



Centennial Coal



2011 ANNUAL ENVIRONMENTAL MANAGEMENT REPORT

Mining Titles/Leases:

CCL704, ML1424, Pt. CCL702

Angus Place

MOP Approval Period	July 2006 – June 2013
AEMR Reporting Period	1 Jan 2011 - 31 Dec 2011
Version	v1
Leaseholder	Centennial Angus Place Pty. Ltd.
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Title	Environmental Officer
Date	29 February 2012



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1. INTRODUCTION

Angus Place and Kerosene Vale Collieries

Angus Place Colliery is situated in the New South Wales western coal field and is owned and operated by Centennial Angus Place Pty Ltd, which exists as a joint venture company between Centennial Coal Pty. Ltd. and SK Kores Pty Ltd, pursuant to the joint venture agreement. Centennial Angus Place Pty Ltd acquired Angus Place Colliery from Powercoal Pty. Ltd. in August 2002.

In 2010, Centennial Coal Ltd was subjected to a successful takeover bid by Banpu Public Company Limited, listed on the Thailand Stock Exchange. Following the acquisition, Centennial Coal Company was delisted and now exists as Centennial Coal Company Pty Ltd, a subsidiary of Banpu Public Limited.

The principle components of the development are an underground longwall mine, associated underground development panels, supporting surface infrastructure (Angus Place pit top), a secondary coal stockpile area situated at the abandoned Newcom Colliery pit top (Kerosene Vale) and dedicated haul roads to Delta Electricity's Wallerawang and Mount Piper Power Stations. The latter is owned privately by Coal>Link Pty. Ltd., however, is operated by Centennial Angus Place under an agreement between the two parties.

Angus Place Colliery is located five kilometres north of the village of Lidsdale, eight kilometres northeast of the township of Wallerawang and 15 kilometres northwest of the city of Lithgow. Angus Place is bordered by Baal Bone Colliery (Xstrata Coal Pty Ltd) and Invincible Colliery (CET Resources Pty Ltd) to the north; Centennial Springvale Coal to the south; and the Wolgan Valley and Newnes State Forest to the north-east. The Angus Place Colliery pit top lies within the Coxs River Catchment, reporting to the Sydney Catchment area; the Colliery Holding Boundary (lease areas) traverses both the Coxs and Wolgan River Catchment areas, the latter of which reports to the Hawkesbury Nepean Catchment.

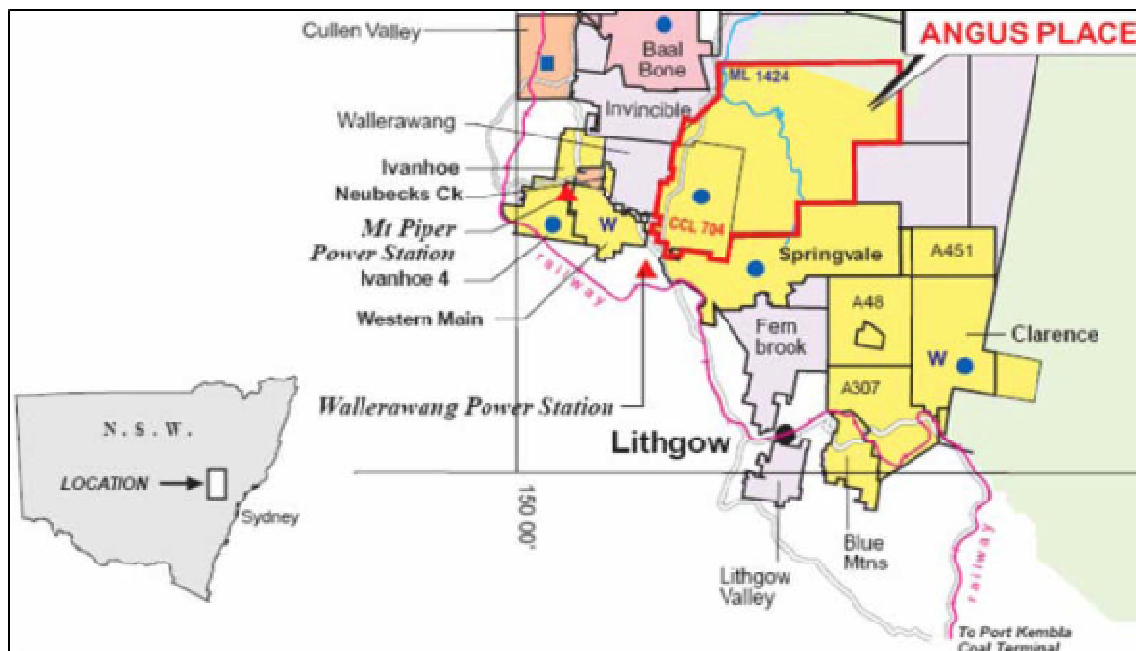


Figure 1: Regional Location of Angus Place

The surface lands adjacent to and above the Angus Place Colliery underground workings are situated on the Newnes State Forest which comprises of narrow gorges with high ridgelines,

steep sided slopes and sandstone cliffs above incised valleys, hilly areas with relatively flat crests and spurs and moderately sloped ephemeral drainage lines. Streams, such as Kangaroo Creek and the Wolgan River and their tributaries can be found in the vicinity.

Angus Place Colliery commenced production in 1979, after being developed as an extension of the Newcom Mine at Kerosene Vale. Coal is extracted from the Lidsdale seam, which exists as a conglomerate with the Lithgow seam. The Lidsdale seam typically exists as the lower three metres of the conglomerate.

The longwall method of mining is utilised at Angus Place Colliery. Longwall mining is a form of underground coal mining where a block (termed a longwall) of coal is mined using a longwall shearer. At Angus Place Colliery the longwall blocks are typically 3km by 300m at an average depth of cover of 300-350m. The longwall mining method is supported by roadway development, mined using a continuous miner unit. Development activities entail the extraction of coal to produce underground roadways and headings, enabling access to future longwall extraction areas. Mains development extraction is undertaken using continuous miner units, which simultaneously allow the installation of roof bolts for roof support.

Coal is currently extracted for domestic power generation only at both Wallerawang and Mount Piper Power Stations. Approximately 225 employees and 75 contractors are employed by Angus Place Colliery, operating across three shifts during the week and two shifts over the weekend enabling continuous operations. In 2011 coal was mined from Longwalls 960 and 970, with a longwall changeover occurring from 5 July 2011 to 24 August 2011. Simultaneous development of the 980 and 910 panels also took place (Appendix 2).

Enforceable Undertaking

The Department of Sustainability, Environment, Water, Population and Communities has conducted an investigation of the impact of Springvale's longwall mining and mine water discharge on Temperate Highland Peat Swamps on Sandstone since 2007.

In early 2010, Centennial Coal commenced discussions with the Department to address the concerns raised by the Department in the course of its investigation. This culminated in Centennial Coal agreeing to enter into an Enforceable Undertaking with the Minister administering the EPBC Act under section 486DA of the Act. As a result, Centennial Coal agreed to an undertaking of \$1.45 million to be paid to the Australian National University for the purpose of a research program.

Commonwealth Colliery

Commonwealth Colliery is legally described as Lot 1 in Deposited Plan (DP) 52865 and Lot 1 in DP 65810 and is located in the Lithgow City Council Local Government Area. The site is currently leased by Angus Place Colliery, situated approximately 3.2 km north east of the site. From an investigation into the history of the site, information obtained suggests that the coal mining operations at Commonwealth Colliery were not limited to the site, and that two larger open cut pits located to the north and west of the site also formed part of the Commonwealth Colliery. The information further indicates that the former Commonwealth Colliery was the first open cut coal mine in NSW, commencing operations in 1940. It is understood that the Federal Government took over Commonwealth Colliery in 1944 in an effort to increase production until mining ceased in the 1950's. The disturbed areas of the Site have since been partially rehabilitated to grassland and pine forest. Further rehabilitation is required to satisfy Industry and Investment NSW requirements.

Vale of Clwydd No 2 Colliery

The Vale of Clwydd No. 2 Colliery is a former mining operation which exists in the western coal field of NSW. The Vale of Clwydd No. 2 Colliery has been partially rehabilitated since its closure however, there are still remnants of various derelict mine buildings present at the site. The mine's development began in 1926 and closed during the Great Depression in 1930. The pit top is located to the west of Wolgan Road, approximately 1km north of the Angus Place pit top.

Appendix 1 Figure 1 illustrates the site and situation of Angus Place Colliery, Kerosene Vale, Commonwealth and Vale of Clwydd Collieries.

Guidelines and Conditions

The 2011 Annual Environmental Management Report (AEMR) has been executed in accordance with the *Guidelines to the Mining, Rehabilitation and Environmental Management Process* (2006). All Plans required under the *Guidelines* are presented in Appendix 2. The 2011 AEMR also complies with the following conditions:

- Schedule 5, Condition 3 of the Angus Place Project Approval (06_0021) granted on 29th August 2011.
- The annual reporting conditions stipulated in the Angus Place Water Licenses which are regulated by the NSW Officer of Water (Condition 2).
- ML1424 Condition 3 *Annual Environmental Management Report*
- CCL 704 Condition 4 *Environment Management Reporting*

1.1 CONSENTS, LEASES, LICENCES AND OTHER APPROVALS

1.1.1 Consents

One Project Approval is applicable to Angus Place Colliery, which was approved by the NSW Department of Planning (DoP) pursuant to a Part 3A application in accordance with the *NSW Environmental Planning and Assessment Act 1979* (EP&A Act). Project Approval (PA) 06_0021 was granted on 13 September 2006 to expand the mining area and increase the production limit to 3.5 million tonnes per annum (Appendix 3). PA 06_0021 is currently due to lapse on 18 August 2024.

In 2010 Angus Place Colliery submitted an application to the DoP requesting to modify Project Approval 06_0021 pursuant to a Section 75W of the EP&A Act. Angus Place Colliery proposed to extend its operations through the development and extraction of two additional longwall panels, as well as development of the nominated supporting surface infrastructure. The project was approved under the NSW Environmental Planning and Assessment Act (1979) on the 29th of August 2011.

In May 2011 an EPBC Referral for 910/900W was submitted to SEWPaC. The proposed action was determined as a controlled action requiring consideration under the EPBC Act. The element of the proposed modification of the existing consent that has potential impact on Matter of National Environmental Significance (MNES) under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) consists of the proposed longwalls. These longwall panels will potentially result in mine subsidence occurring beneath the Endangered Ecological Community (EEC) known as Temperate Highland Pet Swamps on Sandstone (THPSS). The Preliminary documentation was reviewed by Macquarie University and was Submitted to SEWPaC in September 2011. Preliminary Documentation was on Public Exhibition between the 1st and 15th of December 2011. In total, four submissions were received during the exhibition period. A response to the submission was prepared in the remainder of the year. Angus Place will continue to report on the 910/900W project in the 2012 Annual Review.

On the 21st of December 2011 Angus Place submitted an application and briefing paper for the Ventilation Facility Project to Department of Planning and Infrastructure. The colliery received director general requirements for the received Director General requirements for the project on the 18th of January 2012. This will be further reported in the next annual review.

Schedule 5 Condition 8 of the Angus Place Project Approval (PA 06_0021 dated 29th of August 2011) required Angus Place Colliery to commission an independent environmental audit prior to 31 December 2007, and every 3 years thereafter. To this end, URS were commissioned prior to 31 December 2010 to carry out an independent audit of the Angus Place Project Approval granted on the 13th of September 2006. The audit was undertaken from 1 February 2011 to 4 February 2011. The Independent audit found Angus Place to be 74% compliant with Project Approval 06_0021 granted on the 13th of September 2006. In accordance with the Schedule 5, Condition 10 of the modified Project Approval the audit report is available on the company's website.

1.1.2 Leases

The Angus Place holding includes CCL 704 (granted 02/01/1990; period of renewal until 14/01/2023), ML1424 (granted 09/02/1998; period of renewal until 18/08/2024) and part of CCL702 (Plan PC10, Appendix 2). CCL704 and ML1424 are held by Centennial Angus Place Pty. Ltd., after being transferred from Powercoal Pty. Ltd. in 2003. CCL702 is held by Coalpac Pty. Ltd., however, Angus Place Colliery has title to a portion of the lease via a sublease agreement.

The area held by Angus Place under mining title is 10,278 hectares, of which 175 hectares is surface title including colliery pit top and surface infrastructure areas, including the Kerosene Vale site.

On 16 December 2010 Conditional Approval was given for the addition of 29.97 hectares of ML 1326 to the Angus Place Colliery Holding and the simultaneous deletion of this area from the Centennial Springvale Colliery Holding. Subsequent to the approval modification Project Approval 06_0021 pursuant to a Section 75W pathway in accordance with Part 3A of the *Environmental Planning and Assessment Act, 1979*, this area will enable the mining of an additional longwall (Longwall 900 West) and associated gateroads. As reported in Section 1.1.1 Consents, the 910/900W Project has been determined under the NSW Environmental Planning and Assessment Act (1979) as approved on the 29th of August 2011. Currently, Angus Place still requires federal approval for the Proposed Project.

The current Mining Operations Plan (MOP) for Angus Place was approved in June 2007 and has not been varied throughout the reporting period. The MOP describes the mining operations and environmental management for the period 2006-2013 inclusive and is consistent with the approved Subsidence Management Plan commitments, Environment Protection Licence 467 requirements, the Angus Place Project Approval 06_0021 as well as all other relevant environmental legislation applicable to the Colliery.

Subsidence Management Plan

The original Subsidence Management Plan (SMP) application, submitted June 2005, applied for mining activities to be carried out in Longwalls 930-980. Approval for longwall 930 only was granted on 9 December 2005. Variations to the original SMP Approval were as follow:

Table 1: SMP Approval variations

Variation	Description	Approval Date
October 2006	Revisions to the installation position of Longwalls 940 & 950 Revisions to the take-off positions of Longwall 940 to 980 Variation to the gateroad pillar widths	29 December 2006
March 2008	Variation of chain pillar dimension 960 Panel Minor increase in the width of Longwall 960	17th April 2008
March 2009	Variation of the chain pillar width of 970 & 980 Panel Increase in the width of Longwall 970 Decrease in the width of Longwall 980	20th April 2009
March 2010	Minor variation to chain pillar lengths 970 & 980 Panel	25th March 2010

1.1.3 Licences

Environment Protection Licence 467

Centennial Springvale Pty. Ltd. is the licensee of the Angus Place Colliery Environment Protection Licence (EPL) 467, which encompasses the pit top, Kerosene Vale site and emergency licensed discharge point on the Newnes State Forest. EPL 467 appears as Appendix 4. The Licence allows for five utilisation/discharge points and has an anniversary date of 1 January. Variations to the EPL throughout 2011 are documented in Section 3.3.

Water Licences

Angus Place Colliery has three extractive Water Licenses associated with the 930 dewatering borehole (decommissioned), 940 dewatering borehole and the pit top groundwater collection system. All license applications were pursuant to Part 5 of the Water Act 1912 and are regulated by the NSW Office of Water. The extractive bore licenses are summarised in the table below.

Table 2: Dewatering bore licenses

License number	Description	Issue date	Expiry date
10BL601852	930 dewatering bore (decommissioned)	04/09/2007	03/09/2012
10BL601851	940 dewatering bore	04/09/2007	03/09/2012
10BL601838	Groundwater collection system	04/09/2007	03/09/2012

940 dewatering borehole flows are monitored by bore pumping rates, with all water pumped into the Springvale – Delta Water Transfer Scheme during normal operation (Section 3.6.5). The Groundwater Collection System flows are monitored via a weir structure and level sensor situated at LDP001 (Section 3.6.2). Water is discharged offsite to Kangaroo Creek flowing into the Cox’s River.

In addition to the three extractive bore licenses, there are five monitoring bore licenses held by the Colliery. These licenses are associated with the several Newnes Plateau groundwater and multilevel piezometers across the lease area on the Newnes State Forest. During 2011 three applications were submitted to NSW Office of Water (NOW) under Part 5 of the of the Water Act 1912. These applications were for 17 bores as part of the 2011-2012 exploration drilling program, five shallow piezometers within NPSS and a geotechnical investigation shaft. The licence application for the geotechnical investigation shaft is currently being reviewed by NOW. The monitoring bore licenses are summarised in the table below.

Table 3: Monitoring bore licenses

License number	Description	Issue date	Expiry date
10BL601829	Newnes Plateau Groundwater piezometers	04/09/2007	Perpetuity
10BL603236	Piezos AP1PR to AP6PR	28/08/2009	Perpetuity
10BL603802	Piezos AP8PR to AP12PR	03/03/2010	Perpetuity
10BL604512	Licensing of Geological boreholes and groundwater monitoring bores	17/2/2011	Perpetuity
10BL604709	Observation Bores	22/6/2011	Perpetuity

The Groundwater Monitoring Piezometers/boreholes are used to monitor aquifer pressure levels only and do not extract water once installed.

All Water Licenses appear as Appendix 5.

Radiation Licences

During 2011, an inspection of the Angus Place fixed radiation gauge was undertaken by an accredited contractor. Angus Place radiation licence for its Fixed Radiation Gauge (RR11830) was renewed in 2010 and is now scheduled to expire on the 7th July 2012. This licence is granted under the Radiation Control Act 1990.

Angus Place also held a license to sell/possess issued in accordance with the Radiation Control Act 1990 throughout the reporting period (license number 29229). During the reporting period this licence was renewed. The licence now scheduled to expire on 21st January 2014.

1.1.4 Other Approvals

Occupation Permit

The Newnes State Forest is located above the majority of the underground workings. To enable Angus Place Colliery to operate under the forest and to build infrastructure and other surface facilities, an Occupation Permit is required from Forests NSW. Occupation Permit (PB 28362) is held by Angus Place Colliery and this covers all surface facilities

associated with the Colliery that are located on Forests NSW land. Occupation Permit (PB 03797) extends into the Ben Bullen Forest to the west of the pit top.

During 2011, the Angus Place exploration program continued with several boreholes being additionally utilised as groundwater monitoring piezometers. Angus Place will continue to liaise with Forests NSW regarding exploration activities within the Newnes State Forest.

Exploration License

Angus Place Colliery has two approved Exploration Licenses administered by Industry and Investment NSW. Exploration license EL6856 is applicable to majority of the lease area across the Newnes State Forest. EL6293 is applicable to areas surrounding the Wolgan Road. Please refer to Section 2.1 Exploration for specific details of drilling activities undertaken during the 2011 reporting period.

S95 Certificate

An s95 certificate is granted for the hand removal of weeds within Narrow Swamp. A Section 95 certificate was deemed necessary as the weed removal activities are occurring in an Endangered Ecological Community. The certification was issued under the *Threatened Species Conservation Act, 1995* pursuant to Section 95(2). Periodic progress updates on weed removal activities were reported in the four monthly Subsidence Management Status Reports

1.2 MINE CONTACTS

Mine Manager: Mr. Jacques le Roux
Phone (02) 6354 8721
Fax (02) 6355 1493
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Environmental Officer: Miss Natalie Conroy
Phone (02) 6354 8938
Fax (02) 6355 1493
Email natalie.conroy@centennialcoal.com.au

Angus Place Enquires: (02) 6354 8700

Angus Place Community Complaints: (02) 6354 8700

1.3 ACTIONS REQUIRED BY PREVIOUS AEMR REVIEW

Actions required from the previous AEMR review are presented in the table below.

Table 4: Actions Required from the 2010 AEMR

Actions Required	Update/Reference
Subsidence Community Consultation Program (SCCP) was not approved by Industry an Investment. Industry and investment did not have any objections with its content.	Noted. Refer to Section 4.2
Rehabilitation Cost Estimate (RCE) needs to be revised to remove haul roads. Preferable to differentiate coverage of the Kerosene Vale, Vale of Clywdd No2 and Commonwealth Colliery sites.	Haul Roads have been removed from cost estimate. The breakdown of costs associated with Angus Place surface, Kerosene vale, Vale of Clywdd and Commonwealth Colliery have been included in Appendix 10.
Uncontrolled Dirty water management in the area south of the compressor building	<i>Ongoing- A sump was created short term with sediment fences throughout the drainage line . Underground services prevented a sump of adequate size and depth from being established. Dirty water generated from conveyor washing and wash water not being directed into established sumps. Sand bags installed immediately to direct water into sump and drive over humps being established in 2012 to direct wash down water into the sumps located east of the conveyor.</i>
New V drain at the storage area is very shallow	Noted- Water is directed into the wash down and oil separator unit. This will be considered in future drain installations following inspections of underground services.
Some evidence of coal spillage from the ROM stockpile	In 2011 a V-drain was installed to direct stockpile runoff and coal into the CHP runoff. Bund established is considered relatively effective. Angus Place will monitor and maintain surrounding area.

1.4 PLANS REQUIRED UNDER THE GUIDELINES

The table below presents the location of plans required under the DPI-MR AEMR Guidelines for Angus Place, Kerosene Vale, Commonwealth Colliery and Vale of Clwydd (VOC) No 2 Colliery. The majority of operations plans are not required for Kerosene Vale, Commonwealth, and Vale of Clwydd No2 as no mining activities were undertaken at the three sites. During 2011 Kerosene Vale was only utilised as a stockpiling facility.

Table 5: Plans Required under the DPI AEMR 2006 Guidelines

Plan Required	Angus Place Ref N°	Kerosene Vale Ref N°	VOC Ref N°	Commonwealth Ref N°
Mine and Context	Appendix 1, Figure 1	Appendix 1, Figure 1	Appendix 1, Figure 1	Appendix 1, Figure 1
Proposed Mining in 2012	Appendix 2, 6683	Not required	Not required	Not required
Proposed Land Preparation during 2012	Appendix 9, AP6689	Contaminated site assessments to occur	Contaminated site assessments to occur	Contaminated site assessments to occur
Proposed Rehabilitation during 2012	Appendix 9, AP6689	Appendix 9, AP6687	Appendix 9, AP6688	Contaminated site assessments to occur
Plan 6. Final Rehabilitation for Site	Not changed since MOP (not required)	See Appendix 9	See Appendix 9	See Appendix 9

2. OPERATIONS DURING THE REPORTING PERIOD

2.1 EXPLORATION

24 exploration boreholes were drilled across 15 approved exploration sites during the reporting period. The sites were situated across the Angus Place Colliery Holding Boundary and aimed to assess coal seam quality and enable the installation of several piezometers for groundwater monitoring purposes. Approval was sought under Exploration License No. 6856 and was executed in accordance with Division of Mineral Resources guidelines. All exploration sites were situated on the Newnes State Forest off Sunnyside Ridge Road, Black Fellows Hand Trail and Becroft Track.

There are a further 29 boreholes (including a Geotechnical hole) proposed to be drilled over 2012. To gain the maximum benefit from the program, it is proposed that four boreholes will be dual purpose in that they will be equipped with multi-level piezometers to enhance the existing groundwater monitoring program.

2.2 REPORT ON ACTIVITIES PROPOSED IN 2010 AEMR

A significant number of the activities proposed for the 2011 reporting period were carried out during the reporting year. The table below presents the activities that were proposed

by Angus Place to be carried out during 2011. Section 6 includes the activities proposed for the 2012 reporting period. This section typically details any activities that were not carried out during the 2011 reporting period.

