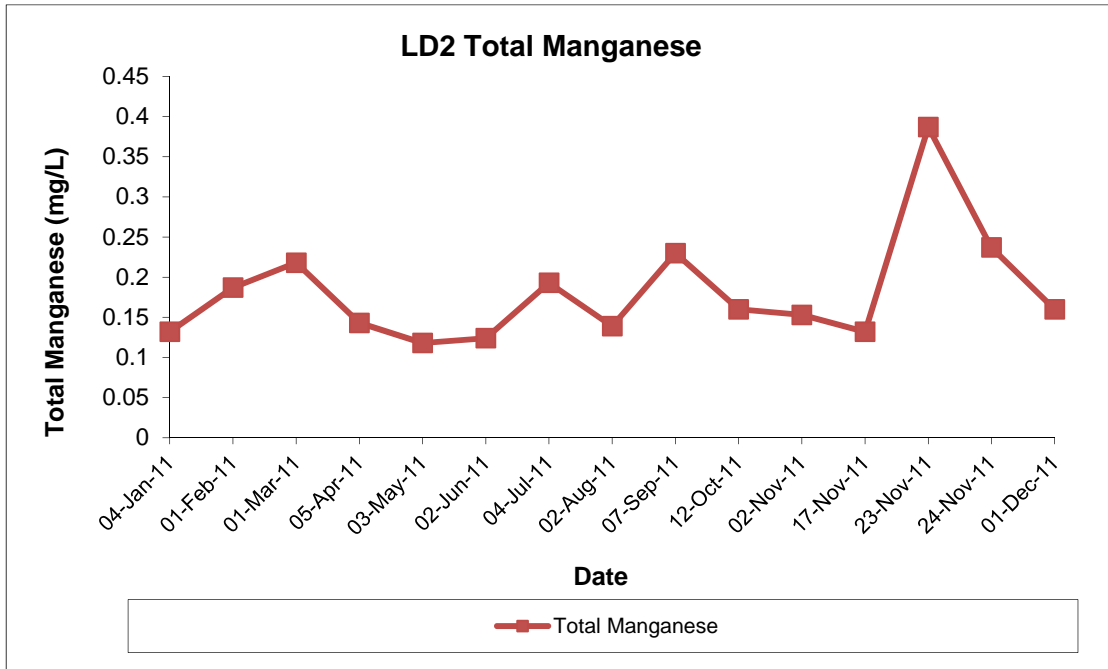


Figure 15 Total Manganese LD2 2011

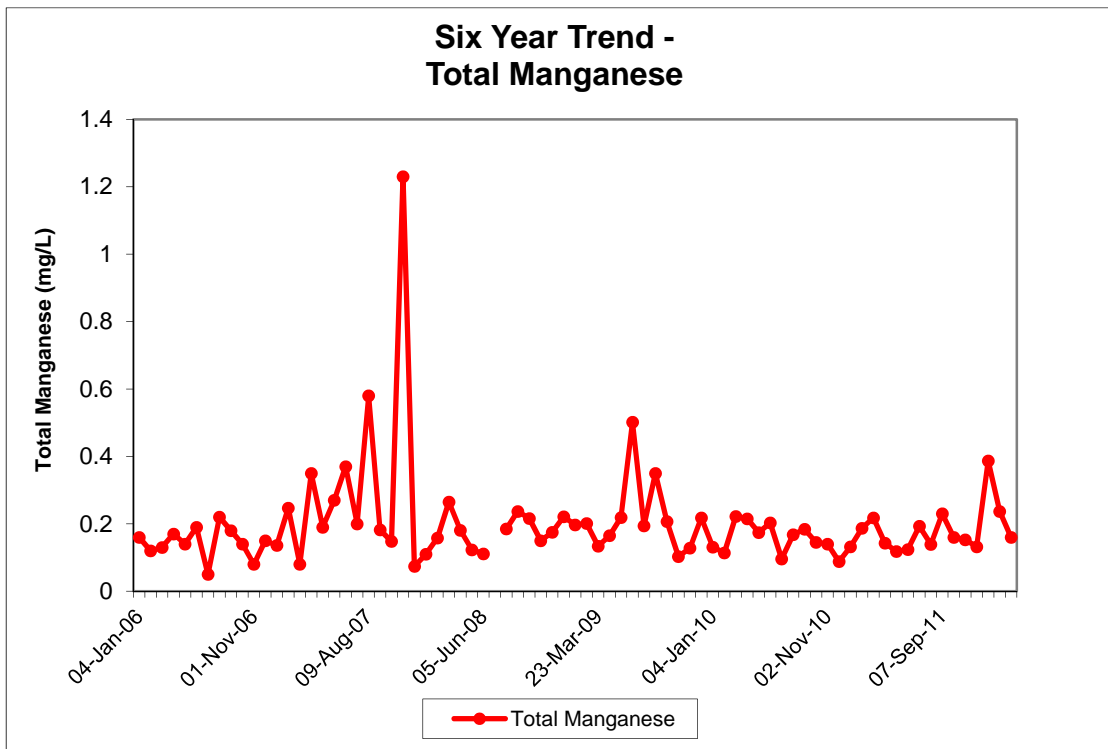


Figure 16 Total Manganese LD2 Six year trend

3.4.2.6 Total Arsenic LD2

Total Arsenic results for discharged water sampled at LD2 during the reporting period were below the licence limit (0.05mg/L) and below the detection limit (0.001mg/L) on all occasions.

Monitoring results for Total Arsenic at LD2 are presented in **Figure 17** below with the long term trend shown in **Figure 18**.

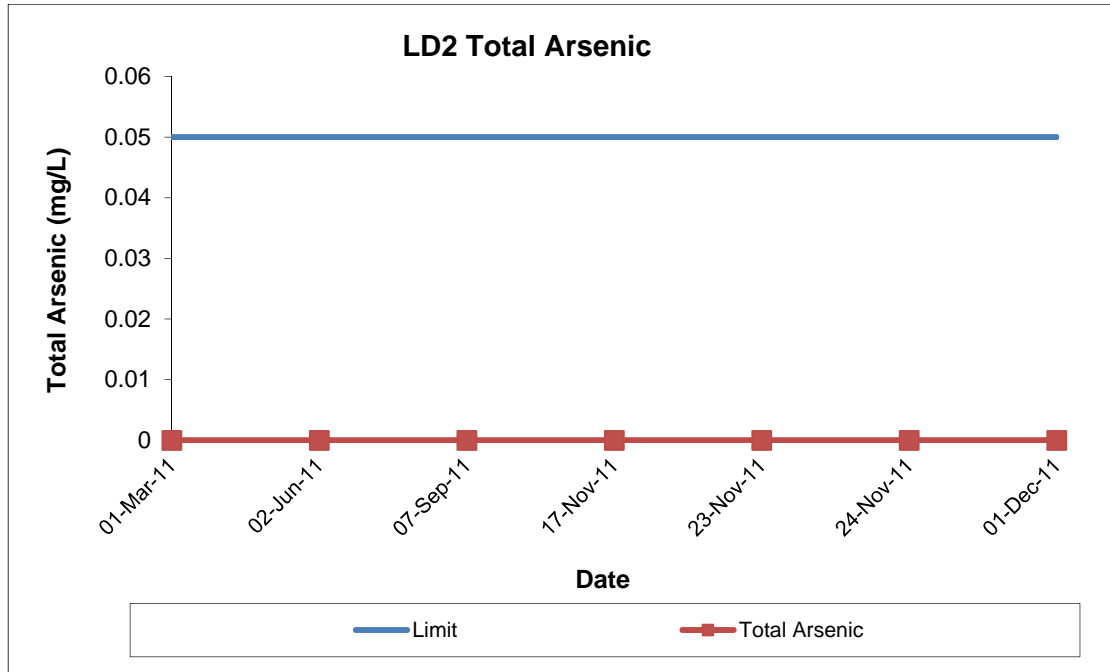


Figure 17 Total Arsenic LD2 2011

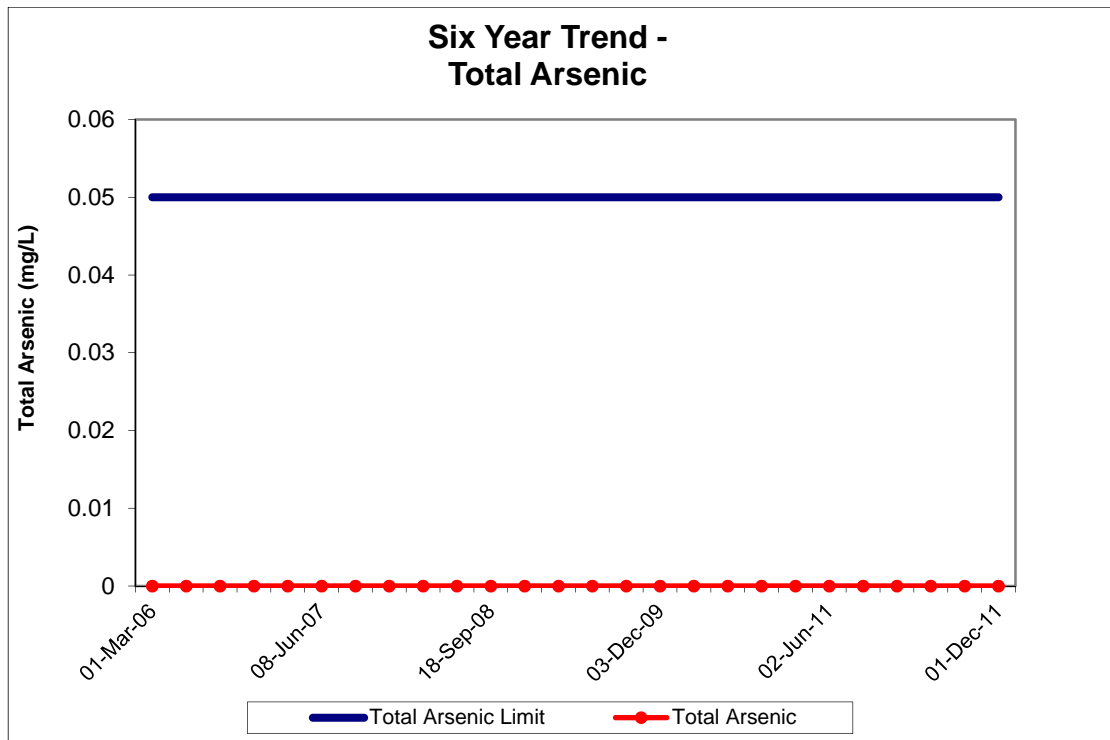


Figure 18 Total Arsenic LD2 Six year trend

3.4.2.7 Total Boron LD2

Total Boron results for discharged water sampled at LD2 during the reporting period were below the licence limit (1mg/L) and below the detection limit (0.05mg/L) on all occasions.

Monitoring results for total boron at LD2 are presented in **Figure 19** below with the long term trend shown in **Figure 20**.

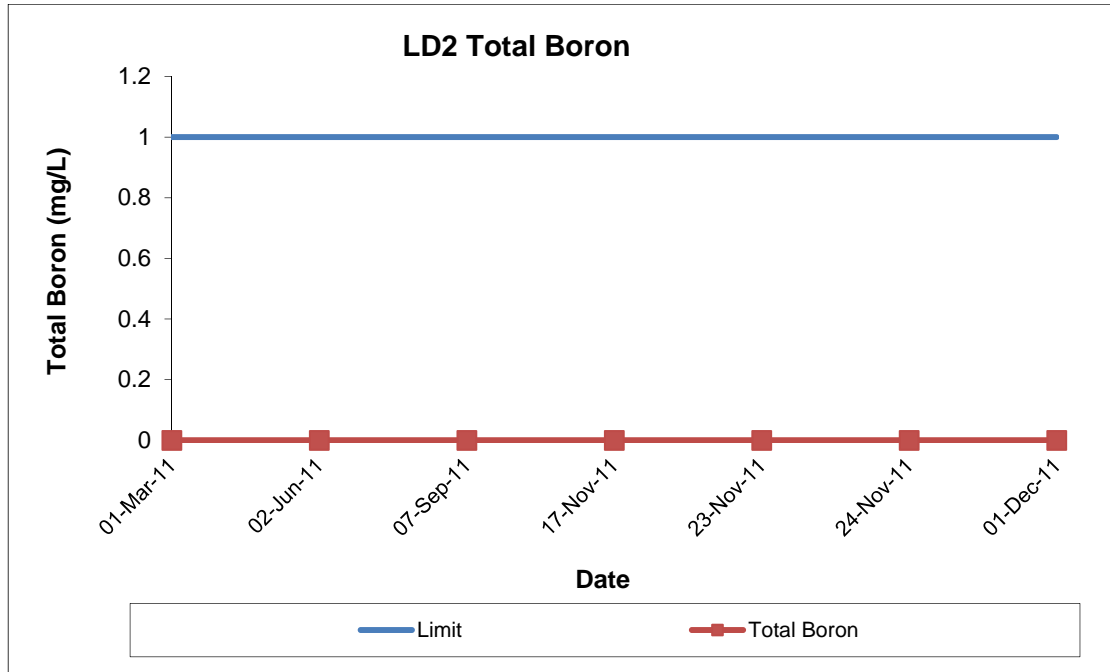


Figure 19 Total Boron LD2 2011

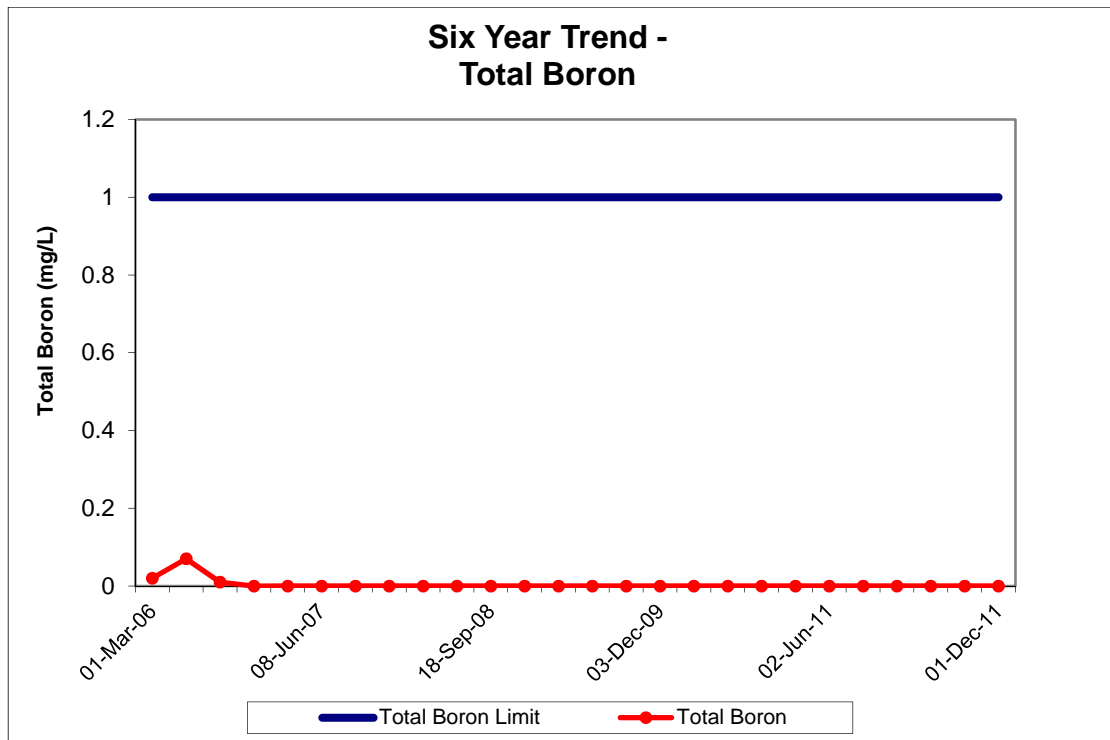


Figure 20 Total Boron LD2 Six year trend

3.4.2.8 Total Cadmium LD2

Total Cadmium results for discharged water sampled at LD2 during the reporting period were below the licence limit (0.01mg/L) on all occasions with the highest result being 0.0002mg/L on the 1st March 2011.

Monitoring results for Total Cadmium at LD2 are presented in **Figure 21** below with the long term trend shown in **Figure 22**.

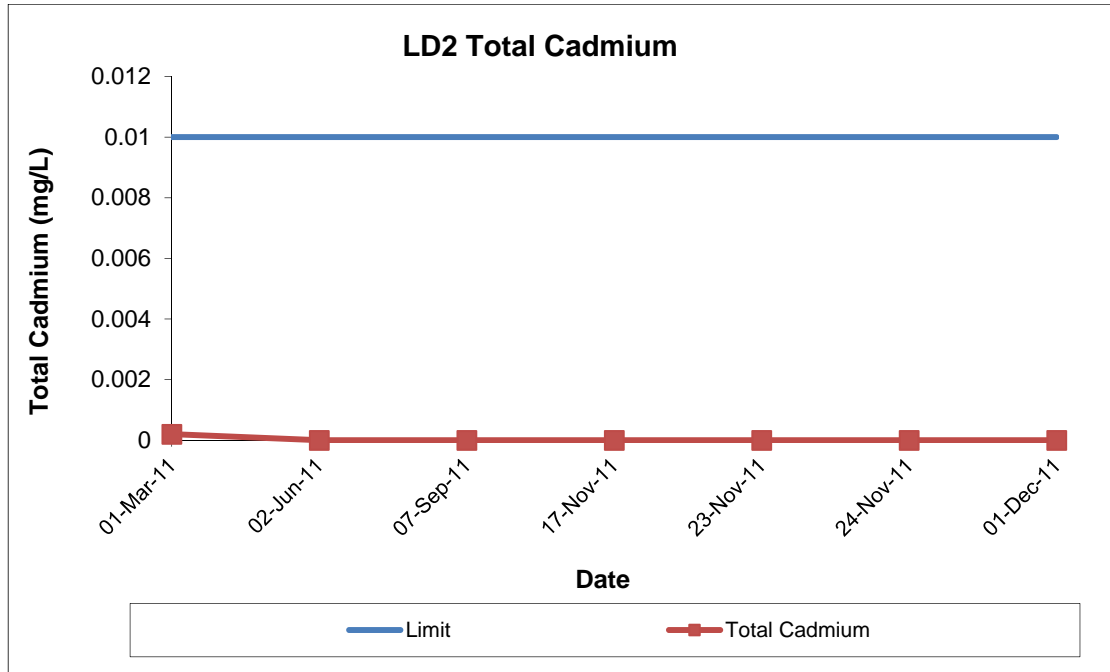


Figure 21 Total Cadmium LD2 2011

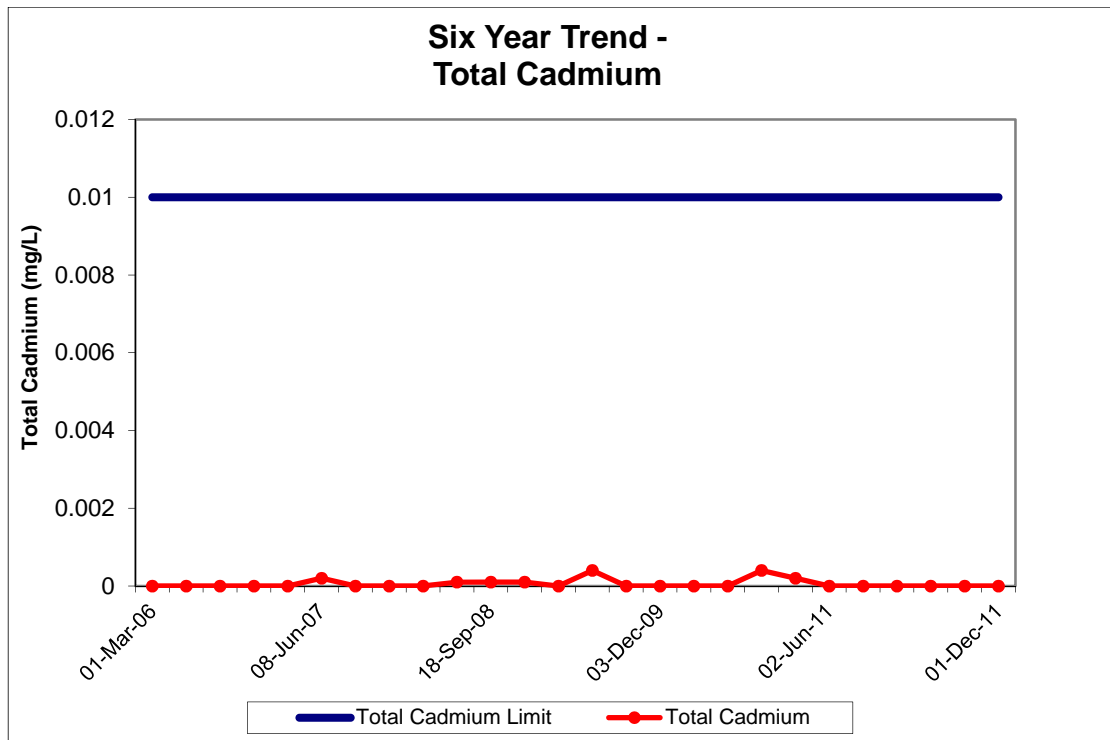


Figure 22 Total Cadmium LD2 Six year trend

3.4.2.9 Total Chloride LD2

Total Chloride results for discharged water sampled at LD2 during the reporting period were below the licence limit (250mg/L) on all occasions with the highest result being 5mg/L on 17th and 24th November 2011.

Monitoring results for Total Chloride at LD2 are presented in **Figure 23** below with the long term trend shown in **Figure 24**.

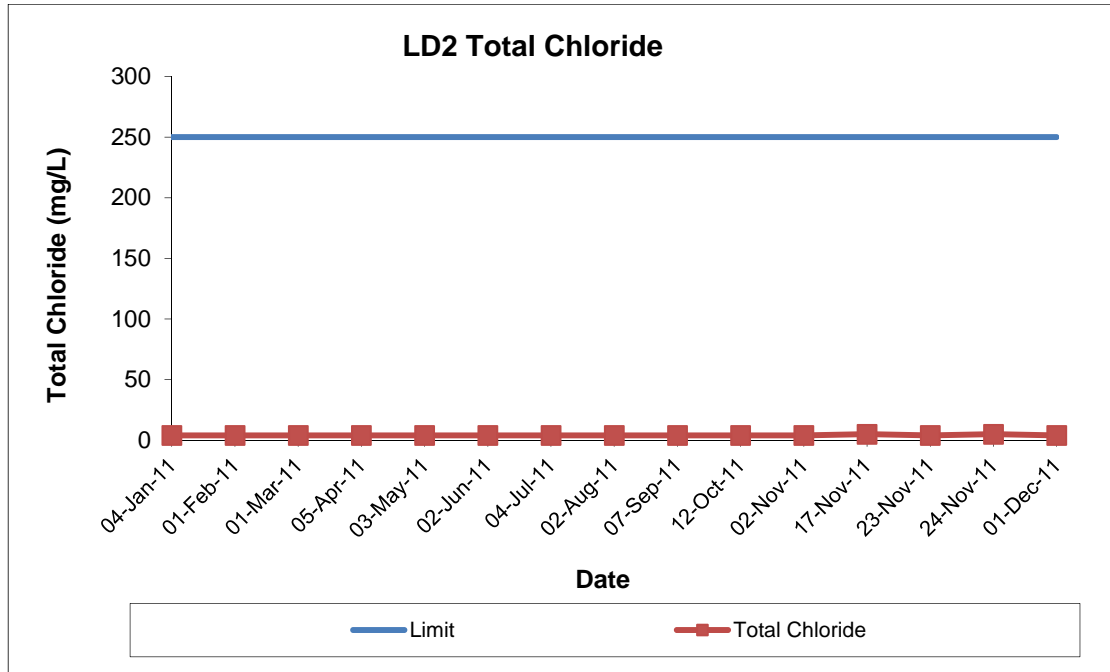


Figure 23 Total Chloride LD2 2011

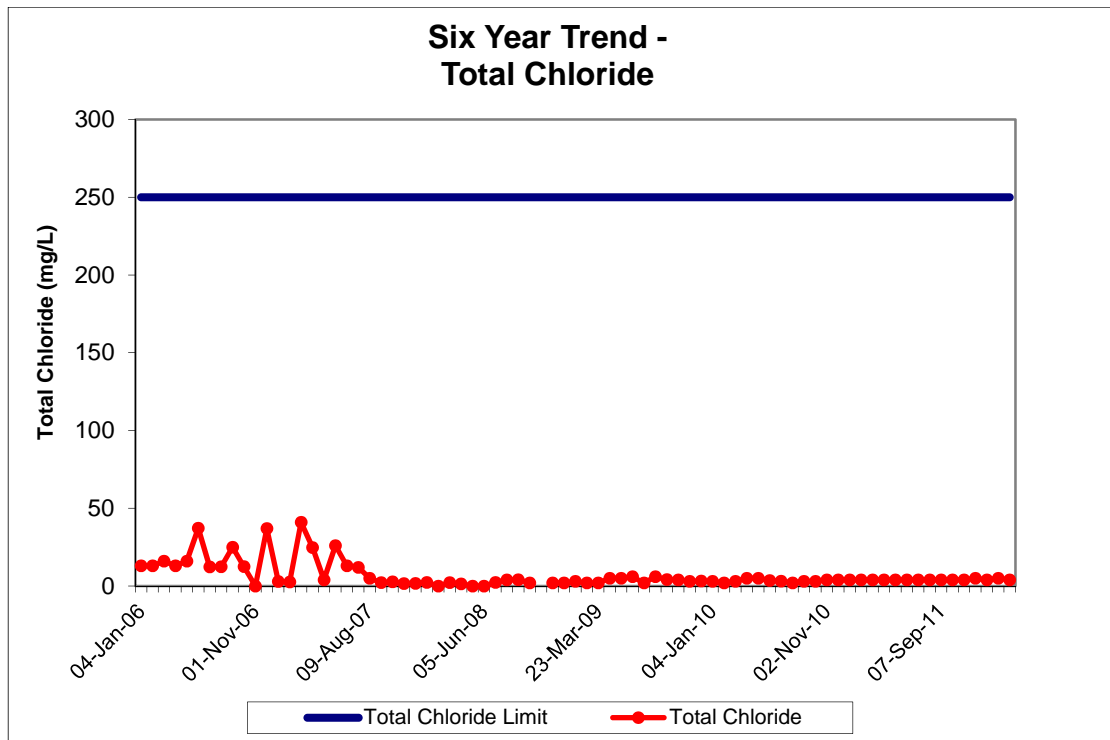


Figure 24 Total Chloride LD2 Six year trend

3.4.2.10 Total Chromium (hexavalent) LD2

Total Chromium (hexavalent), also referred to as Total Chromium (VI), results for discharged water sampled at LD2 during the reporting period were below the licence limit (0.05mg/L) and below the detection limit (0.01mg/L) on all occasions.

Monitoring results for Total Chromium (VI) at LD2 are presented in **Figure 25** below with the long term trend shown in **Figure 26**.

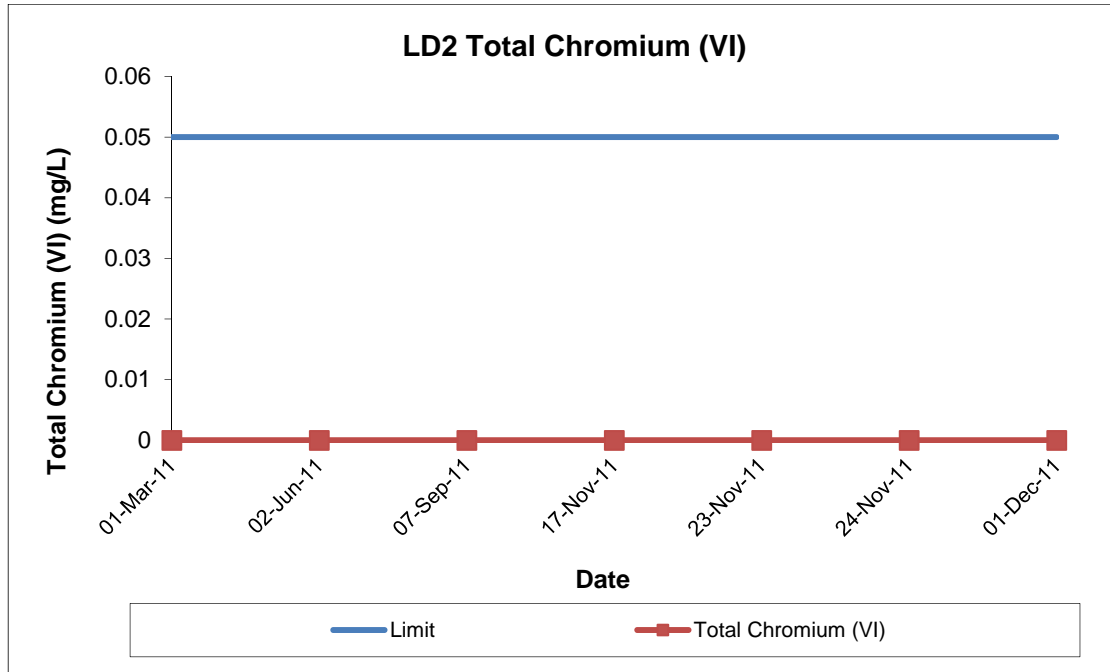


Figure 25 Total Chromium (VI) LD2 2011

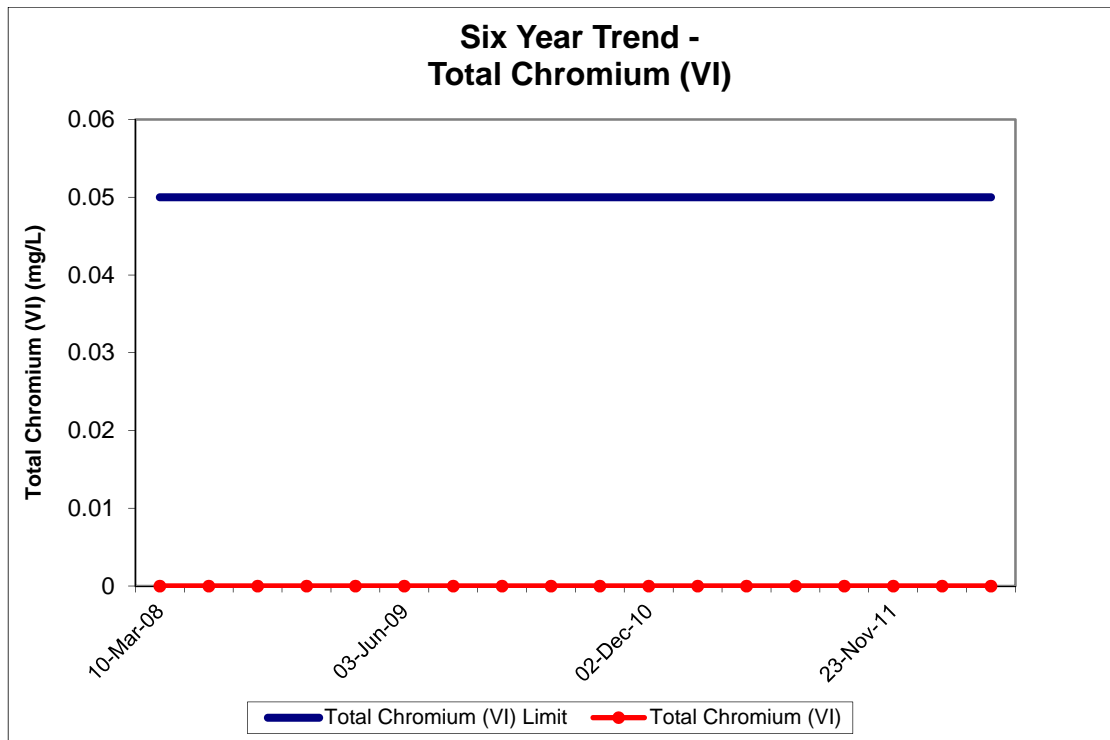


Figure 26 Total Chromium (VI) LD2 Six year trend

3.4.2.11 Total Copper LD2

Total Copper results for discharged water sampled at LD2 during the reporting period were below the licence limit (1.0mg/L) on all occasions with the highest reading of 0.003mg/L recorded on the 23rd November 2011.