Table 6: Summary of Progress on Activities Proposed for 2011

Activities Proposed during 2011	Progress during 2011
Prepare for and facilitate the independent compliance audit required in accordance with Schedule 5, Condition 5 of the Angus Place Colliery Project Approval 06_0021.	Independent Audit Undertaken in February 2011 with URS Australia. Refer to Section 1.1.1.
An inspection of the stockpile and coal handling plant settling ponds found that water from the stockpile does not enter the CHP settling ponds during heavy rainfall events due to the capacity of the existing system. To change this, it is proposed to design and install a 'v' drain from the stockpile to pond three to direct the higher volumes of runoff.	V Drain installed in September 2011 to direct dirty water runoff from the stockpile into settling pond. Refer to Section 2.8.
Meet the requirements of the EP&A Act to finalise the 75W Modification Project.	Project was determined 29 th of August 2011. Refer to Section 1.1.1
Continue to undertake weed control works around the pit top and within Narrow Swamp in accordance with the S95 certificate.	Weed control works continued to be undertaken throughout 2011. Refer to Section 3.12
Rehabilitation of drill sites on Newnes Plateau following the completion of operations.	Exploration Drill sites on Newnes State Forest rehabilitation progress continued to be monitored throughout 2011. Report sent to Forests NSW June 2011 providing an update rehabilitation of AP1PR to AP12PR which were drilled in 2009 and 2010. Refer to Section 5.2.2
Review outcomes from the Phase 1 Environmental Site Assessment and commission the recommended Phase 2 Environmental Site Assessments.	Phase 2 Environmental Site Assessments were undertaken in 2011 at both the Former Kerosene Vale Site and Vale of Clywdd No 2. Refer to Section 3.8
Review and consider the implementation of actions gained from the Vale of Clwydd No 2 Colliery Heritage Assessment.	Various remnant items found at Vale of Clywdd No 2 site. Proposal received for low maintenance outlining mining history at the site. Further investigations will be conducted following rehabilitation of the site.

Investigate long term sediment control options beyond dosing at LDP003 in addition to proposed rehabilitation activities at Kerosene Vale.	Significant improvement works were undertaken throughout 2011 to improve the management of surface water at the Kerosene Vale Site. Phase 2 Contaminated lands undertaken. Refer to Section 2.1
Expand groundwater monitoring program in terms of additional multi-level piezometers as part of the proposed 2011 exploration program.	During 2011 4 were installed as part of the 2011 exploration program. The installation of piezometers will continue in 2012
Review the outcomes from the commissioned weather station audit scheduled to occur during early 2011. This activity principally aims to ensure compliance with Schedule 3 Condition 23 of the Angus Place Colliery Project Approval 06_0021.	Recommendations from the audit were allocated to an appropriate contractor who upgraded the Angus Place Pit Top meteorological station and the secondary metrological station situated along the Wallerawang haul road in accordance with the approved methods for sampling air pollutants in NSW.
As part of the continued implementation of the site EMS, a comprehensive training and awareness program will be undertaken during 2011 across the Angus Place workforce and staff.	Evolution Program undertaken in 2011. Refer to section 3.1.
It is proposed during 2011 to review the lighting audit undertaken during 2008 to ensure that action undertaken satisfies the requirements of AS/NZ 4282, 1997 <i>Control of the Obstructive Effects of Outdoor Lighting</i> . This will be undertaken in consultation with the Department of Planning to ensure compliance with Schedule 3 Condition 30 of Project Approval 06_0021.	Audit undertaken. Refer to section 3.15

2.3 LAND PREPARATION

Land preparation for mining activities is rare at Angus Place Colliery, as the colliery is an underground mine which tends not to alter in footprint. Despite this there was some minor clearing associated with exploration borehole sites and associated access tracks. Each drill site involved the clearing of approximately 900 m² (excluding access tracks).

Land preparation works for all projects were subject to a Review of Environmental Factors (REF) as per Part 5 of the NSW Environmental Planning and Assessment Act 1979 (EP&A Act). This process combines ecological and archaeological surveys to determine impact levels and recommends appropriate mitigation strategies. Forests NSW and NSW Department of Trade and Investment, Regional Infrastructure and Services (DTRIS) approved the project as per works outlined in the REF. All works were conducted in accordance with the conditions stipulated on the REF and EL6856. These conditions, as

well as an update of project progress, were audited periodically by the site Environmental Officer, with a copy supplied to Forests NSW.

Additionally in 2011 approximately 900 m² was cleared for the construction of a gabion borehole and storage facility following the completion of a due diligence ecological and archaeological survey. The site chosen had undergone numerous historical disturbances such as underscrubbing, construction of an existing concrete borehole, weed invasion, placement of large amounts of earth, and the presence of metal equipment, poly pipes, bore casing and other mining equipment and infrastructure (such as dams and vehicular tracks). This is demonstrated in the Figure 2 below.



Figure 2: Location of Gabion Borehole Facility on Angus Place Pit Top

2.4 CONSTRUCTION

There was no construction for mining activities at Angus Place in the reporting period.

In accordance with Schedule 3, Condition 28 of the modified project approval, the colliery commenced construction of a sealed carpark in accordance with councils parking codes. This carpark is located west of Wolgan road, opposite the collierys current carpark. The carpark was designed to accommodate for 40 cars and will be completed in 2012. The design of the carpark is shown below in Figure 3. An update on the carpark construction will be reported in the 2012 AEMR.

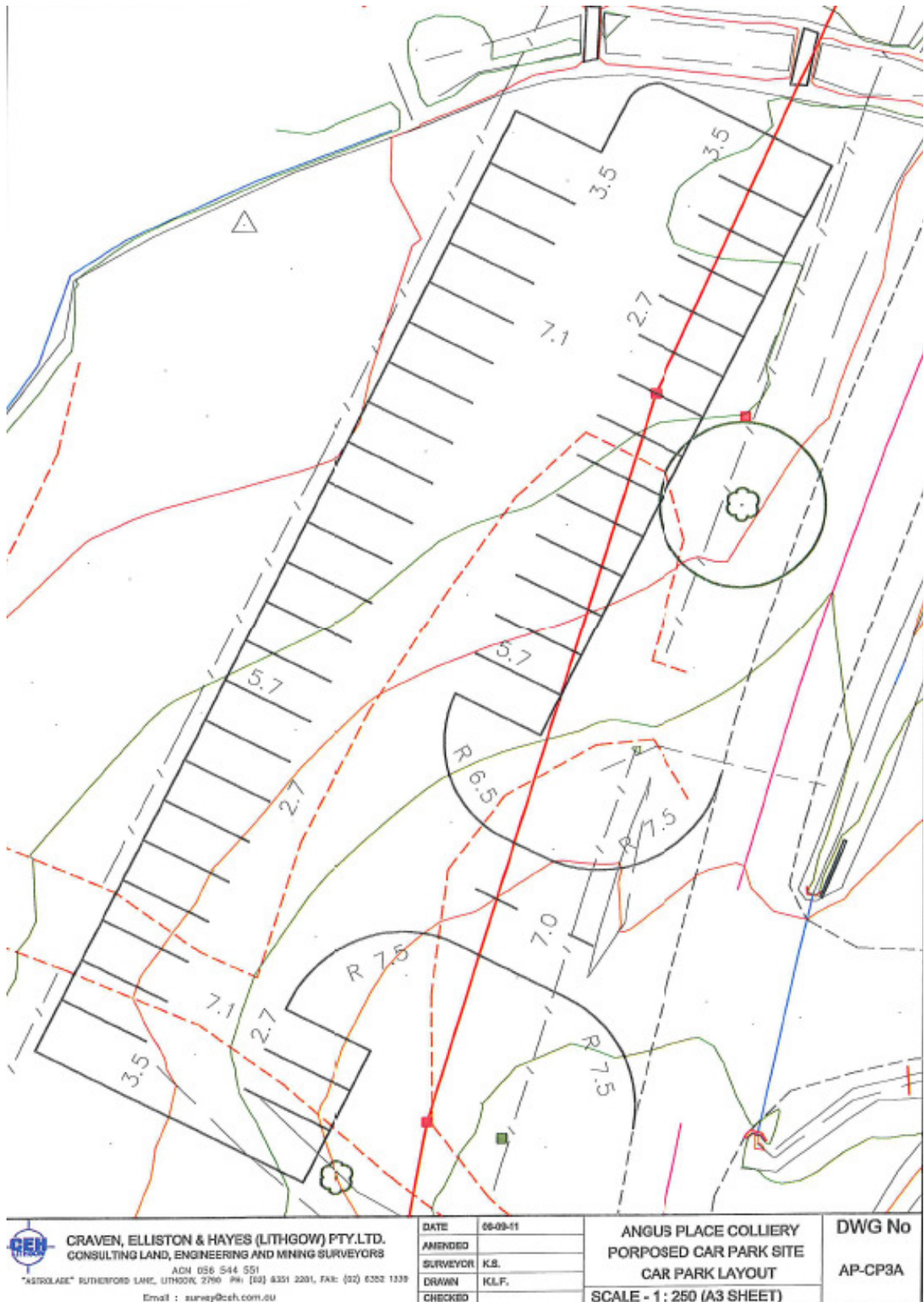


Figure 3: Design of the Angus Place New Western Carpark

2.5 MINING

During the reporting period longwall coal was extracted from longwalls 960 and 970, with a longwall changeover occurring from 5 July 2011 to 24 August 2011. Simultaneous

development of the 980 and 910 panels also took place (Plan 6260, Appendix 2). Mining has progressed in accordance with the SMP Approval and as outlined in the MOP.

Total ROM coal produced during the 2011 calendar year totalled 3,224,911 tonnes (see Table 7 below). The limit stipulated on PA 06_0021 is 4.0 million tonnes and EPL 467 is 3.5 million tonnes per year. During 2012 a variation will be sought to the EPL so that it is consistent with the recent project modification approval.

During 2011 Angus Place Colliery Modified PA06_0021 in accordance with Section 75W of Part 3A under the EP&A Act to make provisions for an increase in the annual production limit to 4 million tonnes per year. Due to the cyclical nature of longwall mining, this would cater for those years which experience continuous extraction of the coal resource due to no longwall change over period. A typical longwall changeover takes six to eight weeks. If this downtime does not occur during the reporting period (calendar year), a larger quantity of coal is produced within the 12 month period. It is not anticipated that production would increase due to process improvements.

No coal washing occurs at Angus Place Colliery, as the mine delivers sized ROM coal domestically to both Wallerawang and Mount Piper power stations. There are no reject losses from the operation and saleable coal yield is 100 percent.

Table 7: Production (ROM) at Angus Place

Calender Year	Production (tonnes)	MOP Financial Year	MOP Provisional Production (tonnes)
2007	2,804,583	2006/07	2,753,000
2008	2,083,811	2007/08	3,137,000
2009	3,692,335	2008/09	3,451,000
2010	3,303,692	2009/10	2,858,000
2011	3,224,911	2010/11	2,868,000
2012	-	2011/12	3,389,000
2013	-	2012/13	2,849,000

During 2012, development is planned to continue in the 900 District and longwall 980 gate roads. Following the completion of longwall 960 and associated change over period, longwall mining will continue in longwall 970. This information is illustrated in Plan 6101, Appendix 2.

2.6 MINERAL PROCESSING

With sized ROM coal sold to all current contracts, there is no coal Washery at Angus Place Colliery. Consequently, the only mineral processing type operation is coal crushing and sizing.

2.7 WASTE MANAGEMENT

Angus Place Colliery does not process any coal beyond sizing so there is no processing waste with all run-of-mine considered product.

With no coal rejects being produced by the Colliery, the major waste streams from the mine include water (Section 2.9), coal fines and sludge resulting from surface runoff,

packaging, wood, waste oil, oil filters, oily water, oil drums, scrap metal, hoses, sewage effluent, paper and cardboard as well as general rubbish.

Sediment laden runoff termed 'dirty water' is managed by the site's dirty water management system. Essentially, sediment laden runoff from the stockpile, coal handling plant (CHP) and disturbed areas is captured by the four CHP settling ponds. The residence time provides the ability for particles to drop out of suspension and sink, with clean water cascading over the spill weirs. Clearly this process results in the accumulation of sediment at the base of the pond which is periodically removed and blended with ROM stockpile as saleable product.

In July 2011 Angus Place changed licensed waste removal contractors. As part of the change management process a tool box talk was delivered to all shifts. The figure shown below was included within the toolbox talk and clearly demonstrates how waste on site should be disposed. Since the introduction of the colour coding waste system the colliery has demonstrated an increase in recycling rates.



Colour Coding Your Waste



<h3 style="color: #008000;">General Waste</h3> <p>YES</p> <ul style="list-style-type: none"> • Food Scraps • Styrofoam eg. Cups • Damaged Pallets • Damaged Air Filters • Light Contaminated Rags • Rubber eg: Hoses • Food Wrappers • Plastic Bags • Rope  <p>NO</p> <ul style="list-style-type: none"> • Recyclables • Grease • Oil Filters • Absorbents 	<h3 style="color: #4169E1;">Paper / Cardboard</h3> <p>YES</p> <ul style="list-style-type: none"> • Paper • Newspaper • Envelopes • Cardboard  <p>NO</p> <ul style="list-style-type: none"> • Tin Foil • Styrofoam (cups) • Crockery • Food Scraps • Plastic Bags • Plastic Wrap 	<h3 style="color: #FF8C00;">Co-Mingled Recycling</h3> <p>YES</p> <ul style="list-style-type: none"> • Plastic Bottles • Milk Cartons • Steel cans • Aluminium Cans  <p>NO</p> <ul style="list-style-type: none"> • Food Scraps • Plastic Bags • General waste
<h3 style="color: #FFD700;">Oil Filters</h3> <p>YES</p> <ul style="list-style-type: none"> • Oil Filters • Fuel Filters  <p>NO</p> <p>No other items to be placed into these bins</p>	<h3 style="color: #FFD700;">Oily Rags / Absorbents</h3> <p>YES</p> <ul style="list-style-type: none"> • Heavily contaminated oily rags • Hydrocarbon contaminated soil • Used oil absorbents  <p>NO</p> <p>No other items to be placed into these bins</p>	<h3 style="color: #8B4513;">Waste Grease</h3> <p>YES</p> <ul style="list-style-type: none"> • Waste grease • Blackjack • Contaminated grease  <p>NO</p> <ul style="list-style-type: none"> • General Waste • Recyclable Products • Oily Rags • Packaging etc

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Figure 4: Waste and recycling units actively used at Angus Place

General rubbish is disposed of to landfill by licensed waste contractors. Oil drums and filters (after draining) are recycled with other waste metals, and are removed from site by a metal recycling company. Paper and cardboard are also recycled both from bulk packaging from the store and across the various offices on site. Waste oil and oily water are disposed of by licensed waste transporters to a licensed waste treatment plant. Waste effluent is taken via a waste contractor to the Lithgow Sewage Treatment Works.

During 2011, a printer cartridge recycling station was also established in administration building. Additionally a co-mingled waste station was established in the kitchen to enable milk containers and aluminium cans to be recycled.



Figure 5: Printer Recycling Station in administration building of Angus Place

Where possible, all quantities of waste or recyclable material are quantified and recorded for benchmarking and continuous improvement purposes as well as reporting in accordance with the National Greenhouse and Energy Reporting Scheme.

2.8 ROM AND PRODUCT STOCKPILES

Currently, the nominal capacity of the ROM stockpile is approximately 75,000 tonnes.

The former Kerosene Vale site has an approved stockpile capacity (under the 2006 Project Approval) for up to 500,000 tonnes of coal. The Kerosene Vale stockpile is used to assist with coal handling at the power stations.

The drift coal conveyor feeds ROM coal onto the ROM coal stockpile. Coal is then fed onto a reclaim hopper and conveyed to the sizer at the existing CHP. After sizing, coal is then fed onto the product coal conveyor and sent to the product coal bin to be loaded into haulage trucks. Trucks then haul the product coal to either Wallerawang or Mount Piper power stations along private, sealed haul roads.

Throughout 2011, Angus Place Colliery continued to monitor the effectiveness of the markers installed at the upper boundary of the stockpile. The establishment of markers has assisted in the colliery in managing the size of the ROM stockpile. Additionally the installation of the retainment wall has assisted in minimising the amount of coal entering the pit top area. To further direct coal and dirty water runoff from the stockpile a V-drain was installed along the access road to the CHP in September 2011. It is noted for completeness that the depth of the drain was restricted by the presence of underground services. The effectiveness of this drain is shown below.



Figure 6: V Drain Installed to direct runoff from stockpile into CHP ponds

2.9 WATER MANAGEMENT

Potable water at Angus Place is sourced from both Lithgow City Council (used primarily in surface toilets and showers) and Lithgow Valley Springs (bottled drinking water). The majority of process water is sourced from underground, which is used for the underground fire water system, as well as for both surface and underground dust suppression. Two 60,000L rainwater tanks capture water from the workshop roof area to be used in the vehicle wash down process. The two tanks can also be topped up by mine water supplied by a pipe from underground.

The Angus Place wastewater management system consists of surface (see Appendix 1; Figure 4) and underground infrastructure (indicative plan shown in Appendix 1; Figure 5). All water management systems are as described in the MOP and dam storage volumes are provided in the table below.

Table 8: Water Storage Volumes at Angus Place

Water Storage	Volume Held (kL)		
	Start of Reporting Period	End of Reporting Period	Storage Capacity
Clean Water			
West of Wolgan Rd Dams	5 000	2 000*	5 000
Fire Fighting Tanks	375	375	375
LD001 Dams and Wetlands	5 000	5 000	5 000
Kerosene Vale Dam	3 000	1 000*	9 500
Potable Water Tanks	227	227	227
Rainwater Capture Tanks	120	120	120
Dirty Water			
Coal Plant Dams	2 000	2 000*	6 000
Kerosene Vale Dams	1 000*	1 000*	2 500
Sewage Ponds	7 000	7 000	7 000
Contaminated Water	1	1	100

* Estimate based on levels

When compared to the volumes held at the end of the reporting year are lower than previously reported. This is due to managing the settling ponds at a lower level to maximise storage capacity at the site during high risk rainfall periods. The storage capacity at Kerosene Vale site has been increased due to sediment removal activities. The portable water tanks capacity was also reported in 2010 as 272 kL however a review of site services plans indicated the holding capacity is 227kL.

All water discharges from the operation are through Licensed Discharge Points (LDP) as detailed in the Angus Place Environment Protection Licence 467. EPL 467 appears as Appendix 4. LDPs as detailed on EPL 467 are as follows:

- LDP001 – discharges excess water pumped to the surface fire tanks or from an underground storage area. This water passes through two settling ponds and two wetland systems which are separated by a series of rock gabions or a portion of water from underground is also directly transferred through a galvanised pipe directly to the weir. LDP001 discharges into Kangaroo Creek (tributary of the Coxs River) adjacent to the Colliery.
- LDP002 – discharges water from the pit top operations to the Coxs River west of the Colliery. Prior to discharge the water from the pit top passes through an oil water separator and settling ponds. Water from the CHP and stockpile is directed through a series of settling ponds designed to reduce the concentration of suspended solids. The flow rate of LDP002 is heavily dependent of rainfall.
- LDP003 – discharges as a result of prolonged rainfall and is situated across the Wallerawang haul road from the decommissioned Kerosene Vale Colliery, which was used as a stockpile site during 2011. Water discharges from LDP003 to the Cox's River. An automated dosing system commissioned in 2010 and was further upgraded in 2011 to adjust dosing rates to incoming volumes of water.
- LDP005 – discharges aerated sewage effluent from Angus Place Colliery by spray irrigators to a designated utilisation area. Sewage is pumped from Angus Place Colliery to the top of four oxidation ponds in series. Sewage is then periodically pumped to the series of irrigators for application across the utilisation area. The utilisation area is within the Coxs River catchment. Periodic soil sampling takes place to ensure that the utilisation area does not become saturated resulting in runoff.
- LDP006 – is an emergency licensed discharge point from the 940 dewatering bore on the Newnes State Forest. This licensed discharge point is only operated under emergency conditions. Emergency conditions are considered to exist when the bore water cannot be fed into the Springvale Delta Water Transfer Scheme. The emergency discharge point was developed as a contingency and is licensed accordingly. Water is discharged to the Wolgan River from LDP006 via Narrow Swamp North. All discharge events occur in accordance with EPL 467, with a report sent to the NSW Office of Environment and Heritage as stipulated in Condition E1.5 of the Angus Place Colliery EPL. During the reporting period, LDP006 was not utilised resulting in no discharge.

The 940 dewatering bore situated on the Newnes State Forest extracts groundwater from the eastern end of the extracted longwall 940. During 2011, all water pumped to the surface at this point was transferred to the Wallerawang Power Station via the Springvale Delta Water Transfer Scheme.

2.9.1 Water Supply and Use

Potable water is supplied to the Colliery from Lithgow City Council via an underground potable water pipeline. This water is primarily used in the bathhouse and administration building. The potable water usage is metered by the Lithgow City Council. Additional drinking water for employees is sourced from a local commercial drinking water supplier, Lithgow Valley Springs.

2.9.2 Surface Water Management

Angus Place

The surface water management system at Angus Place relies on the separation of clean and dirty water and the treatment of dirty water prior to discharge.

The clean water management system consists of a series of diversion bunds and drains that intercept clean water that would otherwise run across disturbed areas and become dirty, thus increasing the volume of dirty water to be treated. Appendix 1 (Figure 3) shows the general surface water management system associated with the Pit Top.

The dirty water management system is more extensive than the clean water management system and consists of drains, grit traps, oil separators and settling ponds (Appendix 1 Figure 3). Dirty water from the workshop, washdown bay and pit top areas are directed to the workshop grit trap and oil/water separator prior to delivery to the two settling ponds to the west of Wolgan Road and are discharged through LDP002. Runoff from the Coal Handling Plant and stockpile area is directed to four settling ponds situated adjacent to the stockpile and then through the above two pollution ponds prior to discharge via LDP002.

Throughout 2011 significant improvement works were undertaken at the colliery to improve the water management system at LDP002. These works include:

- Installation of a V drain near the coal stockpile to divert water runoff into the CHP settling ponds and increase settling time for solids.
- Installation of an automated coagulant dosing kit at the collection point for both pit top runoff and the stockpile to aid dropping the sediment from incoming water prior to discharge.
- Lining the settling pond entry point with ballast and installing rock gabion structures to prevent additional solids being collected post flocculant treatment and to filter incoming water.
- Implementation of controlled discharge system whereby additional sampling sites have been established to determine the water quality at the two settling areas prior to discharge. A pipeline with a knife valve has been established between the two ponds and the discharge point. It enables treatment strategies such as coagulant dosing to occur if water is outside the water quality criteria specified in the EPL. Water level at the ponds can also be managed at a lower level to enable the capture of rainfall and allow the residence time to be increased.
- Concreted and lined between the settling ponds and discharge point to prevent additional solids being collected between the ponds and weir and thereby preventing changes in the water quality following treatment to a known TSS concentration.

Images of the improvement works are shown in Figure 7 and 8



Figure 7: Automated coagulant dosing system installed at LDP002 entry point



Figure 8: Controlled Discharge Valve installed at LDP002

Additionally, Angus Place operates the sediment ponds with a pumping system to create additional freeboard when heavy rainfall is predicted in the weather forecast. If captured runoff is above the pollutant criteria for the downstream discharge point (LDP002), coagulant is dosed into pond to manage TSS. Turbidity measurements are taken to indicate TSS levels from the sediment ponds prior to discharge.