Monitoring results for Total Copper at LD2 are presented in **Figure 27** below with the long term trend shown in **Figure 28**.

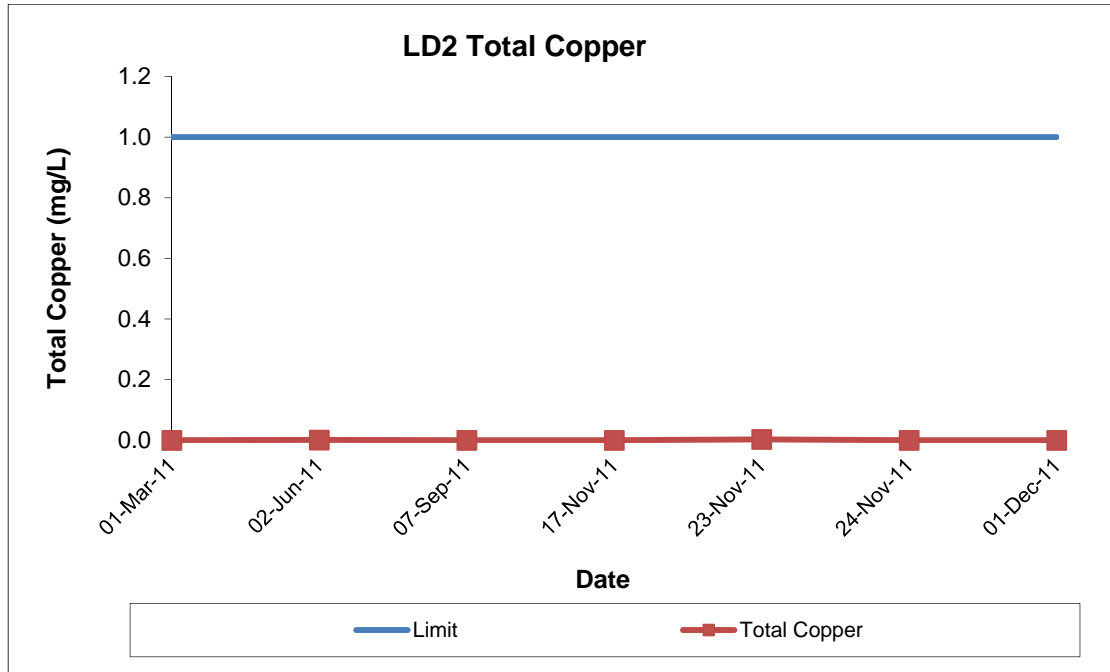


Figure 27 Total Copper LD2 2011

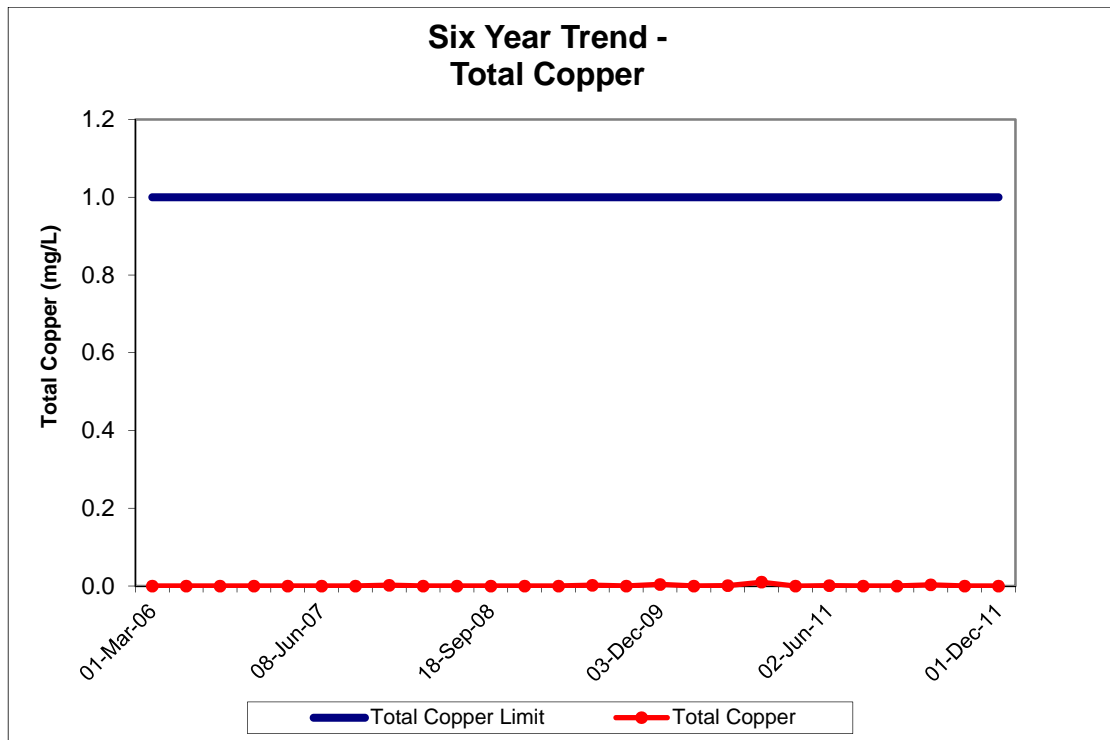


Figure 28 Total Copper LD2 Six year trend

3.4.2.12 Filterable Iron LD2

Filterable Iron results for discharged water sampled at LD2 during the reporting period were below the licence limit (0.3mg/L) and below the detection limit (0.05mg/L) on all occasions.

Monitoring results for Filterable Iron at LD2 are presented in **Figure 29** below with the long term trend shown in **Figure 30**.

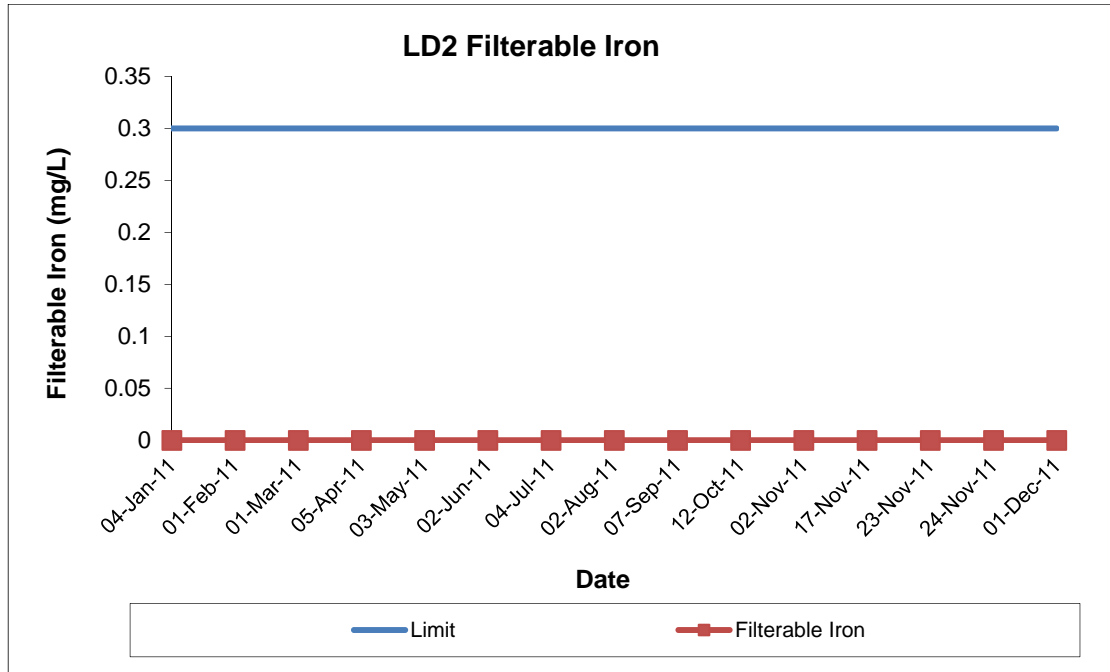


Figure 29 Filterable Iron LD2 2011

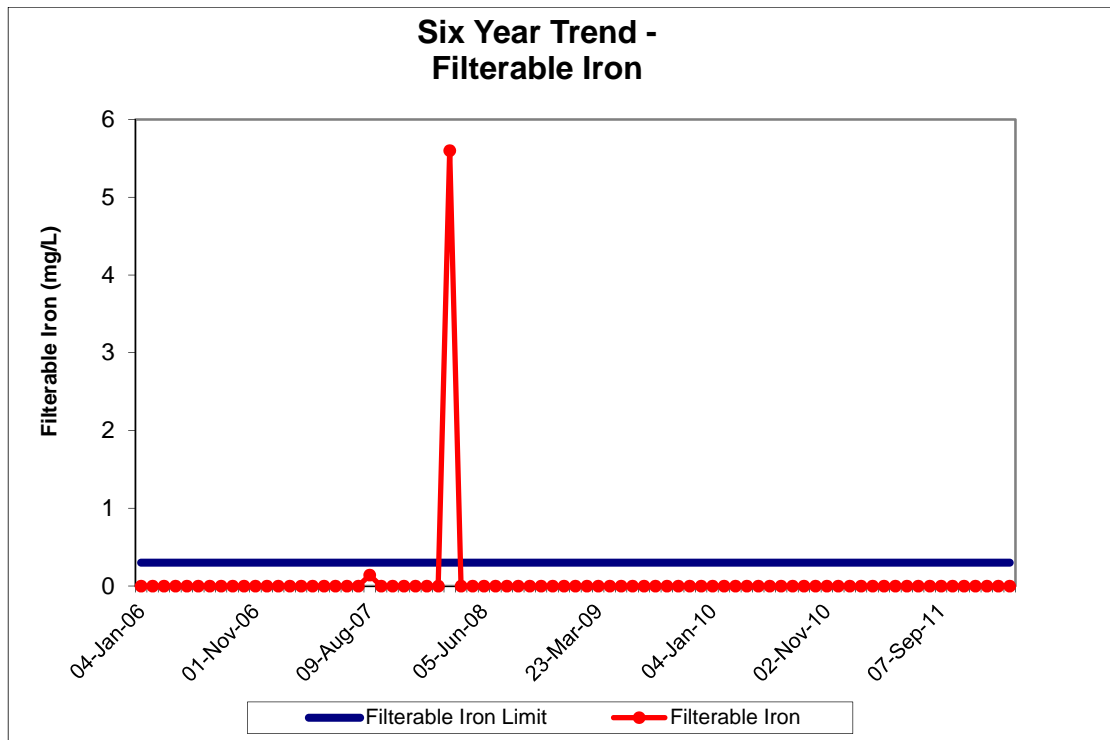


Figure 30 Filterable Iron LD2 Six year trend

3.4.2.13 Total Fluoride LD2

Total Fluoride results for discharged water sampled at LD2 during the reporting period were the below licence limit (1.5mg/L) and below the detection limit (0.1mg/L) on all occasions.

Monitoring results for Total Fluoride at LD2 are presented in **Figure 31** below with the long term trend shown in **Figure 32**.

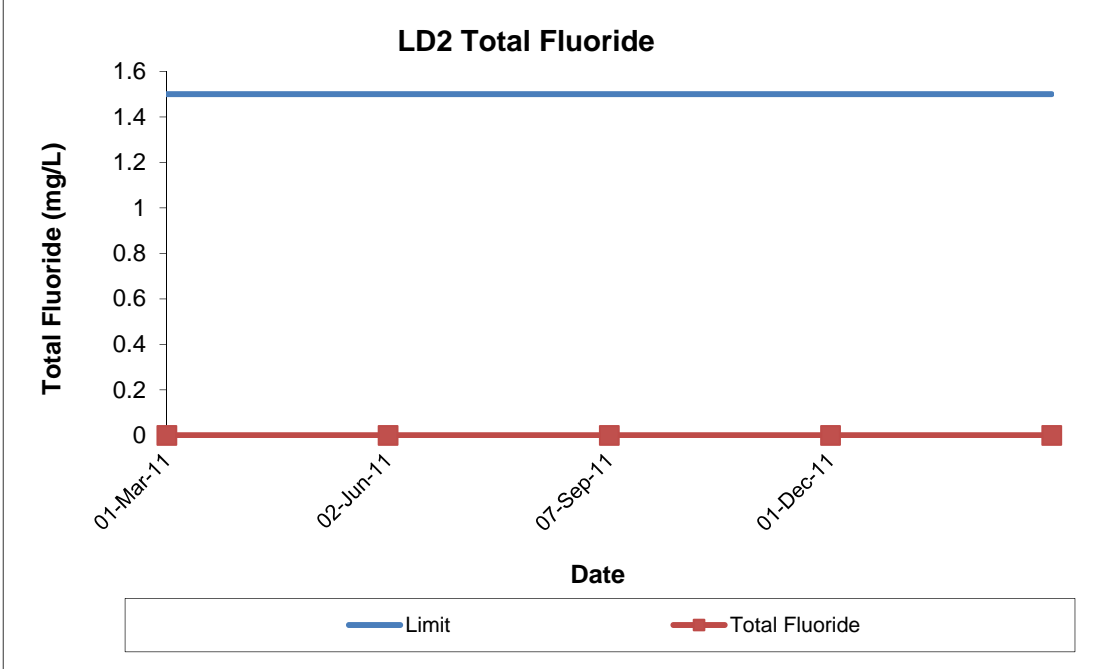


Figure 31 Total Fluoride LD2 2011

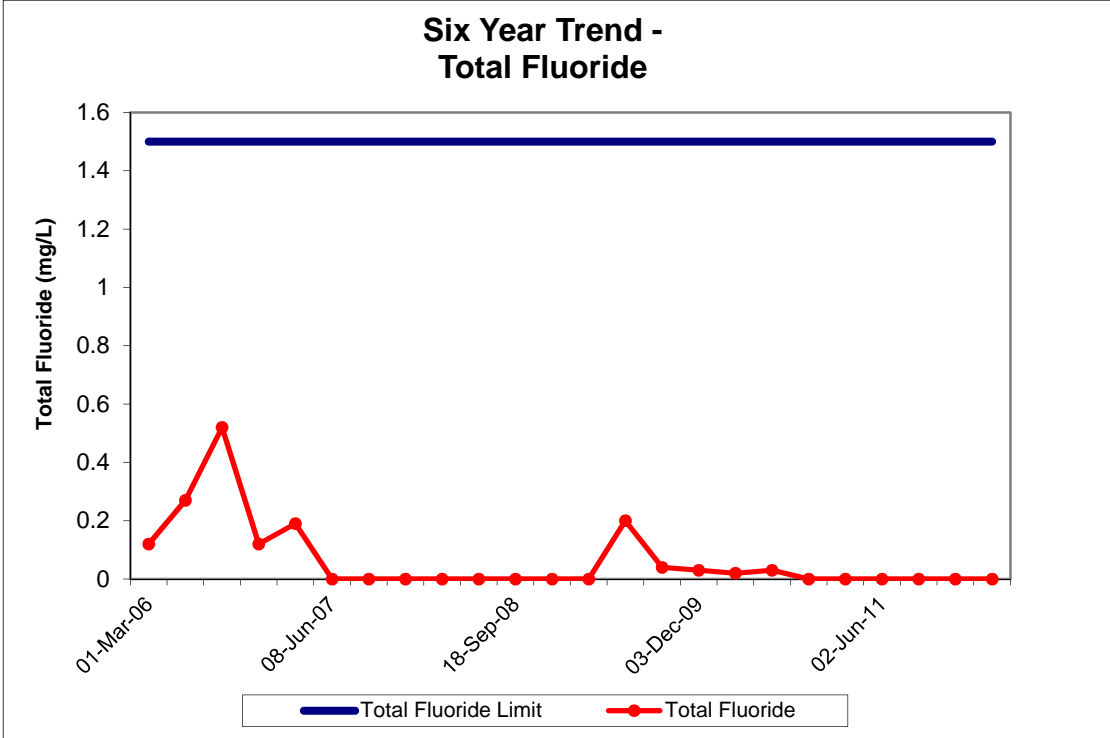


Figure 32 Total Fluoride LD2 Six year trend

3.4.2.14 Total Lead LD2

Total Lead results for discharged water sampled at LD2 during the reporting period were below the licence limit (0.05mg/L) and below the detection limit (0.001mg/L) on all occasions.

Monitoring results for Total Lead at LD2 are presented in **Figure 33** below with the long term trend shown in **Figure 34**.

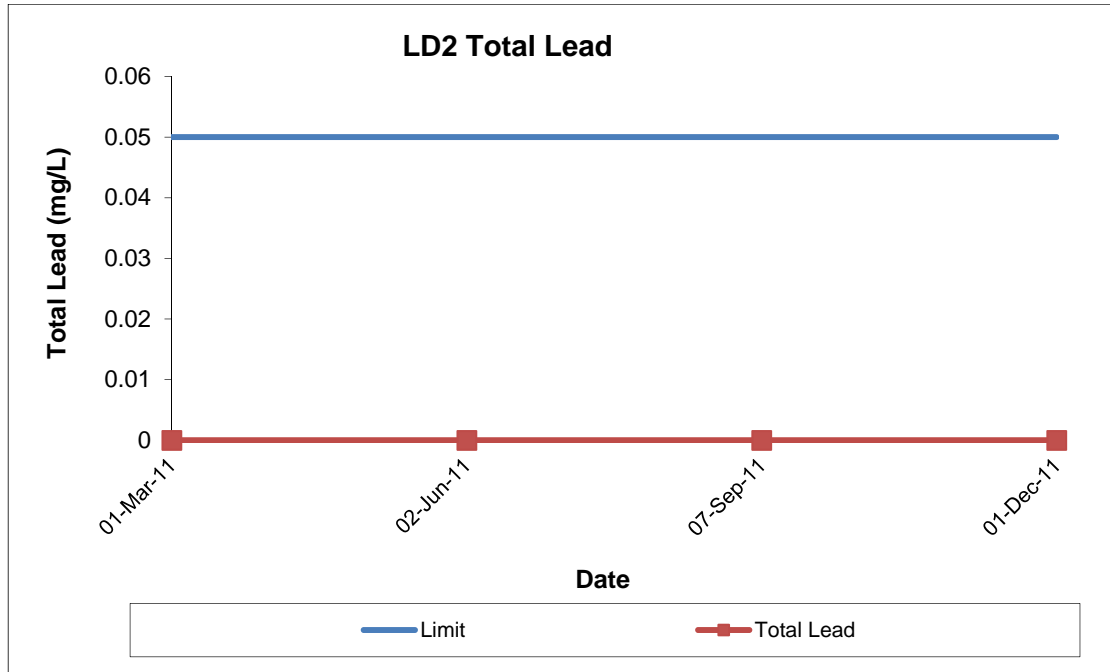


Figure 33 Total Lead LD2 2011

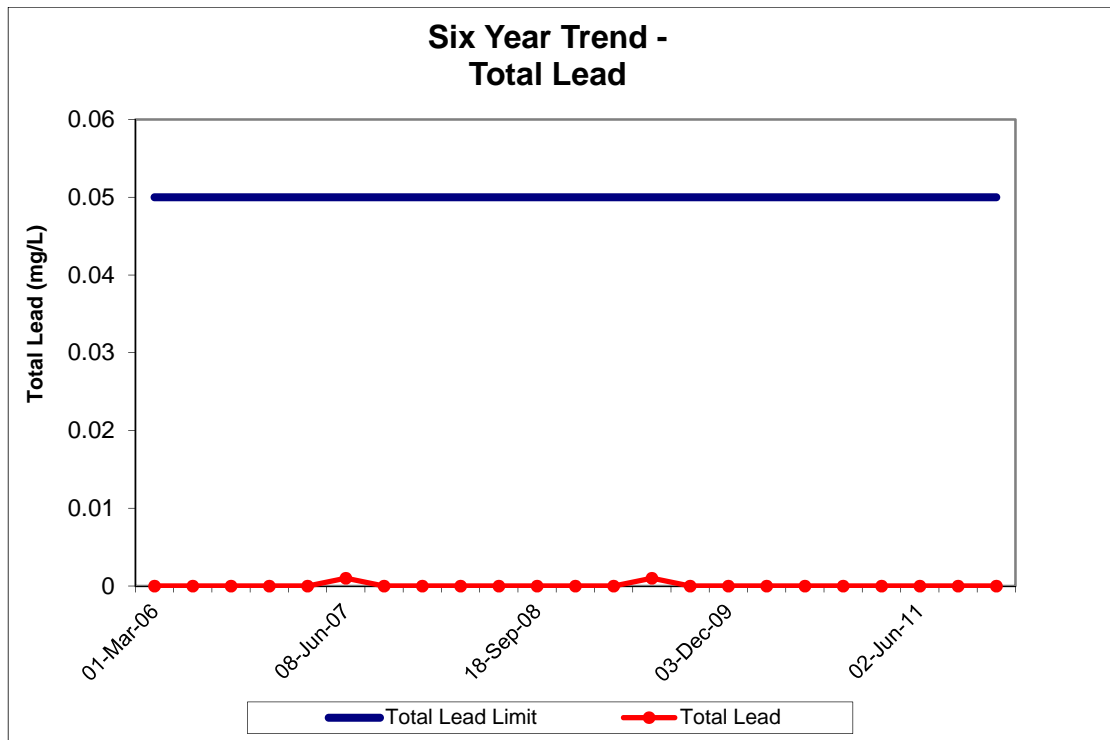


Figure 34 Total Lead LD2 Six year trend

3.4.2.15 Total Mercury LD2

Total Mercury results for discharged water sampled at LD2 during the reporting period were below the licence limit (0.001mg/L) and below the detection limit (0.0001mg/L) on all occasions.

Monitoring results for Total Mercury at LD2 are presented in **Figure 35** below with the long term trend shown in **Figure 36**.

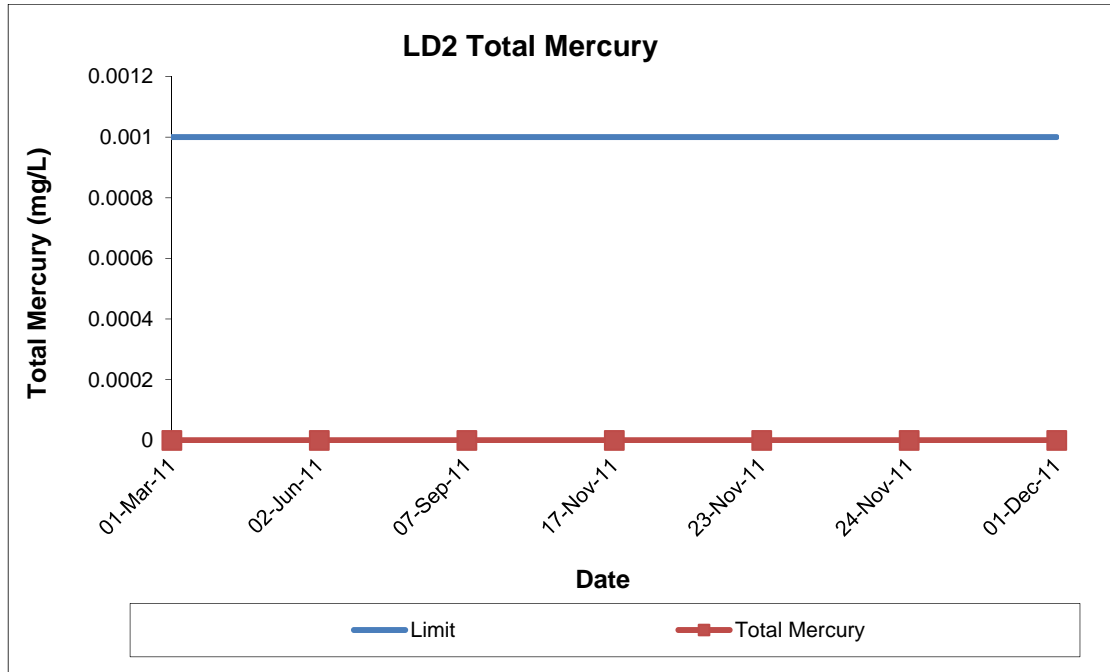


Figure 35 Total Mercury LD2 2011

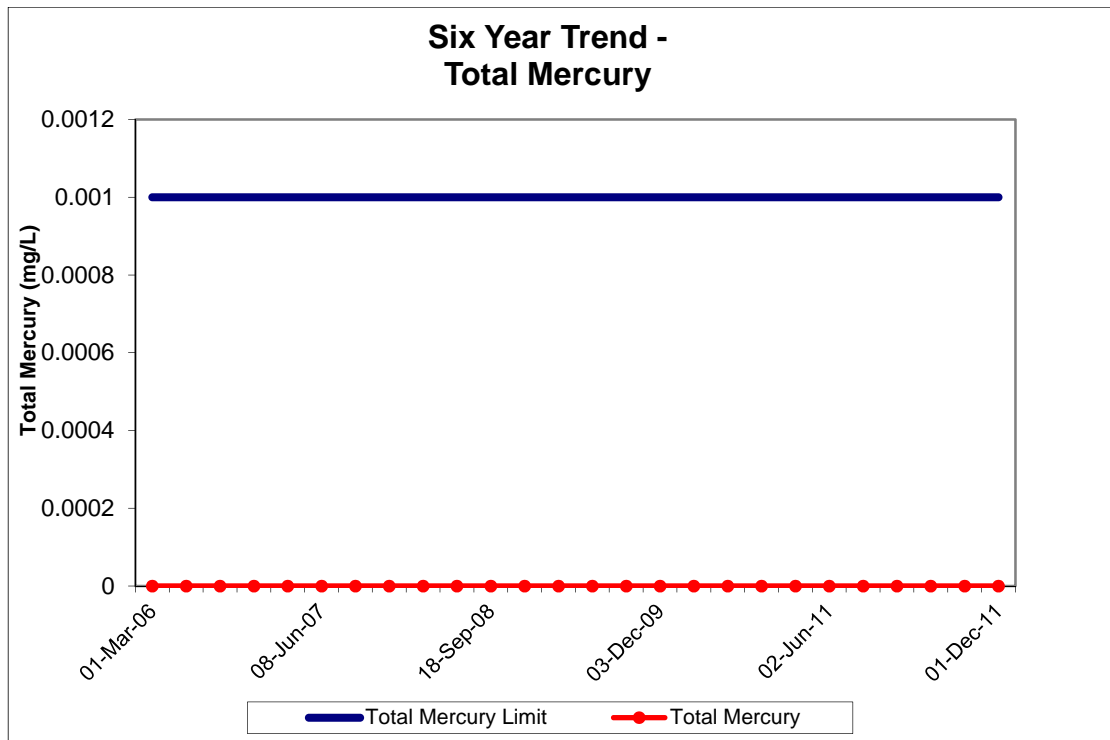


Figure 36 Total Mercury LD2 Six year trend

3.4.2.16 Total Selenium LD2

Total Selenium results for discharged water sampled at LD2 during the reporting period were below the licence limit (0.01mg/L) and below the detection limit (0.01mg/L) on all occasions.

Monitoring results for Total Selenium at LD2 are presented in **Figure 37** below with the long term trend shown in **Figure 38**.