The level of sediment trapped by filtering structures (gabions) is reviewed monthly and is scheduled to be removed as required.

There has been no TSS exceedances since March 2011.

Kerosene Vale

Stormwater run-off from disturbed areas of Kerosene Vale drain to the dirty water system, which is directed through two on-site settling ponds prior to discharge through Licensed Discharge Point 3 (LDP003) (Plan 3209, Appendix 2). The dam collects run off from the Kerosene Vale pit top area, which has been partially rehabilitated. A monitoring weir has been constructed at LDP003 and flows are continuously monitored and recorded. Additionally a turbidity probe provides an indication of TSS concentrations and acts as an early warning system. Additionally the level sensor is able to provide tiered alerts based on proximity to the weir. This provides an advanced warning of potential discharge events.

In August 2011 Angus Place Colliery proposed to OEH to remove Environmental Protection Licence condition L4.2 which stated “the licensee must not discharge from point 3 unless discharge from point 3 occurs solely as a result of rainfall event at the premise that is greater than or equal to a 1 in 5 year occurrence interval of 24 hours duration”. This was accepted by OEH on the 22nd of August. Since the removal of this Licence condition the colliery has been utilising a pumping system to manage the freeboard to maximize the storage capacity of the settling dam during high risk rainfall periods.

Additionally during the reporting period Angus Place undertook the following works to improve the LDP003 water management system:

- Angus Place engaged a consultant in 2010 who designed a coagulant to reduce the suspended solids (coal fines and clay collides) contained within the runoff from Kerosene Vale. This is used to treat water settling in the pond prior to discharge and in an automated dosing system upstream of LDP003 to treat incoming water which was commissioned in January 2011. This system is currently being upgraded to adjust the dosing rate of coagulant to suit the volume of water entering the point.
- The settling pond on Kerosene Vale side of the haul road was deepened, lined with ballast and had gabion baskets installed to assist in the management of TSS by creating additional settling time following dosing. In addition the ballast lining aims to prevent further solids being collected prior to entering the discharge area.
- Installed a geomesh lined gabion basket to further filter incoming water prior to entering the primary settling area for LDP003.
- Sediment removal works are undertaken as required during low risk rainfall periods.

Images of the improvement works are shown in Figures 9 and 10.



Figure 9: Ballast and Gabion Baskets installed at LDP003 coagulant dosing site



Figure 10: Geomesh lined Gabion basket installed at LDP003 primary settling pond

The colliery has had no TSS exceedances since the removal of Licence condition L4.2.

2.9.3 Underground Water Management System

The underground mine water management system is dynamic to adapt to the current mining conditions. In general, the previously mined areas need to be dewatered to prevent flooding of the underground workings.

Water make from underground mine workings collected via portable air pumps which transfer water to portable fish tanks. Water collected within these fish tanks is then pumped to the 930 Dam. The water within the 930 Dam is then delivered to the district 700 and 800 which acts as a storage area to allow fines to settle out. This water is further feed into the 48c/t Dam. From this collection point water a portion pumped to three fire tanks on the surface where underground water is recirculated back underground for fire fighting, cooling and dust suppression. A small portion of water is transferred to the Coal Handling Plant (CHP).

Predominantly water is transferred from the fire fighting tanks into to two settling ponds which then cascade to two wetland systems (Cumbungi) which are separated by a series of rock gabions prior to discharge. In 2011 additional water management infrastructure was commissioned to enable a second portion of underground water to be directed through a polypropylene and galvanised steel pipe into location slightly upstream of the discharge point. Both water filtered through the wetland system and water transferred via the pipeline is discharged through LDP001. The pipeline was commissioned in November 2011 to manage pH below the 90th percentile limit of 8.5. Water quality results obtained since the installation demonstrate the effectiveness of the strategy. A photograph of the pipeline is shown below in Figure 10.



Figure 11: Galvanised pipeline installed at upstream of LDP001 to manage pH.

Underground water gravitating in the direction of the coal seam dip (north east) is extracted from the mine via the 940 dewatering bore (which is situated at the lowest point within the extracted workings) where it enters the Springvale – Delta Water Transfer Scheme at the surface. Appendix 1, Figure 4.13 illustrates the layout of the Scheme. Water is transferred at an average rate of approximately 42.4 litres per second (3.66 ML/day). While this is the average transfer rate for the pumping infrastructure for the period from April 2006 to December 2010, adjustments which are dependent on the location of the longwall face require periodic increases and decreases to manage fluctuating water inflow rates. In 2011 the average transfer rate was 43.81 litres per second (3.79ML/day) which is consistent with historic date.

During abnormal times of shut down or maintenance, Angus Place Colliery is able to discharge water under emergency circumstances in accordance with EPL 467. Discharged water from LDP006 flows into a tributary of the Wolgan River and is monitored and reported in accordance with EPL 467.

2.9.4 Sewage Treatment

Sewage and grey water from the Angus Place Colliery bathhouse and administration buildings is treated at an onsite sewage treatment facility (licensed by DECCW) and disposed of at LDP005 via a spray irrigation network. Sewage is pumped from Angus Place Colliery to the top of four oxidation ponds in series. Sewage is then periodically pumped to a series of irrigators for application across the utilisation area. The utilisation area is within the Coxs River catchment. Soil moisture at LDP005 is monitored to ensure that the irrigation applied does not result in surface water runoff. Approximately 6.6ML was discharged via LDP005 during the 2011 reporting year.

During 2011 the sewage flow meter was upgraded. The program installed on the flow meter calculated a cumulative flow rate. The colliery could subsequently not distinguish between weekly flow volumes. The flow monitoring program has been updated to allow for weekly flow interval readings to be obtained.

2.10 HAZARDOUS MATERIAL MANAGEMENT

Following the removal of explosives from site and changes to the dangerous goods legislation, Angus Place no longer requires a Dangerous Goods Licence.

The electronic database “CHEMWATCH” is available onsite as a Material Safety Datasheet (MSDS) database. MSDS hardcopies are also maintained in a site Chemical Data Register, which is maintained in the First Aid room, Store and statutory library. Prior to new chemicals being allowed onsite, their MSDS information is reviewed in terms of potential health, safety and environment issues.

Angus Place has a 55,000 litre diesel tank on site. The tank is bunded and mechanically protected by a block wall. In early 2010, a self bunded diesel tank was delivered and was commissioned in December 2011. This is shown below in Figure 12. The new unit allows an enhanced level of security against potential diesel spillages. Additionally the tank will improve the quantification of diesel usage to enhance greenhouse reporting systems. In 2008, an additional 25,000 litre diesel self-bunded tank was installed for refuelling the coal stockpile dozer.



Figure 12: Self bunded Diesel tank commissioned in 2011

Solcenic oil is a water soluble oil used as a hydraulic fluid for the longwall roof support equipment. The solcenic oil store contains two tanks (14,000 litres for new solcenic oil and 7,000 litres for waste solcenic oil and contaminated water) in a bunded roofed area. The solcenic fill point is concreted and drains to a sump. Upgrading of the solcenic store occurred in 2008 to improve management and spillage control.

In December 2011, Angus Place simulated a scenario where a truck travelling on the Wallerawang Haul Road to Delta Powers Station overturned while negotiating around a bend. As a result of overturning the vehicle the driver was found to have lacerations to the head and unconscious. In addition fuel spilled into a waterway which entered a Licenced Discharge Point. The exercise demonstrated that the truck drivers had awareness that a spinal injury may have occurred and applied appropriate first aid. Truck drivers did require training on the isolation of the fuel leak and were educated on the components of the spill kits contained on site. All participants found the training valuable and encouraged further scenario training to be conducted on site.

2.11 OTHER INFRASTRUCTURE MANAGEMENT

There are no other major infrastructure management issues that the author is aware of apart from those mentioned in this document.

During 2010, the draft Wallerawang Power Station Coal Haul road Landscape Plan was submitted to the NSW Department of Planning for review and approval, as required under Schedule 3, Condition 29 of the Angus Place Project Approval 06_0021. The Plan outlines Angus Place's strategy regarding the establishment and maintenance of reasonable and feasible landscaping measures to minimise the visual impacts of the haul road.

In November 2011 the colliery received notification from the Department that plan had been approved following a review of the plan indicating that the document meets the requirements of the relevant approval condition.

2.12 ENVIRONMENTAL REVIEWS DURING 2011

Centennial Coal has developed an Environmental Management Strategy supported by an Environmental Policy, Environmental Management System Framework and a series of Corporate Objectives and Targets. These objectives and targets are documented in site based business plans. At the corporate level, the Centennial Coal Environmental Management System (EMS) Framework describes actions required to be undertaken by both Centennial and each site to meet the minimum expectations of Centennial Coal in delivering environmental performance outcomes. These actions are required to ensure environmental performance is measured, monitored, trended, tracked and reported.

As part of the process, Angus Place was required to develop and implement an appropriate EMS in accordance with the requirements detailed in the Centennial Coal EMS Framework and generally in accordance with ISO14001.

As triggered by the modified project approval received on the 29th of August 2011 Angus Place commissioned a review of the Environmental Management System, and relevant management plans and strategies. These documents are currently being revised and will be submitted to the relevant Regulatory Authorities in accordance with the Project Approval requirements.

Schedule 5 Condition 5 of the Angus Place Project Approval (PA 06_0021 dated 13 September 2006) required Angus Place Colliery to commission an independent environmental audit prior to 31 December 2007, and every 3 years thereafter. To this end, URS were commissioned prior to 31 December 2010 to carry out an independent audit of the Angus Place Project Approval. The audit was undertaken from 1 February 2011 to 4 February 2011. The independent environmental audit assessed compliance with relevant approvals, licences and other management plans applicable to Angus Place. In accordance with the Schedule 5, Condition 10 of the modified Project Approval the audit report is available on the company's website.

3. ENVIRONMENTAL MANAGEMENT AND PERFORMANCE

3.1 RISK ASSESSMENT AND MANAGEMENT

To ensure the continued implementation and improvement of the Angus Place Environmental Management System (EMS), the identification and assessment of site based hazards and risks (aspects and impacts) is undertaken periodically to enhance the EMS risk register and site operations. Several response procedures and standards have been developed and exist under the EMS framework document which aim to manage extreme and high risks such as hydrocarbon spills, dirty water management, airborne pollution etc. Each procedure, standard, monitoring program and management plan has a periodic review timeframe regulated to by the site's controlled document system to ensure the EMS remains effective and current.

The primary objectives of the environmental risk analysis include:

- Identification of potential hazards/impacts;
- Determination of the consequence of the hazard/impact occurring;
- Determination of the likelihood of an event occurring;

- Assessment of the risk by determining the probability (likelihood) and consequence (effect) of each hazard/impact; and
- Identification of the controls/safe guards to mitigate the hazard/impact.

Centennial Coal's Risk Management Standard Risk Matrix is used to calculate the consequence and likelihood of an event to evaluate the subsequent risk level (risk rank). This system operates in accordance with AS/NZS 4360:2004.

A comprehensive site risk assessment was facilitated on July 2011. The completed site assessment is summarised in the table below.

Table 9: 2011 Identified Risks and Associated Management Techniques

Environmental consideration	Risk Rank	Monitoring Program/ Management Plan implemented ?	How managed?
Groundwater/ hydrogeology	Significant	Yes – Groundwater Monitoring Program, Environmental Management Strategy and Environmental Monitoring Program	<p>Groundwater Monitoring Program and Response Plan monitors and manages any aquifers and swamps potentially affected by operations at Angus Place Colliery.</p> <p>GW Program aims to ensure operations at Angus Place do not result in any significant:</p> <ul style="list-style-type: none"> ▪ reduction in pumping yield in privately-owned groundwater bores; ▪ reduction in surface flows and groundwater baseflow to upland swamps (Newnes Plateau Shrub Swamps) and wetlands; and ▪ reduction in surface flows and groundwater baseflow to water bodies including Kangaroo Creek, Wolgan River, Lambs Creek and Cox's River. <p>GW Program has been developed to meet the requirements of Conditions 7, 8, 12 and 13 of Schedule 3 of Project Approval 06_0021.</p>
Subsidence	Moderate	Yes – Subsidence Monitoring and Reporting	Implemented Subsidence Monitoring and Reporting Program details the pre and post mining subsidence monitoring that is to

		Program	occur and be reviewed against the baseline data to monitor the effects of mining. Reporting and remediation actions are also detailed within the Program.
Flora and fauna	Significant to moderate	Yes – Flora and Fauna Management Plan, Environmental Management Strategy and Environmental Monitoring Program	Monitoring of ongoing conditions against baseline data to monitor effects of mining as well as external influences. Additionally manages clearing requirements, weed control, access to EECs and reporting requirements.
Infrastructure	Moderate	Yes – Infrastructure Management Plan	The Infrastructure Management Plan address the following: <ul style="list-style-type: none"> ▪ Identification of infrastructure above the Angus Place mining area; ▪ Monitoring of impacts and consequences of longwall mining on identified infrastructure through inspection programs; ▪ Monitoring and management of public safety issues resulting from the consequences of longwall mining on identified infrastructure; and ▪ Defining triggers for notification, reporting, review and remediation (where necessary).
Surface water	Significant to moderate	Yes – Site Water Management Plan, Environmental Management Strategy and Environmental Monitoring Program	Monitoring of ongoing conditions against baseline data to monitor effects of mining as well as external influences. Additionally considers: <ul style="list-style-type: none"> ▪ Erosion and sediment control ▪ Mine water discharge ▪ Surface water creeks and drainage lines with respect to mine induced subsidence. ▪ Water balance ▪ Impact assessment criteria ▪ Response plan

			<ul style="list-style-type: none"> ▪ Reporting
Noise	Moderate	Yes – Noise Monitoring Program, Environmental Management Strategy and Environmental Monitoring Program	<p>Monitoring and assessment of noise impacts from Angus Place Colliery against acceptable impact assessment criteria.</p> <p>Additionally administers identification of issues, notification requirements and mitigation options.</p>
Air quality	Low	Yes – Air Quality Monitoring Program	<p>Outlines methods for monitoring dust generated from the activities of Angus Place Colliery. This Program provides a monitoring protocol for evaluating compliance with the air quality criteria.</p> <p>Additionally identifies the impact assessment criteria and response to impacts as well as statutory reporting requirements.</p>
Hazardous material spills	Low	Yes	Site hydrocarbon management and spill response procedures which exist under the Environmental Management System.
Land contamination	Significant	No	Phase 1 environmental site assessments completed for all sites during 2010.
Community	Moderate	Yes – Stakeholder Engagement Plan	The Stakeholder Engagement Plan aims to provide a consistent management framework to identify and consult with stakeholders who have an interest in Angus Place Colliery.

A site specific environmental risk assessment was scoped during December and will be facilitated during early 2012 as part of the 2012 AEMR preparation and business planning process. This is crucial to ensure the ongoing effectiveness of the site's Environmental Management System which facilitates diligent environmental management through the identification of environmental risks and development of procedures to manage and reduce impact levels.

Consequently, in 2012, Environmental Management will focus on the following:

- Compliance with approval conditions through the internal audits and continued implementation of management plans/monitoring programs;
- Increase groundwater monitoring multi-level piezometers;
- Improvements in water management, especially in terms of suspended solids;
- Improvements in noise management, especially in terms of acoustic treatment and land acquisition ; and

- Continued development and implementation of the Angus Place Environmental Management System. The system was initially formalised during 2007 with a commitment to continually improve and develop the system and will be revised in 2012 in accordance with the modified Project Approval.

As part of the continued implementation of the site EMS, a comprehensive training and awareness program was undertaken during 2011. The program will be delivered across all shifts at Angus Place Colliery and will target the risks and preventative measures that affect each group's respective area of responsibility. Components of the program included

- An environmental inspection with the mine manager
- Environmental message deliveries through morning meeting and employee engagement meetings
- Voluntary meeting with regulators
- Participation in community events
- Collaborative inspections with different site disciplines
- Underground visits and representatives
- Participation site HSEC committee
- Undertaking Planned task observations
- Conducting environment business integration sessions

The program was heightened environmental awareness at the site and enhanced the integration of environment into the business.

3.2 METEOROLOGICAL MONITORING

Meteorological data was collected from the Angus Place Colliery weather station. Additional rainfall data was also collected from a tipping bucket rain gauge located on the Newnes State Forest. The Lithgow average is collected from the Bureau of Meteorology.

During 2011 Angus Place Colliery upgraded the sites meteorological station addressing the recommendations from the audit conducted in 2010 against the requirements of the *Approved Methods for Sampling of Air Pollutants in New South Wales*. This activity principally aimed to ensure compliance with Schedule 3 Condition 23 of the Angus Place Colliery Project Approval 06_0021. In December 2011 Angus Place submitted supporting documenting to the Department for review. To this end compliance with this licence condition will be reported in the 2012 AEMR.

3.2.1 Rainfall

Total annual rainfall for the reporting period at Angus Place Colliery and the Newnes Plateau is presented in the table below.

Table 10: 2011 Rainfall and Wet Day Data for Lithgow and the Newnes Plateau

Month	Rainfall (mm)			No. of Wet Days		
	Lithgow average	Angus Place	Newnes Plateau	Lithgow average	Angus Place	Newnes Plateau
January	95	62.2	111.2	9	6	15
February	82	48	49.0	10	4	8
March	86	51	140.4	6	7	11
April	65	22	51.6	4	3	10

May	65	40.6	83.6	8	6	6
June	69	26.6	68.6	9	8	10
July	69	17.4	31.4	9	8	10
August	65	98.2	68.0	12	9	8
September	60	49.2	68.4	5	6	8
October	68	24.6	62.6	8	7	9
November	69	142.8	179.6	10	11	11
December	76	80	115.6	11	9	9
Total	868	662.6	1030.0	101	84	115

Wet Days: > 1 mm measured precipitation.

A total of 662.6 millimetres of rainfall was recorded at Angus Place meteorological station during 2011 which is below the Lithgow average of 868 millimetres. Above average were recorded in January, August, November and December which indicates that high intensity rainfall events were generally received within the summer months. The Newnes Plateau received 1030 millimetres, which is above the Lithgow average. A comparison between the Newnes Plateau rainfall station and Angus Place Colliery weather station highlights localised storms rather than regional rainfall. The Newnes Plateau also received more wet days than Angus Place which is consistent with the theory regarding the localised storm events.

3.2.2 Wind Speed and Direction

The table below provides a summary of predominant winds for the reporting period (both in terms of wind speed and direction).

The long term averages from Lithgow data shows that the predominant wind is from the southeast in summer and autumn, while from the west in winter and spring.

Table 11: 2011 Wind Data Summary

Month	Predominant Wind 1		Predominant Wind 2		Calm (%)	% Total
	Direction Sector	% Month	Direction Sector	% Month		
January	E	44	NNW	27	7	78
February	SSW	54	ESE	23	6	83
March	ESE	42	SSW	11	11	64
April	E	93	-	-	7	100
May	E	79	-	-	9	88
June	E	79	-	-	6	85
July	NW	33	E	18	5	56
August	NW	35	E	19	2	56

September	E	67	-	-	6	73
October	E	65	SE	11	9	85
November	SW	42	SE	18	9	69
December	SW	63	-	-	9	63

- No wind direction sector greater than 10%

The long term averages from Lithgow data shows that the predominant wind is from the south-east in summer and autumn, while from the south west to west in winter and spring. In 2011, the predominant wind direction was similar to the long term average pattern for autumn\winter (east\south-east in autumn and north-west in winter) but varied for spring\summer (east for spring and south-west for summer). This variation logically aligns with trends of cooler months given that a cooler spring and summer was experienced.

3.3 ENVIRONMENT PROTECTION LICENCE

Centennial Angus Place has a current Environment Protection Licence (EPL 467), which is administered by the DECCW. EPL 467 has an anniversary date of 1 January and requires submission of the Annual Return within 60 days of the anniversary date. A copy of the EPL appears as Appendix 4.

3.3.1 EPL Variations

During the reporting year two license reviews were executed by OEH pursuant to Section 58(5) of the *Protection of the Environment Operations Act 1997* (POEO Act, 1997) following consultation with Angus Place Colliery and Centennial Coal. All proposed changes were accepted by Angus Place Colliery. Specifically the variation changed the following aspects of EPL 467:

- Revision of LDP001 location description following the construction of addition water management infrastructure.
- Removal of condition L4.2 which allowed “discharge from point 3 solely as a result of rainfall event at the premises that is greater than or equal to a 1 in 5 year occurrence interval of 24 hours duration”.
- Modification of U1 control of water discharged via LDP1
- Addition of U2 Coal Mine Particulate Matter Control Best practice PRP

Throughout 2011 Centennial Coal consulted with the Office of Environment and Heritage (OEH) in relation to future management of groundwater discharges via LDP001. On the basis of discussion held on the 2nd of September 2011 OEH decided to vary Licence 467 to incorporate an amended pollution reduction program to reflect the proposed groundwater management arrangements at the premises.

Centennial Angus Place also scheduled a meeting with OEH which was conducted on the 2nd of August 2011 to remove condition L4.2 from the licence to allow better management of surface water from the Kerosene Vale site. This was accepted by OEH on the 26th of October.

Additionally, the colliery advised OEH of additional surface water management infrastructure installed at LDP001 to manage the pH of mine and surface water on the 10th of November. The modified site description was incorporated into the 19th of December licence variation

The Colliery will also be undertaking a site Best Management Practice determination in 2012 to identify the most practicable means to reduce particle emissions.

3.3.2 EPA Annual Return

The 2011 Angus Place Annual Return was submitted to the NSW Office of Environment and Heritage prior to the due date of 2 March 2012. The 2012 Angus Place Annual Return is due prior to 1 March 2013.

In total, there were 11 non-compliances/incidents recorded against EPL 467 during the reporting period. These are summarised in the table below.

Table 12: Summary of 2011 EPL 467 Non-Compliances

Date	Location	Summary
2011	LDP001	pH Result of 8.61 (90 percentile limit is pH 8.5)
6/1/2011	LDP001	TSS Result 41mg/L (limit 30mg/L)
6/1/2011	LDP002	TSS result 38mg/L (limit 30mg/L)
14/2/2011	LDP002	TSS Result 70 mg/L (limit 30mg/L)
14/3/2011	LDP002	TSS Result 32mg/L (limit 30mg/L)
6/1/2011	LDP003	TSS Result 191mg/L (limit 50mg/L)
19/8/2011	LDP003	TSS Result 170mg/L (limit 50mg/L)
2011	LDP003	TSS Result 176.3 mg/L (90 percentile limit 50mg/L)
28/6/2011	R1 Sharpe	Noise Result 40dBA (Evening Criteria limit 38dBA)
7/9/2011	R1 Sharpe	Noise Result 44dBa (Evening Criteria limit 38dBA)
	R2 Mason	Noise Result 43dBa (Evening Criteria Limit 40dBA)
2011	LDP005	Volumetric Sewage Monitoring Undertaken at incorrect frequency

AT LDP001 sampling from underground and at various points between the fire tanks and discharge point has indicated that the pH became slightly alkaline as it travelled through the wetland system. To prevent reoccurrence of this incident the Colliery has constructed both a polyethylene and galvanized steel pipeline between the point on the surface where water exits the underground and discharges via LDP001. It is the intention of splitting a portion of the water through the pipeline and wetland system to mix the pH of the underground water to below 8.5. This pipeline was commissioned in November 2011 and results obtained in this November and December were below the 90th percentile limit of 8.5. The effectiveness to manage pH below 8.5 will continued to monitored in the next reporting period.