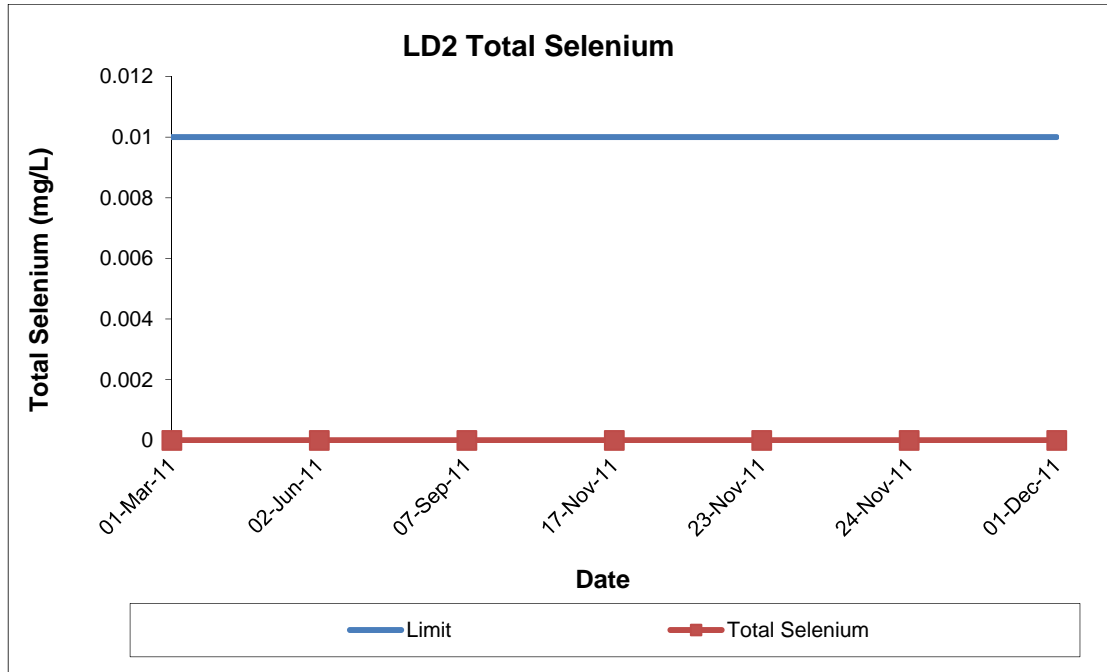


Figure 37 Total Selenium LD2 2011

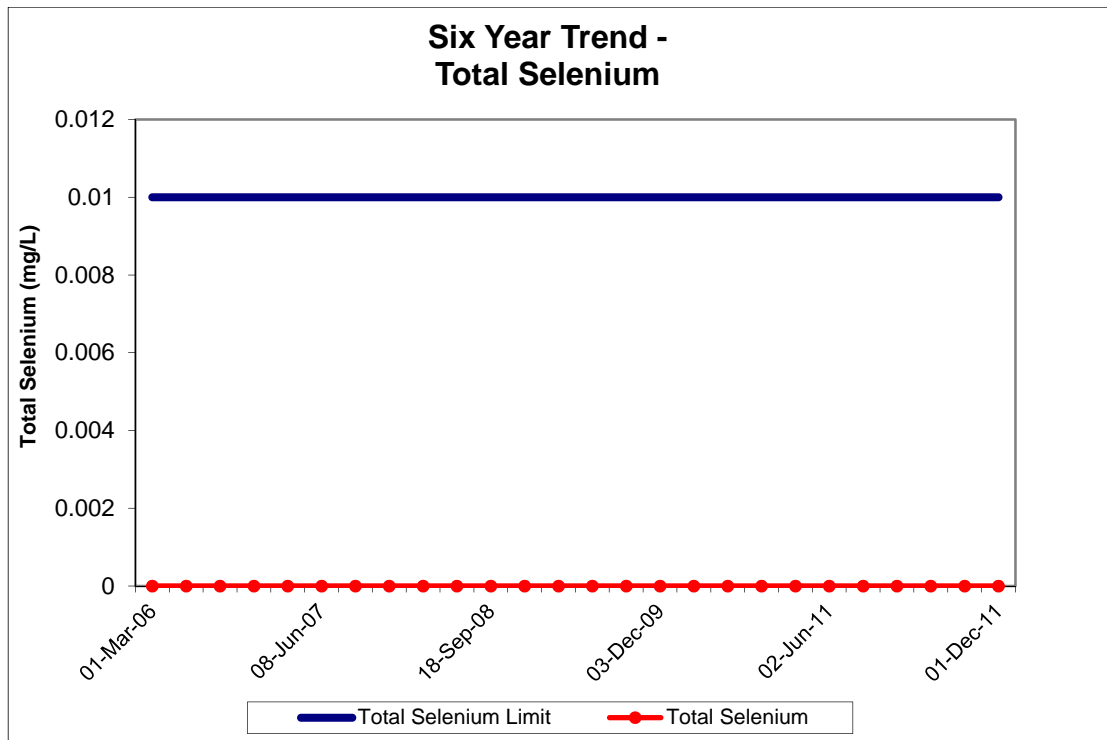


Figure 38 Total Selenium LD2 Six year trend

3.4.2.17 Total Silver LD2

Total Silver results for discharged water sampled at LD2 during the reporting period were below the licence limit (0.05mg/L) and below the detection limit (0.001mg/L) on all occasions.

Monitoring results for Total Silver at LD2 are presented in **Figure 39** below with the long term trend shown in **Figure 40**.

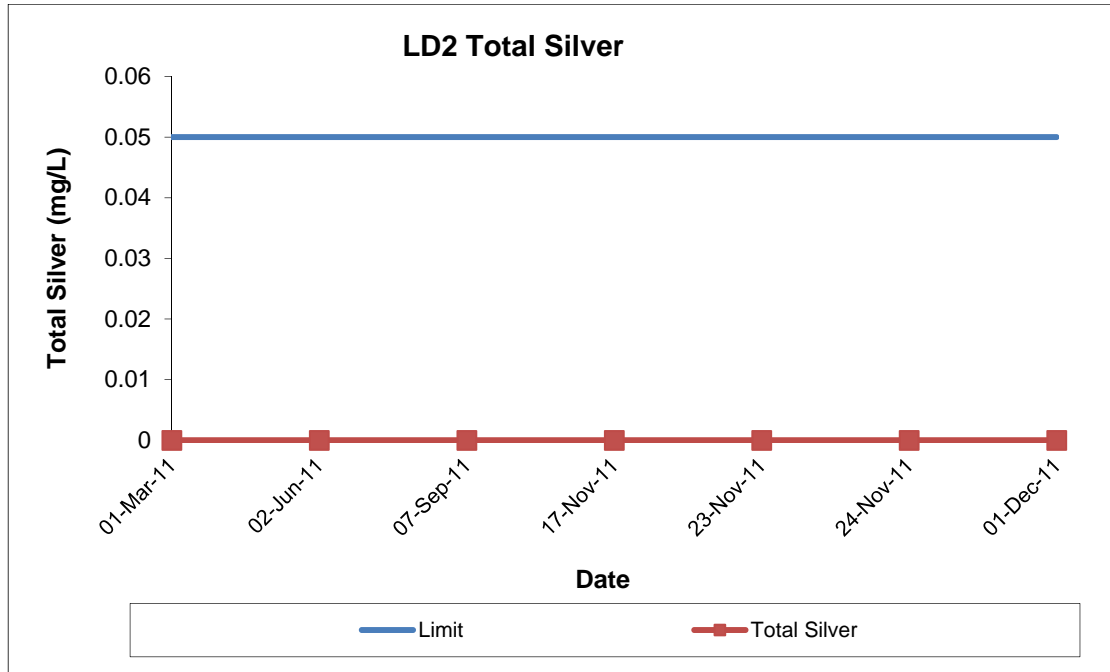


Figure 39 Total Silver LD2 2011

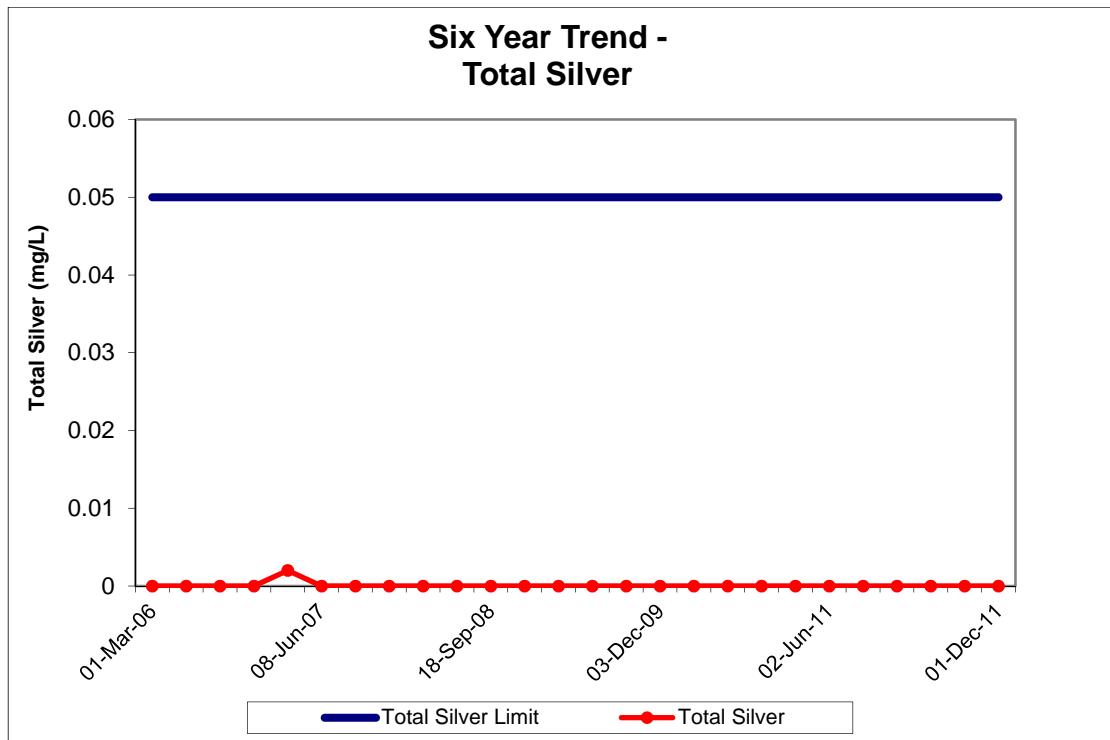


Figure 40 Total Silver LD2 Six year trend

3.4.2.18 Total Sulfate LD2

Total Sulfate results for discharged water sampled at LD2 during the reporting period were below the licence limit (250mg/L) on all occasions with the highest result being 124mg/L on the 2nd June 2011.

Monitoring results for Total Sulfate at LD2 are presented in **Figure 41** below with the long term trend shown in **Figure 42**.

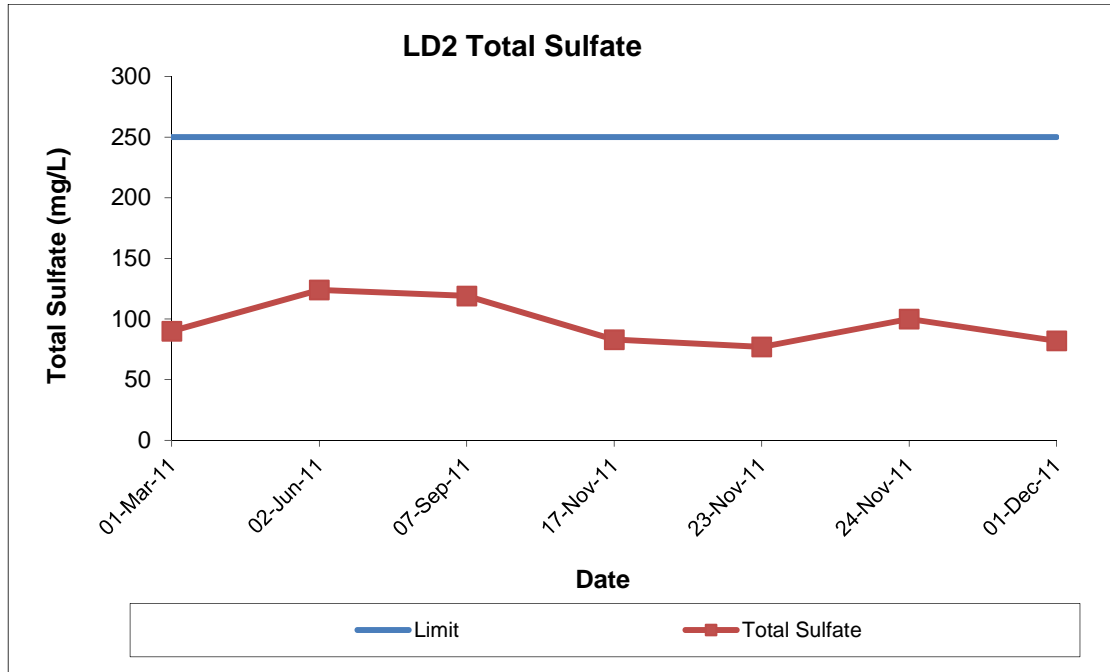


Figure 41 Total Sulfate LD2 2011

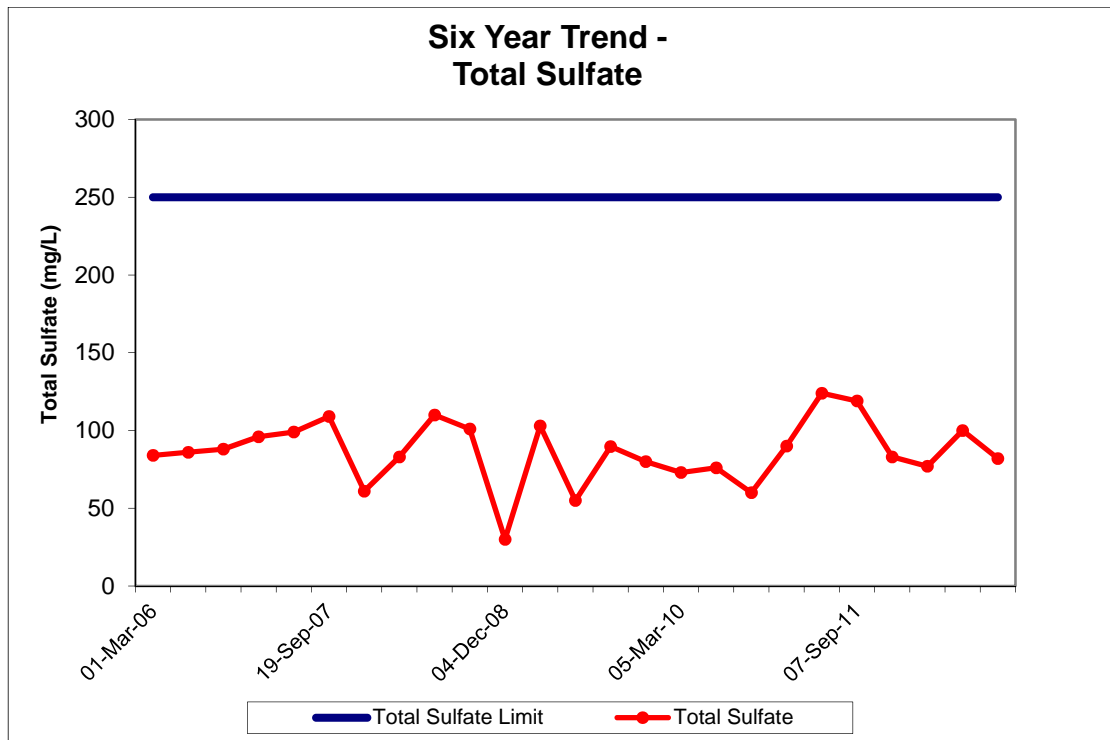


Figure 42 Total Sulfate LD2 Six year trend

3.4.2.19 Total Zinc LD2

Total Zinc results for discharged water sampled at LD2 during the reporting period were below the licence limit (5mg/L) on all occasions with the highest result being 0.309mg/L on the 2nd June 2011.

Monitoring results for Total Zinc at LD2 are presented in **Figure 43** below with the long term trend shown in **Figure 44**.

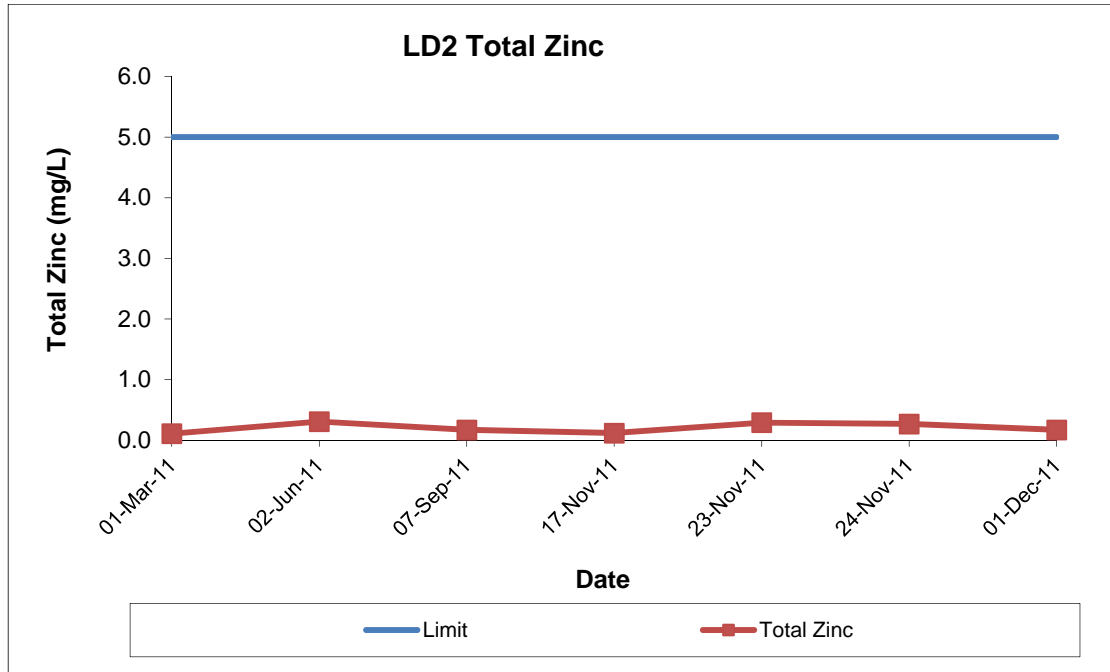


Figure 43 Total Zinc LD2 2011

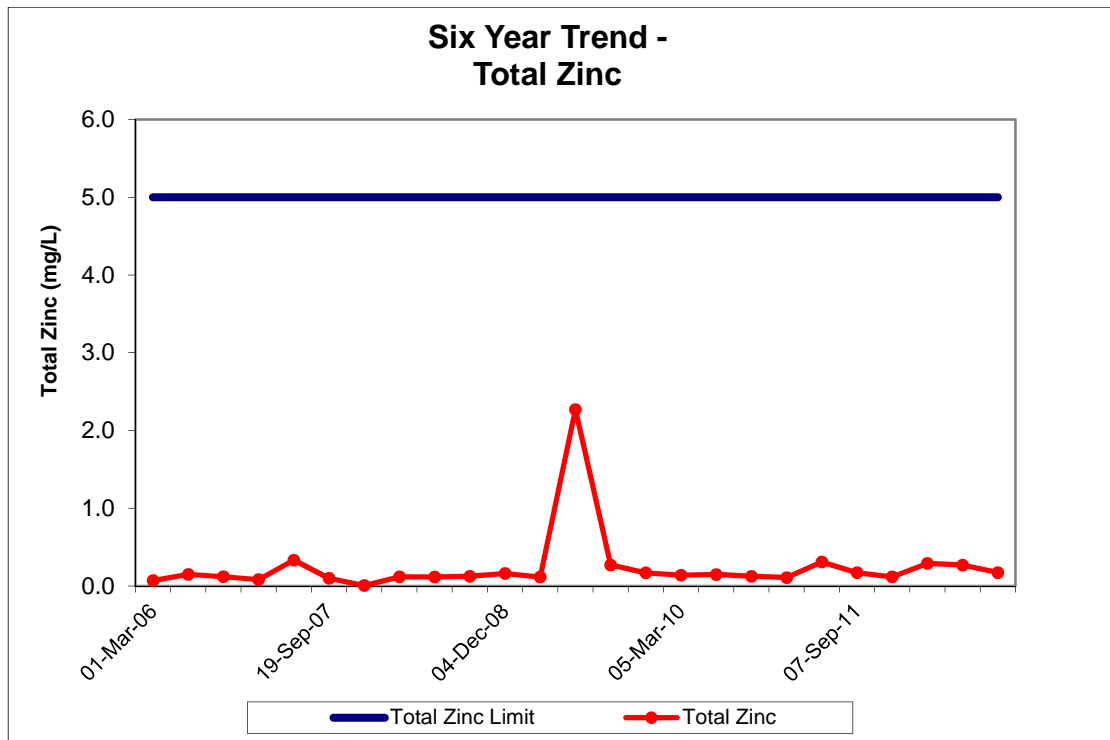


Figure 44 Total Zinc LD2 Six year trend

3.4.2.20 LD3

Water discharged through LD3 at Leachate Dam No.1 on only one occasion during the reporting period. The discharge occurred on the 31st May 2011 during a rainfall event. The water discharged from the licensed discharge point flowed along a drainage line before entering the Main Dam. The discharge of water at both LD3 and the Main Dam were sampled during the discharge event. The discharge event at LD3 exceeded the Total Suspended Solids (TSS) limit of 30 mg/L in EPL 726, with a result of 157 mg/L. The Main Dam (downstream sample) had a result of 6 mg/L. The meteorological station at Clarence Colliery recorded 40.8 mm of rainfall in the twenty four hours prior to the discharge event. The rainfall had reduced the settlement time for sediment to fall out within the sediment structures on site prior to reaching the Leachate Dam No.1 and being released through LD3.

In response to the TSS exceedance surface water management structures on the pit top area will be reviewed to confirm their capacity is consistent with Type D sediment retention basins for mines and quarries as defined in the publication Managing Urban Stormwater: Soils and Construction (Landcom 2006). The assessment will contribute to a review of the water balance for the pit top facilities which is proposed to be completed by May 2012.

Table 11 LD3 Results for 31st May 2011

Parameter	Result	EPA Licence Limit
pH	6.8	6.5-8.5
Total Suspended Solids (mg/L)	157	30
Oil and Grease (mg/L)	<5	20
Arsenic (mg/L)	0.002	0.05
Boron (mg/L)	<0.05	1
Cadmium (mg/L)	0.0003	0.01
Chloride (mg/L)	5	250
Chromium VI (mg/L)	<0.01	0.05
Copper (mg/L)	0.006	1.0
Filterable Iron (mg/L)	<0.05	0.3
Filterable Manganese (mg/L)	0.491	0.5
Fluoride (mg/L)	0.1	1.5
Lead (mg/L)	0.006	0.05
Mercury (mg/L)	<0.0001	0.001
Selenium (mg/L)	<0.01	0.01
Silver (mg/L)	<0.001	0.05
Sulfate (mg/L)	100	250
Zinc (mg/L)	0.815	5.0

3.4.2.21 LD4

Discharge of water through LD4 on Leachate Dam No.2 occurred on only one occasion during the reporting period. The discharge event occurred on the 28th November 2011. The discharge event was also reported to the EPA Environmental Line on the 28th November 2011. The water discharged from the licensed discharge point flowed along drainage lines before entering Wollangambe River downstream from the Main Dam. The discharge of water at LD4 was sampled during the discharge event. Due to the terrain, following the drainage line from LD4 down until it intersected with the Wollangambe River (downstream sampling) is not safe, particularly during wet weather. The laboratory results received for the water sample collected at LD4 identified that the discharged water had exceeded the concentration limits prescribed in Environment Protection Licence 726 for lead, sulfate, zinc,

filterable iron, filterable manganese and pH. The discharge event occurred during a period of rainfall, 142 mm of rainfall was recorded at the meteorological station at Clarence Colliery in the week preceding the event.

In response to the discharge event surface water management structures on the pit top area will be reviewed to confirm their capacity is consistent with Type D sediment retention basins for mines and quarries as defined in the publication *Managing Urban Stormwater: Soils and Construction* (Landcom 2006). The assessment will contribute to a review of the water balance for the pit top facilities which is proposed to be completed by May 2012.

Table 12 LD4 Results for 28th November 2011

Parameter	Result	EPA Licence Limit
pH	3.7	6.5-8.5
Total Suspended Solids (mg/L)	6.8	30
Oil and Grease (mg/L)	<5	20
Arsenic (mg/L)	<0.001	0.05
Boron (mg/L)	<0.05	1
Cadmium (mg/L)	0.0066	0.01
Chloride (mg/L)	1	250
Chromium VI (mg/L)	<0.01	0.05
Copper (mg/L)	0.336	1.0
Filterable Iron (mg/L)	1.32	0.3
Filterable Manganese (mg/L)	5.74	0.5
Fluoride (mg/L)	0.4	1.5
Lead (mg/L)	0.088	0.05
Mercury (mg/L)	<0.0001	0.001
Selenium (mg/L)	<0.01	0.01
Silver (mg/L)	<0.001	0.05
Sulfate (mg/L)	293	250
Zinc (mg/L)	9.18	5.0

3.4.3 Erosion and Sediment

The Erosion and Sediment Control Plan was approved by the Department of Planning in November 2007. It forms part of the site Water Management Plan and is reviewed every 12 months. The Water Management Plan has been updated, which included a review of the erosion and sediment control measures; and is currently in the consultation process prior to submission to DP&I for approval. The Water Management Plan identifies all activities that could cause erosion and describes the location, function and capacity of erosion and sediment control measures. An addition to the Water Management Plan was a plan identifying clean water, dirty water and leachate water drainage lines on the Pit Top created from field investigations conducted 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.

3.4.4 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. These structures are detailed below.

3.4.5 Sediment Basins

Several small sediment basins have been constructed within the dirty water system. These are in addition to the main pollution control structures. 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 separator 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.

3.4.6 Maintenance

The Grit Trap and Primary Separator 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 Reject Emplacement Area (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.

For potential subsidence areas, regular inspections are made of the overlying topography prior to, during and after an area has been mined to identify any areas of surface cracking. In the highly unlikely event that surface cracks are found that may pose an erosion risk, works will be undertaken to fill the cracked areas and prevent soil erosion. This will be particularly important in areas with soils that have high water erosion potential.

3.5 Groundwater Pollution

Groundwater monitoring is undertaken in accordance with Clarence Water Management Plan, Environmental Monitoring Program and Subsidence Management Approvals.

Currently measured groundwater monitoring sites are outlined in **Table 13** below. The location of the sites is provided in **Appendix 1**.

Table 13 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	Existing bore	Clarence Township. Piezo installed 2009
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 Application Area
CLRP12	2010	700 West SMP Application 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

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 700 West/800 Area SMP application. The information is not relevant to current mining operations and therefore results will not be reported at this stage but presented when relevant.

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 baseflows from undermining each swamp.

CLRP11, CLRP12 and CLRP13 were installed to collect further baseline data for the 700 West/800 Area SMP Application. Again, results from these piezometers will be presented when relevant.

CLRP15 and CLRP16 were specifically installed to measure potential impacts around the Lithgow No.2 Dam. These results will also be presented when relevant.

The location of all piezometers is presented in **Appendix 1**.

3.5.1 Open Hole Piezometers

All groundwater levels (except CLRP4) in the open hole piezometers installed in the Clarence Aquifer showed slow, generally very consistent, rises in groundwater level during the period. CLRP4 continued to show a flat trend.

Groundwater levels in all of these holes stand at generally high levels in the data record extending back to 2008, related to the generally wetter conditions since late 2010. CLRP10 was the only site undermined during 2011 but this was first workings only.

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

Monitoring results for piezometric height at CLRP4, CLRP5, CLRP6, CLRP7, CLRP8, CLRP10 and CC113 is presented in **Figure 45** below.

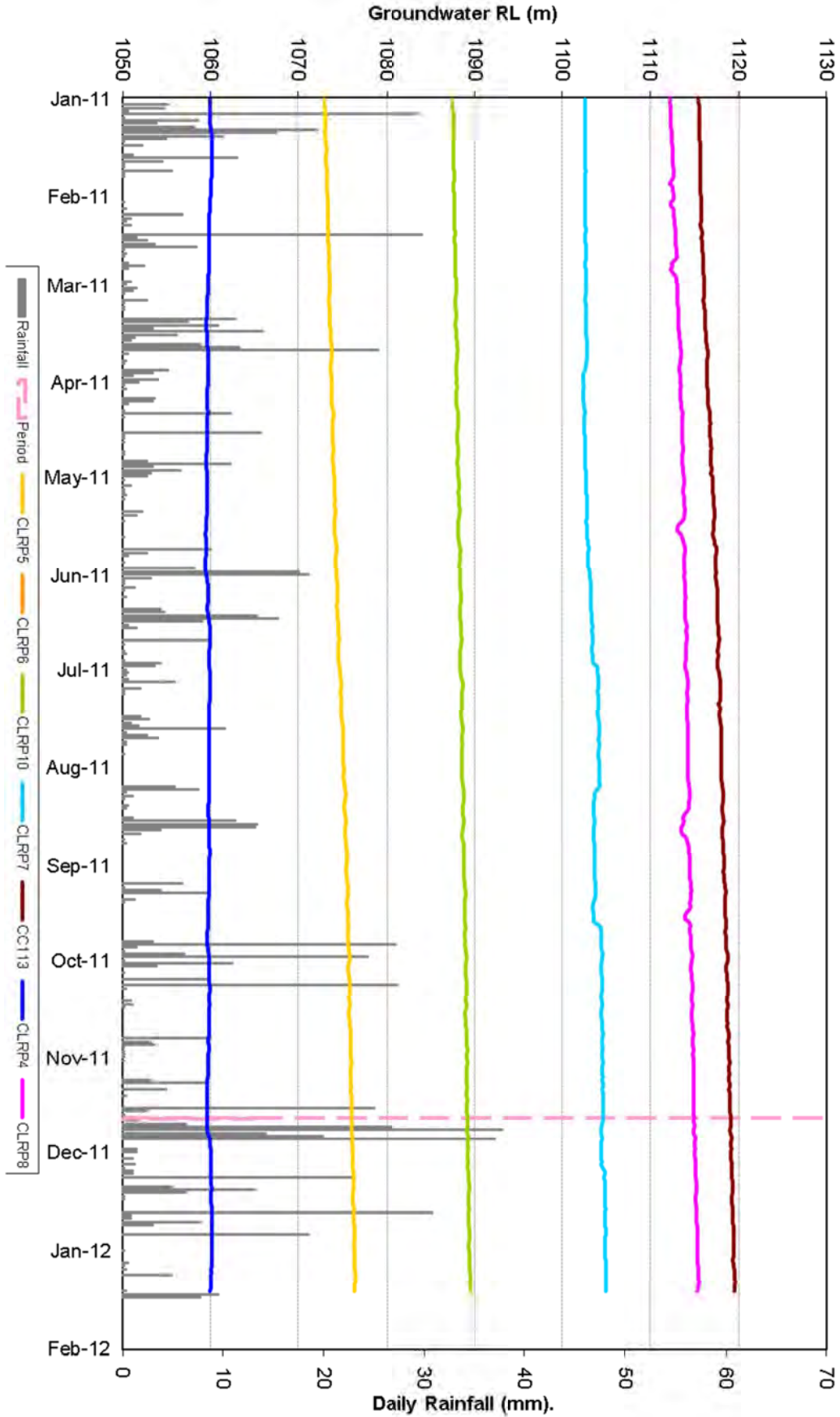


Figure 45 CLRP4, CLRP5, CLRP6, CLRP7, CLRP8, CLRP10 and CC113 Piezometric Height

3.5.2 Multi-Level Piezometers

3.5.2.1 CLRP1

Pillar removal was carried out in Panel 330 immediately to the north of this bore in late 2004. This resulted in a significant depressurisation of the Katoomba seam, as measured by piezometer 1, and a temporary fall in pressure in the piezo immediately above the seam, due to relaxation of the strata. There was no evidence of any permanent mining-related impacts in the three piezometers higher up in the bore (including the two in the Banks Wall Sandstone), although piezometer 2 just above the roof of the seam did show partial depressurisation followed by near-complete recovery. Since that time there have been no further indications from the data recorded to date of any mining-related impacts.

Monitoring results for piezometric height at CLRP1 is presented in **Figure 46** below.

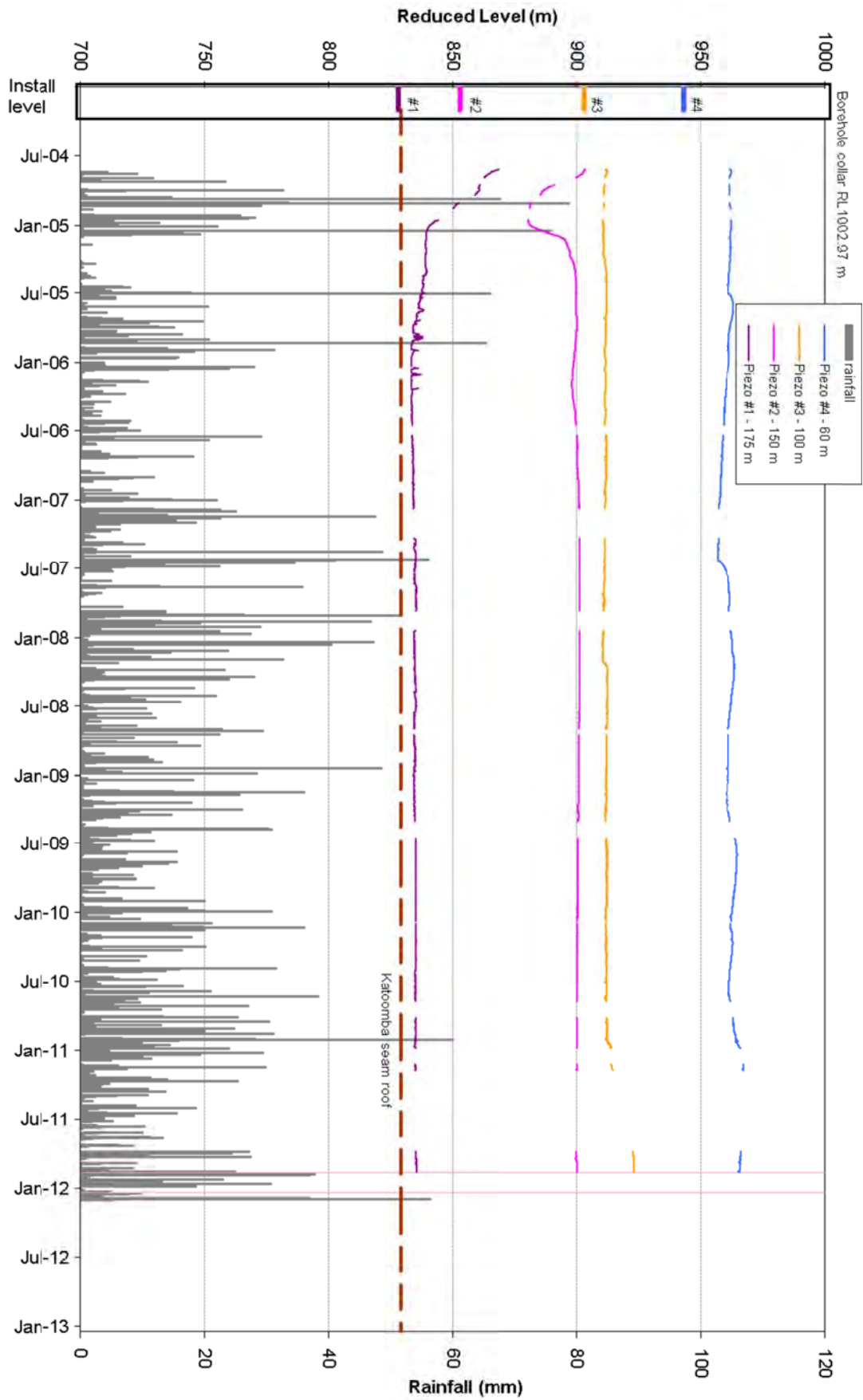


Figure 46 CLRP1 Piezometric Height

3.5.2.2 CLRP2

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 impact from mining at the time, and continued to show no impact from the mining.

The data does not indicate any adverse impact on the near-surface aquifers. If there was any serious, adverse impact, then the plot of the piezometric pressures would show a rapid decline. The increase in pressure suggests that there has not been any cracking which could serve to drain the strata downwards into the mine. The magnitude of the pressure increases measured in the upper aquifers is not sufficient to cause hydraulic fracturing in the strata, especially given the in-situ confining pressure.

Monitoring results for piezometric height at CLRP2 is presented in **Figure 47** below.

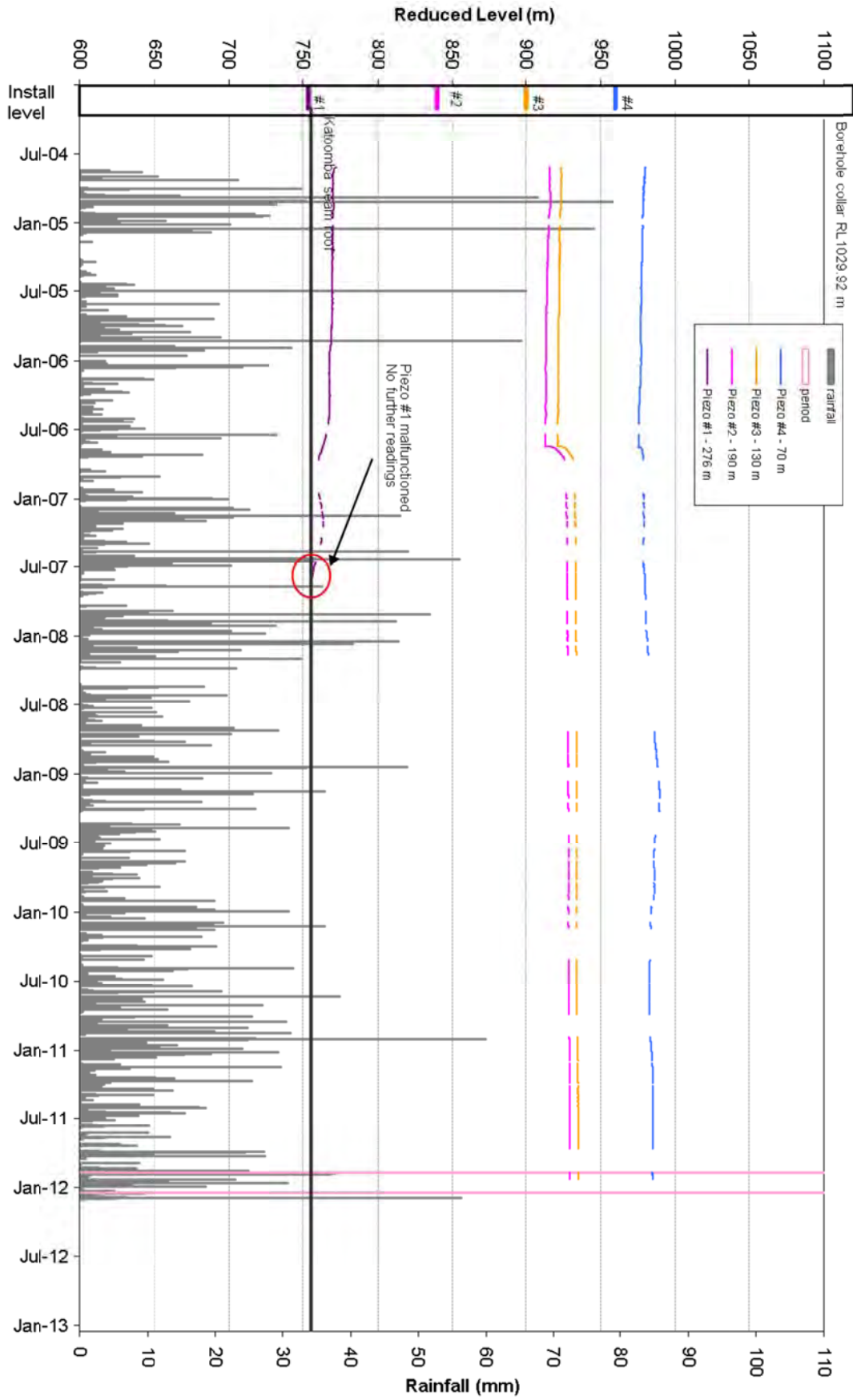


Figure 47 CLRP2 Piezometric Height

3.5.2.3 CLRP3

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

Monitoring results for piezometric height at CLRP3 is presented in **Figure 48** below.

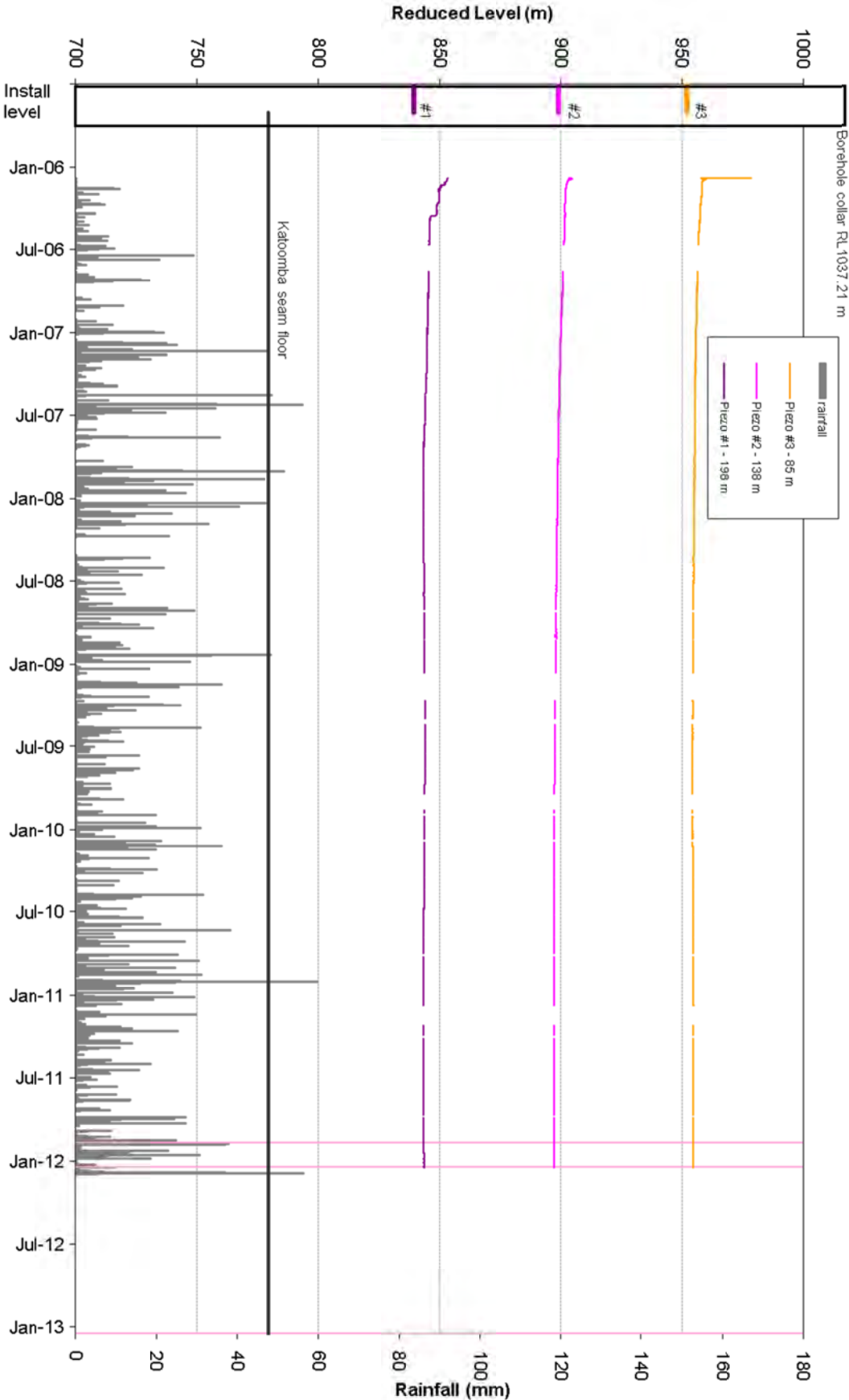


Figure 48 CLRP3 Piezometric Height

3.5.2.4 CLRP6

Partial extraction occurred in September 2009 directly beneath this borehole, and the adjacent panel was partially extracted in December 2009. There is no evidence from the data of any adverse mining-related impacts on the strata containing the two functional piezometers during the extraction of either of these panels. The data continue to suggest that there is no evidence of any adverse mining-related impacts on the strata from subsequent mining.

Monitoring results for piezometric height at CLRP6 is presented in **Figure 49** below.

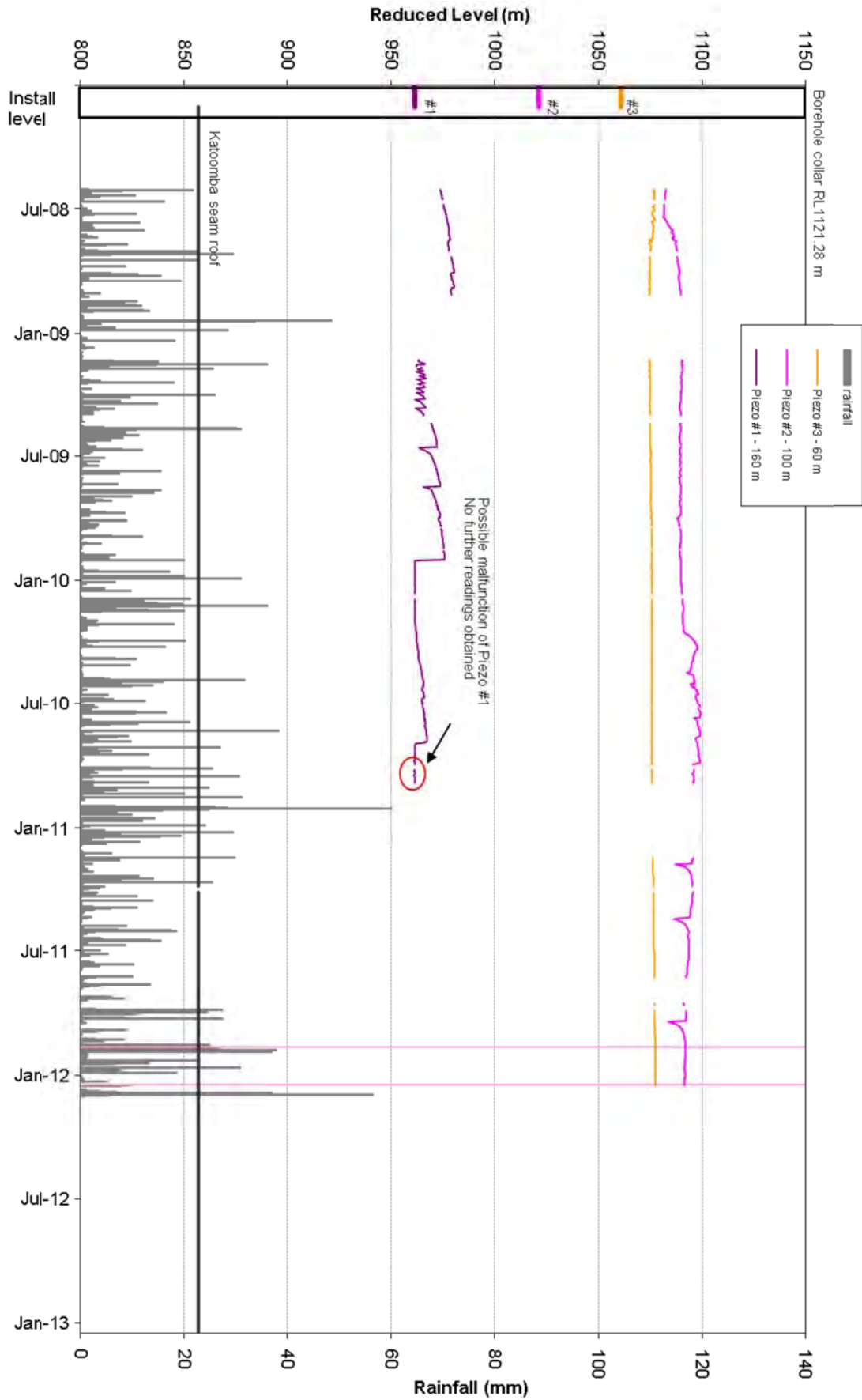


Figure 49 CLRP6 Piezometric Height

3.5.3 Shallow Groundwater Monitoring in Swamps

Groundwater levels in HVU1 and HVU2 were both largely above ground level during 2011. HVU1 shows an overall decline back to ground level, whereas HVU2 is level overall; both show spikes related to storms in November 2011, especially HVU2 which showed a jump of more than 0.2 m. There was no evidence of any abnormal groundwater movements during 2011.

Happy Valley Upper Swamp was undermined (partial extraction) in March 2010. In September 2011, first workings occurred in panel 706 immediately west of HVU2.

There is no evidence from the data of any impact on the groundwater levels in the swamp that could be attributed to the mining. Continuing monitoring shows groundwater level behaviour that is typical for these swamps in areas that have not been undermined. Changes in the measured groundwater levels appear to be due solely to prevailing weather conditions.

HV1 shows a broadly flat trend over 2011, with only a small impact from heavy rain in late November 2011. HV2, located downstream shows a steadily rising groundwater level, with a very marked response to the late November storms. The steady rise appears to be a response to the gradual release of excess water from the drainage system, resulting from the large storms in late November. The water table in both holes was generally less than ~ 0.2 m deep in both holes.

The observed behaviour is typical of a permanently waterlogged swamp.

HV1 was undermined (partial pillar extraction) in October 2010. The swamp was further undermined by first workings in panel 712 in June – July 2011, with subsequent pillar extraction under the swamp in September 2011.

The groundwater data show no change over the mining period, or later, from behaviour observed prior to undermining. This indicates that partial extraction below the swamp had no impact on groundwater levels.

Monitoring results for piezometric height at HV1, HV2, HVU1 and HVU2 is presented in **Figure 50** below.

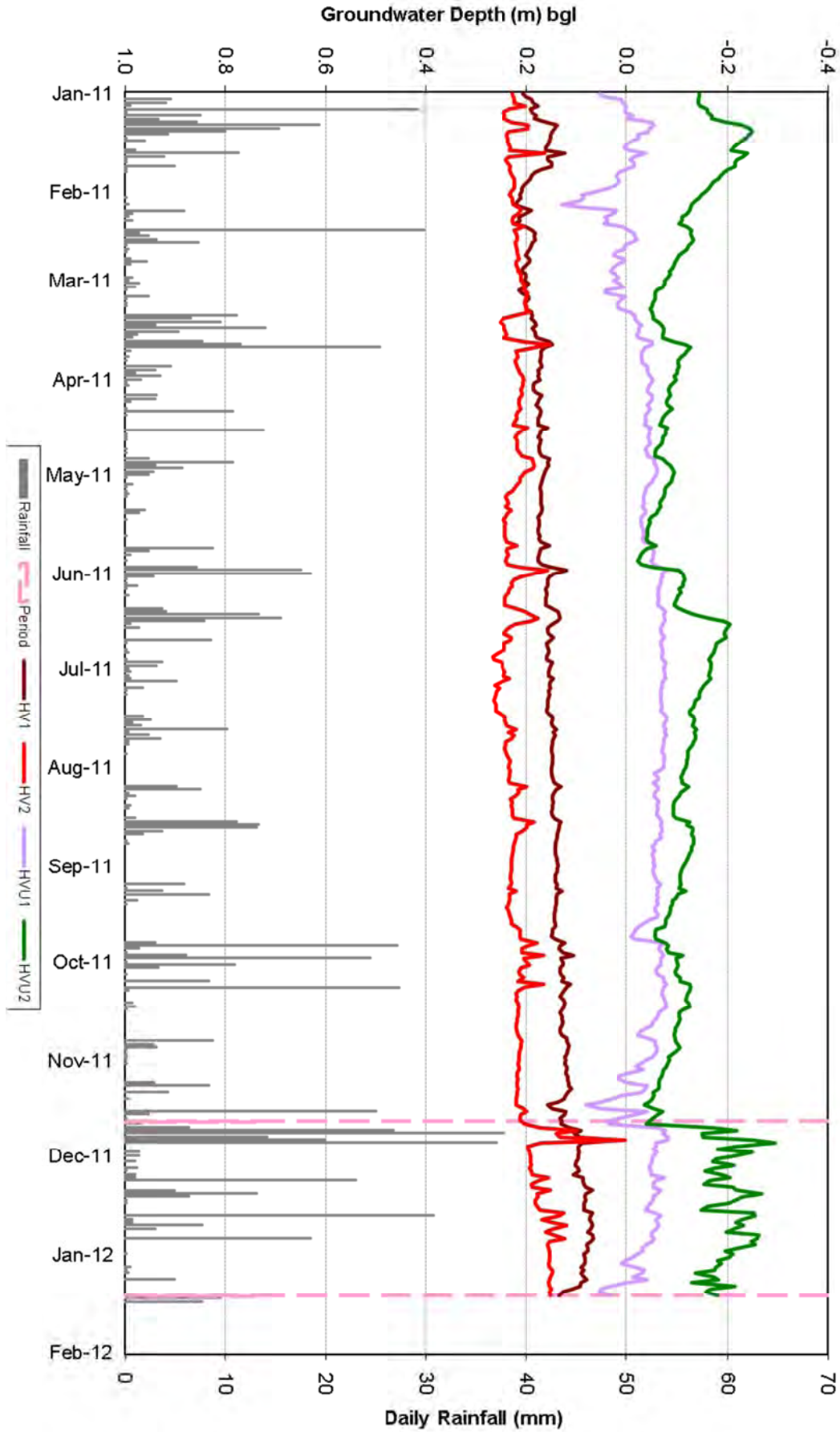


Figure 50 HV1, HV2, HVU1 and HVU2 Piezometric Height

3.6 Threatened Flora

3.6.1 Flora Monitoring Surveys

Flora monitoring fieldwork at Clarence Colliery's pagoda, heath and wet gully sites is undertaken by Roger Lembit of Gingra Ecological Surveys. Flora monitoring fieldwork within Newnes Plateau Shrub Swamps is undertaken by the University of Queensland. A report covering all Centennial sites mining underneath the Newnes Plateau (Angus Place, Clarence and Springvale) is compiled and reported by the Centre for Mined Land Rehabilitation at the University of Queensland. Fieldwork studies are undertaken three times per year during autumn, spring and summer.

Results for 2011 surveys across all swamp sites on the Newnes Plateau are presented in the report *Annual 2011 Flora Report for Angus Place, Springvale and Clarence Mines, Lithgow, NSW*. The Clarence swamp monitoring sites are described in **Table 14** below. A map of the monitoring sites is included in **Appendix 1**.

Table 14 Clarence Swamp Flora Monitoring Site Reference Name and Location

Site	Swamp	No. of times monitored 2011
BNS01	Bungleboori North 1	2
BNS02	Bungleboori North 2	2
CLA01	Banksia Swamp	2
CLA02	Banksia Swamp	2
CLA03	Prickly Swamp	2
CLA04	Prickly Swamp	2
CLW02	Piezo #2 Swamp	3
CLW03	Happy Valley Swamp	3
CLW04	Swamp	2
CLW05	Pine Swamp	3

The vegetation monitoring being undertaken is conducted in a manner which allows assessment against indicators which may provide evidence of an effect of subsidence. These indicators are:

- Species richness – allow 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 2011;
- Exotic vegetation - 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
- Indicator species abundance - when conducting broad scale monitoring it is instructive to have native species that can be used as indicators of environmental change. The health, presence, absence or changing abundance of such species can provide a signal of ecosystem decline.

No swamp monitoring sites were undermined during 2011. CLW03 is located between Panels 710 and 708. Extraction in Panel 710 occurred adjacent to CLW03 in October 2010 and extraction in Panel 708 occurred adjacent to CLW03 in December 2010.

3.6.2 Swamp Flora Monitoring Survey Results

3.6.2.1 Species Richness

Species richness across the Clarence sites on Newnes Plateau has remained relatively steady across the seasons of summer through to spring 2011.

Similar to the 2010 annual report, CLW05 demonstrated the greatest number of species recorded each season throughout the year, with the highest recorded in autumn (53) (**Figure 51**). This site, classified as a Newnes Plateau Shrub Swamp, is a relatively open and weedy site nearby to a pine plantation. This site lacks dense *Leptospermum*'s making it easier for observers to record the presence of smaller herbaceous species. During spring monitoring, a greater presence of standing water was observed across CLW05 which may have contributed to the reduction in species richness during this season.

Similar to previous years, forbs and herbs contribute the greatest number of species to species richness with approximately 35% of all species recorded considered to be forbs. Shrubs represented approximately 30% of species found while ferns and graminoids represented 21%. Grasses contributed approximately 9% of species while the proportion of tree species was similar to 2010 with approximately 4%.

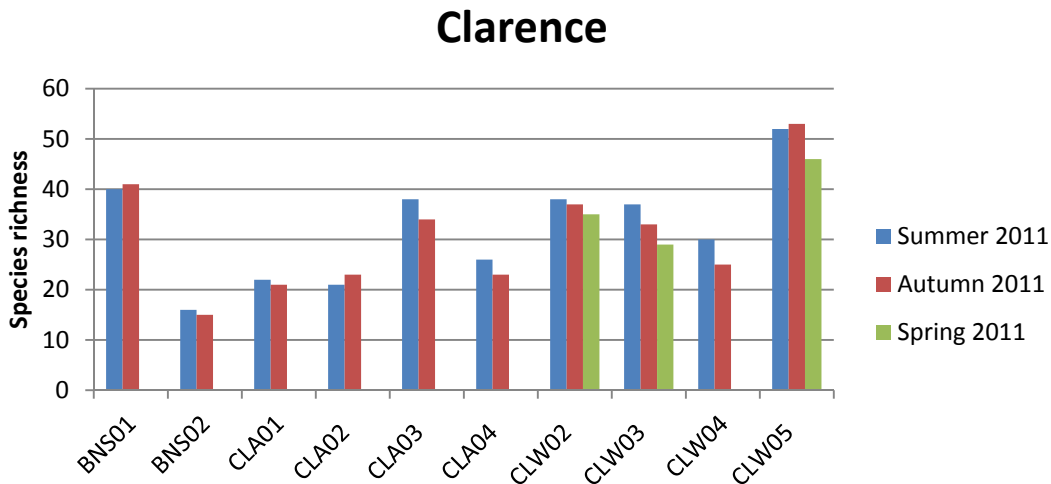


Figure 51 Species richness at Clarence

3.6.2.2 Species composition

Composition of species at each site was examined using PRIMER and MDS analysis. This analysis shows the movement of sites in relation to their species composition across the summer, autumn and spring of 2011.

Sites BNS01, CLW03, CLW05 and CLW02 have different species composition from the bulk of the sites at Clarence as demonstrated by **Figure 52**. Although BNS01 and CLW03 are classified as Newnes Plateau Shrub Swamps (NPSS) and are dominated by *Leptospermum grandifolium*, as are many of the other NPSS sites at Clarence, CLW03 also has a high cover/abundance of *Baumea rubiginosa* and *Hemarthria uncinata* (Matgrass) which separates it from the other sites. Similarly, BNS01 although dominated by *Leptospermum grandifolium* has a high abundance/cover of *Eucalyptus mannifera* and *Pinus radiata*. Site CLW02, classified as a hanging swamp (MU51) is unlike the NPSS sites in that it is dominated by low growing *Lepidosperma limicola* and *Patersonia fragilis* with occasional shrubs.

All swamps across Clarence have shown species composition variation between seasons. This is to be anticipated as some species are more prevalent and obvious during some seasons (e.g. grasses that seed during summer and have little to no basal vegetation and consequently may only be seen during summer), while others respond to recent rainfall and others may be influenced by frost. Removal of monitoring during winter has allowed a more accurate recording of species presence across the seasons as identification of cryptic species during winter was commonly difficult.

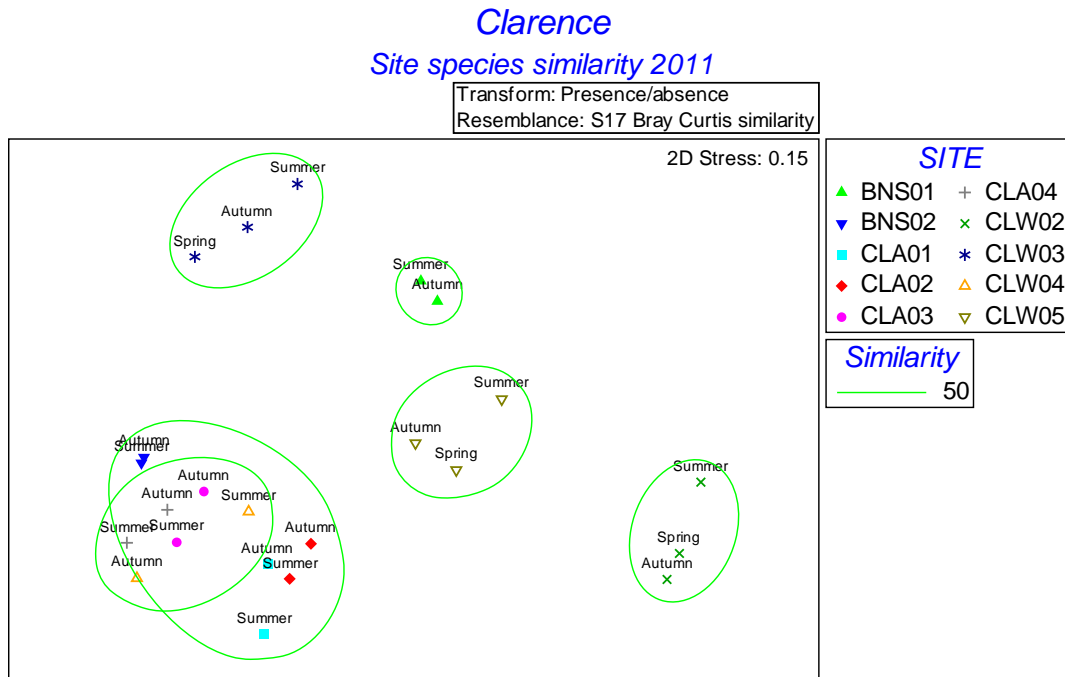


Figure 52 Clarence species composition 2011

3.6.2.3 Exotic species richness

Exotic species in general are not highly prevalent across the swamp communities examined with the exception of those sites that are in close proximity to pine plantations (BNS01 and CLW05).