The TSS exceedance at LDP001 in January 2011 was attributable to rainwater tank cleaning, rainfall and an increased volume of water discharged. Between January and June 2011 Angus Place reviewed the sediment control devices installed at LDP001. Results for the remainder of the 2011 calendar year support that the consistent pumping rates from underground combined with the wetland system and gabion baskets installed

between the fire tanks and monitoring weir are able to manage suspended solids below the prescribed criteria.

Angus Place reviewed and undertook several improvement upgrade projects in 2011 to prevent recurrence of TSS at LDP002 and LDP003. These projects are outlined in section 2.92. Since undertaking this work there has been no further TSS exceedances.

Additionally to prevent reoccurrence of TSS non-compliances Angus Place proposed to remove Environmental Protection Licence condition L4.2 which stated “the licensee must not discharge from point 3 unless discharge from point 3 occurs solely as a result of rainfall event at the premise that is greater than or equal to a 1 in 5 year occurrence interval of 24 hours duration”. This was accepted by OEH on the 22nd of August.

To improve noise management Angus Place has raised with the trucking contractor to ensure that a maximum 8 loads per hour occur (8 movements from the mine and 8 return trips). A toolbox talk was delivered to truck drivers on the 16/9/2011 outlining the importance of controlling truck speed, minimising engine exhaust brake noise, maintaining road surfaces and vehicle checks on trucks to ensure components are secure and operating according to manufacturer’s specifications.

Additionally Angus Place engaged a consultant in August to assess noise reduction strategies applicable to the site and conducted noise modelling to determine the effectiveness of these controls. A draft report was received by the colliery in December 2011. Noise barriers were not considered likely to be effective at Sharp and Mason receiver therefore acoustic treatment of individual receivers and negotiated agreements are being investigated for these locations.

A prevent reoccurrence of the technical non-compliance at LDP005 sewage irrigation site, the flow monitoring program was updated to allow for weekly flow interval readings to be obtained.

There was no community complaints received in 2011.

3.4 AIR POLLUTION

Dust and noise are the potential air pollutants emanating from Angus Place Colliery as identified in Section 3.1 *Risk Assessment and Management*. The main potential dust sources at the Colliery are unsealed traffic areas, coal stockpiles, ventilation fans, coal haulage trucks, un-vegetated areas and trafficked areas. Dust controls used on unsealed or dirty traffic areas include the use of a water cart, road sweeping and permanent sealing (asphalt seals). Dust emissions from the mine ventilation fan are quite low due to the high humidity and low dust levels within the underground mine. In addition, low emission diesel fuel is used underground to reduce air borne particles. Extracted coal on the stockpiles which is transported by trucks is typically moist (10%), which reduces the likelihood of dust emanating from the stockpiles and haulage operations.

In December 2011 Angus Place received a condition in their EPL to conduct a site specific Best Management Practice determination to identify the most practicable means to reduce particle emissions. The outcomes of the investigation will be discussed in the 2012 Annual Review.

Dust Monitoring

Depositional dust monitoring occurs at eight sites within the vicinity of the surface operations (Plan 3211, Appendix 2). During the reporting period, dust management

systems operated effectively. This is evidenced by all eight gauges demonstrating compliance against the long term impact assessment criteria of 4 g/m²/month with an annual averaging period. This is stipulated in the Angus Place Colliery Project Approval 06_0021 and EPL 467.

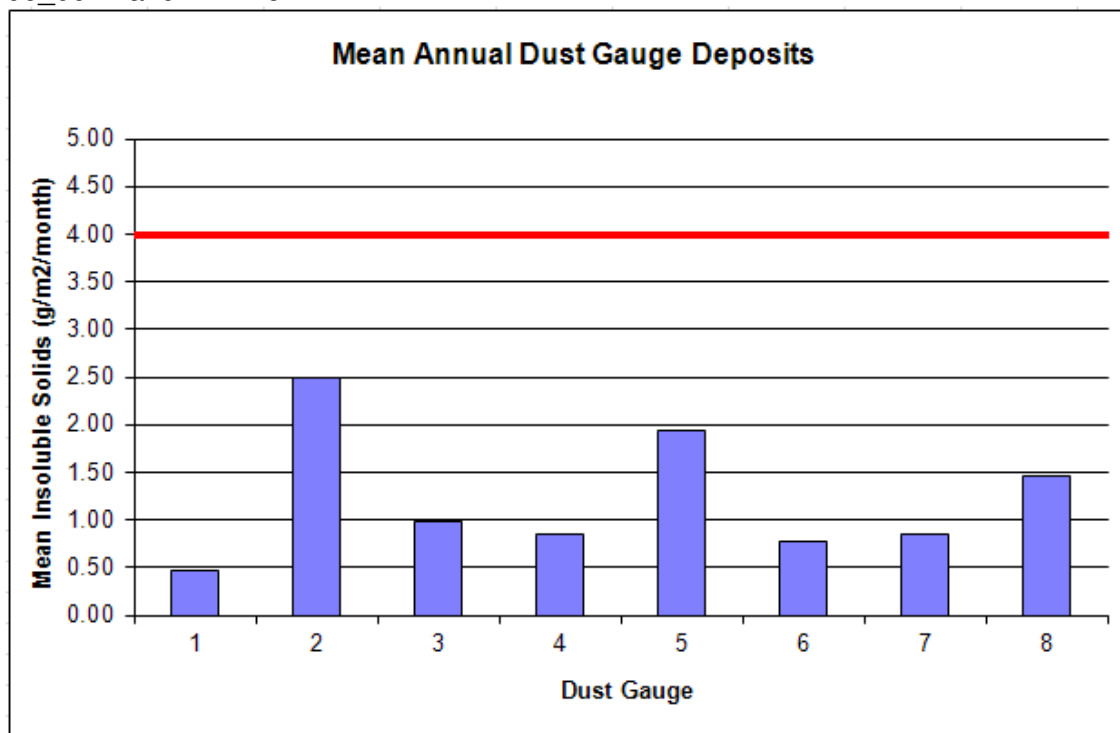


Figure 13: Average Monthly Total Deposited Solid Matter for All Gauges

Table 13: Comparison of Annual Average Dust Monitoring Results

Angus Place Dust Gauge Reference	2007 insoluble solids g/m ² /month	2008 insoluble solids g/m ² /month	2009 insoluble solids g/m ² /month	2010 insoluble solids g/m ² /month	2011 insoluble solids g/m ² /month
DG1	0.6	0.5	2.26	1.84	0.47
DG2	1.3	0.8	2.52	0.75	2.50
DG3	2.4	1.1	2.75	0.64	0.99
DG4	1.6	1.1	2.81	0.56	0.85
DG5	0.7	0.8	2.44	0.63	1.93
DG6	3.1	1.0	2.46	1.31	0.76
DG7	1.0	0.8	2.56	2.21	0.85
DG8	0.9	1.3	2.79	1.56	1.45
Average	1.45	0.93	2.50	1.19	1.23

A comparison of depositional dust monitoring appears in the above table for the period 2007 to 2011. The 2011 results are generally consistent with the 2007, 2008 and 2010

data. Results obtained in 2009 were heavily affected by the state wide September 2009 dust storm.

The Angus Place high volume air sampler (HVAS) as it was installed in June 2009. 2010 was the first year the equipment was fully operational. The HVAS monitors total suspended particles (TSP) and air borne particulate matter less than 10 micrometers (PM10) in accordance with Project Approval 06_0021 and EPL 467. The table below highlights a summary of the attained monitoring data for 2011 which has been contrasted to the previously reported 2009 and 2010 data for comparative purposes.

Table 14: High volume air sampling summary results highlighting PM10 and TSP

HVAS	2009		2010		2011	
	PM 10	TSP	PM 10	TSP	PM 10	TSP
Lowest	1	8	0	1	1	1
Average	6.56	19.78	6.82	16.19	4.04	11.5
Highest	11	34	27	41	15	47

The averages illustrate minor fluctuations between the 2009 and 2011 reporting years in both PM 10 and TSP pollutants. The impact assessment criteria for the HVAS is stipulated within Project Approval 06_0021 and appears in the table below.

Table 15: Long term and short term impact assessment criteria for particulate matter

Long term impact assessment criteria for particulate matter		
Pollutant	Average Period	Criterion
TSP	Annual	90µg/m ³
PM ¹⁰	Annual	30µg/m ³
Short term impact assessment criteria for particulate matter		
Pollutant	Average Period	Criterion
PM ¹⁰	24 hour	50µg/m ³

Clearly from the impact assessment criteria, Angus Place Colliery complied with the applicable limits for particulate matter.

3.5 EROSION AND SEDIMENT CONTROL

Erosion and sediment control activities occur in accordance with the approved Angus Place Erosion and Sediment Control Plan required under Schedule 3 Condition 10 of the Angus Place Colliery Project Approval 06_0021.

Given that the pit top tends not to significantly alter in footprint due to that fact that Angus Place exists as an underground mine, there are relatively few areas of exposed ground with erosion potential. Despite this there are several active erosion and sediment controls implemented at the pit top which principally aim to ensure that water discharged off site complies with suspended solids limits detailed in EPL 467. This objective is intrinsic to

erosion and sedimentation designs and controls, and is achieved by implementing the following principles:

- Separating undisturbed, 'clean water' runoff from disturbed, 'dirty water' runoff to minimise and isolate the amount of 'dirty water' to be treated and disposed of;
- Directing sediment-laden runoff into designated sediment control retention ponds;
- Diverting 'clean water' runoff unaffected by the operations offsite; and
- Maintaining sediment control structures to ensure that the designed capacities are maintained for optimum settling of sediments.

During 2011 rehabilitation preparation works at Kerosene Vale continued with the Phase 2 contaminated land assessments being completed during the year. Rehabilitation of Kerosene Vale aims to improve the quality of water reporting to the LDP003 sediment dam. As discussed in Section 3.3.2 above Angus Place has undertaken significant water management improvement works throughout 2011 to prevent TSS exceedances.

Periodic inspections are carried out on the Newnes State Forest in accordance with the Angus Place Subsidence Management Plan approval and site EMS. As part of this process areas susceptible to erosion and sedimentation are identified, with preventative measures taken to proactively resolve any issues. Examples of subsidence related impacts and consequences are ponding along creeks and tributaries, alterations to the surface gradient and topography, topsoil loss or degradation in areas of surface cracking and vegetation dieback causing topsoil exposure. Such issues are managed through the implementation of the Environmental Monitoring Program required under the SMP Approval.

No erosion and sedimentation issues attributable to subsidence were detected during the 2011 reporting year.

Exploratory drilling (refer to Section 2.1) requires an adequate sump in order to store contaminated water resulting from the operation of the drill rig. To contain water generated by drilling activities within the confines of each site a large sump is excavated with high dam walls built up and sediment fencing installed on the down slope side. Periodic inspections are carried out to ensure their adequacy with feedback provided to Forests NSW. To avoid erosion, exploration sites are rehabilitated promptly with periodic inspections and maintenance of such sites occurring as necessary.

During 2011 Angus Place rehabilitated one site. The colliery is continuing to monitoring the rehabilitation progress of 12 previous exploration sites within Newnes State Forest.

Following initial rehabilitation efforts, quarterly inspections of all rehabilitated sites occur in accordance with the Angus Place Response Procedure *T034 Rehabilitation of Site on Newnes Plateau*. The Procedure aims to ensure satisfactory regeneration by assessing endemic regrowth and monitoring issues such as weeds and soil disturbance. If required there are several rehabilitation acceleration techniques identified such as brush matting used to import seed onto cleared areas and brush harvesting from the nearby area. Such activities if required will be undertaken following approval from Forests NSW.

Occasionally inspections occur with representatives from Forests NSW and other agencies present however during the review period there were no agency inspection inspections.

3.6 SURFACE WATER QUALITY

Surface water quality monitoring occurs in accordance with the approved Angus Place Colliery Site Water Management Plan required under Schedule 3 Condition 8 of the Angus

Place Colliery Project Approval 06_0021. Compliance is assessed against the prescribed impact assessment criteria detailed in EPL 467 and PA 06_0021. Response actions are executed in accordance with the Trigger Action Response Plan for surface water monitoring.

LDPs and their associated upstream and downstream monitoring points were sampled monthly as a minimum during 2011 for pH, TSS, electrical conductivity (EC) and oil and grease in accordance with the conditions of EPL 467. The monitoring suite was expanded in September 2010 to establish site specific trigger values under the ANZECC/ARMCANZ guidelines (2000), quarterly metals and nutrient sampling occurred at the LDPs for National Pollution Inventory reporting purposes.

The surface and underground water management systems control the quality of water leaving the site (see Section 2.9). Plan 6261 (Appendix 2) shows the location of Angus Place and Kerosene Vale LDPs.

3.6.1 Review of Water Quality Monitoring Results for 2011

All graphs regarding surface water quality monitoring appear as Appendix 7.

LDP001

Table 16: Comparison of LDP001 water quality results obtained for previous four years

Parameter	2008	2009	2010	2011		
	Ave	Ave	Ave	Ave	Min	Max
pH	8.4	8.31	8.32	8.35	7.63	8.88
Oil & Grease (mg/L)	<5	<5	6*	<5	<5	<5
TSS (mg/L)	10	16	5.27	6.47	1	41
EC	922	1008	962	921	695	1160

*below detection limit results are not included in the mean calculations. Only one oil and grease result was obtained above the detection limit.

The pH of discharged water from LDP001 ranged between 7.63 and 8.88, with an overall average of 8.35 for the reporting period (Appendix 7, Graph 1). All pH results were compliant with EPL 467 criteria of 6.5 to 9.0 (100 percentile). The 90 percentile criteria was however exceeded as the 90 percentile pH result was 8.61. As the LDP001 readings and the subsequent downstream readings were within the trigger levels stipulated for upland rivers within the ANZECC & ARMCANZ (2000) guidelines throughout the year. It is unlikely that there were any adverse effects resulting from the non-compliance. To prevent reoccurrence of the incident the Colliery has constructed both a polyethylene and galvanized steel pipeline between the point on the surface where water exits the underground and discharges via LDP001. It is the intention of splitting a portion of the water through the pipeline and wetland system to mix the pH of the underground water to below 8.5 consistently. This pipeline was commissioned in November 2011 and results obtained in this November and December were below the 90th percentile limit of 8.5. The effectiveness to manage pH below 8.5 will continued to monitored.

The values for 2011 ranged between 1mg/L and 41 mg/L (Appendix 7, Graph 2). The average level of TSS for LDP001 over the period was 6.47 mg/L. There was one recorded

incident where the TSS at LDP001 exceeded the EPL 467 limit of 30mg/L. An investigation into the incident, considered that a number of factors may have attributed to a suspended solids solid above the defined criteria in the EPL including heavy rainfall, additional throughput of water due to the mine being in shutdown mode and fire tanks being cleaning out. Between January and June 2011 Angus Place reviewed the sediment control devices installed at LDP001. Results for the remainder of the 2011 calendar year support that the consistent pumping rates from underground, combined with the wetland system and gabion baskets installed between the fire tanks and monitoring weir, are able to manage suspended solids below the prescribed criteria.

There was no Total Oil and Grease result detected above the 5mg/L detection limit and therefore all results were below the EPL 467 criteria of 10 mg/L (Appendix 7, Graph 3). To this end there were no exceedances during the reporting period.

Over the years all four parameters have been relatively consistent. TSS results have lower over the last 2 years which is likely attributable to the gabion structures implemented during 2009.

LDP002

Table 17: Comparison of LDP002 water quality results obtained for previous four years

Parameter	2008	2009	2010	2011		
	Ave	Ave	Ave	Ave	Min	Max
pH	7.59	7.89	8.04	7.96	7.31	8.97
Oil & Grease (mg/L)	6	<5	8*	<5	<5	<5
TSS (mg/L)	11	28	46.75	9.5	5	70
EC	442	388	427	214	315	409

*below detection limit results are not included in the mean calculations. Only two oil and grease results were obtained above the detection limit.

The pH of LDP002 ranged between 7.31 and 8.97 with an average of 7.96 for the reporting period (Appendix 7, Graph 6). While there were no exceedances of the 100th percentile limit of 9.0 Angus Place investigated the high pH result obtained in October. It is believed the elevated pH level was attributable the algae growth and the colliery used an algaecide to prevent an exceedance of the EPL criteria.

The average TSS result for the 2011 period was 9.5 mg/L, ranging between a minimum of 2 mg/L and a maximum of 70mg/L. At the time of the incidents the pond cleaning works were being undertaken to remove sediment collected in the ponds. These sediment removal works required the ponds to be dry therefore the residence time was halved between March and April. Angus Place continued to undertake water management improvement work at the throughout the year as outlined in Section 3.3.2 to prevent reoccurrence of the incident.

There were no Total Oil and Grease results detected above the 5mg/L detection limit and therefore no exceedances were recorded for the 2011 period (Appendix 7, Graph 8).

LDP003

The EPL criteria for LDP003 differs slightly from that applicable to LDP001 and LDP002, as monthly water quality monitoring is only required to be undertaken when a discharge occurs. That being so, there were four months when discharge didn't occur (April, May, July and December) resulting in no data being obtained for these months. During 2010 a turbidity probe was installed to provide an indication of TSS concentrations and acts as an early warning system. Additionally the level sensor is able to provide tiered alerts based on proximity to the weir.

Table 18: Comparison of LDP003 water quality results obtained for previous four years

Parameter	2008	2009	2010	2011		
	Ave	Ave	Ave	Ave	Min	Max
pH	7.44	7.85	7.99	7.86	7.13	8.35
Oil & Grease (mg/L)	6	<5	11.5*	<5	<5	<5
TSS (mg/L)	53	320	86.15	63.08	12	198
EC	131	97	153	178.25	59	264

*below detection limit results are not included in the mean calculations. Only two oil and grease results were obtained above the detection limit.

The pH of LDP003 ranged between 7.13 and 8.35 with an average of 7.86 for the reporting period (Appendix 7, Graph 11). The licence range for LDP003 is 6.5 - 8.5.

High rainfall and limited settling time in the dam resulted in two TSS exceedances above the 100th Percentile limit of 50mg/L. The average TSS result was calculated to be 63.08mg/L for the 8 discharges in 2011 (EPL limit is 50 mg/L). The 90th Percentile limit of 30mg/L was exceeded on three occasions. Results appear as Appendix 7, Graph 12). To prevent reoccurrence of the incident Angus Place proposed to remove Environmental Protection Licence condition L4.2 which stated "the licensee must not discharge from point 3 unless discharge from point 3 occurs solely as a result of rainfall event at the premise that is greater than or equal to a 1 in 5 year occurrence interval of 24 hours duration". This was discussed with OEH on the 12th of August and subsequently to condition was accepted by OEH to be removed on the 22nd of August. This has allowed the colliery to maximise the storage capacity at the Kerosene Vale site to enable the capture of rainfall, treatment water and controlled of water. As discussed in Section 3.3.2 the colliery has also undertaken several water management improvements works at the site to prevent TSS exceedances.

There were no Total Oil and Grease results detected above the 5mg/L detection limit and therefore no exceedances were recorded for the 2011 period (Appendix 7, Graph 13).

LDP006

Over the 2011 reporting period, LDP006 did not discharge and as such there was no monitoring or reporting conducted.

3.6.2 Review of Discharge Volume Monitoring Results for 2011

LDP001

Average volume discharged from LDP001 (Appendix 7, Graph 4) was 3,380 kL/day, with a maximum daily discharge of 7,618 kL/day and minimum of 454 kL/day. These results highlight that discharge from LDP001 was within the EPL limit 30,000 kL/day during 2011.

Additionally, the NSW Office of Water regulates bore license 10BL601838 'Groundwater Collection System'. The license stipulates that the volume of groundwater extracted from the works by this unit shall not exceed 2,701ML. Total discharge from LDP001 during 2011 was 1,234ML, which complies with the bore license limit. For trending please review Table 19 *Comparison of Annual Average Discharge Volume over 2007 – 2011*.

LDP002

Volume discharged from LDP002 (Appendix 7, Graph 10) ranges between 0 and 3,624kL/day, with an annual average of 106 kL/day. The results show that discharge from LDP002 is within the EPL limit of 5,000 kL/day for the 2011 reporting period.

LDP003

In 2011 there were multiple overflow periods recorded at LDP003.

EPL 467 does not require volumetric monitoring at LDP003 to be undertaken. Monthly water quality monitoring during discharge is still required.

LDP005

Volumetric sewage monitoring at LDP005 occurs by calculating the flow rate against the operation time. Until September 2011, an annual volume was gained from the operating timer, with weekly discharges calculated. When this system was upgraded in September 2011 a cumulative flow volume was also recorded. The colliery therefore could not distinguish between weekly flow volumes. The flow monitoring program has since been upgraded for weekly flow intervals to comply EPL 467 which requires weekly volumes during discharge to be recorded.

3.6.3 Comparison of 2008 - 2011 Volumetric Results

A comparison of annual averages from 2008 and 2011 summary is presented in the table below.

Table 19: Comparison of Annual Average Discharge Volume over 2008 - 2011

Licensed Discharge Point	Lowest Discharge (kL/day)				Mean Discharge (kL/day)				Highest Discharge (kL/day)			
	08	09	10	11	08	09	10	11	08	09	10	11
LDP001	54	0	0	454	3,510	4,545	4,650	3,380	10,293	26,411	20,427	7,618
LDP002	0	0	0	0	158	124	187	106.15	2,809	1,669	4,799	3,624
LDP005*	n/a	n/a	181.26*	n/a	n/a	n/a	181.26*	n/a	n/a	n/a	181.26*	n/a
LDP006	0	0	0	0	1500	6,747	0	0	3,000	8,470	0	0

*LDP005: EPL467 requires weekly during discharge flow monitoring to be presented in kL/week, 2010 results were based on hours pumping x pumping capacity to gain an annual figure which was divided by the operating weeks to gain a weekly average.

The mean volume of water discharge through LDP001 in 2011 is slightly lower than 2009 and 2010 however the highest discharge volume is significantly lower indicating more consistent pumping rates throughout the reporting year. This is complemented by the slight increase observed in bore 940 pumping rates during the reporting period which is transferred via the Springvale Delta Water Scheme. The volume of water discharge through LDP002 is dependent upon rainfall. The 2011 data reflects the below average rainfall experienced during the reporting period. Volumetric monitoring commenced at LDP005 following the upgrades made to the irrigation system in 2010. Upgrades were made in late 2011 to the irrigation system to allow the identification of weekly flow volumes. LDP006 did not discharge throughout the reporting period.

3.6.4 Stream Flow Monitoring

In accordance with the requirements under the Angus Place Colliery Project Approval 06_0021 and SMP Approval, stream flows and standing water levels are monitored at specific sites within the SMP boundary on the Newnes State Forest. Surface water quality monitoring occurs in accordance with the approved Angus Place Colliery Site Water Management Plan required under Schedule 3 Condition 8 of PA 06_0021. Such activities also occur in accordance with the Angus Place Environmental Monitoring Program required under the SMP Approval and Project Approval 06_0021.