The greatest exotic species richness at Clarence was recorded at site CLW05 (**Figure 53**), this is in keeping with previous assessments. This site is located beside a road and down slope from a pine plantation and is likely subjected to increased nutrient flow and run off which may have contributed to the increased presence of exotic species at this site. In comparison with last year the presence of exotic species at this site has decreased by approximately 3 species. The presence of standing water at this site during late 2011 is thought to have contributed to the overall reduction in species richness and consequently reduction in exotic species also. Several sites including BNS02, CLA03, CLA04, CLW03 and CLW04 remain weed free.

Clarence exotic species richness 2011

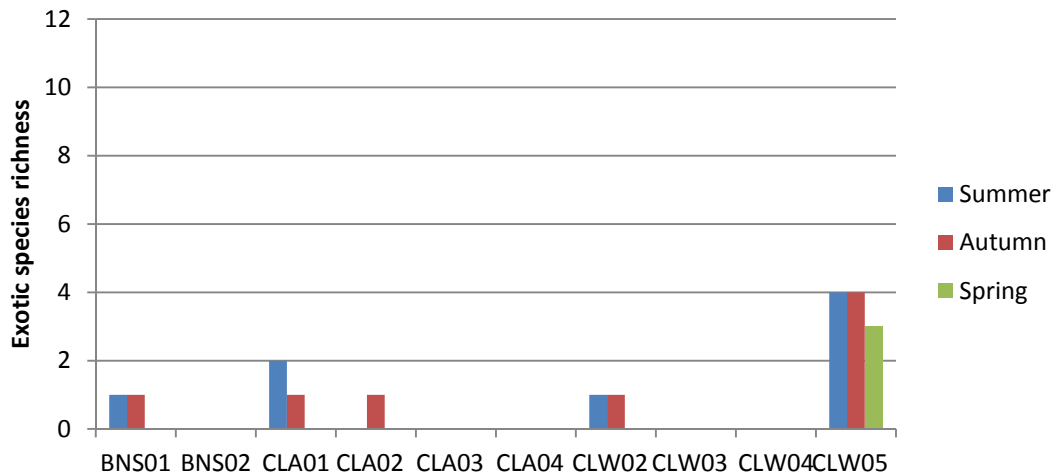


Figure 53 Clarence exotic species richness

3.6.2.4 Relationship between condition and abundance for selected species

The following section compares the condition of dominant species (using the condition scale) with scores recorded in previous monitoring and with time since undermining.

In addition, abundance scores for the same plant species as measured for the condition scale have also been shown below to establish if any trends are apparent between the two scales. The selected sites are CLW02 and CLW03 as these have been undermined.

While the figures shown below are primarily being compared with time since undermining or the change in observers, care should be taken to also consider climate. Since 2005, all years, with the exception of 2010 have shown well below average rainfall anticipated for the Newnes Plateau. Taking into consideration the loss of data from September 2009 due to a faulty tipping bucket, the current deficit of rainfall, compared to the long term average of the Newnes Forest Centre, from January 2003 until December 2011 is approximately 1825mm which has most likely resulted in a change in the swamp communities condition and abundance. The average rainfalls experienced across the plateau during 2011 should assist in maintaining condition and abundance of species.

Fluctuation in the condition and cover/abundance of species over time is common across sites. This may be due to a number of factors including:

- climatic conditions such as temperature, rainfall, snowfall or frost (as is often the case for frost sensitive species such as *Gleichenia dicarpa*),
- the observer's interpretation of the assessment scales,
- a disturbance such as undermining or another mechanism (e.g. emergency discharge events, pine plantation fertiliser runoff, recreational trail bikes etc.)

It is apparent that a change in observers may result in a change in cover/abundance and condition scores, as can be seen throughout the following figures when observers were introduced in autumn 2009.

Site CLW02 (**Figure 54**) showed an improvement in average condition when compared with 2010 with an increase in condition for species *Leptospermum*

continentale, *Empodisma minus* and *Leptospermum polygalifolium*. Abundance of species at this site remained stable, the most abundant species being *Lepidosperma limicola*. Site CLW03 (Figure 55) remained stable for both condition and abundance, at this site the most abundant species was *Leptospermum grandifolium*.

The general increases in both condition and abundance are most likely attributable to improved conditions, such as constant rainfall for species at these sites.

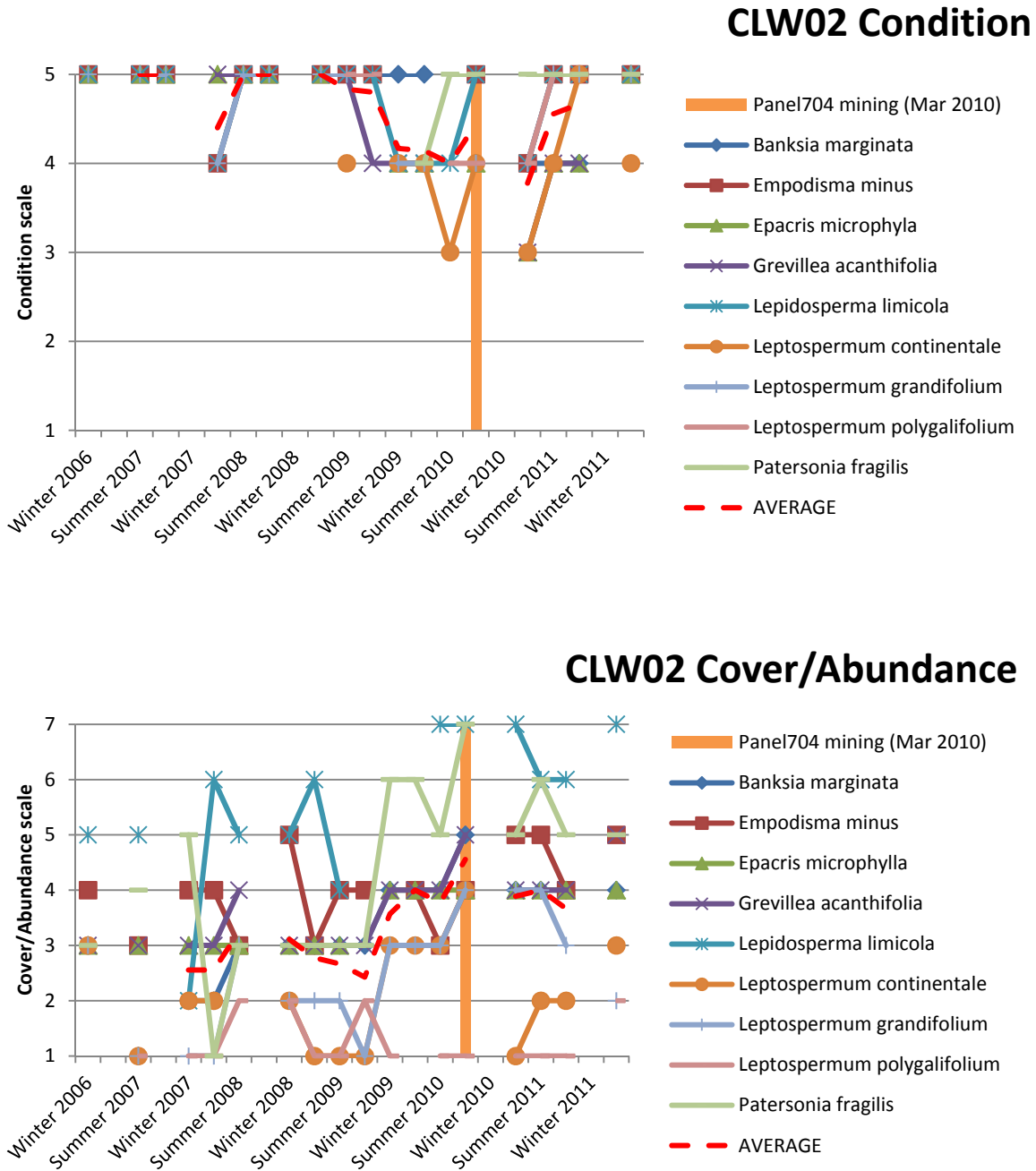


Figure 54 Condition (a) and Cover/Abundance (b) of species at CLW02

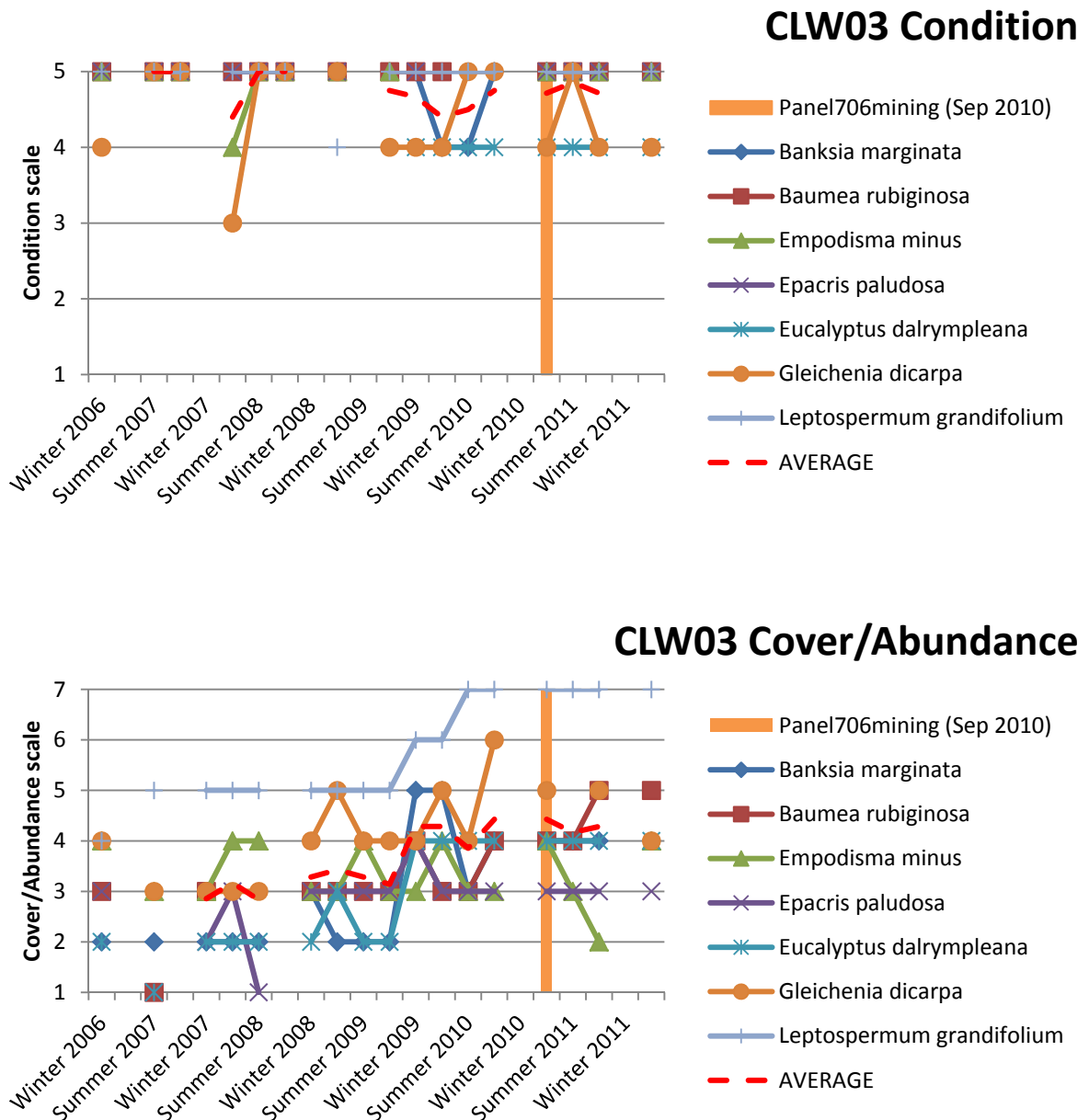


Figure 55 Condition (a) and Cover/Abundance (b) of species at CLW03

3.6.2.5 Swamp Flora Monitoring Results Conclusion

Results presented in this report generally concur with those of the 2009 and 2010 annual reports.

The drop in condition recorded at CLW02 in the 2010 annual report has since improved with species recording scores of 4 or above throughout 2011. Although a slight decrease in average abundance of species at site CLW02 has been recorded since undermining in March 2010, levels recorded post mining are still within the levels experienced prior to mining. CLW03 (first undermined October 2010) remained stable for both condition and abundance.

3.6.3 Heath/Pagoda Flora Monitoring Survey Results

3.6.3.1 700 SMP and Eastern SMP Areas

Plant condition in 2011 was good, with limited records of plants suffering dieback or branch damage. Those plants affected by dieback or damage appeared to have been affected by natural conditions including insect predation and fungal pathogens.

There was no evidence of death or dieback which could be attributed to an effect of subsidence.

Plant species richness records were within the range previously recorded across sites. There was no diverging trend between impact and control sites.

There were no records of exotic plant species at any site in 2011.

A number of species have either increased or decreased in cover/abundance within sites, although all species previously recorded as having changed in abundance have been stable over the past twelve months. No consistent trend has been observed that would indicate an effect of subsidence.

3.6.4 Outbye SMP Area

The condition of the plants across the Outbye sites reflects the seasonal conditions which prevailed over 2010 and 2011. There is no significant difference in responses between impact and control sites in terms of species richness patterns and detected changes in plant species distribution and abundance. There is no evidence of weed invasion.

There is no indication that subsidence associated with mining of the Outbye area is having an impact on heath vegetation. That is species composition is stable, the only instance of dieback recorded in 2011 is attributable to natural causes and there is no evidence that other potential indicators of an effect (e.g. weed invasion) are in operation. Further, no surface expression of subsidence was observed in or near the monitoring sites.

3.7 Threatened Fauna

Fauna monitoring at Clarence Colliery is undertaken by Biodiversity Monitoring Services. Fieldwork commenced in 2004 and is undertaken 3 times per year – autumn, spring and summer.

Fauna monitoring now occurs in 4 separate areas:

- Eastern SMP Area (extraction completed in February 2009);
- Outbye SMP Area (extraction commenced in February 2009; no extraction in 2011);
- 700 SMP Area (extraction commenced in August 2009 and continued during 2011);
- 800 Area (no mining to date; background monitoring only).

Only fauna monitoring in the 700 SMP Area measured impact from mining during the 2011 report period and the results are presented below. It is noted that the 700 SMP Area monitoring also includes background monitoring for the proposed 700 West areas, with the collectively area also referred to 'Western SMP Application areas.

Ongoing fauna monitoring within the Eastern and Outbye SMP Areas during 2011 found no evidence of any mining related impact.

Six long term fauna monitoring sites have been established within the 700 SMP Area to identify impacts (if any) of mining induced subsidence on native fauna as presented in **Table 15** below.

Table 15 700 Area Fauna Monitoring Sites

Site	Type	Landscape	Undermining Status
CLW01	Control	Pagoda	Not undermined
CLW02	Treatment	Swamp	Undermined November 2009
CLW03	Treatment	Swamp	Undermined October 2010
CLW04	Control	Swamp	Not undermined
CLW05	Control	Swamp	Not undermined
CLW06	Treatment	Pagoda	Undermined November 2011

Locations of fauna monitoring sites can be seen in **Appendix 1**.

Fauna monitoring undertaken uses the methods of setting traps including Elliot traps, tomahawk cage traps, glider traps, reptile funnel traps and also spotlighting, hair funnels, bird surveys, call broadcasting, herpetological searches, bat call detection, animal track recognition and opportunistic observations. Pit traps have not been established due to difficulty in establishing pits in stony ground associated with pagoda areas.

Data analysis criteria used to monitor fauna following surveys are:

- Species richness of faunal groups
- Diversity indices of faunal groups
- Population status of individual species
- 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
- Comparisons between Treatment and Control sites

Results for the 2011 surveys are included in the annual report *Fauna Monitoring During 2011 within the Western Subsidence Management Plan Application Area at Clarence Colliery*. A summary of results is provided below.

3.7.1.1 Threatened Species Located

Nineteen threatened species have been located within Clarence Colliery Western SMP Application areas as a result of the surveys up to 2011. These are the Gang-gang Cockatoo, Glossy Black-cockatoo, 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 and Giant Burrowing Frog. 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, Brown Treecreeper and Eastern Bentwing 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 and the Eastern Bentwing Bat, which can roost in caves and overhangs and the Blue Mountains Water Skink that is associated with wet swamps. Despite searching preferred habitats during the warmer months, there was no evidence of the presence

of the Blue Mountains Water Skink, Giant Dragonfly and Purple Copperwing Butterfly in the area.

Six threatened species were located during 2011, these were the Eastern Pygmy-possum, Flame Robin, Gang-gang Cockatoo, Giant Burrowing Frog and Scarlet Robin.

3.7.1.2 Species Richness

The number of species within each faunal group provides an index of its biodiversity. The higher the species richness, the higher the biodiversity. A high biodiversity index indicates an area containing a variety of natural habitats in good condition. Three main faunal groups have been identified including native mammals, reptiles and birds. The species richness for the three groups over 2006 to 2011 is presented in **Figure 56** below.

The trend lines for species richness show that all three groups have increasing species diversities over the years.

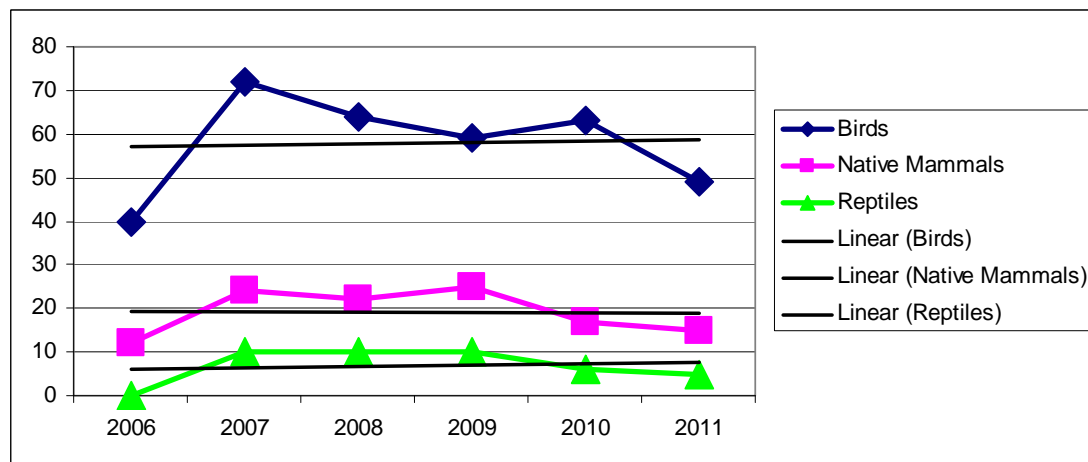


Figure 56 Species Richness at Clarence Colliery Western SMP areas

3.7.1.3 Diversity Indices

A diversity index combines species richness and individual numbers to provide a better indication of biodiversity. The closer the Simpson's Index of Diversity is to one, the higher the biodiversity and, by implication, the better the area for fauna.

Simpson's Index of Diversity and Evenness for the three main faunal groups are given in **Figure 57** and **Figure 58**.

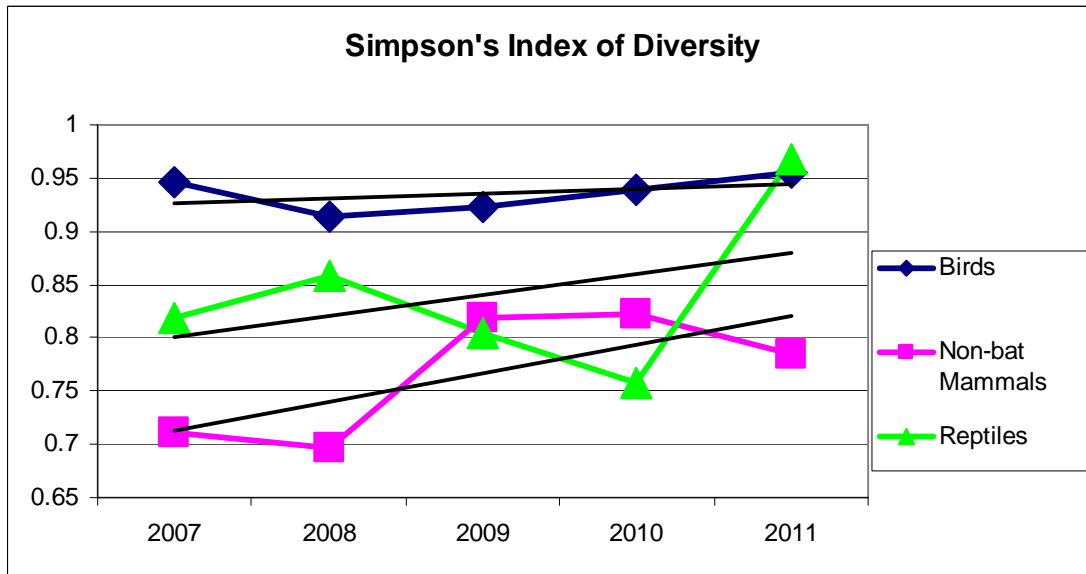


Figure 57 Simpson's Index of Diversity (1-D) between 2006 and 2011

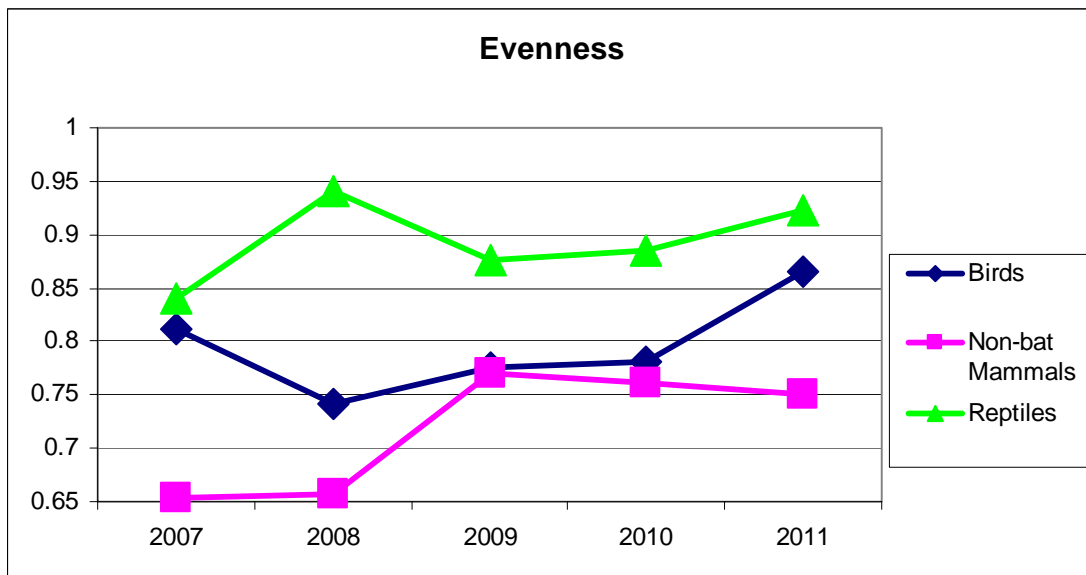


Figure 58 Evenness Scores between 2006 and 2011

Simpson's Indices of Diversity for birds, mammals and reptiles are trending upwards over the years. At present, there are no statistical differences for diversity or evenness over the years for the three groups (ANOVA). There is a relationship between the Simpson Index and evenness i.e. as evenness falls so does the Simpson's Index. This relationship is seen with the native mammals where high numbers of a particular species exist. Relative high numbers of the Southern Bush Rat in 2007, 2008 and 2011 produced a low evenness score (135 captured in 2011) but more even mammal numbers in 2009 and 2010 resulted in a higher score.

3.7.1.4 Capture Rates of Individual Species

Small mammals captured in Elliott traps provide a capture rate (expressed as % of trap-nights) that can be used as a rough estimate of an index of population size. These are illustrated in **Figure 59** for the overall capture rates for 2011 and for 2006 to 2010. There are no statistical differences between the years (non-parametric Kruskal-Wallis One Way ANOVA on Ranks), although there has been an increase in trapping rates over the years.

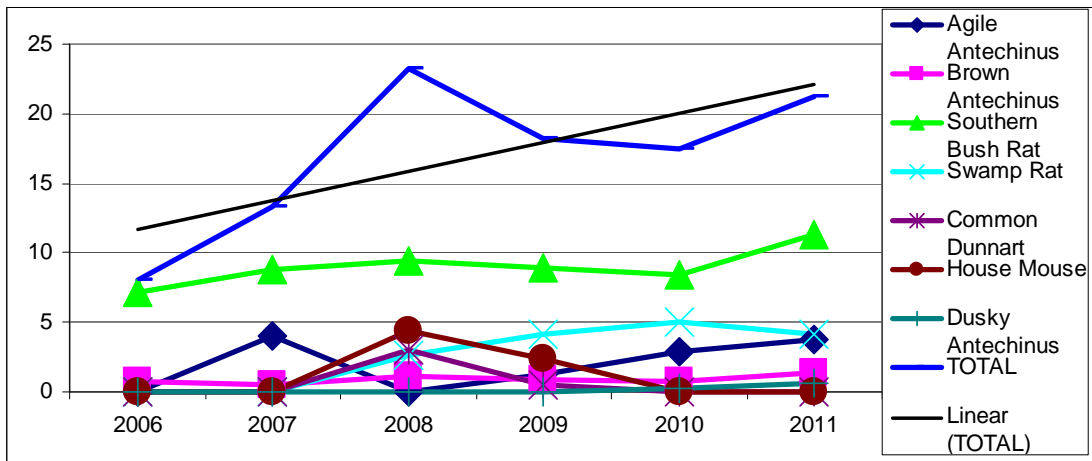


Figure 59 Total Trapping Rates at Clarence Colliery Western SMP areas

3.7.1.5 Population Status of Species

Derivation of the local population status of species located at Clarence Colliery Western SMP areas requires a relatively large dataset. Population status is based upon the numbers and distribution of each species within the SMP areas. This data is still being collected.

3.7.1.6 Contribution to the faunal assemblages by threatened species, species dependent upon woodland and by species declining in the Central West

The proportion of woodland dependent birds with declining populations and woodland dependent birds is presented in Figure 60 below.

The results indicate that more than 80% of the bird fauna located within the Western SMP areas is dependent upon the woodland habitat and that more than 10% are considered to be of conservation concern i.e. declining populations. Significant changes to this figure over time may indicate changes to the condition of the woodland habitat. In general, there appears to be a slight increase in the proportion of woodland dependant and declining bird species over time.

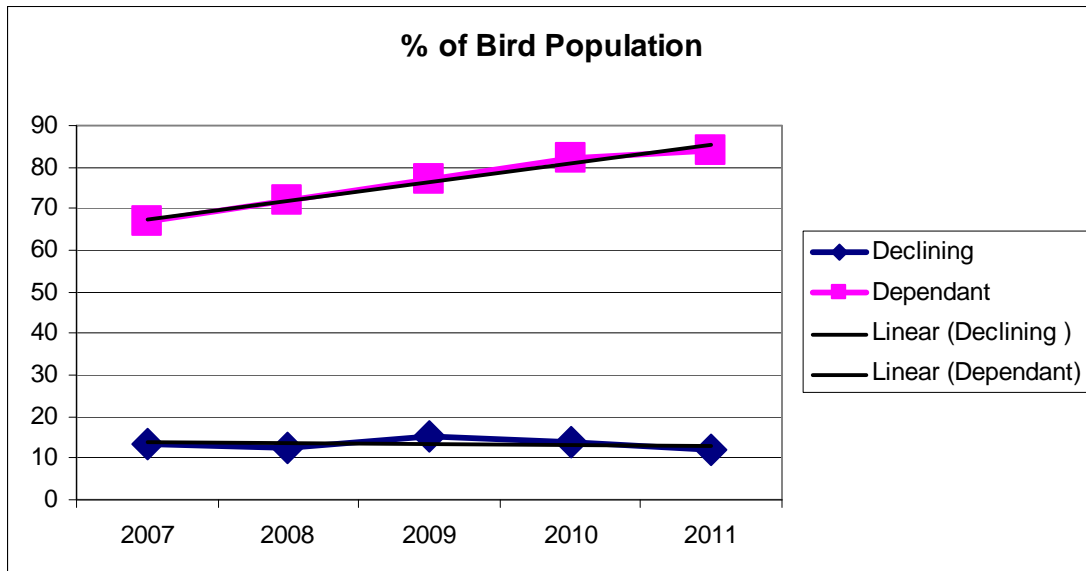


Figure 60 Proportion of Declining and Woodland Dependiant Bird Species

3.7.1.7 Habitat Complexity Scores

Habitat complexity scores (out of 18) are presented in **Figure 61** below.

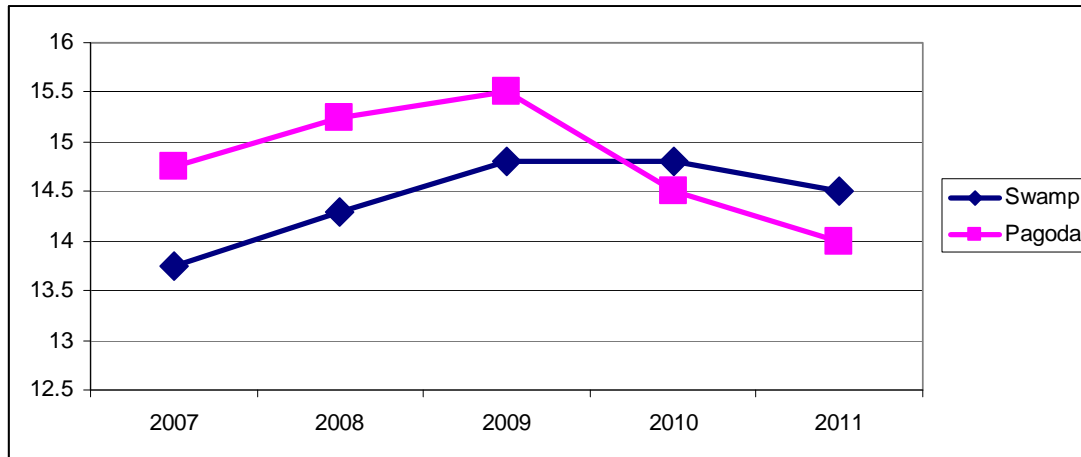


Figure 61 Changes in Habitat Complexity Scores in Swamp and Pagoda Sites between 2007 and 2011

The Habitat Complexity Scores were relatively high between 2007 and 2009, there has since been a falloff in the scores from most of the sites. Because the scores for the control sites fell as well as the treatment sites, the falloff is not the result of underground mining (in fact many of the sites at Clarence West have not yet been undermined). Rather, it is possibly the result from the prolonged dry years prior to 2009. However, there are no significant differences between the scores from the control and potential treatment sites at present (both have mean values of 15). The main benefit from these approaches is the production of a single number that represents habitat values. By tracking such numbers over time some insight into changes in habitat values may be possible.