The surface water monitoring program for the SMP/Project Approval areas includes fortnightly water quality monitoring of four sites (two sites each at Kangaroo Creek and Narrow Swamp). Surface flow monitoring is undertaken by in-situ weirs: one weir within Kangaroo Creek and two within the drainage line associated with Narrow Swamp. The weirs have level sensors and continually record volumetric flows. The water depth of a waterhole within Kangaroo Creek (upstream of the Swamp) is also continuously monitored. By continuously reviewing and interpreting this information it enables an understanding of the level of impact of the project on surface water and ground water baseflows. This information is discussed in the subsequent sections below.

Stream flow monitoring points on the Newnes State Forest are shown in Appendix 1 (*Environmental Monitoring Locations*).

Kangaroo Creek Stream Flows and Waterhole

Kangaroo Creek Weir 1 (KCW1) is located downstream of Kangaroo Creek swamp at the base of Newnes Plateau. KCW1 tends to reflect the prevailing climatic conditions as the weir responds well to rainfall events which are noticeably apparent in Appendix 8, Figure 8. Clearly illustrated is the fact that that higher flow rates were experienced during in November and December during and following high intensity rainfall events. Exemplifying this theory is data from the late November when a maximum flow rate of 9.057 ML/day was detected on the 26th of November after 166 mm of rain fell between 16th of November and the 26th of November.

Surface water quality monitoring results obtained downstream of Kangaroo Creek Swamp indicate typical characteristics of NSW upland rivers and tributaries which are close to the catchment water watershed. For the 2011 reporting period the following information was obtained:

- The downstream pH ranged between 4.77 and 6.04 (average 5.61);
- The downstream EC ranged between 21µs/cm and 45 µs/cm (average 28.92 µs/cm);
- The downstream Mn ranged between 0.02mg/L and 0.11mg/L (average 0.05mg/L); and
- The downstream Fe ranged between 0.10mg/L and 0.82mg/L (average 0.37mg/L).

These results show that surface water flows continue to be received downstream of the mining area. The quality of this water appears to be unaffected by any potential mining impact associated with the extraction / subsidence caused by Longwall 960.

The manganese and iron data also demonstrates a cyclical trend from 2009. The cyclical nature of filterable manganese and iron levels is believed to be attributable to rainfall conditions. It is possible that heavy rainfall results in higher outflows from springs which contain dissolved iron which precipitates once it emerges and comes into contact with air. Furthermore, increased rainfall and runoff may have contributed additional iron

concentrations picked up from the soil as the water flows over land. It is important to note the effect rainfall may have on manganese and iron levels may not be reflected in all samples taken due to relatively short duration of some rainfall events not correlating with the sampling regime established.

Kangaroo Creek Weir 2 (KCW2) was located upstream of the Kangaroo Creek North Swamp, waterhole and spring and as is apparent from Appendix 8 Figure 8 is historically dry. Following the passage of Longwall 950, observable impacts were detected at KCW2 during January 2010, which ultimately displaced the unit. Given the fact that no flow had been detected at the weir since it was commissioned, a decision was made to remove it which was reported in the August 2010 four monthly Subsidence Management Status Report. To this end no data was collected in 2011.

The Kangaroo Creek Waterhole (KWH) is situated below the Kangaroo Creek spring. On 7 November 2008, a water level sensor and conductivity probe was commissioned to measure the water level and conductivity in the water hole. As can be seen from Appendix 8, Figure 10 The water depth gradually declined throughout 2011 with increases in groundwater level being observed following high intensity rainfall events. For comparative purposes, a photo of the waterhole from 20th of January 2011 is presented in Figure 14 and photo of the waterhole from 17th of October is presented in Figure 15.

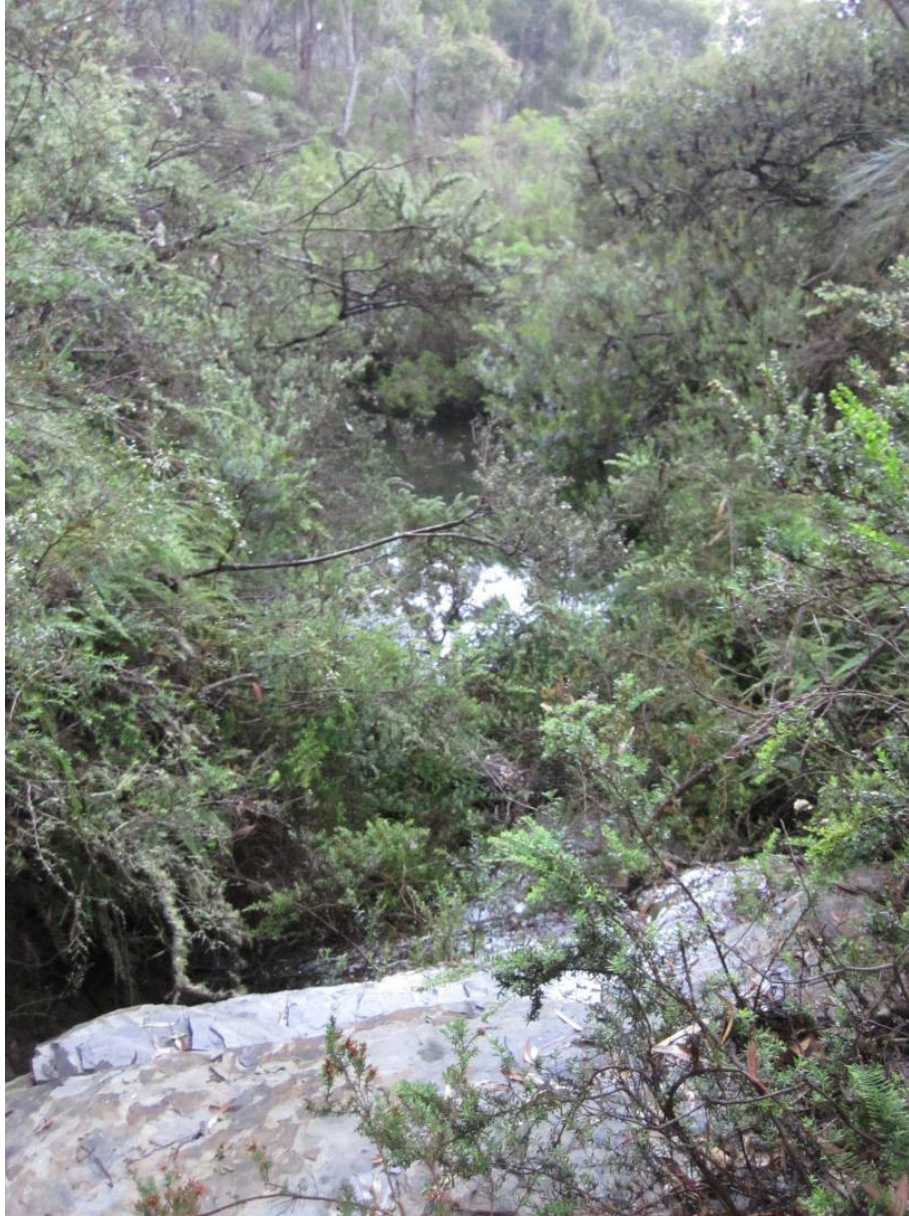


Figure 14: Waterhole as at 20/1/2011



Figure 15: Waterhole as at 17/10/2011

The waterhole is maintained by a spring in the rock bar. Importantly, the spring was unaltered by the passage of longwall 950 and has been regularly monitored and inspected during the reporting period.

Drainage Line associated with West Wolgan

As stated above, there are two Narrow Swamp Weirs (NSW). Previous reports have identified 3 weirs however in 2009 the upstream weir which measured flows from Springvale's emergency discharge point, LDP005 and is located above longwall 980 (this area is yet to be undermined) was destroyed by vandals. It is noted for completeness that Springvale did not use the emergency discharge point during the reporting period.

NSW1 exists above longwall 940 (which has been extracted) in between Narrow Swamp North and Narrow Swamp South and upstream of Angus Place's emergency discharge point, LDP006. NSW2 is just north of longwall 920.

Flow within Narrow Swamp continues to depend on heavy rainfall. The variation in flow rate between NSW1 and NSW2 reflects the wider catchment and geographic location of weir.

Minor flows were recorded at NSW1 during the review period following rainfall at the end of November. The flow rate was up to 1.9 ML/day but was sustained for only a short period. Scheduled photographic monitoring surveys during the reporting period did detect several instances of pooled water within Narrow Swamp, an example of which (detected in July) appears below.



Figure 16: Pooled Water detected at Narrow Swamp North on July 22nd

At NSW2 small, short-lived flows up to c. 6.5 ML/day were recorded at NSW2 in mid-August associated with rainfall of c. 50 mm recorded over 17th – 21st August. Similarly 3.6 ML/day flows were recorded at NSW2 in early October. These followed, but were not directly associated with, good rains in late September. The lack of direct correspondence between rainfall and runoff suggests that levels of soil saturation are having an impact on runoff, with the relatively dry conditions in much of mid-2011 resulting in varying degrees of rainfall retention and runoff delay. A sustained flow was recorded at NSW2 from the end of November through to the end of the reporting period. The maximum hourly flow was 7 ML/day on 24 November 2011 and the maximum daily flow 3 ML/day on the same day.

No downstream or upstream water quality results could be obtained as there was no flow detected at the weir during sampling.

3.6.5 Water Transfer Scheme

Angus Place Colliery commenced transferring water extracted by the 940 dewatering borehole into the Springvale Delta Water Transfer Scheme (SDWTS) on 14 April 2006. As such, all data regarding the water transfer is reported in Centennial Springvale's AEMR.

In 2011, the 940 dewatering borehole extracted 1381.8ML (averaged 3.78 ML/day) into the Springvale – Delta Water Transfer Scheme. The extraction rate was below the bore licence 10BL601851 'Bore Hole 940' extraction limit of 2,523ML. For trending please review Table 19 *Comparison of Annual Average Discharge Volume over 2007 – 2011 for LDP006*.

3.7 GROUNDWATER CONTAMINATION

The major potential sources of groundwater pollution are from hydrocarbon storage, dispatch and use. The risk of groundwater pollution from these sources is low, as all bulk storage facilities are aboveground and banded. Oil and grease monitoring occurs at the LDP001 and the 940 dewatering bores to detect any issues resulting from underground hydrocarbon use.

Although there is a risk of hydrocarbon contamination in the underground operations from significant spillages of solcenic oil and engine oil, this is minimised by having the main storage of these items on the pit top. Engine and transmission oil is only taken underground in 20 litre drums and waste oil is returned to the surface for disposal. Solcenic oil is a water soluble oil used in the longwall hydraulic chocks which support the roof at the longwall face. Underground storage is limited to a specifically designed 2,000 litre pod. Solcenic oil is used in very small concentrations (1-2 ppm) and readily breaks down in sunlight. Monitoring results for total oil and grease from the 940 Dewatering Borehole and LDP001 indicate no issues with contamination from underground sources.

3.8 CONTAMINATED LAND

All fuel and oil storage areas are banded and are actively managed through periodic inspections and maintenance checks. The bunds are sealed and the material removed as required. Apart from the potential contamination of land by hydrocarbons, there is no other potential for contamination.

As committed to in the 2010 AEMR, Phase 2 Environmental Site Assessments (ESA) were undertaken at Kerosene Vale and Vale of Clwydd No2 Collieries in anticipation of future rehabilitation works. Both reports were completed by AECOM Australia Pty Ltd. The objective of the Phase 2 assessments was to identify and characterise potential soil and groundwater contamination. Notification pursuant to Section 60 of the CLM Act is being managed by Centennial Coal.

With respect to both sites, the consultants recommended that additional information be used to evaluate remedial and or environmental management obligations.

3.9 FLORA

Flora monitoring occurs in accordance with the approved Angus Place Colliery Flora and Fauna Management Plan required under Schedule 3, Condition 24 of the Angus Place Colliery Project Approval 06_0021.

Flora issues at the pit top site mainly relate to noxious weed control. Major weed threats include blackberry, Scotch Thistle, St. Johns Wart, English Broom and Sweet Briar, which

are targeted by the noxious weed control program. Where Pampas Grass and pine trees are encountered, these will be sprayed as well.

A weed survey was conducted around the Angus Place pit top to identify those areas warranting spraying. Weed spraying occurred around the pit top in December with further spraying planned for 2011 to eradicate weeds around the remaining areas of the Angus Place pit top.

With respect to subsidence impacts, flora monitoring at Angus Place is conducted by the University of Queensland during summer, autumn and spring for vegetation communities described as mapping units MU50 (Newnes Plateau Shrub Swamps), MU51 (Newnes Plateau Hanging swamps) and other minority communities such as MU52 (Newnes Plateau Sedge Snow Gum Heath), MU7 (Newnes Plateau Narrow Leaved Peppermint Mountain Gum Brown Stringybark Layered Forest) and MU 26a (Newnes Plateau Narrow Leaved Peppermint Silvertop Ash Layered open forest).

As per the Angus Place Colliery Flora and Fauna Management Plan, there are currently 12 flora monitoring sites within the Angus Place Colliery Holding Boundary. Two additional sites (East Wolgan 1 and East Wolgan 2) which straddle the Springvale/Angus Place lease are also managed and reported by Angus Place Colliery. An additional 4 sites were added at Angus Place in Twin Gully (TG) and Tri-star (TRI) swamps. These additional plots provide a greater number of unmined reference sites which brings the total number of vegetation monitoring plots across the Newnes Plateau to 47. The sites, TG01, TG02, TRI01 and TRI02 mapped as MU50, were first described in summer 2011 and monitored again in autumn.

All sites are listed below and are mapped on Appendix 1 (*Environmental Monitoring Locations*).

Table 20: Summary of Flora Survey Site Locations

Site	Location	Easting	Northing	Establishment Date
NS01	Narrow Swamp	236015	6305085	July 2004
NS02	Narrow Swamp	235947	6304991	July 2004
NS03	Narrow Swamp	235664	6304448	July 2004
NS04	Narrow Swamp	235797	6304710	July 2004
WW01	West Wolgan Swamp	234499	6304343	March 2002
WW02	West Wolgan Swamp	234510	6304306	August 2002
WW03	West Wolgan Swamp	234513	6304708	July 2004
WW04	West Wolgan Swamp	234447	6304792	July 2004
WW05	West Wolgan lower	234779	6304918	March 2006
WW06	West Wolgan lower	234727	6304863	March 2006
KC03	Kangaroo Creek	233070	6304283	August 2006
KC04	Kangaroo Creek	233050	6304395	August 2006
EW01	East Wolgan	236389	6303977	July 2004
EW02	East Wolgan	236376	6303915	July 2004
TRI01	Tri-star*	236565	6308755	May 2011

TRI01	Tri-star*	236439	6308765	May 2011
TG01	Twin Gully*	237378	6306876	May 2011
TG02	Twin Gully*	237212	6307036	May 2011

*Sites Established Autumn 2011

All sites are permanently marked with 20 x 20m quadrats within which vegetation abundance and condition was measured with the exception of two sites, EW01 and NS01 which are 10 x 40m quadrats. The plots for the latter sites differ to the others as the narrowness of the swamp dictates that a longer, thinner plot is more appropriate.

At each site, vegetation structure, dominant species, estimated cover and height for each stratum, full floristics, estimated cover abundance using a modified Braun-Blanquet scale and condition of common species using a pre-determined condition scale are recorded. During the 2011 reporting year, monitoring for summer was conducted in February, for autumn in May and spring in October.

3.9.1 Flora Monitoring Summary

The objective of the flora monitoring program is to assess indicators which may provide evidence of subsidence impacts. Indicators include:

- A decline in diversity and abundance of plant species which typically are associated with water-logging and swampland plant communities;
- An increase in diversity and abundance of plant species which typically occur in forests or woodlands in locations initially supporting species characteristic of swamp communities;
- An increase in diversity and abundance of exotic species or native species favored by disturbance;
- Unusual variation in species diversity; and
- Decline in condition of swamp plant species known to be sensitive to changes in water availability. These species include Coral Fern (*Gleichenia dicarpa*) and Sphagnum (*Sphagnum cristatum*).

Species Richness

Species richness assessments allow for a quick measure of a site's complexity and can be compared across both season and year.

At Angus Place (Figure 17), EW01 consistently showed the greatest species richness of all sites throughout the year. This site was established as a swamp 'edge' plot (while its partner plot, EW02, is wholly within the swamp), which means that it has an edge ecotone (the transition area between two adjacent but differing plant communities) between the swamp and surrounding drier forest. It is within this ecotone that a considerable proportion of species are collected, which increase the species richness for this site. The trend of increasing species richness noted in the last annual report has begun to decrease with a range of 52 to 54 species recorded in 2011.

The addition of new sites at Twin Gully and Tri-star swamps included a new site, TRI02, which had the lowest (19) species richness of all sites across Angus Place. TRI02 is a site dominated by *Leptospermum obovatum* (Tea tree) in high densities, covering between 50-75% of the site. *Gleichenia dicarpa* (Pouched coral fern) is also present in high densities alongside *Lepidosperma limicola* (Razor sword-sedge) and *Gahnia sieberiana* (Red-fruit

saw-sedge). This site is typically wet with an apparent permanent surface water flow (noted over the 2011 monitoring period). Observations across the plateau have suggested that where high densities of *Gleichenia dicarpa* are present, species richness tends to be reduced due to the light restricting habit of this species.

With the addition of the Twin Gully and Tri-star sites, the overall percentage of herbs or forbs found at Angus Place monitoring sites was approximately 41%, in comparison with 50% in 2010. Grasses represent 16% (although in reality this value is likely to be smaller as an individual grass species that cannot be identified to species is potentially the same as another individual that has been identified to species level). Shrubs represent 18% of all species found in 2011 and sedges, other graminoids and ferns represent 19%. Trees represent the smallest (6%) component of all species found across the Angus Place sites. This breakdown shows that although the majority of swamps monitored across the plateau are considered shrub swamps, many life forms contribute to this ecosystem.

Interestingly when the similarity in habit composition is examined, three of the new sites at Twin Gully and Tri-star are distinctly different to the majority of sites. On closer examination this is due to the high proportion of shrubs (22-29%) and sedges and ferns (32-39%). These sites are generally wet which tends to inhibit the growth of grasses and trees. Sites at West Wolgan also demonstrated greater than average presence of grass species with between 23 and 29% which is in keeping with field observations.

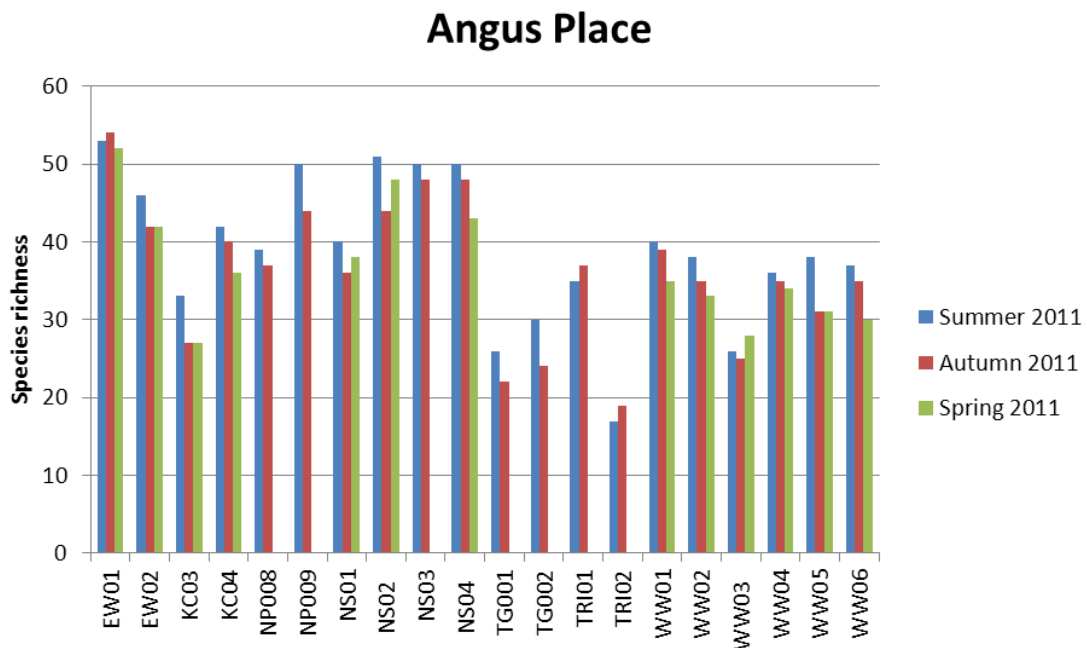


Figure 17: Species richness in 400m² vegetation monitoring plots at Angus Place

Species Composition

Composition of species at each site was examined using non-parametric multi-dimensional scaling analysis. This analysis shows the movement of sites in relation to their species composition across the seasons within 2011. Results are shown below in Figure 18.

All swamps across Angus Place 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.