3.7.1.8 Comparisons between Treatment and Control Sites

The sites surveyed in the Clarence Colliery Western SMP areas cover land where secondary extraction (partial extraction for Clarence) has occurred (treatment sites) and where mining has not occurred (control sites). Treatment sites are CLW02 (undermined in November 2009), CLW03 (undermined October 2010) and CLW06 (undermined November 2011), as shown on Plan CL315 in **Appendix 1**. These sites sample two swamps and one pagoda habitat. The three control sites also sample two swamps and one pagoda habitat, these are CLW01, CLW04 and CLW05. Thus it is now possible to compare the results from the 2011 surveys of the two clusters of sites i.e. control versus treatment. The results from the bird surveys have been used, as these provide the best data.

There are no significant differences between the two groups (non-parametric Mann Whitney Rank Sum Test). The results are shown in **Figure 62** and **Figure 63**.

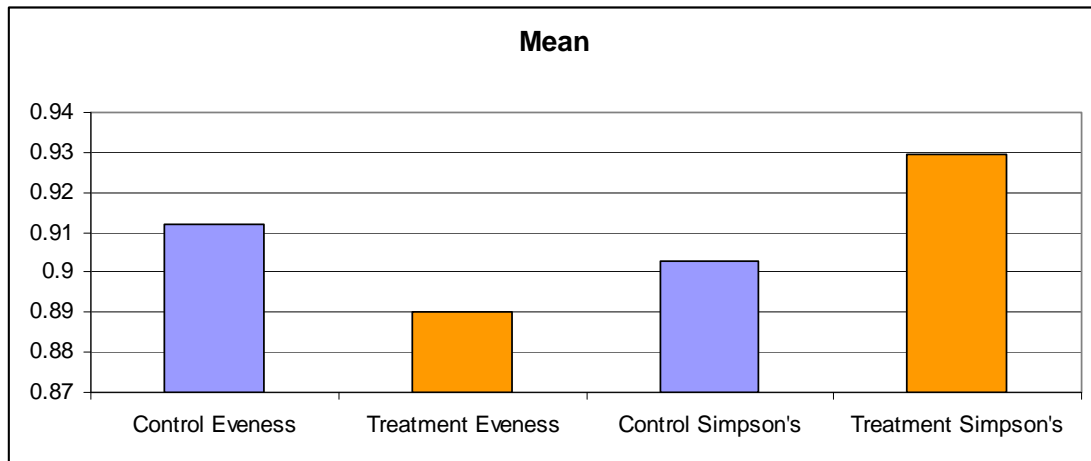


Figure 62 Evenness and Simpson's Index of Diversity at Treatment and Control Sites 2011

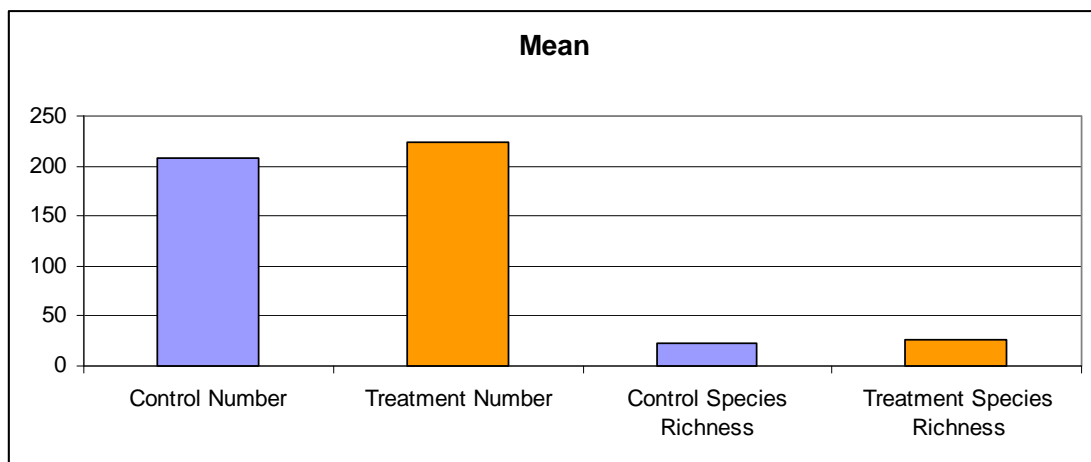


Figure 63 Numbers of Birds Recorded and Species Richness at Treatment and Control Sites 2011

3.7.1.9 Fauna Monitoring Conclusion

At present, there appears to be no evidence of potential effects from subsidence upon the fauna diversity at Clarence Colliery.

3.8 Weeds

Clarence carried out spraying to manage identified weeds during 2011. The spraying campaigns targeted declared and environmental weeds occurring onsite and was undertaken by appropriately qualified contractors.

Areas targeted during the campaigns across the Clarence pit top included the CHPP, administration buildings, water storages, drainage lines, access roads and rehabilitation areas. Spraying around the edge of water storages was completed on foot with individual plants being spot sprayed.

Weeds identified to occur on the site include:

- Pampass Grass (*Cortaderia selloana*);
- Scotchbroom (*Cytisus scoparius*);
- Pussywillow (describes a number of willow species); and
- A range of annual and perennial exotic herbaceous weeds.

3.9 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.

3.10 Operational Noise

A Noise Management Plan for Clarence Colliery has been completed as required under Clarence Development Consent (DA 504-00).

A review of this plan has occurred during the preparation of the AEMR.

In addition to the internal review Clarence undertook a Phase 1 Air Quality and Noise Modelling Assessment in 2009. The Assessment reviewed existing site data and modelling and identified additional information required to complete the Phase 2 and 3 air quality and noise modelling and assessments. The report identified a list of information required relating to site operations and available monitoring data. No further monitoring was required for Phase 2.

Normal activities at the mine site have little if any influence on the background noise environment of the nearest residential receptors at Newnes Junction, particularly when the CHPP is not operating. The Colliery's nearest neighbour is approximately 3 kilometres away and separated from the Colliery by a ridge. There were no noise complaints at Clarence during the reporting period. No noise complaints have been received since the commencement of operations at Clarence.

The highest risk for a noise source related to the colliery is the train loading operation. As with other coal exporters, coal trains tend to be loaded outside normal peaks in commuter train movements, that is, late evening or early morning.

3.10.1 Noise performance against Environmental Impact Statement Prediction

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. Noise monitoring results for 2011 and historical noise monitoring data (2007-2011) is provided in **Table 17** and **Table 18**.

3.10.2 Control Measures

The basic 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 in the past. 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 in 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.

3.10.3 Monitoring and Interpretation

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 at any residence on privately owned land. The criteria is listed in **Table 16** below:

Table 16 Noise impact assessment criteria

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

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 2011 is presented in **Table 17** with historical results (2007-2011) presented in **Table 18**.

Table 17 Noise Monitoring Results 2011

Date	Time	Leq (dB(A))	LAeq,15min (dB(A))*	Comments
28-Mar-11	Day 3:38pm	41	36	Traffic noise from Chifley road (intermittent) 40 – 41, Insects (constant) 40-42, Aircraft Flyover 46-47, Train Shunting 46-56, Clarence Colliery general, operations audible up to 45
28-Mar-11	Day 3:54pm	41	36	Traffic noise from Chifley road (intermittent) 38, Birds 44, Insects (constant), 39-42, Train Shunting 48, Clarence Colliery general, operations audible up to 49
28-Mar-11	Day 4:12pm	40	36	Traffic noise from Chifley road (intermittent) 40 – 46, Birds (intermittent) 44, Insects/frogs (constant) 39-40, Aircraft Flyover 40-55, Train passby 40-45, Clarence Colliery general, operations audible up to 43
28-Mar-11	Day 4:30pm	44	36	Birds (intermittent) 43-47, Insects (constant) 40-42, Train passby 45-51, Clarence Colliery general, operations audible up to 47
28-Mar-11	Evening 6:00pm	36	33	Traffic noise from Chifley road (intermittent) 36 – 39, Birds (intermittent) 33 – 49, Insects/frogs

Date	Time	Leq (dB(A))	LAeq,15min (dB(A))*	Comments
				(constant) 38, Aircraft Flyover 35-52, Train passby 47, Clarence Colliery general, operations audible up to 35
28-Mar-11	Evening 6:16pm	36	30	Traffic noise from Chifley road (intermittent) 30 – 45, Birds (intermittent) 38 – 52, Insects/frogs (constant) 34-38, Aircraft Flyover 44-46, Train passby 33-47, Clarence Colliery general, operations audible up to 33
28-Mar-11	Evening 6:34pm	37	30	Traffic noise from Chifley road (intermittent) 35 – 40, Birds (intermittent) 48 – 57, Insects/frogs (constant) 36-43, Train passby 34-40, Clarence Colliery general operations audible up to 30
28-Mar-11	Evening 6:50pm	37	33	Traffic noise from Chifley road (intermittent) 36 – 42, Birds (intermittent) 39 – 49, Insects/frogs (constant) 40-44, Clarence Colliery general, operations audible up to 43
28-Mar-11	Night 10:00pm	39	30	Traffic noise from Chifley road (constant) 31 – 34, Insects/frogs 38-50 (constant), Clarence Colliery general, operations audible (constant) up to 30.

* Mine noise contribution

Table 18 Historical Noise Monitoring Results 2007-2011

Date	Time	Leq (dB(A))	LAeq,15min (dB(A))*
15-Mar-07	Day	40.2	20.5
	Evening	47.4	19.8
	Night	37.9	21.5
01-May-08	Day	50.9	38.0
	Evening	46.7	32.8
	Night	40.7	27.8
17-Mar-10	Day	36	33
	Evening	37	33
	Night	38	35
28-Mar-11	Day	40-44	36
	Evening	36-37	30-33
	Night	39	30

* Mine noise contribution

3.11 Visual or Stray Light

Visual or stray light is not considered a risk under the Environmental Risk Register in Section 3.19.1.

Clarence commissioned an audit against Australian Standard AS4282 (INT) 1995 – Control of Obtrusive Effects of Outdoor Lighting. The audit found that Clarence is generally in compliance with the Standard.

3.12 Aboriginal Heritage

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.

Archaeological assessments (including ground trothing of listed sites) were undertaken in 2011 for the 700 West/800 Area Subsidence Management Plan Application.

In 2011, Clarence Colliery also engaged a consultant to undertake a due diligence study for Aboriginal Heritage on the Pit Top. The report fulfils the requirements as set out in the OEH document *Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales (2010)*. Whilst field surveys did not identify any Aboriginal sites within the Pit Top area, areas of archaeological sensitivity were identified and it was recommended that these areas undergo further archaeological investigation prior to any works in these areas.

A summary of the location and type of archaeological sites is provided below in **Table 19**.

Table 19 Location and Type of Archaeological Sites

Mining Lease Area	Description	Number Identified
Eastern portion of ML1583	Open Camp Site	1
	Isolated Artefact	2
	Scarred Tree	1
Western portion of ML1583	Axe Grinding Groove, Shelter with Deposit	1
	Open Camp Site	14
	Shelter with Art	2
	Shelter with Deposit	2
	Artefact Scatter	1
ML1353	Axe Grinding Groove, Rock Engraving, Shelter with Deposit	1
ML1354	Open Camp Site	3
	Axe Grinding Groove, Shelter with Art	2
	Shelter with Art	1
	Open Camp Site, Stone Arrangement	1
CCL705	Open Camp Site/Stone Arrangement	5
	Axe Grinding Groove	2
	Shelter with Art, Shelter with Deposit	4
	Open Camp Site	4

3.13 Heritage

3.13.1 European Heritage

European Heritage items include the Zig Zag Railway and associated buildings, the Clarence Tunnel and the old Newnes Railway formation which crosses the existing lease near the ventilation fan, the northern portion of ML1583. There has been no mining in these areas during the reporting period.

3.13.2 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.

3.14 Spontaneous Combustion

When coal is exposed to air, the reactive components of the coal oxidise in an exothermic reaction. When this rate of heating is balanced or exceeded by the rate of cooling, the coal will remain stable indefinitely. It is only when the rate of heating exceeds the rate of cooling that spontaneous combustion can occur.

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.

3.15 Bushfire

Clarence reviewed the Clarence TARP 2009 Bushfire risk assessment in 2010 with representatives from the NSW Rural Fire Service, the Clarence-Dargan Bushfire Brigade and the Clarence Fire team members.

3.15.1 Bushfire Management System

Following the bushfire risk assessment Clarence Colliery has implemented:

- Development of a Bushfire Management Plan that identifies the process for review of the Risk Assessment, undertaking of an annual inspection (in accordance with the Annual Inspection Standard for Bushfire Prevention) and emergency response in accordance with Clarence Emergency Management System.
- Development of an Annual Inspection Standard for Bushfire Prevention. The Standard includes a checklist of the following requirements as a minimum:
 - o Building Gutters;
 - o Access Roads and Paths;
 - o CHPP Facilities;
 - o Surface Facilities;
 - o Asset Protection Zones (Defined in the Management Plan); and
 - o Training adequacy.
- Review of the Bushfire Procedure for monitoring and responding to potential bushfire threats. The Procedure is a plan (A0 size) that identifies the asset protection zones, response levels for an approaching bushfire and relevant contact numbers for the Rural Fire Service and State Forests for monitoring an approaching bushfire and obtaining direction when a fire is approaching Clarence.

3.16 Mine Subsidence

Appendix 1 contains the location of environmental monitoring sites related to subsidence.

3.16.1 SMP Applications and Variations

During 2011, the following SMP applications and variations occurred:

- 2nd SMP variation application for 700 Area (712 panel) submitted during the previous reporting period (4th November 2010) approved 28th January 2011.
- Application to mine second workings (partial extraction) within the Notification Area of Lithgow No.2 Dam (Panel 714 only) submitted to the Dams Safety Committee and District Inspector of Coal Mines on 7th October 2011. Approval issued by Department of Trade and Investment, Regional Infrastructure and Services (DTIRIS) on 6th December 2011. No secondary extraction occurred within the Notification Area during 2011.
- SMP application for 700 West and 800 areas submitted on 23rd November 2011.

3.16.2 Summary of Subsidence Monitoring

During the 2011 reporting period the following monitoring was undertaken in relation to subsidence:

- Subsidence monitoring lines in Outbye areas were resurveyed in relation to the 602 panel (R and 605 line), 400, 402 and 403 panels (U line) and 306 panel (W and Z lines) following partial extraction completed in 2009.
- Subsidence monitoring lines in the 700 Area (subsidence lines 700A, 700B, 700C, 700D and 700E) were resurveyed following partial extraction of panel 702 (completed December 2009), panel 704 (completed March 2010), panel 710 (completed December 2010) and panel 808 (completed April 2011).
- Subsidence monitoring lines were resurveyed over panel 612 (H and I lines) and the 609 area (609A and 609D lines) for longer term subsidence monitoring.
- Pre-mining survey and post mining survey of rock marks over panels 314/316 (completed August 2011).
- Establishment and pre-mining survey of rock marks around Lithgow No.2 dam on 8th and 10th February.
- Post mining photographic monitoring of Happy Valley Swamp, Happy Valley Upper Swamp and Bungleboori Swamp 4 in the 700 Area;
- Pre mining photographic monitoring of Farmers Swamp in the 700 Area
- Ongoing monitoring of multi-level groundwater piezometers (CLRP1, CLRP2, CLRP3, CLRP6, CC114, CC115, CLRP11, CLRP12, CLRP13, CLRP14, CLRP15, CLRP16) and open hole piezometers (CLRP4, CLRP5, CLRP7, CLRP8, CLRP10 and CC113).
- Ongoing monitoring of shallow groundwater piezometers in Happy Valley Swamp (HV1 and HV2) and Happy Valley Upper Swamp (HVU1 and HVU2) in the 700 Area;
- Ongoing fauna monitoring during autumn, spring and summer;
- Ongoing flora monitoring during autumn, spring and summer;
- Monthly surface water sampling for Farmers Creek upstream and downstream (700 Area SMP and DSC Approval).
- Surface water sampling for Bungleboori Creek upstream and downstream (Outbye Areas SMP) on 7th June 2011.
- Photographic monitoring of the Lower Blue Mountains Motorcycle Club following extraction of 710 and 708 panels.

- Surface subsidence management inspections;
- Underground roof monitoring and inspections; and
- Underground geotechnical audits.

All subsidence monitoring has been carried out in accordance with the relevant Subsidence and Environmental Monitoring Programs as stipulated by the various SMP approvals as outlined in **Section 1.1**.

3.16.3 Subsidence Results

All subsidence monitoring results for 2011 were within the 100mm maximum predicted in the SMP for all panels relevant to the 700 Area, Outbye Areas and 314/316 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).

Maximum recorded subsidence for the Outbye Areas during the reporting period was 40mm on the W line on 21st September 2011. The W line is located above 306 panel. The subsidence results are well within the maximum predicted and within Condition Green of the Outbye Areas SMP Trigger Action Response Plan (TARP) where no further action (other than routine monitoring and reporting) is required.

Maximum recorded subsidence for the 700 Area during the reporting period was 46mm on the 700A line on 14th January. The 700A line is a cross line that traverses panels 702 to 712. The subsidence results are well within the maximum predicted and within Condition Green of the 700 Area SMP TARP where no further action (other than routine monitoring and reporting) is required.

Maximum strain and tilt (averaged over a number of pegs) for all lines were less than 1mm/m and 2mm/m respectively. These results are within predicted values in the relevant SMP.

Maximum measured subsidence of the older areas (2008 and earlier) was 103mm measured on the 609D line above 609 panel on 24th October 2011. The result is fractionally above 100mm although survey error is at least +/-3mm. The 609 panels were approved under section 138 of the former *Coal Mines Regulation Act 1982*. The Principal Subsidence Engineer of DTIRIS was notified in writing on 24th November 2011 of the 609D line result. Mining was completed in 609 panel in May 2005. A surface inspection on 24th November 2011 found no evidence of any surface impacts related to subsidence. Groundwater monitoring in the nearby CLRP2 borehole (above 611E panel) has not detected any groundwater impacts. The panel design for later panels (namely 700 area) were already based on a revised subsidence model and no further action was required in terms of altering mine design. With maximum subsidence in the 700 area measuring well below 100mm, the higher result over 609 panel is not indicative of current mining practices.

Subsidence results for the remaining older areas (H, I and 609A lines) were all less than 100mm.

Subsidence for all areas extracted during the reporting period has not led to any observed surface cracking or any other surface disturbance.

3.16.4 Flora and Fauna Results

Flora and fauna monitoring has shown no measurable impact from mining during 2011. Results for flora and fauna monitoring can be found in Section 3.6 and Section 3.7 respectively.

3.16.5 Groundwater Monitoring Results

Groundwater monitoring results during 2011 did not indicate any adverse impact on the near-surface aquifers. Full details on groundwater monitoring are provided in Section 3.5.

3.16.6 Photographic Monitoring and Surface Inspections

Post mining photographic monitoring of swamps within the 700 Area has found no visual evidence of mining related impacts.

Post mining photographic monitoring of the Lower Blue Mountains Motorcycle Club facilities in the 700 Area has found no visual evidence of any mining related impacts.

Routine surface inspections have found no visual evidence of surface disturbance as a result of mining during 2011.

Overall the monitoring indicates that subsidence impacts are minimal.

3.17 Hydrocarbon Contamination

3.17.1 Fuel Containment

During the reporting period the existing below ground diesel tank at the Coal Handling Preparation Plant was decommissioned. A new above ground diesel tank was installed adjacent to the Primary Arrestor at the CHPP. Two existing below ground diesel tanks adjacent to the storage sheds at the pit top were also decommissioned. Two new above ground diesel tanks are scheduled to be installed adjacent to the storage sheds at pit top during 2012.

A Phase 2 hydrocarbon contamination assessment commenced during November 2011. The objective of the Phase 2 assessment was to assess the presence of soil and groundwater contamination at the Pit Top and CHPP areas. The assessment also investigated the presence of contamination during decommissioning of the below ground diesel tanks at the Pit Top and CHPP.

3.18 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.

3.19 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. 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.

All people required to carry out work on the site must be inducted and if required to carry out work underground, complete an underground induction. All contractors to site must sign in at the computer in the lamp room or CHPP crib room. They must have a valid purchase order number to sign in under before any work can begin, they must have completed the required safe work method statements for the task and supplied Workers Compensation and insurance details to their site representative.

During the reporting period there were no incidents relating to public safety.

3.20 Other Issues and Risks

3.20.1 Risk Management

Environmental risks were considered within the Clarence Environment and Community Risk Assessment in 2011. The Risk Assessment is reviewed annually inclusive of the current Environmental Risk Register (ERR) 22.

The identification of risks from the Risk Assessment and ERR are the components for identification of required actions within the Clarence Environmental Management System and Annual Business Plan. Clarence was reviewed following the Environment and Community Risk Assessment in 2011. The Risk Assessment identifies risks by mining area and activities similarly to those in **Table 20**.

Table 20 Environmental Risk Identification for Clarence Colliery

	Mining Activity						
	Drilling	Underground Mining	Coal Preparation Plant	Workshop	Stores	Ancillary	Rehabilitation
Air Pollution Dust/Other	L	L	M	N/A	L	L	L
Erosion/Sediment Control	L	L	M	N/A	N/A	M	L
Surface Water Pollution	L	L	M	L	L	M	L
Ground Water Pollution	L	L	N/A	L	N/A	L	N/A
Contaminated Land	L	N/A	L	L	L	L	L
Threatened Flora Protection	L	L	N/A	N/A	N/A	L	L
Threatened Fauna Protection	L	L	N/A	N/A	N/A	L	L
Weed Control and Management	L	N/A	N/A	N/A	N/A	L	L
Operational Noise	L	L	L	N/A	N/A	N/A	N/A
Vibration and Air Blast	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Visual Amenity, Stray Light	L	N/A	L	N/A	N/A	N/A	N/A
Aboriginal Heritage	L	L	N/A	N/A	N/A	N/A	L
Natural Heritage Conservation	L	L	N/A	N/A	N/A	N/A	N/A
Spontaneous Combustion	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Bushfire	M	M	L	L	L	N/A	L
Mine Subsidence	N/A	L	N/A	N/A	N/A	N/A	N/A
Hydrocarbon Contamination	L	M	M	M	M	L	L
Methane Drainage/Venting	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Public Safety	L	L	L	L	L	L	L
Leachate/Reject Management	N/A	N/A	L	N/A	N/A	L	N/A
Subsidence and SMP Risks	N/A	L	N/A	N/A	N/A	N/A	N/A

3.21 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 (CO₂).

Greenhouse gas emissions reported through the NGER reporting program for the 2011 financial year reporting period (as reported) are listed in **Table 21** below.

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 21 Greenhouse Gas Emissions 2011 Reporting Period (CO₂ -e T)

Financial Year 2011	Financial Year 2010	Financial Year 2009	Scope
7 133	15 418	14 559	Scope 1
31 764	27 413	27 682	Scope 2

Note: A calculation error led to higher Scope 1 emissions being reported in 2009 and 2010.

3.21.1 Energy Efficiency Projects

Clarence has identified and developed several projects targeted to reducing greenhouse gas emissions. The projects are the installation of a power factor correction unit, the reuse of heat exchanging system from the compressor system for hot water and space heating in the bathhouse, and a revision of the water management system on site to reducing the length of pumping. These projects are described in detail below.

3.21.1.1 Installation of the power factor correction unit

The power factor correction unit measures how efficiently each amp of electricity is converted into heat, light or power for electric motors onsite. Clarence Colliery has poor Power Factor, typically 0.85 and below at times of maximum demand. Following the Clarence Colliery Energy Savings Action Program a 4.5 Mvar Power factor correction unit was installed. Commissioning and integration of the unit was undertaken in 2010. In 2011 the power factor improved from 0.85 and below to being typically 0.98 and above.

3.21.1.2 Bathhouse hot water & heating

In 2008 the site explored the option of installing a heat exchanger system from the compressor system to utilise waste heat for hot water heating and space heating within the bathhouse. The project was put forward as part of the internal Centennial Environmental Innovations Awards. The project won the Environmental category and the costs for the installation were partially covered by the Centennial Greenhouse fund. The project was estimated to save 1,994,500 KWH of electricity and 2,114 tonnes of CO₂ per year. The building and associated infrastructure was constructed

during the reporting period and the compressors and electrical infrastructure are scheduled to be installed during 2012.

3.21.1.3 Implementation of water management actions

A water management system review was carried out in the 2008 period. The review explored options for saving energy within the transportation of water across site and to the underground.

Clarence has formalised an onsite Committee managing and assessing priorities of previously identified and newly identified energy saving opportunities within the water management system. Energy savings identified to date include:

- Recycling of water within the CHPP (where possible) rather than releasing underground and pumping to the surface for treatment and re-use; and
- New configuration of pumps underground to reduce pumping requirements.

4 Community Relations

4.1 Environmental Complaints

There were no community complaints during 2011.

4.2 Community Liaison

Clarence undertakes community engagement through planned and unplanned activities outlined in the Clarence Stakeholder Engagement Plan.

Centennial undertakes regular meetings with the Blue Mountains Conservation Society and the Colong Foundation for Wilderness.

During 2011 Clarence contributed through monetary and in kind donations to local community events and organisations. During the 2011 period community events and organisations supported included:

- AUSIMM;
- Australian Air League;
- Australian Army Cadets, Marrangaroo;
- Australian Roof Bolting and Coal Shovelling Titles 2011;
- Celebrate Lithgow;
- Central West Supported Playgroups
- Central West Vision Team;
- Christmas and Beyond in Lithgow;
- Clarence Dargan Bushfire Brigade;
- Community Drug Action Team
- Girl Guides Australia - Lithgow
- Jack and Jill Preschool;
- Lithgow City Band Inc;
- Lithgow Flash Gift
- Lithgow High School;
- Lithgow Public School and P&C;
- Lithgow Tidy Towns Committee;
- Live Well Lithgow;
- Lithgow Brass Band;
- Mount Victoria Great Train Weekend;
- NSW Aboriginal Rugby League Knockout 2011
- Wallerawang Public School;
- Wallerawang Sports Association Inc.;
- Zig Zag Public School

Centennial Coal offers a Sporting Sponsorship Program. Sporting programs sponsored by Clarence in 2011 include:

- Centennial Charity Golf Day;
- Lithgow Golf Club;
- Portland Gold Club;
- Hartley Cricket Club;
- Lithgow District Cricket Association;
- Lithgow District Junior Cricket Association;
- La Salle Hornets Crick Club;
- Lidsdale Lions Cricket Club;
- Lithgow Valley Junior Cricket Club;
- Portland Junior Cricket Club;
- Centennial Coal Cup;
- Lithgow Workmen's Club Rugby League Football Club;
- Clarence Touch Football Team;
- Lithgow City Bowling Club;
- Lithgow Hockey Association;
- Central Tablelands Mountain Bike Club;
- Lake Wallace Community Boating Centre Inc;
- Lake Wallace Sailability;
- Lithgow District Netball Association;
- Lithgow Flash Dragons Dragon Boat Club;
- Lithgow Small Arms Rifle Club;

- Portland T-Ball Association;
- Wallerawang Baseball Association;
- Wallerawang Indoor Sports Association;
- Western Region Academy of Sport.

4.2.1 Save Our Swamps Program

Centennial Coal contributed to the Save Our Swamps (SOS) program in 2011. The SOS program was a joint project between Blue Mountains City Council, Gosford City Council, Lithgow City Council and Wingecarribee Shire Council to protect and restore the Temperate Highland Peat Swamps on Sandstone endangered ecological community (EEC).

In the local area Newnes Plateau Shrub Swamps are considered part of the Temperate Highland Peat Swamps on Sandstone EEC. The Newnes Plateau Shrub Swamp wetlands are listed under both State (NSW *Threatened Species Conservation Act 1995*) and Commonwealth (*Environment Protection and Biodiversity Conservation Act 1999*) legislation.

Clarence Colliery participated in the Swamp Care day held at Browns Swamp during June 2011. Many local residents attended the day and planted tree seedlings.

4.2.2 Community Consultative Committee

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 2011. Information presented in the meetings include operational, environmental and community performance updates.

A community newsletter was distributed in May 2011. The newsletter considers article items discussed at the Clarence CCC meetings.

Specific items discussed during committee meetings in 2011 include:

- The Subsidence Management Plan Application for 700 West/ 800 Area;
- The development of Reject Emplacement Area IV;
- The modifications to the truck wash down bay;
- The Independent Environmental Audit results; and
- Environmental incidents/complaints;

5 Rehabilitation

5.1 Buildings

Clarence installed an 18 metre by 7 metre shed near the administration building to house the new air compressor.

Given that the mine has coal reserves to sustain current production levels for in excess of 20 years and that all site buildings are required, no buildings are scheduled for removal in the near future.

5.2 Rehabilitation of Disturbed Land

5.2.1 Pit Top

A small area adjacent to the wheel wash bay was rehabilitated during 2011. The rehabilitation was minor maintenance work to reduce erosion and sediment transport and does not warrant inclusion in the main rehabilitation summary. There was no other rehabilitation carried out on Clarence Pit Top during 2011.

An area of 2.8 hectares was disturbed for the new REA IV and this area is now the main REA. A portion of REA III will continue to be used to dry 'pond fines' (underflow from the CHPP thickener) prior to reclamation for blending with product coal. This will be done on an infrequent basis should there be an issue with the belt press filters within the CHPP. The remainder of REA III will be progressively rehabilitated.

A rehabilitation plan is shown in **Appendix 1** and a rehabilitation summary for Clarence is given in **Table 22**.

5.2.2 Newnes Plateau

As discussed in Section 2.1, no exploration activities occurred during 2011 and no areas were disturbed on the Newnes Plateau. No further rehabilitation is required at this stage however inspections are made to monitor the progress of previously rehabilitated areas, particularly sites CLRP11, 12, 13, 14, 15 and 16 that were disturbed and rehabilitated during the previous reporting period.

When drilling does occur, exploration boreholes with piezometers are rehabilitated through a specific grouting process undertaken by the drilling contractor. A specific grout mix is applied to the bottom of the borehole through a 20mm grout pipe. The grouting is carried out in stages using separate grout pipes permanently in the hole. The pipes are installed at typically 70 to 100m intervals, but not more than 100m intervals. The grout is pumped into the bottom pipe and a known volume is added to bring the grout level to a theoretical level 10m above the next pipe. The pipe above is flushed with water immediately after grouting to dilute any grout at this level to allow further grouting from this level after an initial cure period. Once the piezometers are all grouted in then the mix is thickened by the addition of further cement to obtain a quicker set while filling the top of the hole to surface.

A site inspection was undertaken with DTIRIS on the 6th October 2011 during an audit of exploration licence EL5072 to review the progress of rehabilitated boreholes.

5.3 Other Infrastructure

During the reporting period the two existing below ground diesel tanks adjacent to the oil storage shed at the Pit Top were removed from the site. The excavation area was cleared of contamination during the phase two contamination assessment before

being backfilled with validated clean fill. The below ground diesel tank at the CHPP was decommissioned and filled with a sand cement slurry. The diesel tank was left in situ due to the proximity of the tank to the SC12A gantry leg footing at the CHPP.

No other infrastructure was removed or rehabilitated in the reporting period.

5.4 Rehabilitation Trials and Research

There were no rehabilitation trials and research undertaken during the reporting period.

5.5 Further Development of the Final Rehabilitation Plan

The final rehabilitation plan will be progressively implemented as works within disturbed areas cease. In 2011, no rehabilitation was undertaken as no surplus disturbed land was available.

With over 20 years of mining reserves in current lease areas, the final rehabilitation plan for the Pit Top is conceptual only. Budget costs for final rehabilitation have been calculated and the accrual of this money is in place. Rehabilitation costs and cost allocations are reviewed each year.

A life of mine rehabilitation, mine closure and decommissioning workshop was held during February 2011. This was followed by another mine closure and decommissioning risk assessment workshop which was held during April 2011.

Table 22 Rehabilitation Summary Clarence

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)	9.8	7	9.8
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	62.8	60	62.8
C: REHABILITATION PROGRESS			
C1: Total Rehabilitated Area (except for maintenance)	18.6	18.6	18.6
D: REHABILITATION ON SLOPES			
D1: 10 to 18 degrees	0	0	0
D2: Greater than 18 degrees	0	0	0
E: SURFACE OF REHABILITATED LAND			
E1: Pasture and grasses	0	0	0
E2: Native forest/ecosystems	18.6	18.6	18.6
E3: Plantations and crops	0	0	0
E4: Other (include non vegetative outcomes)	0	0	0

F1

F2

Table 23 Maintenance Activities on Rehabilitated Land- Clarence

NATURE OF TREATMENT	Area Treated (ha)		Comment/control strategies/ treatment detail
	Report Period	Next Period	
Additional erosion control (drains re-contouring, rock protection)	0	0	
Re-covering (detail-further topsoil, subsoil sealing etc)	0	0	
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)	0	0	
Adversely Affected by Weeds (detail-type and treatment)	18.6	18.6	Hand spraying for all environmental and noxious weeds. Note total area affected is not currently known.
Feral animal control (detail – additional fencing, trapping, baiting etc)	0	0	

6 Activities Proposed in the Next AEMR Period

The activities proposed for 2012 are generally in accordance with the current MOP, and include:

- Continued review of water management at Clarence Colliery and update the Water Management Plan in accordance with the outcomes, and seek feedback from relevant regulatory bodies of the reviewed Water Management Plan;
- Continued planning for progressive decommissioning and rehabilitation of Reject Emplacement Area III;
- Commencement of planning for life of mine reject emplacement;
- Further planning and exploration in the 800 area;
- Review of the Mining Operations Plan;
- Conduct a site specific Best Management Practice particulate determination to identify the most practicable means to reduce particle emissions from the premises.
- Review of the management system of the Water Treatment Plant in collaboration with the Water Treatment Plant operator.
- Review of the telephone communication system hardware at the Water Treatment Plant to identify any opportunities to improve the design of the system.
- Surface water management structures on the pit top area will be reviewed to confirm their capacity is consistent with Type D sediment retention basins for mines and quarries as defined in the publication Managing Urban Stormwater: Soils and Construction (Landcom 2006). The assessment will contribute to a review of the water balance for the pit top facilities which is proposed to be completed by May 2012.

APPENDIX 1 PLANS

Regional Location Plan

2011 Workings

2012 Proposed Workings

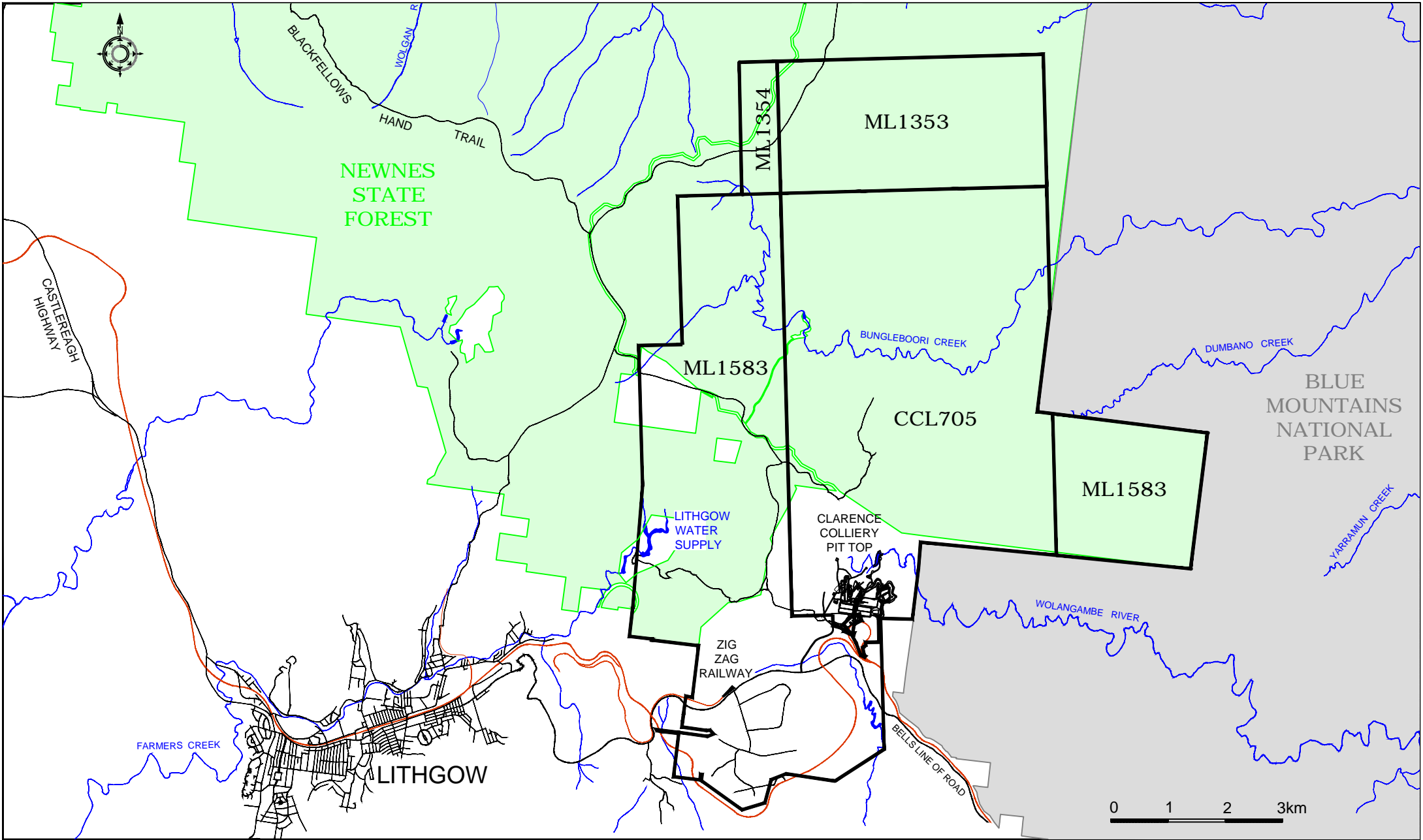
Combined Surface Monitoring

Pit Top Monitoring Locations

Aerial View of Surface Facilities

Surface Rehabilitation 2011

Clarence Water Schematic



NEWNES STATE FOREST

BLUE MOUNTAINS NATIONAL PARK

LOCATION PLAN

RAIL LINE

MINING LEASE BOUNDARY(S)



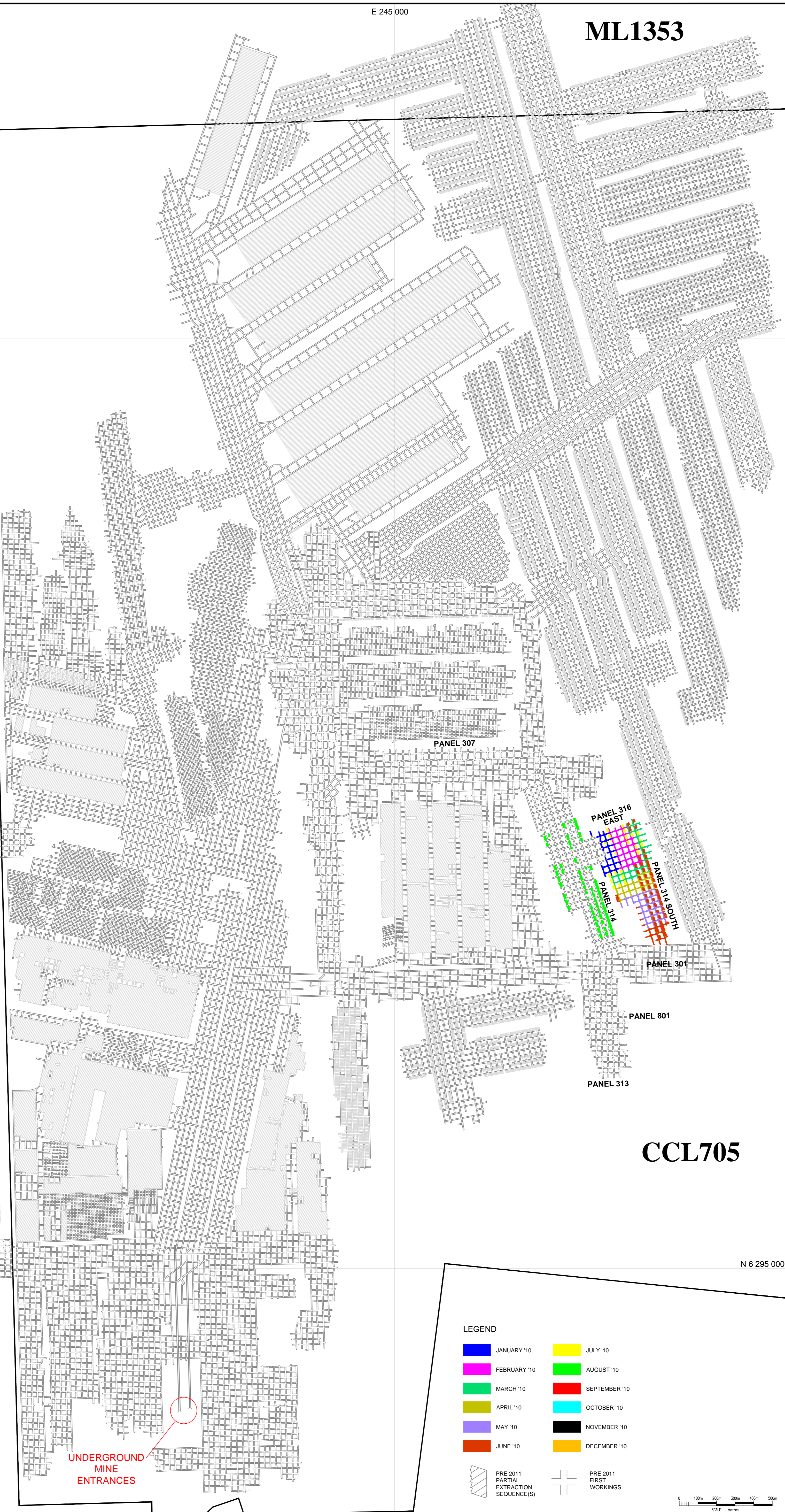
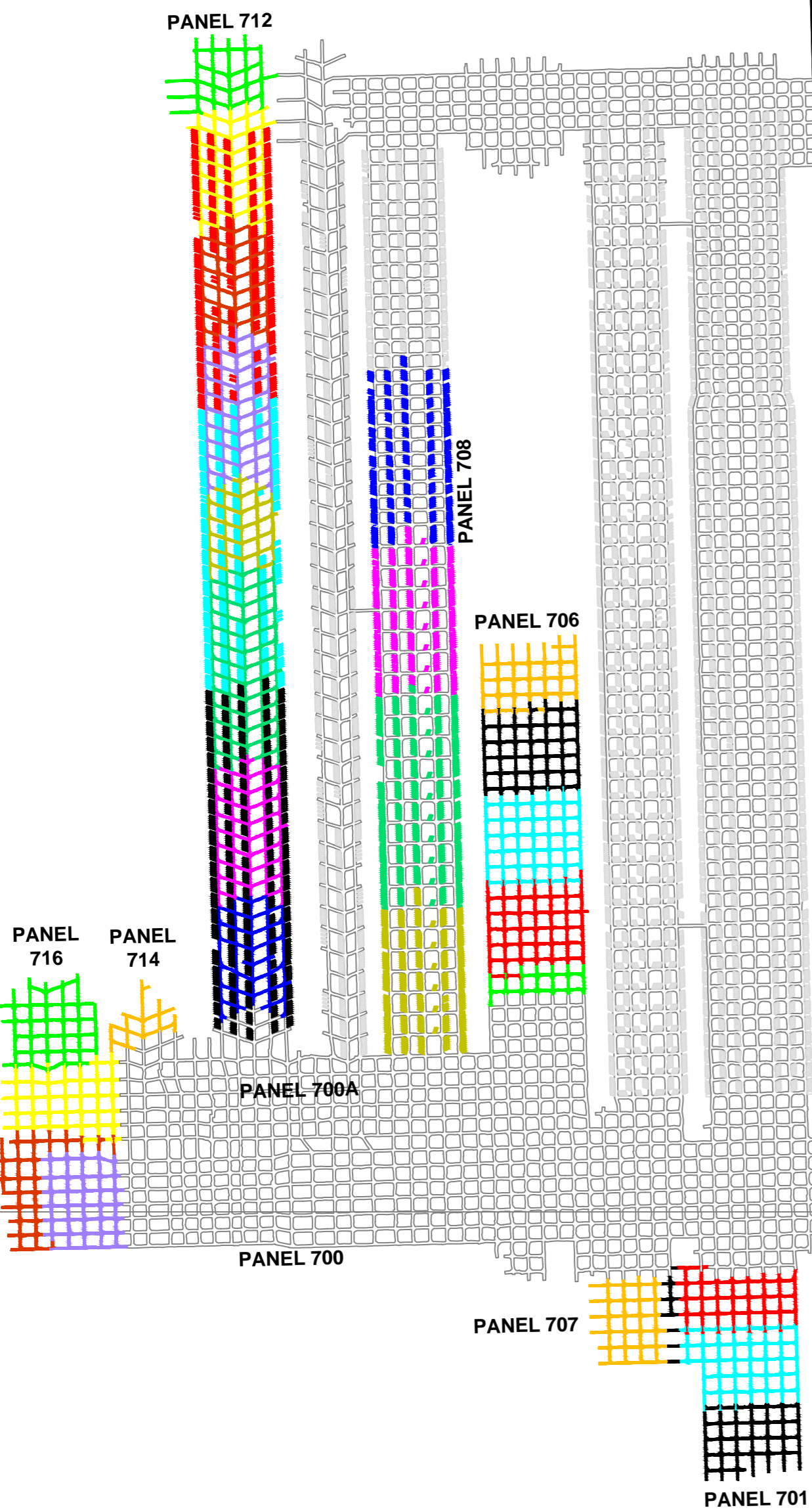
ML
1354

E 245 000

ML1353

N 6 300 000

ML
1583

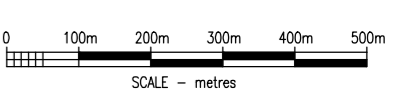
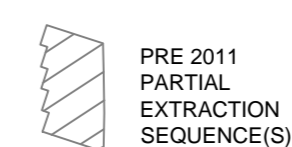


CCL705

N 6 295 000

LEGEND

- JANUARY '10
- FEBRUARY '10
- MARCH '10
- APRIL '10
- MAY '10
- JUNE '10
- JULY '10
- AUGUST '10
- SEPTEMBER '10
- OCTOBER '10
- NOVEMBER '10
- DECEMBER '10



UNDERGROUND
MINE
ENTRANCES

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	6.2.2012
REFERENCE	N:\SHARED\PLANS\ENVIRONMENTAL\AEMR\2012\WORKINGS_2011
SCALE	AS SHOWN

DEVELOPMENT AND
EXTRACTION WORKINGS
FOR 2011



DRG. No. CL847



E 245 000

ML 1354

ML1353

ML 1583

N 6 300 000

ML 1583

N 6 295 000

PANEL 714

PANEL 706

PANEL 700

PANEL 707

PANEL 701

PANEL 801

PANEL 808

PANEL 810

PANEL 812

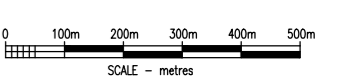
PANEL 313

PANEL 800

CCL705

LITHGOW WATER SUPPLY

UNDERGROUND MINE ENTRANCES



LEGEND

-  DEVELOPMENT ONLY
-  DEVELOPMENT & EXTRACTION
-  PRESCRIBED DAM BOUNDARY

-  FIRST WORKINGS ONLY
-  DSC APPROVAL BOUNDARY

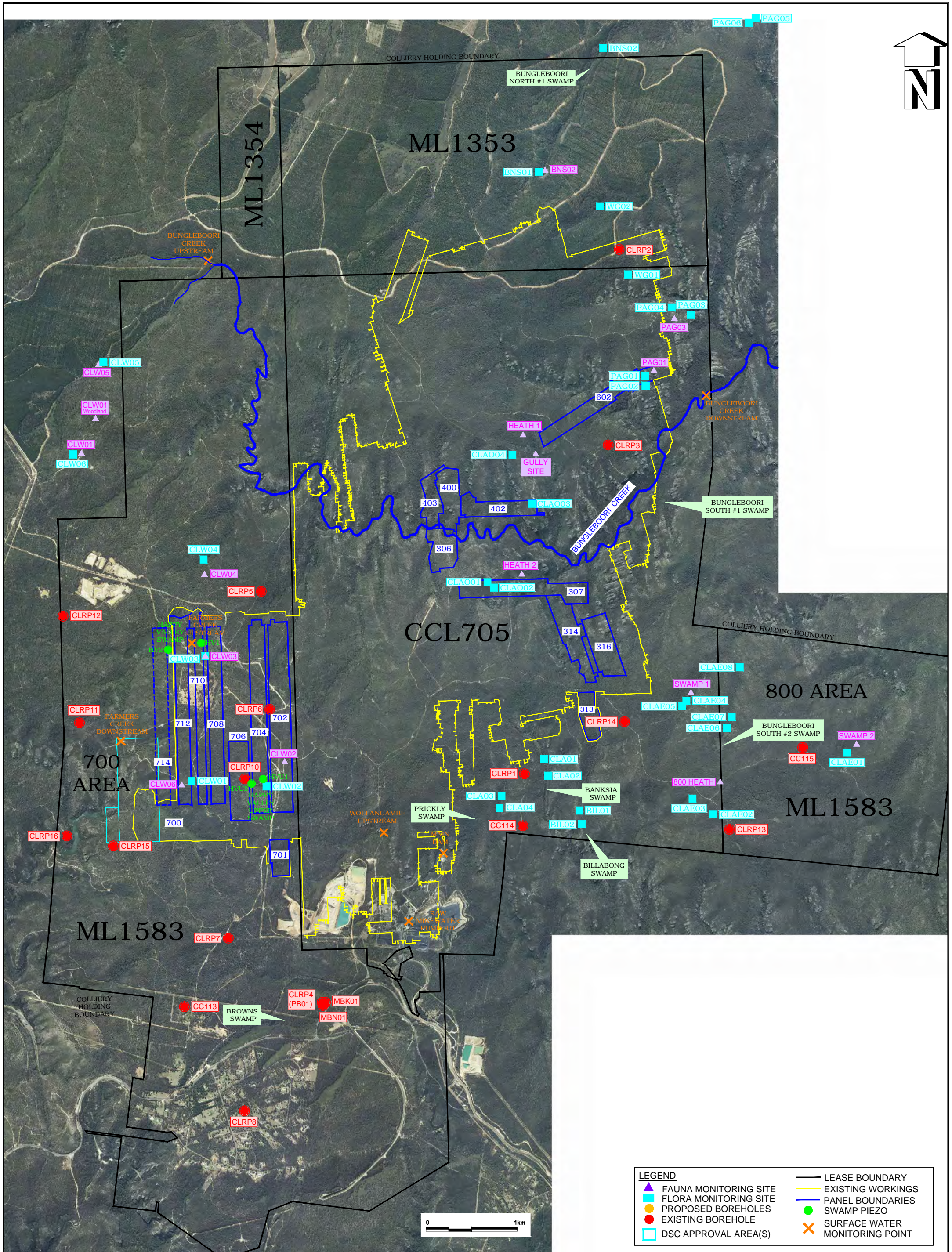
NOTE: The workings and scale shown on this plan are indicative only
 Mine workings pre 2005 - refer to hard copy Mine Working Plan (in I.S.G.format)
 Current mine workings - refer to digital mine working plan

DATE	21.2.2012
REFERENCE	N:\SHARED\PLANS\ENVIRONMENTAL\AEMR\2012\PROPOSED_WORKINGS_2012
SCALE	AS SHOWN

PLAN 4
PROPOSED DEVELOPMENT AND EXTRACTION WORKINGS FOR 2012



DRG. No. CL848



LEGEND	
	FAUNA MONITORING SITE
	FLORA MONITORING SITE
	EXISTING BOREHOLE
	DSC APPROVAL AREA(S)
	LEASE BOUNDARY
	EXISTING WORKINGS
	PANEL BOUNDARIES
	SWAMP PIEZO
	SURFACE WATER MONITORING POINT

DATE	21.11.2011
REFERENCE	N:\SHARED\PLANS\ENVIRONMENTAL\PANEL_EXTRACTION_MONITORING
SCALE	AS SHOWN

COMBINED SURFACE MONITORING POINTS



THIS DRAWING IS THE PROPERTY OF CLARENCE COLLIERY PTY. LTD.

DRG. No. **CL618**



● WOLLANGAMBE
UPSTREAM

● MAIN
DAM

● LD1

● DM2

● LD3

● LD2

● RAW
MINEWATER

● LD4

COLLIERY HOLDING
BOUNDARY

● DM3

● DM1

0 200m
SCALE - metres

DATE	28.2.2012
REFERENCE	N:\SHARED\PLANS\ENVIRONMENTAL\CLARENCE_MONITORING
SCALE	AS SHOWN

CLARENCE COLLIERY PIT TOP MONITORING LOCATIONS

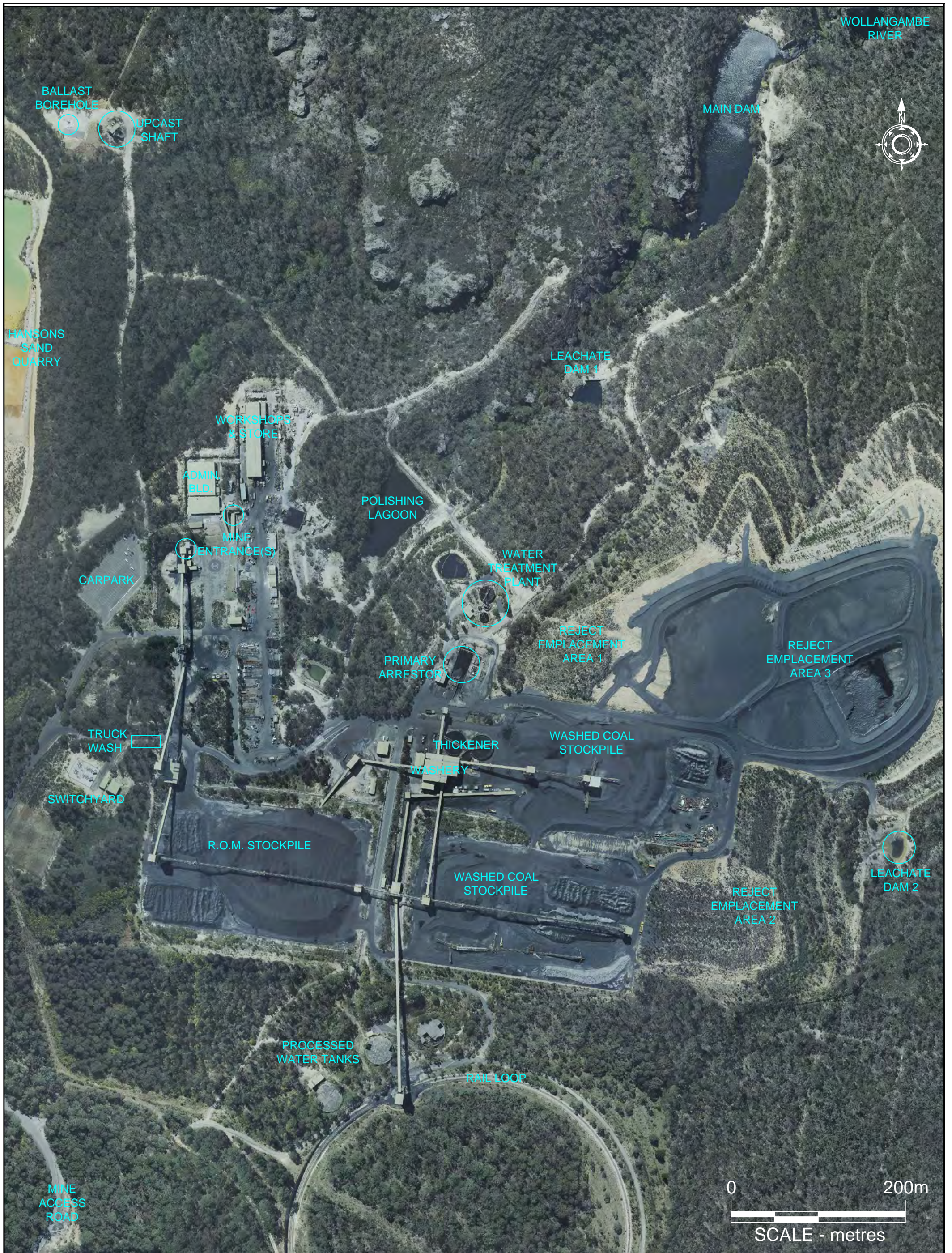
- DUST MONITORING SITE(S)
- TSP & PM10 MONITORING SITE
- WATER MONITORING SITE(S)
- WEATHER STATION
- ▲ NOISE MONITORING SITE



**Clarence
Colliery**

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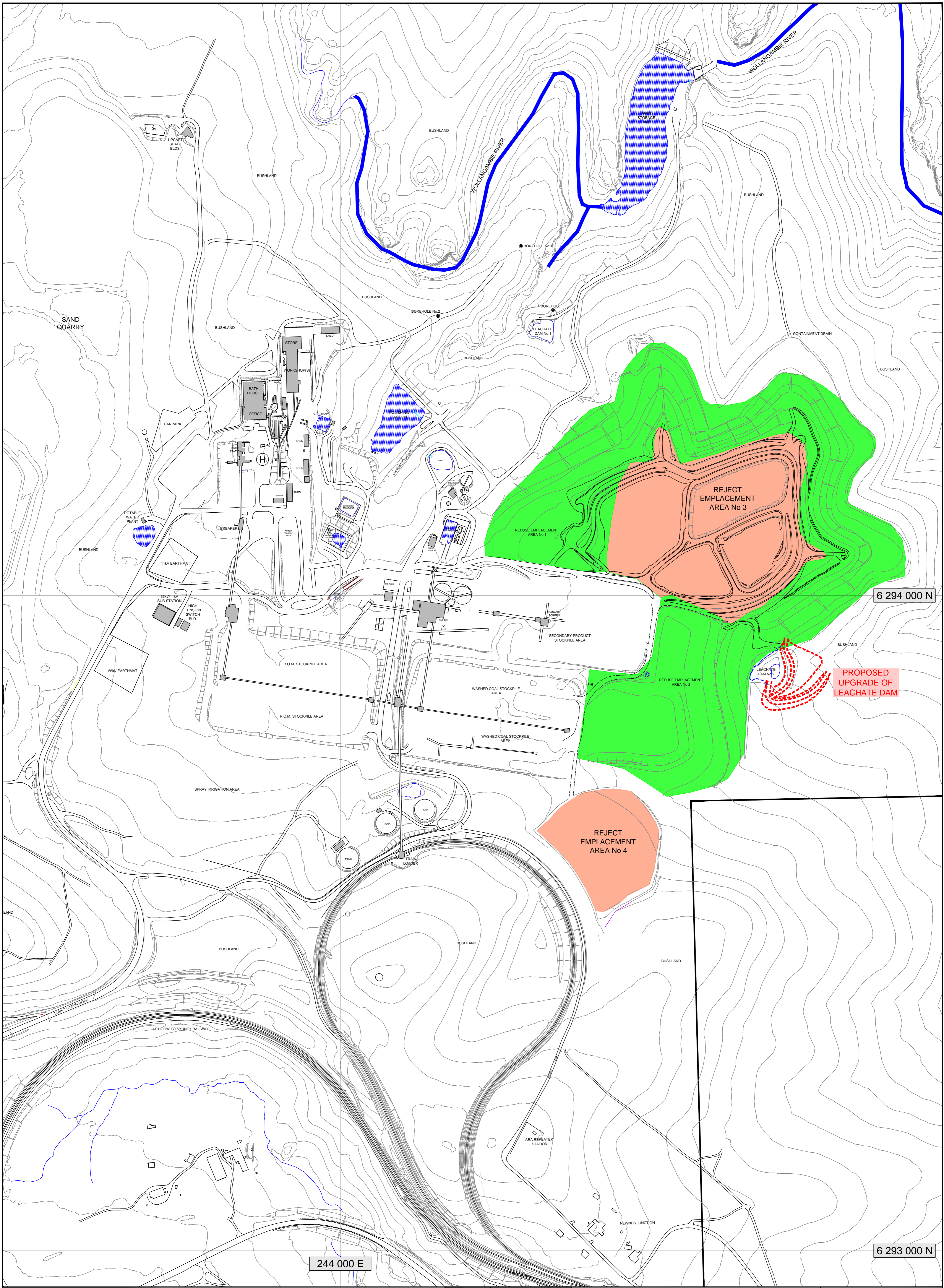
DRG. No. CL126