Sites that had experienced emergency mine water discharge in the past (NS01, NS02, EW01 and EW02) were at least 50% similar to one another. These 4 sites are more similar in composition due to their greater exotic and weedy species richness and prevalence of species able to tolerate post discharge conditions. As in previous reports, species found at sites in West Wolgan are very similar to one another with minimal variation in species richness noted between seasons

Angus Place Site species similarity 2011

Transform: Presence/absence
Resemblance: S17 Bray Curtis similarity

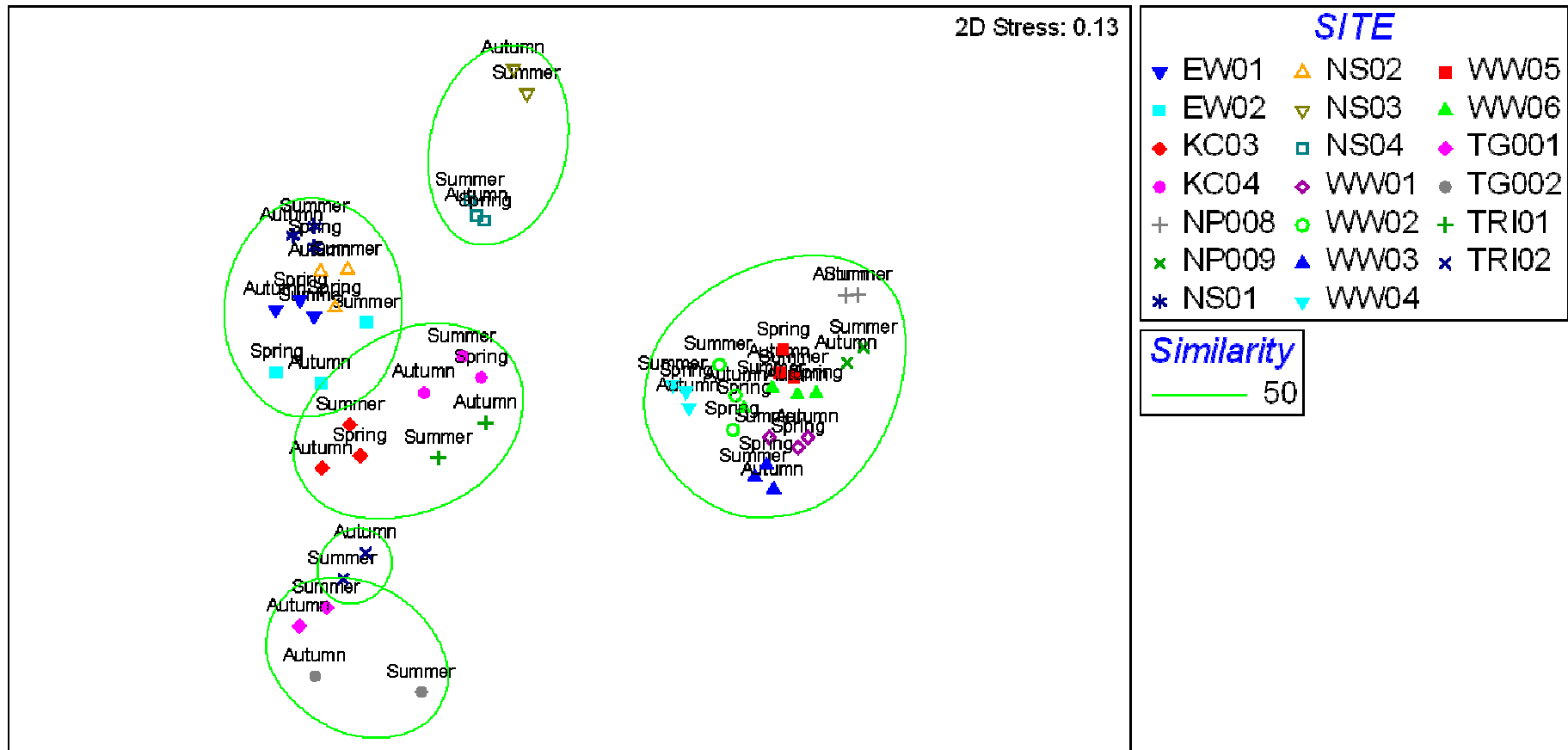


Figure 18: Angus place vegetation monitoring plots species compositional changes in 2011

Exotic Species

Exotic plant species, or weeds, can be used as indicators of ecosystem change as they generally only occur in vegetation that has had some level of disturbance (particularly human mediated). Exotic species are generally rare in the Newnes Plateau EECs but some sites show relatively high levels of exotic species richness. Exotic species are classified as those that are not native to Australia.

Exotic species richness

Exotic species in general are not highly prevalent across the swamp communities examined. The exception to this rule are sites that have been impacted by emergency discharge events. As can be seen from the figure below exotic species richness does not vary considerably over the seasons of 2011 but that sites NS01, NS02, EW01 all EW02 all show a minimum of 7 exotic species at one point throughout the year. This is in contrast to relatively undisturbed sites such as the Kangaroo Creek sites KC03 and KC04 at Angus Place which demonstrate a consistently low presence of exotic species. Exotic species that were most commonly encountered included *Hypochaeris radicata* (Cats-ear) and less commonly *Cirsium vulgare* (Scotch thistle or swamp thistle).

Angus Place exotic species richness 2011

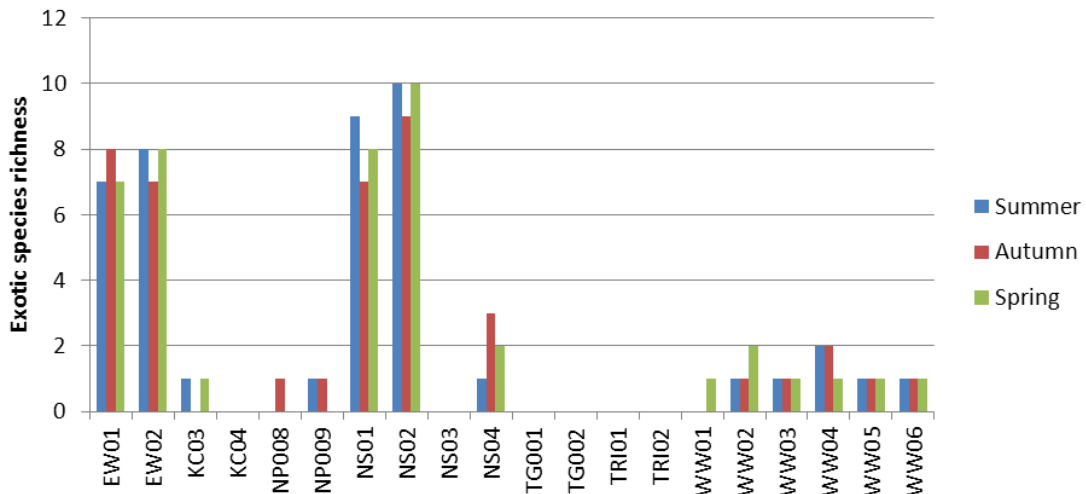


Figure 19: Exotic species richness in 400m² vegetation monitoring plots at Angus Place

To manage the exotic species apparent in Narrow Swamp and East Wolgan Swamp a process of de-heading and removing weeds by hand from these areas is continuing.

Comparison against Predictions and Conclusion

From the 2006 Environmental Assessment it was noted that the dominant vegetation system in the proposed mining area is Newnes Plateau Woodland. This community exists on relatively deep soil profiles which are not adversely affected by subsidence. It has been subject to previous underground mining and monitoring indicates that there is no evidence that detrimental effects have occurred. From pre and post mining photographic monitoring surveys and periodic inspections, ongoing mining activities have generally been consistent with the initial predictions made.

Prior to 2006, it was noted in the Angus Place 2006 Environmental Assessment that monitoring within Newnes Plateau Shrub Swamps to date has not shown any impact from underground mining. As such an eight-part test was conducted which concluded that the proposed longwall mining operation is not likely to have a significant impact on Newnes Plateau Shrub Swamp and a Species Impact Statement is not required. The nature of the proposed mining operation and experience of longwall mining beneath the Newnes Plateau at Angus Place Colliery indicates that the mining operation proposed will not cause any significant alteration of habitat.

Results presented in this report generally concur with those of the 2009 and 2010 annual reports. Sites NS01, NS02, EW01 and EW02 which had all previously experienced emergency mine water discharge demonstrate higher than average exotic species presence. Exotic species abundance at site NS02 is still of concern although no additional exotic species were recorded this year. It is encouraging to note that photographic monitoring indicated a decline in the abundance of weeds. In both the August and October 2011 inspection it was noted in the report that blackberry and thistle present in Narrow Swamp south had reduced.

A drop in condition at site KC03 reported in the 2010 annual report in relation to time since mining has since improved with all species monitored for condition obtaining a score of 4 or higher. This may be attributable to improved climatic conditions and also suggests that undermining has not had a long-term impact upon the average condition of species at this site.

3.9.2 Newnes Plateau Shrub Swamps Monitoring Program

Angus Place Colliery developed a Newnes Plateau Shrub Swamp (NPSS) Management Plan in accordance with the SMP approval for longwall 930 and confirmed in the SMP approval for longwalls 930-980. The NPSS Management Plan additionally satisfies Schedule 3 Condition 4 of the Angus Place Colliery Project Approval 06_0021. Approval for the Management Plan was received in December 2006.

Angus Place Colliery has undermined West Wolgan Swamp, Narrow Swamp, East Wolgan Swamp and Kangaroo Creek. Newnes Plateau Shrub Swamps are dual listed both at the NSW and Commonwealth levels. Under the NSW *Threatened Species Conservation Act 1995* the swamps are classified as MU50 *Newnes Plateau Shrub Swamps*. At the Commonwealth level under the *Environment Protection and Biodiversity Conservation Act (1999)* they are classified as *Temperate Highland Peat Swamps on Sandstone*. This latter category also encompasses MU51 Newnes Plateau Hanging Swamps. To monitor any changes in these swamps as a result of mining, a comprehensive monitoring program has been put in place. Parameters that are monitored include:

- Groundwater (four shallow piezometers in West Wolgan and two in Narrow Swamp, Kangaroo Creek and East Wolgan Swamp monitoring water levels continuously). There are also two deeper piezometers to a depth of around 50m to monitor groundwater levels in between West Wolgan and Narrow Swamp and in between Narrow Swamp and East Wolgan Swamp) is discussed in Section 3.11;
- Surface water flows and quality (upstream and downstream of the mining area) discussed in Section 3.6;
- Flora (four in West Wolgan and Narrow Swamp and two in East Wolgan Swamp);

- Fauna (one at each swamp) discussed in Section 3.10;
- Subsidence monitoring discussed in Section 3.20;
- Photographic monitoring and regular inspections; and
- Rainfall monitoring on the Newnes Plateau discussed in Section 3.2.

Appendix 1 (*Environmental Monitoring Locations*) shows the location of these monitoring points.

Minor cracking was identified along a section of Kangaroo Creek Road during a scheduled photographic monitoring survey on 28 July 2011. Upon closer inspection of the cracking by Colliery staff on 29 July 2011 it was considered that the minor cracking was attributable to longwall 960. The cracking observed is minor, ranging from hairline to approximately 1cm in width at its widest point and 27.5m in length. Photographs of the minor cracking appear below in Figure 20 and Figure 21. It is not considered that the minor cracking poses a public safety hazard to road users. As required under the Public Safety Management Plan the minor cracking was reported to Forest NSW in early August. These actions occurred in accordance with the Public Safety Management Plan required under Condition 16 of the Angus Place SMP approval.



Figure 20: The variation observed in crack width 29/7/2011



Figure 21: The maximum width of the crack measured 29/7/2011

Photographic surveys and inspections were undertaken throughout in the remainder of the year and the natural process of sedimentation has begun to fill the cracks detected in July during the current reporting period as demonstrated by Figure 22 below. Angus Place will continue to monitor the site however as evident from the photograph below taken in December 2011 no additional remediation works will be required to be undertaken by the colliery.



Figure 22: Kangaroo Creek Road December 2011

The four monthly Subsidence Management Status Reports contain a summary of all the results from all the monitoring carried out on the NPSS's. These reports were provided to the following stakeholders:

- Bathurst Local Aboriginal Land Council;
- Blue Mountains Conservation Society;
- Centennial Springvale Coal;
- Colong Foundation for Wilderness;
- Forests NSW;
- Gundungurra Tribal Council;
- Lithgow City Council;
- Mine Subsidence Board;
- NSW Department of Environment, Climate Change and Water;
- NSW Department of Industry and Investment;
- NSW Department of Planning;
- NSW Office of Water; and
- Sydney Catchment Authority.

3.9.3 Newnes Plateau Shrub Swamps Photographic Monitoring

During 2011, scheduled photographic monitoring was undertaken in Narrow Swamp, West Wolgan Swamp and Kangaroo Creek. Additional photographic monitoring was undertaken at Kangaroo Creek where subsidence impacts were observed at in 2010.

No significant changes were identified at West Wolgan Swamp.

Ongoing monitoring of the minor cracking observed on the western slopes near Narrow Swamp has displayed no further movement. The photographic monitoring undertaken has indicated a decline in the abundance of weeds within Narrow Swamp. In both the August and October 2011 inspections it was noted in the report that blackberry and thistle present in Narrow Swamp south had reduced.

Ongoing monitoring of the minor cracking observed on the western slopes near Narrow Swamp has displayed no further cracking. Photographic monitoring in Narrow Swamp has continued to monitor areas that have been colonised by weeds. Management of this issue is currently ongoing in terms of the hand removal of exotic species. As would be expected during the final few months of 2010 following heavy rainfall events, photographic monitoring in the first quarter of 2011 did illustrate the presence of pooled water and small flow in Narrow Swamp North.

Following the subsidence impacts observed at the Kangaroo Creek waterhole locality attributable to longwall 950, a detailed cracking survey was undertaken on 24 May 2010 to determine the extent of the cracking in the locality and to map/identify the cracks to enable targeted future monitoring. The survey was completed in May 2010 to ensure sufficient time for cracks to develop and settle. Subsequent observations were contrasted against this baseline survey to determine any alterations in form. The frequency of photographic monitoring was rationalised to two monthly intervals during since August 2011, with monthly visual inspections occurring at sensitive surface features continuing. The monitoring frequency has been reduced as limited changes have been identified from the program. To this end, the photos taken during this reporting period were consistent with previous surveys undertaken.

It is noted for completeness that pre mining surveys of Longwall 970 (which included post mining inspections over the extracted areas of Longwall 960) was carried out on

the 2nd and 3rd of December 2010. The objective of the pre mining survey was to provide a base line of the existing environment against which post mining surveys will be compared. While no negative consequences from subsidence caused by LW 960 were noted on the surface comments were made regarding the condition of the current nature of the surface above the extracted LW960 area and the unextracted LW970 area.

3.10 FAUNA

There were no fauna issues to the Angus Place Colliery pit top site detected during the reporting year.

Four long term fauna monitoring sites have been established at Angus Place Colliery to identify any potential impacts caused from mining induced subsidence on native fauna within the SMP boundary. The aim of the surveys has been to collect terrestrial fauna baseline data to be used to monitor changes in populations that may occur over time. Information regarding presence of fauna species, species diversity, population numbers and habitat characteristics were also obtained. The table below details the locations of the fauna monitoring sites and Appendix 1 *Environmental Monitoring Locations* illustrates the locations of the fauna monitoring sites.

Table 21: Locations of the Fauna Monitoring Sites at Angus Place

Site Name	Swamp Name	Water Course	Site Type
AP3	East Wolgan Swamp	Eastern Arm of Wolgan River	Treatment
AP4	Narrow Swamp	Central Arm of Wolgan River	Treatment
AP5	West Wolgan Swamp	Western Arm of Wolgan River	Treatment
Kangaroo Creek	Kangaroo Creek	Tributary of Cox's River	Treatment

All sites primarily sample wetland habitat (shrub swamps), but the surrounding woodland habitat is also surveyed. During the 2011 reporting period, fauna surveys were carried out during autumn, spring and summer. A brief summary of the monitoring activities undertaken is provided below.

A total of 55 bird, eleven reptile, three amphibian and 20 native (plus three introduced) mammal species have been located within Angus Place Colliery SMP Application area during the 2011 surveys. This number of species is similar to that obtained for the last five years and can be considered as typical of that expected from the Central Tablelands. Species richness (Figure 23) appears to hover about a constant value for each fauna group i.e. bird species richness about 55, mammal species richness about 20 and reptile species richness about 10. There are some fluctuations from year to year and this is possibly due to varying climatic conditions and natural variations associated with changing survey conditions. There have been no significant changes in species richness values for any of the fauna groups over the seven years of survey.

There are several species that are new records for surveys of the area but not for Newnes Plateau (Brown Falcon, Peregrine Falcon, Horsfield's Bronze-cuckoo,

Australian Owlet-nightjar, White-throated Needle-tail, Rufous Fantail, Beautiful Firetail, Common Brushtail Possum, Long-nosed Bandicoot, striped Marsh Frog). The total numbers of species found in Angus Place SMP Area since 2004 are: birds 107; reptiles 24; native mammals 33, and amphibians 6. The number of bird and mammal species located within the SMP area has increased over the years, as expected with continued surveys.

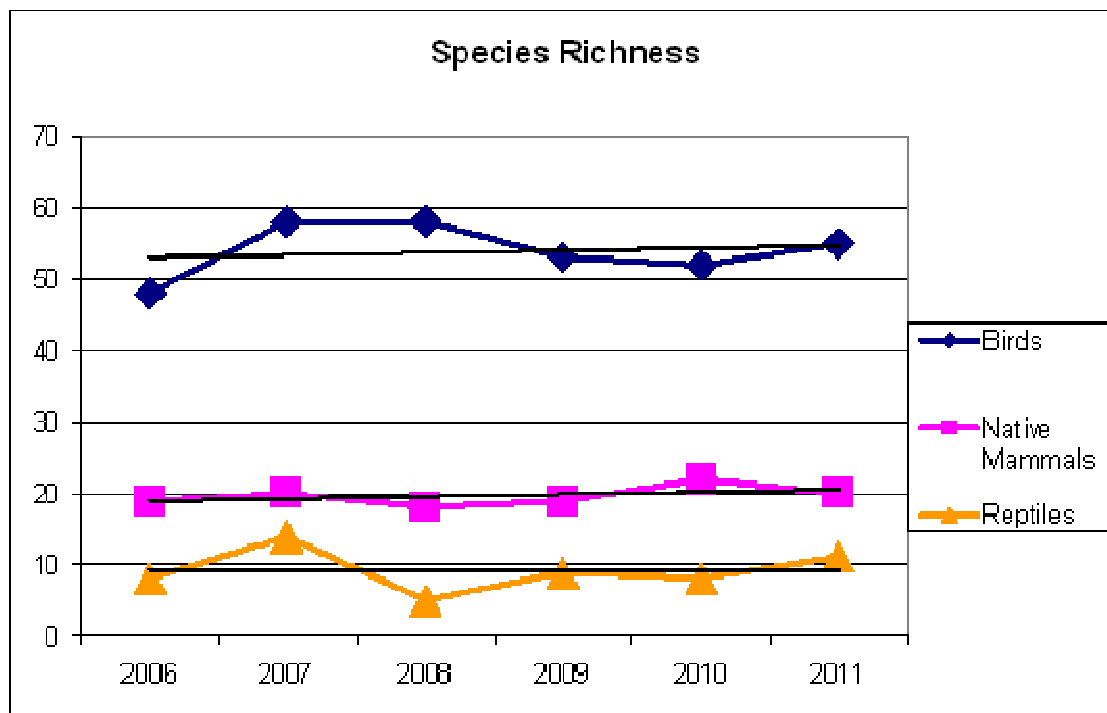


Figure 23: Species richness over time for the three major faunal groups (non-bat native mammals)

Eighteen threatened species have been located within Angus Place SMP Application Area as a result of the surveys between 2004 and 2010. The Brown Treecreeper, Speckled Warbler, Hooded Robin, Scarlet Robin, Flame Robin and Black-chinned Honeyeater are part of a suite of threatened species that are listed because of their declining population status within the western slopes of NSW. This area (called the sheep-wheat belt) has undergone extensive clearing and much of the woodland habitat preferred by these species has been lost. However, in the Newnes Plateau region woodland habitat has been retained (albeit logged), and such bird species are still to be located. None of these threatened bird species would be directly affected by subsidence-induced changes to their preferred habitat.

The threatened species located during the 2011 surveys were those commonly encountered at Newnes Plateau (although they are still rare). The Gang-gang Cockatoo, Flame Robin, Scarlet Robin, Varied Sittella, Large-eared Pied Bat, Eastern False Pipistrelle and Eastern Bentwing Bat were located in 2011. Searching preferred habitats during the warmer months did not result in a sighting of the Giant Dragonfly, *Petalura gigantea*. This insect was sighted in 2010 at a pool on Kangaroo Creek in summer. There were no sightings of the Purple Copperwing Butterfly in the area, nor of the Blue Mountains Water Skink.

Habitat characteristics have been measured within Angus Place SMP Area from results from trap site descriptions. Although there are differences between the amounts of habitat cover between the seasons and between the years, there are no significant differences between the habitat characteristics non-parametric (Kruskal-Wallis One Way Analysis of Variation on Ranks). Overall, the habitat characteristics

have been relatively steady over the years with some slight increases in some parameters since 2007 as demonstrated by Figures 24 and 25 below. This is possibly due to the better climatic conditions experienced from 2007 onwards.

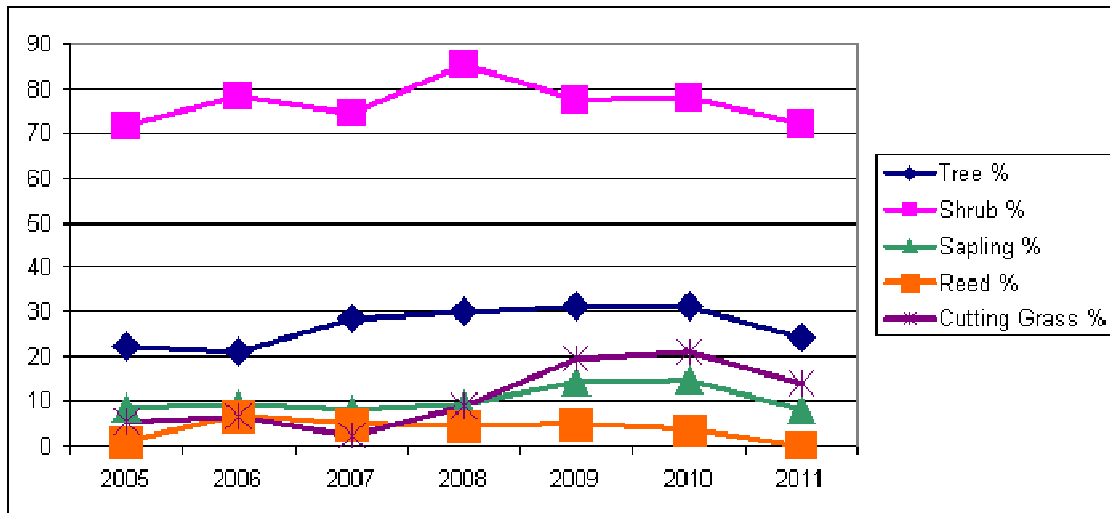


Figure 24: Upper and Middle Canopy Habitat Characteristics

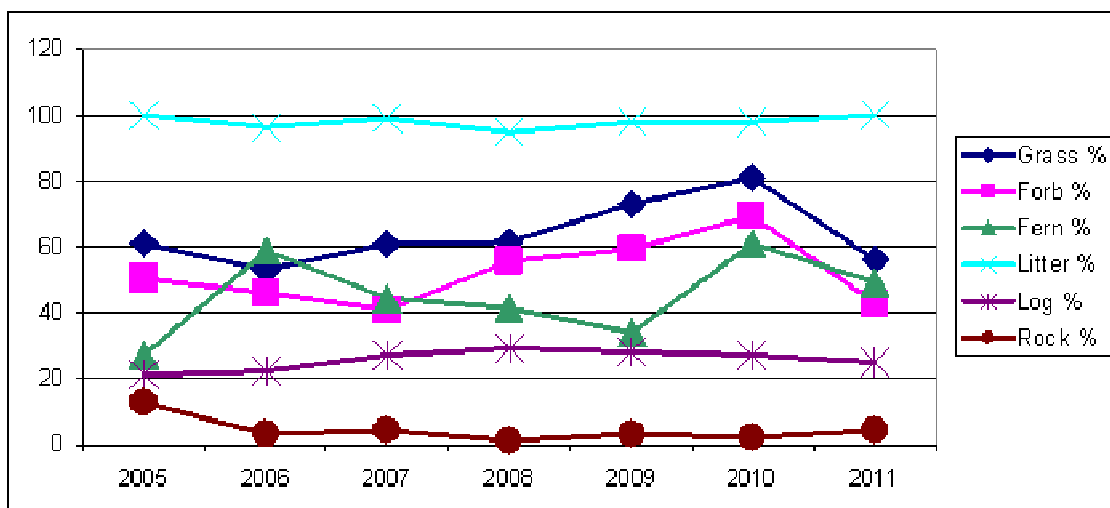


Figure 25: Lower Strata and Ground Cover Habitat Characteristics

Apart for an overall fall in values in 2007 here has been little change in the Simpson's Index of Diversity over the years for all three faunal groups (all trend lines are level). There are no statistical differences over the years for both the Simpson's Index of Diversity and Evenness (ANOVA). The fall in 2007 has been attributed to the drought conditions prevailing at the time. The biodiversity indices for native mammals, birds and reptiles do not differ significantly from that measured in previous years (Figure 26).

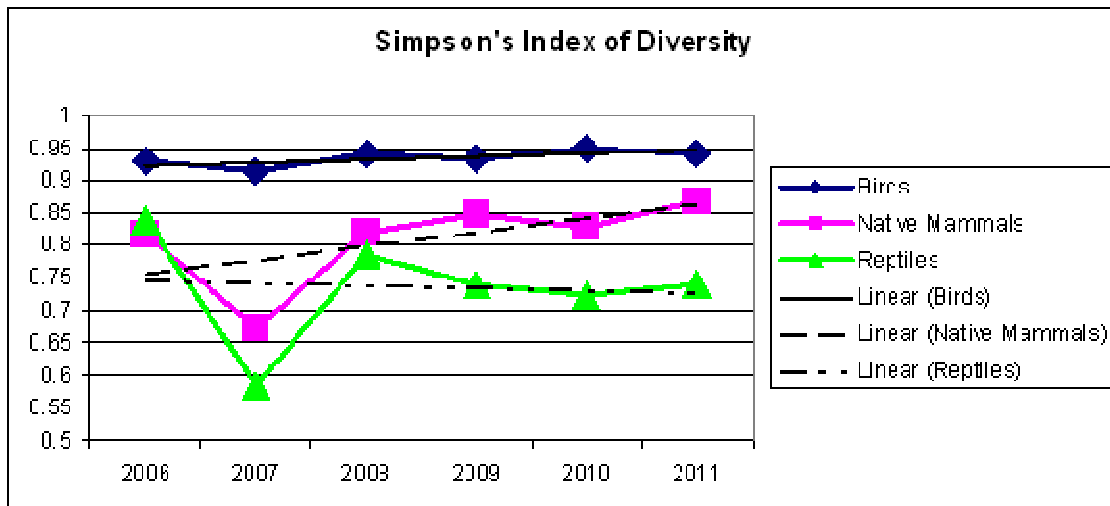


Figure 26: Biodiversity Indices for period 2006 - 2011

With the exception of 2007, no significant differences were apparent between any of the indices used to monitor the fauna obtained at Angus Place Colliery between spring 2005 and 2011.

Comparison against Predictions and Conclusion

Eight Part tests were carried out as part of the 2006 Environmental Assessment process to determine whether or not underground mining activities will have an impact on them or their habitat. The eight part tests concluded that expected implications would be minor if any and that a Species Impact Statement would not be required.

The conclusion from the 2011 analysis is consistent with the initial predictions made in that, at present, there appears to be no evidence of potential effects from subsidence upon the fauna diversity at Angus Place Colliery. Over the years, the survey techniques used have been successful in locating a wide range of species, including new records for the Newnes Plateau region. Such monitoring will continue into 2012.

3.11 GROUNDWATER MONITORING

Groundwater monitoring occurs in accordance with the approved Angus Place Colliery Groundwater Management Plan required under Schedule 3 Conditions 7, 8, 12 and 13 of the Angus Place Colliery Project Approval 06_0021 as well as Condition 2 of the applicable bore licenses. Extraction rates for Bore 940 are located in Section 3.6.5.

In accordance with the Groundwater Management Plan, an intensive monitoring program has been implemented on the Newnes State Forest to detect any impacts from underground mining on the groundwater regime, and in particular the Newnes Plateau Shrub Swamps. The monitoring programs include the following main aspects:

- Within the Angus Place SMP approval area, groundwater levels are monitored in three swamps, with a total of ten shallow groundwater observation bores;
- The groundwater level in the upper aquifer zone in the overburden is measured in five piezometers, which have been installed on the ridges between the swamps;

- A trial soil moisture monitoring program is also being undertaken in Narrow Swamp;
- Multi-level piezometer arrays have been installed in three boreholes in the area to the north east of the current workings; and
- A basic weather station provides climatic data for the Newnes State Forest.

Data are downloaded from these installations on site on a two-monthly basis. At this time, the condition of the instruments is checked, as well as the battery levels and the data quality. The subsequent report which is prepared presents the latest data downloaded from the installations, and includes an interpretation of the data which highlights any anomalies. Comments are also included on evidence of any mining-induced impacts, interpreted from the data over the review period, in swamps that are in the vicinity of active mining areas. This information is reported on a four monthly basis to stakeholders through the Subsidence Management Status Reports.

For the purposes of this report, the swamps in the monitoring program have been divided into three types based on the apparent source of groundwater within the swamp. These types are:

- Type A – dependent predominantly on rainfall infiltration (broad, high level swamps)
- Type A* – dependent predominantly on rainfall infiltration (narrow valley swamps) with some contributions from mine discharge
- Type C – dependent on aquifer water source as well as rainfall contribution (broad valley swamps).

Type A swamps (rainfall dependent) can show large and reasonably rapid variations in groundwater level in response to significant rainfall events, whereas Type C Swamps (groundwater dependent) have a relatively static groundwater level that is largely unaffected by rainfall events. The source of the groundwater in each swamp (and hence the swamp type) has been interpreted solely from the monitoring results to date.

Table 22: Shrub swamp groundwater monitoring infrastructure

Swamp/Area	Longwall Number	Well Nos.	Date Installed	Depth (m)	Swamp Type
Kangaroo Creek	LW 940	KC1	2005	1.1	Type C
Kangaroo Creek	LW 950	KC2	2008	1.55	Type A
West Wolgan	LW 930	WW3	2005	2.4	Type A
		WW4	2006	2.07	
West Wolgan	LW 940	WW1	2005	1.8	Type A
		WW2	2005	2.3	
Narrow Swamp	LW 920	NS4	2008	2.4	Type A*
Narrow Swamp	n/a	NS3	2008	2.8	Type A*
Narrow Swamp	LW 950	NS1	2005	2.35	Type A*
		NS2	2005	2.55	

Kangaroo Creek

The groundwater level at KC1 still appears to be influenced by previous mining activities. During the 2011 reporting period, the water level in KC1 in the lower part of the swamp was near the base of the bore however it is important to note that the groundwater level in KC1 rose briefly following the rainfall at the end of November. (Appendix 8, Graph 2). This behaviour is similar to that demonstrated throughout most of 2010 and was initially observed in June 2008 where there was a sudden reduction in water level not related to rainfall events. An underground lateral flow through mining-induced cracks is assumed to be occurring at this site causing the groundwater level to remain at the base of the bore. The groundwater level and the flow in the creek should eventually be restored if the cracks in the rock become filled with sediment as a result of high rainfall events. This result however will occur gradually and is dependent on prevailing weather conditions. It is important to note that the change to the hydrogeological conditions in the watercourse does not appear to have impacted the vegetation in the swamp to any significant degree

KC2 was undermined by LW950 in January 2010 and Longwall 960 passed 150m south of KC2 in May 2011. No local mining impacts are evident, however as the bore is normally empty anomalous behaviour is difficult to detect. A minor increase in ground water level was seen following rain received in February and August as can be seen from Appendix 8, Graph 3.

West Wolgan Swamp

All piezometers in West Wolgan Swamp are located above or immediately adjacent to LWs 930 or 940, and the upper and lower parts of the swamp showed distinct responses that were consistent with long-term trends (Appendix 8, Graph 4).

In the upper part of the swamp, WW1 and WW2 show similar sharp rises to peaks in groundwater level following heavy or sustained rainfall in January, March, May, November and December. This was followed by slower, steady declines during the drier periods. These groundwater level patterns are typical of periodically waterlogged swamps.

By contrast, WW3 and WW4, in the lower part of the swamp, show slightly different groundwater level behaviour. Both bores showed a sharp rise in groundwater level in March and at the end of November due to rainfall events, but the level declined more rapidly than in the upper part of the swamp. This may reflect the slightly steeper gradient in the lower part of the swamp.

WW1, WW2 and WW3 are above LW940 and were all undermined during October 2007. All three boreholes have continued to show a normal response to the prevailing climatic conditions for a periodically waterlogged swamp (similar to the pre-mining period) and there was no evidence of any significant impact on groundwater behaviour from mining activities. The general rate of rise and subsequent decline in the groundwater levels following rainfall events has been similar to the response measured prior to undermining by LW940 and LW950, which passed under WW1 and WW2 at the end of July 2009. The monitoring results showed no abnormal trends or movements in the groundwater levels which could be attributed to mining.

WW4, above LW930, has groundwater in the bore, with a rising water table, reflecting good rain during the review period. The change in behaviour in WW4 since heavy rains in late 2010 and early 2011, has been sustained throughout the year,

and suggests that groundwater behaviour in the lower part of the swamp is strongly influenced by occasional, peak, rainfall events. Water level fluctuations over this year suggest that there has been no impact from mining at this location.

Narrow Swamp

During the review period, there were no recorded emergency discharges into the Narrow Swamp from Springvale Colliery (LDP005) and no emergency discharges from Angus Place Colliery (LDP006). Because of this, the water levels in NS1, NS2, NS3 and NS4 show normal behaviour for this type of swamp, and only respond to some significant rainfall events (Appendix 8, Graph 5).

Groundwater levels in NS1 and NS2, which are at the upper end of the swamp, were near the base of the casing throughout the review period. The groundwater response demonstrated by NS3 and NS4 are similar to each other, which is attributable to their location in the lower part of the swamp. NS3 and NS4 exhibit an increasing trend following rainfall in February and November. The behaviour is consistent with previous records.

Longwall 970 was adjacent to Narrow Swamp during the reporting period and no impact to groundwater is evident from the monitoring results. However, since the groundwater level in both bores is normally near the base of the hole, any impact would be difficult to detect. Similarly none of the groundwater behaviour in the southern part of the swamp can be attributed to the extraction of LW950, which undermined the two bores in this part of the swamp (NS1 and NS2) during early 2009.

The two bores in the northern part of the swamp (NS3 which has not been undermined and NS4) also showed no apparent impact from previous mining, and continued during the reporting period to show trends consistent with long-term behaviour of a periodically waterlogged swamp.

Ridge Piezometers

Angus Place has two deeper piezometers installed on the ridges in between Narrow Swamp and East Wolgan Swamp. The locations of the two piezometers above Angus Place (RNW and REN) are presented in Appendix 8, Figure 6. RNW is drilled to a depth of 50.46m and REN is drilled to a depth of 55.1m.

RNW was measured 0.71m shallower at the end of May and an additional 0.45m shallower at the end of July. As appears in Appendix 8, Graph 6, cave in of the sandy material within the RNW hole appears to have stabilised. The cave in was considered unrelated to mining activities as longwall 950 passed beneath RNW in May 2009. Longwall 960 extraction was adjacent to the piezometer in September 2010. Historically, the water level at RNW has been dropping steadily over the last 5 years however it had stabilized at the base of the bore since December 2009. At the time of monitoring the hole was dry.

Borehole REN, which has been dry for most of the monitoring history, was wet on in November, with a water table approximately 5 m above the base of the hole. The reasons for this sudden influx of groundwater are unclear at this time. Ongoing monitoring may give an indication whether this is significant. After an initial decline at the start of the reporting period, REN continued to remain dry in line with its historic behaviour.

There are no mining impacts evident from the data, although there was no mining near most of the bores during the review period.

Soil moisture monitoring

Angus Place Colliery is participating in a trial to assess the value of undertaking soil moisture monitoring within the Newnes Plateau Shrub Swamps. Over Angus Place, there is one soil moisture installation located within Narrow Swamp (referred to as NS3). The location of the soil moisture probe is shown in Appendix 1 *Environmental Monitoring Locations*. The results from the soil moisture monitoring for Narrow Swamp are presented in Appendix 8, Graph 7.

The soil moisture content reflects the climatic conditions experienced throughout the reporting period. The current soil moisture profile demonstrates an increase following rain received in early September. Similarly the level of rainfall increased the depth of groundwater below the surface. At higher depths (400-500mm) the moisture content is consistently higher. This indicates that there may be a layer of material that has a higher field capacity and is able to retain greater soil moisture levels over time. At a depth of 1000mm a sharp increase in groundwater depth is observed. This increase in soil moisture content is historically higher when compared to the relative groundwater depth. The groundwater level trends observed in the swamp at this location have been consistent since March 2009.

Multi-level piezometers

As part of the 2010 drilling program, three boreholes were constructed with multi-level vibrating wire piezometers. These boreholes are located approximately 1.5 km northeast of longwall 920. The boreholes were designed to measure groundwater response, mainly in the lower sequence including the coal measures.

Piezometers in AP2PR pressures (Appendix 8, Graph 19) slowly rose in the deepest instruments (#1 and #2), although the rate of pressure rise appears to be declining. As before, generally stable pressures were recorded in the upper piezometers. The magnitude of the pressure rise in the Lithgow Seam instrument (#1) is still unexplained at this stage, but is unexpected given that extraction of the seam is continuing. The closest mining is extraction of LW970, over 8 km to the southwest. Instrument #4 beneath the Mt York Claystone showed no signs of previous instability.

Piezos in AP10PR continue to show generally stable pressures during the reporting period (Appendix 8, Graph 19), with minor rising head low in the sequence, somewhat similar to AP2PR (instrument 1 and 2 — Lithgow seam and below as well as instrument 3 in the roof of the seam). The pressure in these three instruments continues to stabilise. Instrument 7 has previously shown considerable variability, but the data for the current period showed a steady, slowly rising trend, similar to instrument 6, which is also between the Katoomba Seam and the Mt York Claystone.

Piezos in AP11PR (Appendix 8, Graph 19) generally show level trends during the reporting period. Instrument 6 continues stable at the elevated pressure established previously. Instrument 5 just above the Mount York Claystone still appears unstable, with the reduced fluctuations observed since mid-2011 continuing. Data from this instrument must be considered suspect at this time. Instruments 5, 6 and 7 now have a near identical pore pressure level, indicating that they are probably hydraulically connected. Instrument 4 showed pressure fluctuations to 5 m previously, but it has continued the more stable trend established in early 2011. These fluctuations do not appear to relate to rainfall events, and may be instrumental effects, or grout-related,

or due to pressure stabilising in the installed horizon. Instruments 8 and 9 also show pore pressure levels that have been approaching one another since the instruments were installed. This also suggests some hydraulic connection between these two piezometers.

There has been no mining in the area. There are no indications of mining impacts in the piezometer data.

Comparison against Predictions

From the 2006 Environmental Assessment, it was anticipated that the proposed mining at Angus Place Colliery is not likely to result in any significant, long-lasting impact on the upper two aquifers.

Groundwater monitoring activities continue to show that areas that have been undermined continue to exhibit pre-mining behaviour, with the groundwater levels responding to the prevailing climatic conditions. The monitoring results showed no abnormal trends or movements in the groundwater levels which could be attributed to mining during the reporting period and as such are consistent with the initial predictions made in the 2006 Environmental Assessment.

3.12 WEEDS

Major weed threats include blackberry, Scotch Thistle, St. Johns Wart, English Broom and Sweet Briar, which are targeted by the noxious weed control program. Where Pampas Grass and Pine Trees are encountered, these will be sprayed as well.

Weed removal and spraying occurred on a monthly basis around the pit top as a component of the surface maintenance contract. In June 2011 weed survey was conducted targeted blackberry's to establish weed spraying schedule. Accordingly a targeted blackberry spray was scheduled to occur in late November however this was required to be rescheduled for 2012 due to weather conditions.

Photographic monitoring undertaken within Narrow Swamp highlighted that some areas have been colonised by weeds. A s95 certificate was granted by the DECCW to enable weed control works (including hand removal of weeds) to commence. A suitably qualified contractor (the Bush Doctor) has been engaged to undertake the works. This work continued during the reporting period and will continue to be monitored.

3.13 BLASTING

No blasting is carried out at Angus Place and no explosives are stored on site.

3.14 OPERATIONAL NOISE

Potential noise sources from the pit top facility include machinery operations on the pit top (predominantly the Coal Handling Plant), coal sizing and coal loading at the Coal Handling Plant, and coal transportation to the Wallerawang and Mount Piper Power Stations on dedicated coal haul roads.

Noise mitigation controls include the establishment of buffer zones around the surface operations, the restriction of operating hours for major material deliveries and

coal loading and haulage operations, the site conveyor and coal handling upgrade and the complete enclosure of the Coal Handling Plant.

The Angus Place Project Approval (06_0021) contains noise impact assessment criteria (Schedule 3, Condition 16 – Table 23)

Table 23: Noise Impact Assessment Criteria dB(A) L_{Aeq} (15 minute intervals)

“From no later than 28 February 2007, the Proponent shall that the noise generated by the project, including the Proponent’s operation of the haul road to the Wallerawang Power Station, does not the noise impact assessment criteria presented in Table 6 at any residence on privately-owned land.

Land	Day	Evening	Night
Sharpe	42	38	36
Mason (West) and Wolgan Road rural properties¹	41	37	35
Lidsdale village residents	44	40	35

Notes:

- a) *For more information on the references to land in this condition, see ‘Property Details’ figure of the EA.*
- b) *The noise criteria do not apply where the Proponent 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 project 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 $L_{Aeq(15\text{ minute})}$ noise limits in the above table. Where it can be demonstrated that direct measurement of noise from the project 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 emission limits identified in the above table apply under meteorological conditions of:*
 - *Wind speeds of up to 3 m/s at 10 metres above ground level; or*
 - *Temperature inversion conditions of up to 3°C/100m, and wind speeds of up to 2 m/s at 10 metres above ground level.”*

In addition, the Project Approval required the preparation and implementation of a Noise Monitoring Program (Schedule 3, Condition 22). This program was approved by the Department of Planning on the 12 June 2007.

Noise monitoring surveys were undertaken for the quarters ending April, July, October and January 2012. Full monitoring reports appear as Appendix 11. The table below provides overall Angus Place noise contributions measured during 2011 against the Project Approval limit criteria.

Table 24: Angus Place overall noise contributions measured during 2011

	Limit	Apr	July	Oct	Jan*
Day					
Sharpe	42	37	39	36	41
Mason	41	36	37	36	41
Neubeck	44	41	40	39	41
Evening					
Sharpe	38	33	40	44	<30
Mason	37	32	37	43	<30
Neubeck	40	<30	39	39	<30
Night					
Sharpe	36	32	32	30	<30
Mason	35	30	30	30	<30
Neubeck	35	<30	<30	<30	<30

* monitoring for the quarter ending January 2012 was undertaken in December 2011.

The graphs below illustrate the above results against the Project Approval limit criteria.

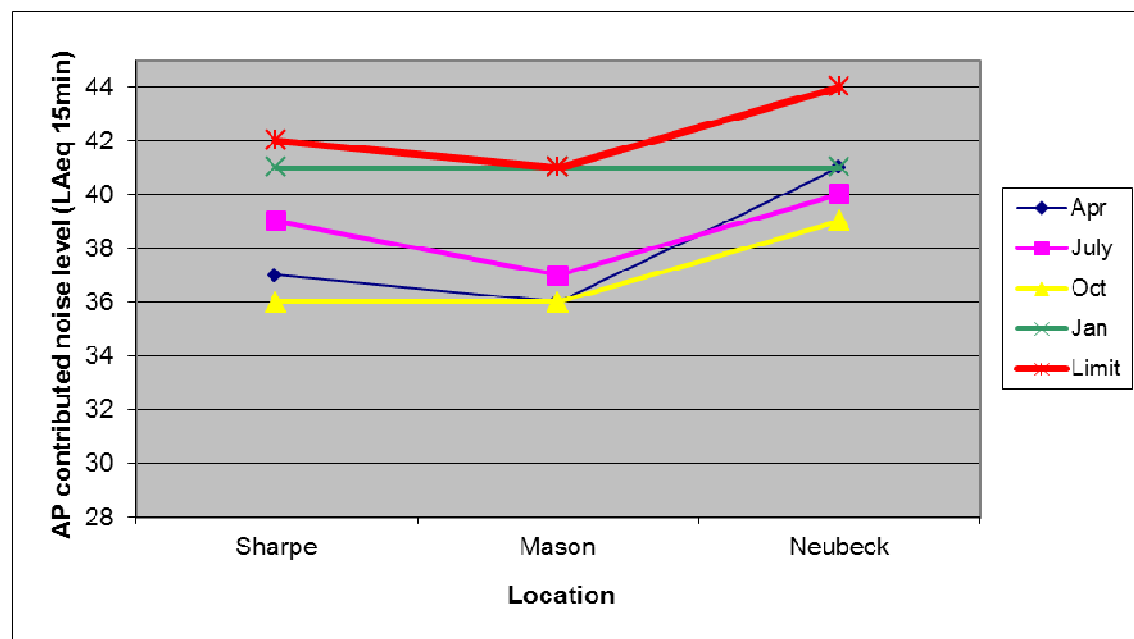


Figure 27: Daytime noise modelling results (7:00am – 6:00pm)

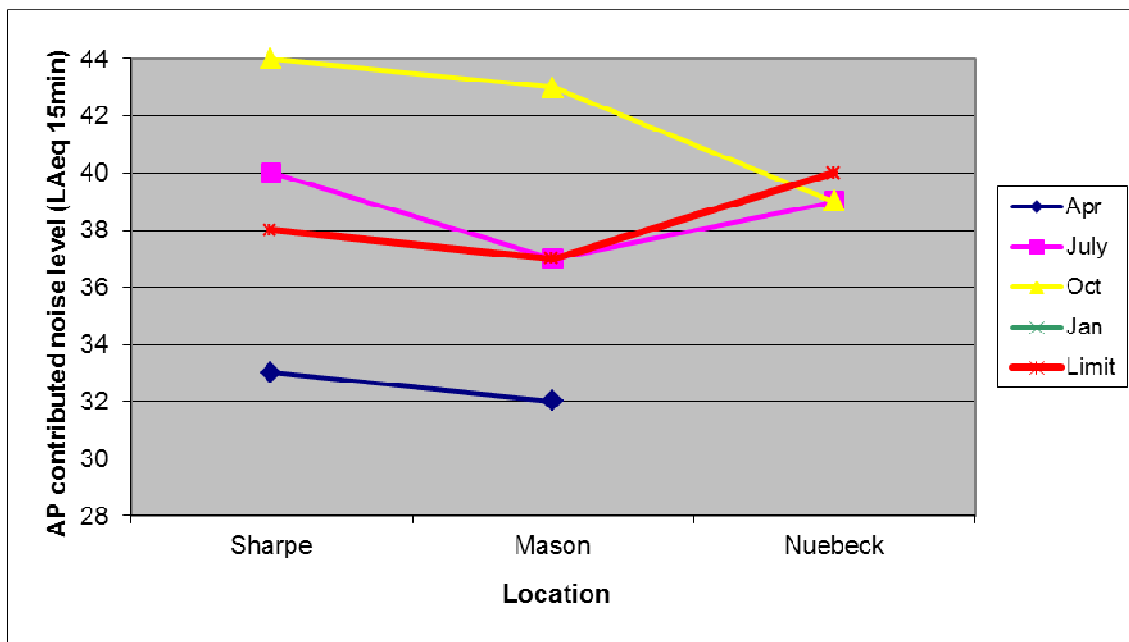


Figure 28: Evening noise modelling results (6:00pm – 10:00pm)

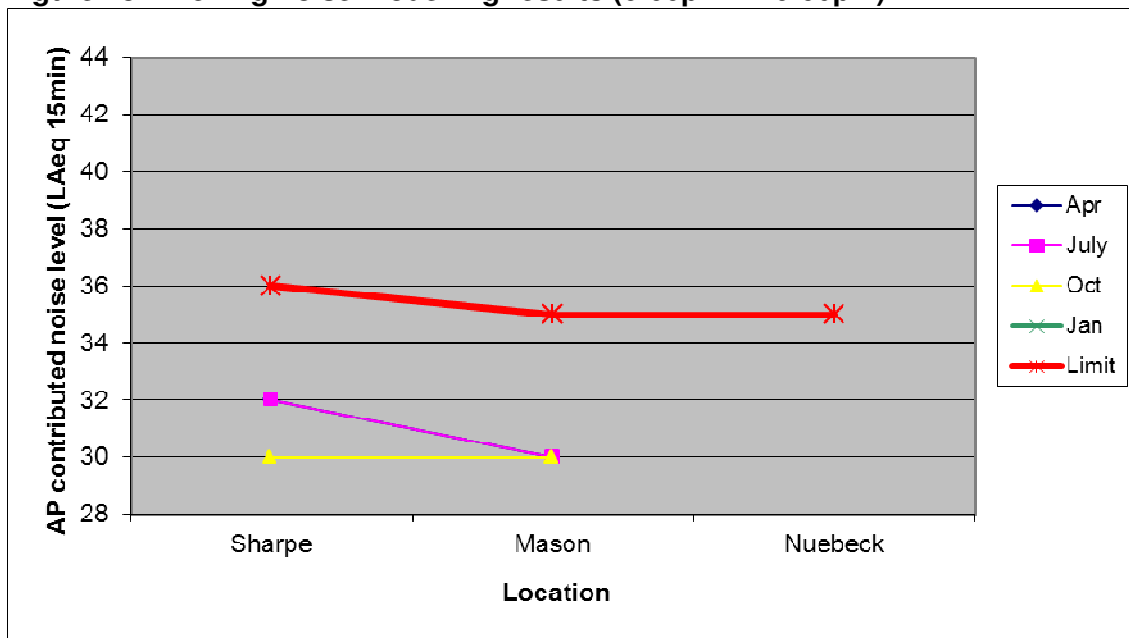


Figure 29: Night time noise modelling results (10:00pm – 7:00am)

Note: those values which are below the practical quantitation level have been omitted.