DATE	9.12.2010
REFERENCE	
N:\SHARED\PLANS\ENVIRONMENTAL\AERIAL_A3_CL5a	
SCALE	AS SHOWN

PLAN 1A
AERIAL VIEW OF SURFACE FACILITIES

	Clarence Colliery
	<small>THIS DRAWING IS THE PROPERTY OF CLARENCE COLLIERY PTY. LTD.</small>
DRG. No.	CL5a



	REHABILITATED		COLLIERY HOLDING BOUNDARY
	ACTIVE REJECT EMPLACEMENT AREA		

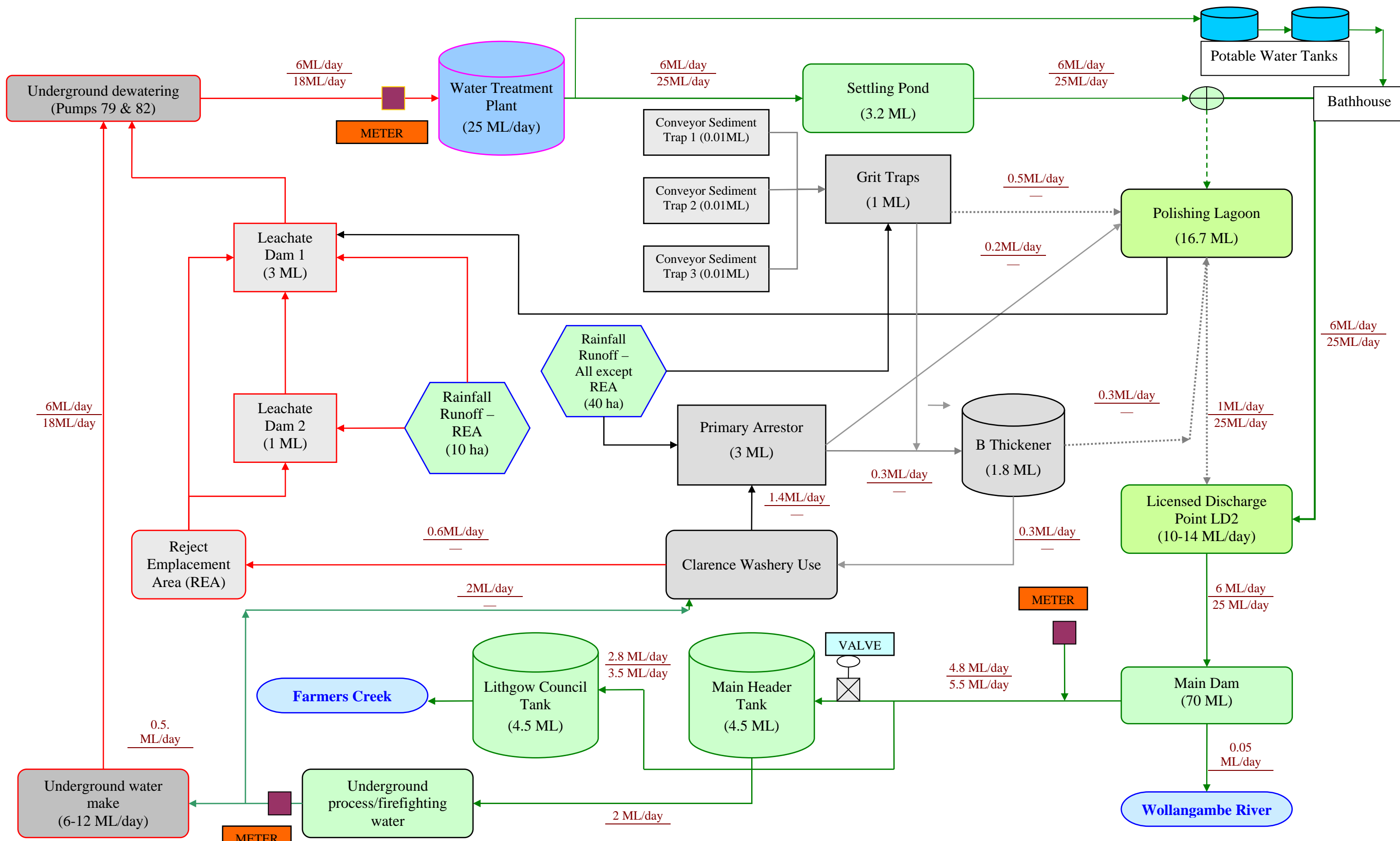
NOTE:
 1. Surface features - digital plan from previous MOP
 2. Sand Quarry - boundary indicative only
 3. Co-ordinates - M.G.A. Zone 56 / Contours - A.H.D.
 4. Scale shown indicative only - do not scale from plan
 5. REA No4 area shown has been surveyed by colliery surveyors

DATE	20.2.2012
N:\SHARED\PLANS\ENVIRONMENTAL\AEMR\2012\PLAN7_REHAB	
0 50m 100m	
SCALE 1:2,500	

PLAN 7

PLAN SHOWING SURFACE REHABILITATION FOR 2011

	Centennial Coal Clarence
THIS DRAWING IS THE PROPERTY OF CLARENCE COLLIERY PTY. LTD.	
DRG. No.	CL851



LEGEND

- Water with dissolved metals
 - Water with coal fines
 - Primary treated water
 - Secondary treated water
 - Clean water
- | | |
|----------------|---|
| $\frac{6}{25}$ | Normal Flow (ML/day)
Maximum Flow (ML/day) |
|----------------|---|

APPENDIX 2 CENTENNIAL COAL ENVIRONMENT AND COMMUNITY POLICY



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

APPENDIX 3 APPROVALS AND LICENSES

Development Consent DA 504-00

Environment Protection Licence No.726

(EPL valid from 10th December 2010 to 19th December 2011)

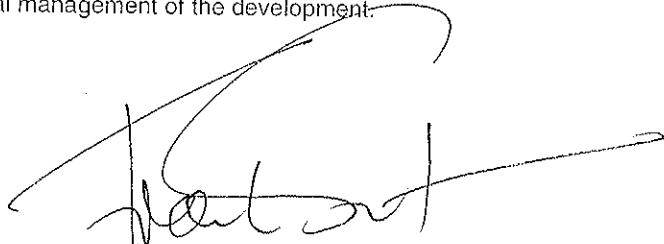
Development Consent

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, 19th Dec 2005

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 <i>Environmental Planning and Assessment Act 1979</i> , because it involves coal-mining related development that requires a new mining lease under section 63 of the <i>Mining Act 1992</i> .
Integrated Development:	The proposal is classified as integrated development, under section 91 of the <i>Environmental Planning and Assessment Act 1979</i> , because it requires additional approvals under the: <ul style="list-style-type: none">• <i>Protection of the Environment Operations Act 1997</i>; and• <i>Water Act 1912</i>.
Designated Development:	The proposal is classified as designated development, under section 77A of the <i>Environmental Planning and Assessment Act 1979</i> , because it is for an underground coal mine, and consequently meets the criteria for designated development in schedule 3 of the <i>Environmental Planning and Assessment Regulation 2000</i> .

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*.

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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
DEC	Department of Environment and Conservation
Department	Department of Planning
Director-General	Director-General of the Department of Planning, or delegate
DNR	Department of Natural Resources
DPI	Department of Primary Industries
EIS	Environmental Impact Statement
EP&A Act	<i>Environmental Planning and Assessment Act 1979</i>
EP&A Regulation	<i>Environmental Planning and Assessment Regulation 2000</i>
Evening	Evening is defined as the period from 6pm to 10pm
GTA	General Term of Approval
Land	Land means the whole of a lot in a current plan registered at the Land Titles Office at the date of this consent
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
Privately-owned land	Land excluding land owned by a mining company, where a private agreement does not exist between the Applicant and the land owner
ROM Coal	Run-of-mine coal
RTA	Roads and Traffic Authority
SCA	Sydney Catchment Authority
Site	Land to which the DA applies
Supplementary Report	Report titled <i>Variation to Development Application No.504-00 and Supplementary Information</i> , 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; and
 - (d) conditions of this consent.
3. If there is any inconsistency between the above, the most recent document or the conditions of this consent shall prevail to the extent of the inconsistency.
4. The Applicant shall comply with any reasonable requirement/s of the Director-General arising from the Department's assessment of:
 - (a) any reports, plans or correspondence that are submitted in accordance with this consent; and
 - (b) the implementation of any actions or measures contained in these reports, plans or correspondence.

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 per year by road. The Applicant shall not cause any truck movements through the City of Lithgow without the prior approval of the Council, to the satisfaction of the Director-General.

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 DPI 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 DPI.

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 DPI, SCA and the Director-General 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, DEC, DNR 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 Director-General.

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 Director-General

Water Management Plan

6. Within 12 months of the date of this consent, the Applicant shall prepare and subsequently implement a Water Management Plan for the mine in consultation with Council, SCA, DEC, DPI, and to the satisfaction of the Director-General. 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.

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.

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 DEC, and to the satisfaction of the Director-General. 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 Director-General and DEC.
- (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 $L_{Aeq(15 min)}$ noise limits in the above table. Where it can be demonstrated that direct measurement of noise from the development is impractical, the DEC 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 DEC, and to the satisfaction of the Director-General. The plan shall include:
- a noise monitoring protocol for evaluating compliance with the noise impact assessment criteria;
 - 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
 - a protocol for the investigation, notification, and mitigation of identified exceedances of the noise impact assessment criteria.

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 DEC and the Director-General.

TRAFFIC & TRANSPORT

Road Haulage

18. The Applicant shall ensure that all loaded vehicles entering or leaving the site are covered.
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.

VISUAL IMPACT

20. The Applicant shall minimise the visual impacts of the development to the satisfaction of the Director-General.

Lighting Emissions

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

WASTE MINIMISATION

24. The Applicant shall minimise the amount of waste generated by the development to the satisfaction of the Director-General.

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, DPI, SCA and DEC, and to the satisfaction of the Director-General. 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.

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 Director-General 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 Director-General is satisfied that an independent review is warranted, the Applicant shall within 3 months of the Director-General 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 Director-General, 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 Director-General and landowner a copy of the independent review.
3. If the independent review determines that the development is complying with the relevant criteria in schedule 3, then the Applicant may discontinue the independent review with the approval of the Director-General.
 4. If the independent review determines that the development is not complying with the relevant criteria in schedule 3, and that the mine is primarily responsible for this non-compliance, then the Applicant shall:
 - (a) take all practicable measures, in consultation with the landowner, to ensure that the development complies with the relevant criteria; and
 - (b) conduct further monitoring to determine whether these measures ensure compliance; or
 - (c) secure a written agreement with the landowner to allow exceedances of the relevant criteria in schedule 3;to the satisfaction of the Director-General.

If the additional monitoring referred to above subsequently determines that the development is complying with the relevant criteria in schedule 3, then the Applicant may discontinue the independent review with the approval of the Director-General.

If the Applicant is unable to finalise an agreement with the landowner, then the Applicant or landowner may refer the matter to the Director-General for resolution.

If the matter cannot be resolved within 21 days, the Director-General shall refer the matter to an Independent Dispute Resolution Process (see Appendix 3).

5. If the independent review determines that the development is not complying with the relevant criteria in schedule 3, but that several mines/extractive industries are responsible for this non-compliance, then the Applicant shall, with the agreement of the landowner and other mines/extractive industries, prepare and implement a Cumulative Impact Management Plan to the satisfaction of the Director-General. This plan must provide details of the joint approach to be adopted by the Applicant and other mines/extractive industries to manage cumulative impacts at the landowner's dwelling.

If the Applicant is unable to finalise an agreement with the landowner and/or other mines/extractive industries, and/or prepare a Cumulative Impact Management Plan, then the Applicant or landowner may refer the matter to the Director-General for resolution.

If the matter cannot be resolved within 21 days, the Director-General shall refer the matter to an Independent Dispute Resolution Process (see Appendix 3).

6. If the landowner disputes the results of the independent review, either the Applicant or the landowner may refer the matter to the Director-General for resolution.

If the matter cannot be resolved within 21 days, the Director-General shall refer the matter to an Independent Dispute Resolution Process (see Appendix 3).

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 Director-General. 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 Director-General'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 Director-General. 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 Director-General.

ANNUAL REPORTING

5. The Applicant shall prepare and submit an AEMR to the Director-General 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.

INDEPENDENT ENVIRONMENTAL AUDIT

6. Within 5 years of the date of this consent, and every 5 years thereafter, unless the Director-General 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 Director-General;
 - (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 Director-General.
8. Within 3 months of commissioning the Independent Environmental Audit, the Applicant shall submit a copy of the audit report to the Director-General, 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 Director-General in consultation with the Council;
 - (b) be chaired by an independent chairperson, whose appointment has been approved by the Director-General;
 - (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 Director-General 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 Director-General.

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 Director-General.

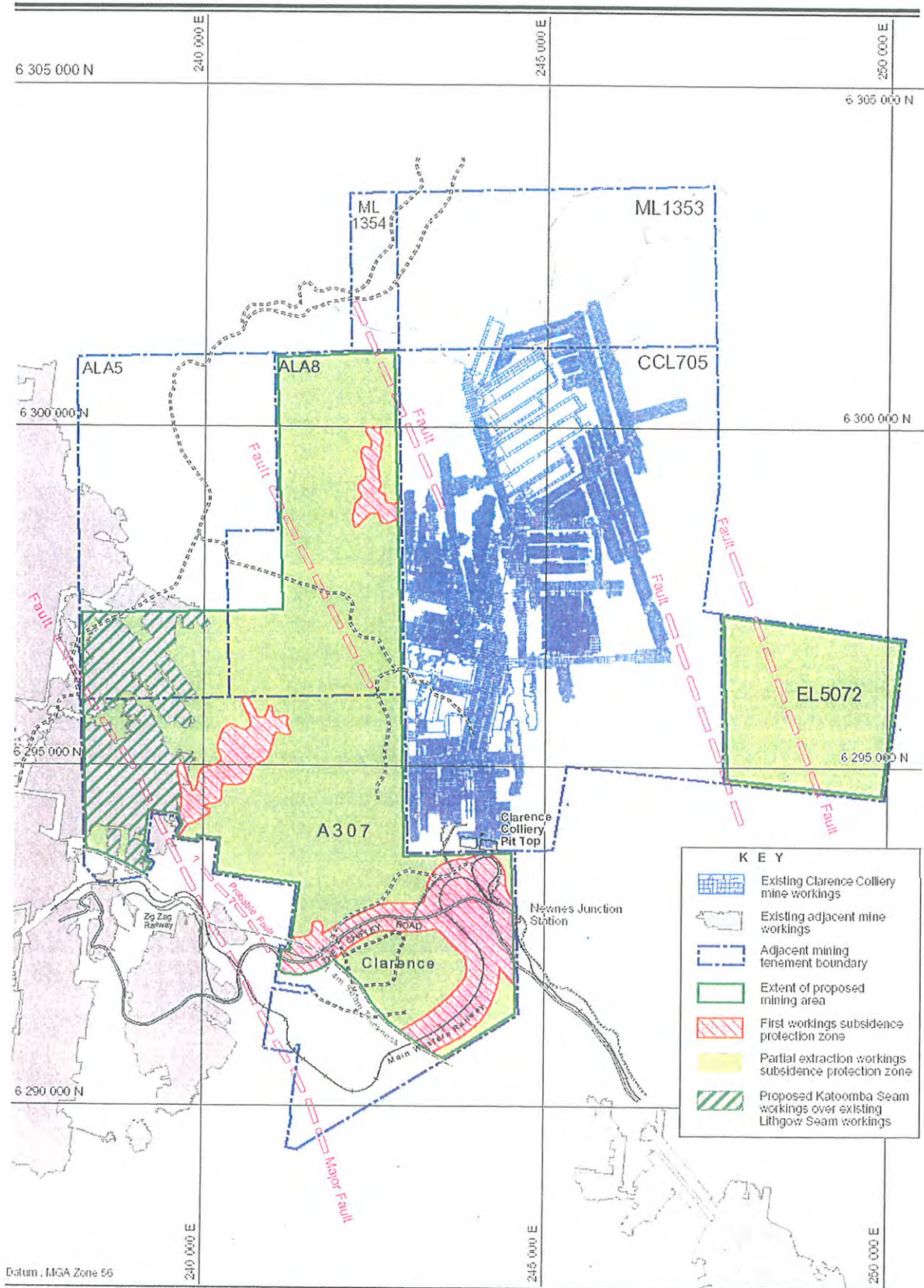
Note: The Applicant's environmental management plans/protocols should specify the reporting provisions for each environmental aspect.

**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

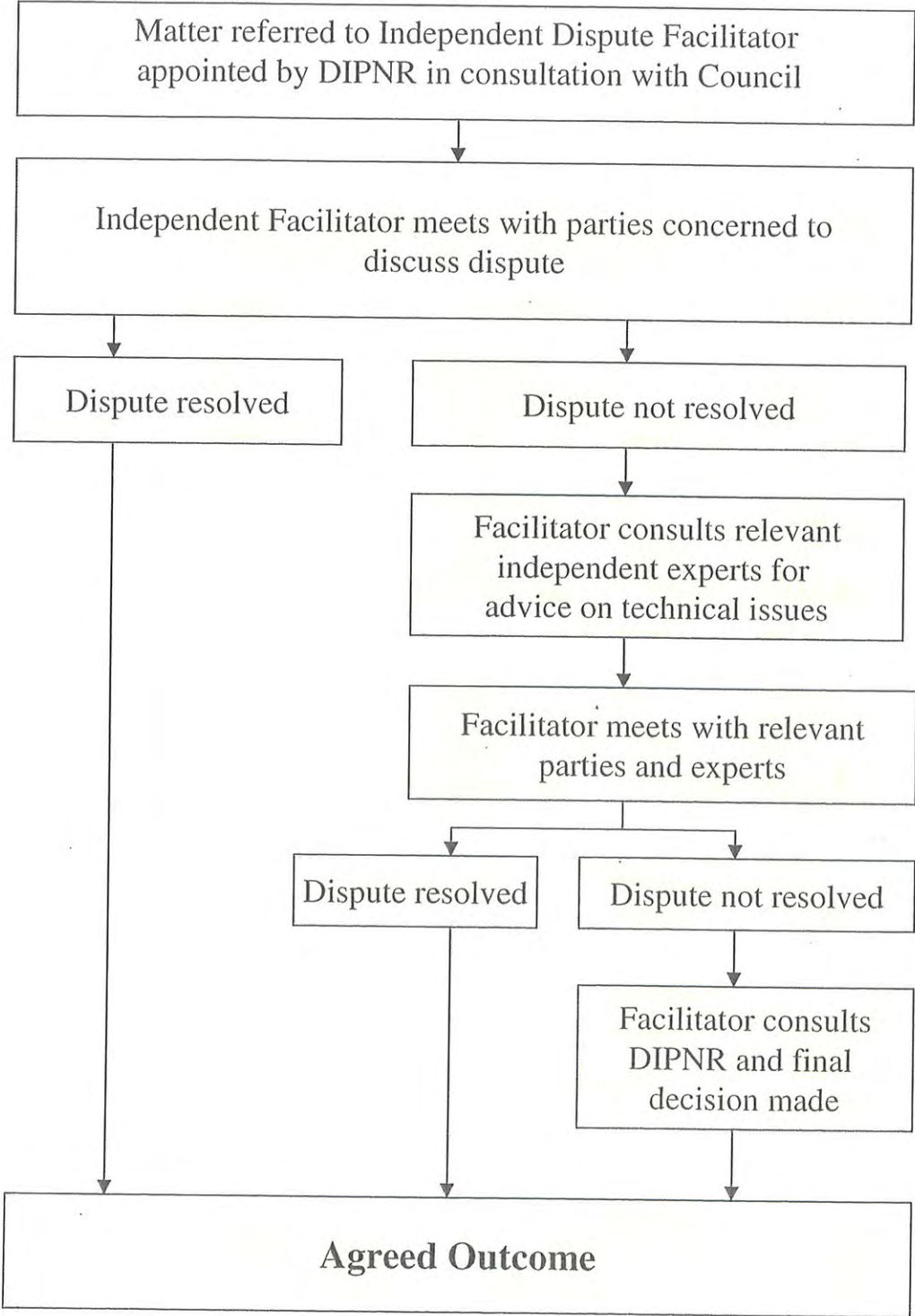
**APPENDIX 2
MINE PLAN AND SUBSIDENCE PROTECTION ZONES**



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

APPENDIX 3
INDEPENDENT DISPUTE RESOLUTION PROCESS

**Independent Dispute Resolution Process
(Indicative only)**



Environment Protection Licence

Licence - 726



Environment,
Climate Change
& Water

Licence Details

Number:	726
Anniversary Date:	01-January
Review Due Date:	10-Sep-2014

Licensee

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

Licence Type

Premises

Premises

CLARENCE COLLIERY
OFF BELLS LINE OF ROAD
NEWNES JUNCTION NSW 2790

Scheduled Activity

Mining for coal
Coal works

Fee Based Activity

Mining for coal
Coal works

Scale

> 2000000 - 3500000 T produced
> 2000000 - 5000000 T loaded

Region

North West - 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



Environment,
Climate Change
& Water

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Environment Protection Licence



Licence - 726

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Information about this licence

Dictionary

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

Responsibilities of licensee

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

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

Variation of licence conditions

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

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

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

Duration of licence

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

Licence review

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

Fees and annual return to be sent to the EPA

For each licence fee period you must pay:

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

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.

1 Administrative conditions

A1 What the licence authorises and regulates

A1.1 Not applicable.

A1.2 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
Mining for coal
Coal works

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

A1.3 Not applicable.

A2 Premises 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 , ML1354 & ML1583

A3 Other activities

A3.1 Not applicable.

A4 Information supplied to the EPA

A4.1 Works and activities must be carried out in accordance with the proposal contained in the licence application, except as expressly provided by a condition of this licence.

In this condition the reference to "the licence application" includes a reference to:

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

2 Discharges to air and water and applications to land

P1 Location of monitoring/discharge points and areas

P1.1 Not applicable.

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

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

Water and land

EPA identification no.	Type of monitoring point	Type of discharge point	Description of location
1	Discharge to waters Discharge quality monitoring	Discharge to waters Discharge quality monitoring	Point identified as "001" on map of premises supplied with the Licence Information Form dated 19 January 2000
2	Discharge to waters Discharge quality monitoring	Discharge to waters Discharge quality monitoring	Point identified as "002" on map of premises supplied with the Licence Information Form dated 19 January 2000
3	Discharge to waters Discharge quality monitoring	Discharge to waters Discharge quality monitoring	Point identified as "003" on map of premises supplied with the Licence Information Form dated 19 January 2000
4	Discharge to waters Discharge quality monitoring	Discharge to waters Discharge quality monitoring	Point identified as "004" on map of premises supplied with the Licence Information Form dated 19 January 2000

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 Load limits

L2.1 Not applicable.

L2.2 Not applicable.

L3 Concentration limits

L3.1 For each monitoring/discharge point or utilisation area specified in the table\ 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.

L3.2 Where a pH quality limit is specified in the table, the specified percentage of samples must be within the specified ranges.

- L3.3 To avoid any doubt, this condition does not authorise the pollution of waters by any pollutant other than those specified in the table\.

Water and Land

POINTS 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				0.05
Boron	milligrams per litre				1
Cadmium	milligrams per litre				0.01
Chloride	milligrams per litre				250
Copper	milligrams per litre				1.0
Lead	milligrams per litre				0.05
Mercury	milligrams per litre				0.001
Oil and Grease	milligrams per litre				20
pH	pH				6.5-8.5
Selenium	milligrams per litre				0.01
Silver	milligrams per litre				0.05
Sulfate	milligrams per litre				250
Zinc	milligrams per litre				5.0
Chromium (hexavalent)	milligrams per litre				0.05
Fluoride	milligrams per litre				1.5
Total suspended solids	milligrams per litre				30
Filterable iron	milligrams per litre				0.3
Filterable manganese	milligrams per litre				0.5

L4 Volume and mass limits

- L4.1 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

- L4.2 Notwithstanding the volume limits specified in condition L4.1, the combined volume discharged from point(s) 2 may exceed 25,000 kL/day on any day that that greater than 10 mm of rainfall is recorded at the premises, for that day.

L5 Waste

L5.1 Not applicable.

L6 Noise Limits

L6.1 Not applicable.

4 Operating conditions

O1 Activities must be carried out in a competent manner

O1.1 Licensed activities must be carried out in a competent manner.

This includes:

- (a) the processing, handling, movement and storage of materials and substances used to carry out the activity; and
- (b) the treatment, storage, processing, reprocessing, transport and disposal of waste generated by the activity.

O2 Maintenance of plant and equipment

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

O3 Dust Control

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.

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:

*Water and Land***POINTS 1,2,3,4**

Pollutant	Units of measure	Frequency	Sampling Method
Arsenic	milligrams per litre	Special Frequency 1	Grab sample
Boron	milligrams per litre	Special Frequency 1	Grab sample
Cadmium	milligrams per litre	Special Frequency 1	Grab sample
Chloride	milligrams per litre	Monthly during discharge	Grab sample
Chromium (hexavalent)	milligrams per litre	Special Frequency 1	Grab sample
Copper	milligrams per litre	Special Frequency 1	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	Special Frequency 1	Grab sample
Lead	milligrams per litre	Special Frequency 1	Grab sample
Mercury	milligrams per litre	Special Frequency 1	Grab sample
Oil and Grease	milligrams per litre	Monthly during discharge	Grab sample
Selenium	milligrams per litre	Special Frequency 1	Grab sample
Silver	milligrams per litre	Special Frequency 1	Grab sample
Sulfate	milligrams per litre	Special Frequency 1	Grab sample
Total manganese	milligrams per litre	Monthly during discharge	Grab sample
Total suspended solids	milligrams per litre	Monthly during discharge	Grab sample
Zinc	milligrams per litre	Special Frequency 1	Grab sample
pH	pH	Monthly during discharge	Grab sample

Note: In relation to condition M2.1, "Special Frequency 1" means quarterly during discharge.

M3 Testing methods - concentration limits

M3.1 Not applicable.

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

M4 Recording of pollution complaints

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- M4.1 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.
- M4.2 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.
- M4.3 The record of a complaint must be kept for at least 4 years after the complaint was made.
- M4.4 The record must be produced to any authorised officer of the EPA who asks to see them.

M5 Telephone complaints line

- M5.1 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.
- M5.2 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.
- M5.3 Conditions M5.1 and M5.2 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.

M6 Requirement to monitor volume or mass

- M6.1 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.

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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: In relation to condition M6.1, "Special Method 1" means inline bubble metre instrumentation.

6 Reporting conditions**R1 Annual return documents****What documents must an Annual Return contain?**

- R1.1 The licensee must complete and supply to the EPA an Annual Return in the approved form comprising:
- a Statement of Compliance; and
 - a Monitoring and Complaints Summary.
- A copy of the form in which the Annual Return must be supplied to the EPA accompanies this licence. Before 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.

Period covered by Annual Return

- 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:
- 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
 - 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.

Deadline for Annual Return

- 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').

Notification where actual load can not be calculated

- R1.6 Not applicable.

Licensee must retain copy of Annual Return

- R1.7 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.

Certifying of Statement of Compliance and signing of Monitoring and Complaints Summary

- R1.8 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.
- R1.9 A person who has been given written approval to certify a certificate of compliance under a licence issued under the Pollution Control Act 1970 is taken to be approved for the purpose of this condition until the date of first review of this licence.

R2 Notification of environmental harm

Note: The licensee or its employees must notify the EPA of incidents causing or threatening material harm to the environment as soon as practicable after the person becomes aware of the incident in accordance with the requirements of Part 5.7 of the Act.

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

- R2.2 The licensee must provide written details of the notification to the EPA within 7 days of the date on which the incident occurred.

R3 Written report

- R3.1 Where an authorised officer of the EPA suspects on reasonable grounds that:
- (a) where this licence applies to premises, an event has occurred at the premises; or
 - (b) where this licence applies to vehicles or mobile plant, an event has occurred in connection with the carrying out of the activities authorised by this licence,
- and the event has caused, is causing or is likely to cause material harm to the environment (whether the harm occurs on or off premises to which the licence applies), the authorised officer may request a written report of the event.
- R3.2 The licensee must make all reasonable inquiries in relation to the event and supply the report to the EPA within such time as may be specified in the request.
- R3.3 The request may require a report which includes any or all of the following information:
- (a) the cause, time and duration of the event;
 - (b) the type, volume and concentration of every pollutant discharged as a result of the event;
 - (c) the name, address and business hours telephone number of employees or agents of the licensee, or a specified class of them, who witnessed the event;
 - (d) the name, address and business hours telephone number of every other person (of whom the licensee is aware) who witnessed the event, unless the licensee has been unable to obtain that information after making reasonable effort;
 - (e) action taken by the licensee in relation to the event, including any follow-up contact with any complainants;
 - (f) details of any measure taken or proposed to be taken to prevent or mitigate against a recurrence of such an event; and
 - (g) any other relevant matters.
- R3.4 The EPA may make a written request for further details in relation to any of the above matters if it is not satisfied with the report provided by the licensee. The licensee must provide such further details to the EPA within the time specified in the request.

General conditions

G1 Copy of licence kept at the premises

- 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.

Pollution studies and reduction programs

U1.1 Not applicable.

Special conditions

E1.1 Not applicable.

Dictionary

General Dictionary

In this licence, unless the contrary is indicated, the terms below have the following meanings:

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 1998
AM	Together with a number, means an ambient air monitoring method of that number prescribed by the <i>Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales</i> .
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 1998
assessable pollutants	Has the same meaning as in the Protection of the Environment Operations (General) Regulation 1998
BOD	Means biochemical oxygen demand



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CEM	Together with a number, means a continuous emission monitoring method of that number prescribed by the <i>Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales</i> .
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 1998.
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 (non-putrescible)	Has the same meaning as in Part 3 of Schedule 1 of the Protection of the Environment Operations Act 1997
general solid waste (putrescible)	Has the same meaning as in Part 3 of Schedule 1 of the Protection of the Environment 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 described at the front of this licence
load calculation protocol	Has the same meaning as in the Protection of the Environment Operations (General) Regulation 1998
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 for water pollution	Has the same meaning as in the Protection of the Environment Operations Act 1997

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[or water pollution]

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 months. 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 <i>Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales</i> .
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 - 10-Dec-2010



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.



Centennial Coal