The site noise monitoring results based on the Colliery's activities, as well as localised and distant noise sources have been assessed to determine Angus Place Colliery contributions. The results show the noise generated by Angus Place Colliery is compliant with the Project Approval/EPL limit criteria for the quarters ending April, and January at all three receptor locations. From Table 24 and Figure 28, evening noise monitoring undertaken for the quarters ending July and October was not compliant in the evening. Results were above the evening criteria at Sharp in both quarters however at Mason results were above the criteria in October monitoring only. For the quarter ending July 2011 monitoring was undertaken on the 28th of June and for the quarter ending October 2011 monitoring was undertaken on the 7th of September. No community complaints were received in during the reporting period.

In June an analysis of the results attributes the exceedance to elevated truck movements along the Wallerawang Haul Road to Angus Place Colliery. To address this issue Angus Place has enforced that only 5 trucks are to be utilised along Wallerawang Haul Road during evening periods to reduce truck movements.

In September the exceedance was believed to be due to the following contributing factors; the number of movements on the Haul Road during the evening time, the presence of a non-prevailing noise enhancing wind from the NNE – ENE, high engine noise from the use of engine braking systems, condition of the haul road surface, particularly near mason where large amounts of ‘body rumble’ from empty trucks was audible. To prevent reoccurrence of the incident the exceedance was raised with the trucking contractor to ensure that a maximum of 8 loads per hour occur (8 movements from the mine and 8 return trips) will be used along the Wallerawang Haul Road during evening hours. Ongoing monitoring of truck movements will ensure this action remains in place. A toolbox talk was delivered to truck drivers on the 16/9/2011 outlining the importance of controlling truck speed, minimising engine exhaust brake noise, maintaining road surfaces and vehicle checks on trucks to ensure components are secure and operating according to the manufacturers specifications.

Angus Place engaged a consultant in August to assess noise reduction strategies applicable to the site and conducted noise modelling to determine the effectiveness of these controls. The consultant also aimed to define the number of trucks that could be utilised at different time periods of the day to optimise haul road usage. A draft report was received by the colliery in December 2011. Noise barriers were not considered likely to be effective at sharp and mason receiver therefore acoustic treatment of individual receivers and negotiated agreements are being investigated for these locations

Monitoring undertaken on 7 December 2011 demonstrated that Angus Place Colliery was compliant with the EPL/PA criteria following this action.

Comparison against Predictions

Table 25 highlights the initial noise predictions documented in the 2006 Environmental Assessment and provides a comparison against the highest results obtained during the 2011 reporting year.

Table 25: Angus Place overall noise contributions measured during 2011 against EA predictions

Reference	2006 EA predictions (max)		2011 actual (max)	
	Day	Evening	Day	Evening
Sharpe	45	45	41	44
Mason	44	44	41	43
Neubeck	47	47	41	39

Angus Place Colliery produced lower noise levels during 2011 with respect to the initial predictions made in the 2006 Environmental Assessment.

3.15 VISUAL STRAY LIGHT

Visual stray light is not considered to pose adverse environmental impacts at Angus Place Colliery due to surface footprint, locality and the distance to neighbouring properties. There have been no complaints received in the operating life of the colliery in relation to visual stray light.

During 2011 a lighting engineer attended Angus Place colliery during the reporting year. The consultant reviewed the lighting audit undertaken during 2008 and proposed the relocation of lights situated within the primary colliery carpark. It was identified the installation was not undertaken according to the lighting plan supplied due to infrastructure restrictions. A plan was subsequently developed to meet requirements of AS/NZ 4282, 1997 Control of the Obstructive Effects of Outdoor Lighting. A review of the revised lighting plan was undertaken with electrician and site engineers who subsequently identified a need to alter supplied. This is currently being undertaken and therefore the project will continue in 2012.

While it has been identified the colliery complies with the intent of the AS4282, documentation to demonstrate compliance with Schedule 3 Condition 30 of Project Approval 06_0021 will be obtained following the completion of the project.

3.16 ABORIGINAL HERITAGE

Exploration Assessments

All land clearance works required for exploration activities during 2011 and beyond were assessed under Part 5 of the *NSW Environmental Planning and Assessment Act 1979*. This process required the preparation and submission of a Review of Environmental Factors (REFs), encompassing an Aboriginal heritage assessment. All supporting REFs for the 2011 drilling program were drafted and submitted during 2010 which concluded that no aboriginal heritage sites would be disturbed as a result of exploration activities.

Geotechnical Borehole

AHIMS database search was undertaken on the 25th of July 2011 and results were digitised and plotted using commercially available software. No registered sites are located within, adjacent to or near the Geotechnical Borehole. Further, vegetation types and distance to permanent water in / from the Geotechnical Borehole reduced its archaeological potential.

This assessment was not undertaken following the DECCW 2010 Aboriginal Cultural Heritage Consultation Requirements.

An archaeological assessment was undertaken by Mrs Jenny Streatfeild (OzArk Environmental & Heritage Management) and Chantelle Peters of Bathurst Local Aboriginal Land Council (BLALC) and Jason Brown from the Gundungurra Tribal Council Aboriginal Corporation (GTCAC) on the 9th of June 2011.

Ventilation Facility Project

A search was undertaken of the Office of Environment & Heritage (OEH) Aboriginal Heritage Information Management System (AHIMS) on 21 July 2011 for a 5 km

radius centred on the project area. A total of 41 sites were identified within that search radius. The most common site types within the local landscape are shelters with deposit (51.21%), followed by artefact scatters (17.07%) and shelters with art (12.20%).

Based on the AHIMS, historical and environmental data as well as a review of previous archaeological investigations conducted in the area, a predictive model was developed. It is predicted that the most likely site types to be encountered within the project area are shelter either with/without art and/or deposit and/or artefact scatters. In areas where old growth vegetation remains, scarred trees are also possible.

A survey of the project area was conducted on 16-17 November 2011 in conjunction with Chantel Chapman of Bathurst Local Aboriginal Land Council, Shaun Brown of Gundungurra Tribal Council Aboriginal Corporation and Elwin Wolfedon of Mingaan Aboriginal Corporation. No sites were identified as a result of the survey. As no sites were identified, no mitigation measures are included and recommendations are both general and applicable to all of the project area, unless otherwise specified.

Aboriginal Group Consultation

During 2011 A meeting was facilitated in February and September 2011 between Angus Place, Springvale and Clarence Collieries and the GNTCL regarding the western region. The meetings provided an operational update with respect to aboriginal heritage work undertaken for the 75W modification and the exploration program. During the meeting the group also discussed what activities the GNTCL were currently undertaking.

3.17 NATURAL AND EUROPEAN HERITAGE

European Heritage

During 2011 Angus Place reviewed European Heritage Study of the former Vale of Clwydd No.2 Colliery (VOC#2) mine site.

The study area is located over Lot 248, DP 751636 and is approximately 3 hectares. The pit top is located to the west of Wolgan Road, approximately 1km north of the Angus Place pit top. VOC#2 began extracting coal circa 1929 and was closed a year later in 1930 amid financial troubles. This heritage study has included historical research, a physical evaluation of the site and preliminary mapping and has confirmed that VOC#2 has very little documented evidence associated with it that still remains.

The most intact remnant surviving items at VOC#2 relate to the drift entry way and the brick building that sits atop it. Due to the paucity of information available it is considered that further historic research by Centennial is not warranted and that the significance of the VOC#2 has been adequately established by this study. The VOC#2 satisfies Criterion B of the NSW Heritage Branch Criteria at a local level: *An item has strong or special association with the life or works of a person, or group of persons, of importance in NSW cultural or natural history (or the local area).* In addition the VOC#2 also satisfies the NSW DII attribute of being associated with a key specific historic event, in this case, the Northern Lockout of 1928 – 1930 which was one of the biggest industrial disputes in the history of NSW.

The recommendations were supplied to an architecture firm who supplied a proposal to conserve various remnant items found on the site of Vale of Clywdd No. 2 into a low maintenance park setting which will explain the industrial and cultural heritage of the site. This proposal will be reviewed following rehabilitation of the site.

Land Use

The Newnes State Forest occupies the area above the Angus Place underground coal leases and is managed by Forests NSW, who regularly undertake logging activities. In addition to logging activities, tracks are maintained by Forests NSW which attract 4WD and trail bike enthusiasts. The area is also very popular for campers and bushwalkers.

Flora, Fauna and Habitat Types

Threatened flora and fauna were discussed in Sections 3.9 and 3.10 respectively.

Vegetation communities are important because they indicate fauna habitat areas. Such vegetation communities also add to the natural heritage value of an area. The vegetation communities associated with the mining activities of the Angus Place are presented in the table below.

Table 26: Habitat Types and Vegetation Communities above Angus Place

Habitat Types	Vegetation Communities
Woodland/Forest	Montane Gully Forest
	Newnes Plateau Woodland
Heath	Montane Heath
Wetland	Shrub Swamp
Cliffline	Pagoda Complex

Newnes Plateau Shrub Swamps are listed under State and Federal legislation (Section 3.9.1). Angus Place has three swamps above its SMP Approval area located on the Newnes State Forest. In addition, populations of endangered and vulnerable species, as identified under the *Threatened Species Conservation Act 1995* and *Environment Protection and Biodiversity Conservation Act 1999*, have been identified during previous assessments and are managed in accordance with the applicable management plans.

Prior to any form of land clearance, permission is sought in accordance with the requirements stipulated under the *NSW Environmental Planning and Assessment Act 1979*. REFs prepared and executed during 2009 and 2010 determined that any impacts to natural heritage items would be within an acceptable level of tolerance as a result of land preparation required for the 2010 and proposed 2011 exploration programs.

During 2011, there were no areas of World Heritage significance, specifically, the Gardens of Stone National Park sandstone pagodas, escarpments and clifflines undermined by Angus Place mining activities. In 2012 it is not proposed to undermine any World Heritage areas.

3.18 SPONTANEOUS COMBUSTION

The Lithgow coal seam has a low propensity for spontaneous combustion, with spontaneous combustion issues in relation to *in-situ* or processed Lithgow seam coal being rare. The highest risk of spontaneous combustion in relation to Lithgow seam coal appears to be during stockpiling for greater than approximately 2 years. Coal at Angus Place Colliery is stockpiled on average for 1-2 days due to the fixed long-term contracts the mine has secured. There have been no incidents of spontaneous combustion in the history of Angus Place Colliery.

3.19 BUSHFIRE

Bushfire management is undertaken in consultation with the Rural Fire Service (RFS) and Forests NSW. No controlled burns were deemed necessary with respect to the Angus Place Colliery pit top surface operations during 2011. Fire management and controlled burns within the Newnes State Forest is the responsibility of Forests NSW.

Fire fighting measures on the pit top are restricted to the use of fire extinguishers and fire hydrants for use of fighting fires associated with infrastructure. The RFS will be requested to assist with bushfire events in close proximity of the pit top.

During 2011 a Bushfire Management Plan was developed for the Newnes Plateau exploration area. This plan has been distributed to contractors and staff accessing this area.

3.20 MINE SUBSIDENCE

If not adequately managed, mine subsidence can result in adverse impact to the environment in which we operate and subsequently affect our social license to operate by generating adverse perceptions amongst the community and our stakeholders. Mine subsidence impacts have been highly publicised (particularly within the Southern Coalfields) resulting in elevated community, non-government organisation and government interest.

During the reporting year, longwall 960 passed beneath Kangaroo Creek in May 2011 and Kangaroo Creek Road was undermined between February and May 2011.

Inspections over this period detected evidence of minor hairline cracking during photographic monitoring on July 28th 2011, which was reported to Forests NSW in accordance with Section 7.3 *Infrastructure* of the Angus Place *Subsidence Management Plan Environmental Monitoring Program*. The natural process of sedimentation has filled the cracks. To this end, no action was required to be undertaken by Angus Place to mitigate the effects of minor subsidence.

Longwall 960 was completed on the 5th July, while longwall 970 commenced on the 24th August 2011. East Wolgan Swamp was undermined by longwall 970 in August and September 2011. Periodic monitoring occurred throughout this time and was reported accordingly in the four monthly SMSRs. No private infrastructure was undermined during 2011.

On the Newnes Plateau, subsidence monitoring has been carried out using the following subsidence lines (see Appendix 1 for locations):

Subsidence Baseline Data – Subsidence Line B

Two subsidence surveys were conducted along the B Line on the 20th January and 20th July 2011. The maximum subsidence measured was 1.278m at station B90. This represents 12% above the predicted maximum subsidence value of 1.14m and is less than 1.311m or 15% above subsidence prediction. The next scheduled survey of this line is due May-June 2012.

East Wolgan Swamp – Subsidence EWS Line

Two subsidence surveys were carried out on the EWS Line during the reporting period. Surveys were carried out on the 13th July and 21st November 2011. The measured maximum subsidence was 1.302m at station EWS33. This represents 12% above the maximum predicted subsidence of 1.14m and is below the 115% notification level. This survey was the last scheduled survey for this line.

East Wolgan Swamp – Subsidence M Line

Two subsidence surveys were carried out on the M Line on the 7th July and 21st November 2011. The maximum subsidence measured was 0.759, well below the maximum predicted subsidence of 1.14m. The next scheduled survey of this line is due at the end of 2012 or early 2013.

In accordance with the commitments made in the Subsidence Monitoring and Reporting Program 2007, relevant subsidence lines have been surveyed. Maximum subsidence, tilts, tensile strains and compressive strains are presented in the table below.

Table 27: Maximum Subsidence Tilts and Strains Detected as of 31/12/2011

Line	Subsidence (mm)	Tilt (mm/m)	Tensile Strain (mm/m)	Compressive Strain (mm/m)	Comments
A Line	1319	-	-	-	Final survey 21.3.2006 Subsidence within Prediction (under LW27 Section 138)
B Line	@1278	6.6	1.9	7.8	Exceeded prediction for subsidence
E Line	1012	12.5	6.5	^26.3	Final survey 15.4.2010 Exceeds prediction for strains
EWS Line	#1302	13.1	#13.3	#18.1	Final survey 21.11.2011 Exceeds prediction for subsidence and strains

F Line	*1750	18.0	6.5	15.9	Final Survey 23.9.2010 Exceeds ORIGINAL Predictions within Revised Prediction for areas WITHIN Faulted Zones see Table 33
M Line	759	7.2	2.0	8.5	Subsidence Parameters within Predictions
WWS - A Line	1071	2.5	4.0	3.9	Final survey 7.9.2009 Subsidence Parameters within Predictions
WWS - B Lines	1068	8.8	2.0	6.2	Final survey 7.9.2009 Subsidence Parameters within Predictions

+This subsidence line no longer measured (Date of Final Survey)

@Inspection at location of greater than predicted subsidence (102.1%) carried out as per *SMP Environmental Monitoring Plan Conditions 12,13,14 (March 2006)*

^Subject of Notification 30.6.2008 *Anomalous Subsidence Survey Results for "E" Line*

*Subject of Notification 25.5.2009 *Subsidence Anomaly Along Survey Line "F" Survey - Longwall 950*

#Subject of Notification 10.6.2009 *Subsidence Anomaly Along Subsidence Survey Line EWS east of Panel 950*

Ditton Geotechnical Services Pty Ltd completed an independent review of all the subsidence predictions associated with the SMP LW930-980. The recommendations from this report were adopted and a *Variation to the Recommended Amendments to the SMP Written Report Impact Parameters* was submitted in February 2011. Angus Place is waiting for confirmation for acceptance subsidence impact parameters. This will be reported in next year's AEMR

3.21 HYDROCARBON CONTAMINATION

In 2010 a self bunded Transtank was delivered to site to improve diesel storage and reduce the risk of contamination. This was commissioned in December 2011. The new unit allows an enhanced level of security against potential diesel spillages. Additionally the tank will improve the quantification of diesel usage to enhance greenhouse reporting systems

The installation of the oil water separator which was installed was finalised in quarter one 2011. A schedule has been established to ensure the unit is maintained. Water

passing through the oil water separator reports to LDP002. All results during the reporting period were below the detection limit (5mg/L).

Additionally during 2011 contaminated land assessments were conducted at both Kerosene Vale and Vale of Clwydd No 2 to identify hydrocarbon contamination. For information regarding contaminated land assessments refer to Section 3.8 *Contaminated Land*.

3.22 METHANE DRAINAGE/VENTILATION

The Lithgow coal seam is extremely low in methane gas content and therefore no active management such as methane drainage is required. Methane monitoring in mine ventilation gases is undertaken however for mine safety reasons. Methane monitoring has shown that there is very little methane production from the underground activities at Angus Place.

3.23 PUBLIC SAFETY

Public safety risks associated with the pit top, Kerosene Vale and the coal haulage roads are largely associated with public trespass. Regular security patrols are carried out around these areas to minimise public trespass. Public signage has been installed at Angus Place, Kerosene Vale and Commonwealth Collieries to warn the public against entry to the site.

In accordance with the requirements of the Angus Place SMP approval, the Public Safety Management Plan was reviewed during 2010 and submitted to the Industry and Investment NSW District Inspector for comment. Feedback and subsequent approval was received in early 2011.

Issues detailed within the Public Safety Management Plan mainly relate to subsidence caused issues such as surface cracking, particularly that located along public forest roads. In accordance with the approved plan, Angus Place Colliery installed signs to warn the public of potential dangers resulting from subsidence. Signs were erected adjacent to the various roads and tracks as they approached the mining zone. Regular inspections are carried out to check on these signs as some have been defaced or removed by persons unknown.

3.24 OTHER ISSUES AND RISKS

Other minor environmental risks have been identified during the review of the Angus Place Environmental Risk Assessment; however, the existing controls should be adequate to manage any exposure.

3.25 FERAL ANIMALS

There was no feral control programs carried out by Angus Place in 2011. Feral animals are not considered a significant environmental risk.

3.26 GREENHOUSE

Angus Place is required to report on investigations undertaken to reduce greenhouse gas emissions generated by the project (Project Approval 06_0021 Schedule 3, Condition 31(c)) and report on the investigations in the AEMR. Angus Place, as part of Centennial Coal, became a signatory to the Greenhouse Challenge Program in 2006.

Of the six greenhouse gases identified in the Kyoto Protocol, Angus Place produces four of these, including methane (CH₄), carbon dioxide (CO₂), nitrous oxides (NO_x) and Sulphur hexafluoride (SF₆). Previous reporting obligations by Centennial Coal under the Greenhouse Challenge Plus program precluded the reporting of NO_x and SF₆ until the introduction of the National Greenhouse and Energy Reporting Act 2007. As such, no historical data is available for these gases.

Angus Place monitors the emissions of methane and carbon dioxide from electricity consumption, fugitive methane and carbon dioxide from underground coal mining activities and diesel consumption. The table below summarises the greenhouse emissions for the 2011 reporting period contrasted against emissions from 2010. All data is presented over the following pages, with graphs illustrating the 2010 and 2011 data.

Table 28: 2009 – 2011 Emission Summary greenhouse data

Emissions Summary (Co2-eT)				
Total Emissions Consist of:	2009 – 10 FY	2010 – 11 FY	Variation Between FY's	% Change Between FY's
Scope 1	44,017	48,771	4,754	+10.8
Scope 2	34,629	36,186	1,557	+4.5
Total	78,646	84,957	6,311	+8.0

+ indicates an increase

- indicates a decrease

Scope 1 emissions: refers to the greenhouse gas emissions released to the atmosphere through activities conducted at the site. These emissions can be controlled and managed by the Colliery.

Scope 2 emissions: refers to the greenhouse gases emitted by a secondary facility. For the 2011 AEMR the scope 2 emissions are directly related to the amount of electricity used at the Colliery.

Overall the 2010– 2011 financial resulted in electricity consumption causing 43 % of the overall greenhouse gases emitted. Site based emissions resulted in 57% of total emissions attributable to diesel use, LPG, oil and grease consumption, waste generation etc.

Projects proposed for the Energy Savings Action Plan (ESAP) continued to be implemented throughout the 2011 year. These projects included:

- Conveyor Load Control
- Wonder Non-Destructive Testing and efficiency improvements
- Longwall face water management reduction
- Concrete trailer (increased capacity-less trips)
- Compressor system upgrade

The effectiveness of these projects in reducing energy usage will continue to be monitored to determine the effectiveness of these strategies.

4 COMMUNITY RELATIONS

4.1 ENVIRONMENTAL COMPLAINTS

There was no community complaints received at Angus Place during the reporting period. The table below shows community complaints over the past five years.

Table 29: Community Complaints over a Five Year Period

	2007	2008	2009	2010	2011
Complaints	1	0	0	1	0
Subject	Noise	-	-	Noise	-

4.2 COMMUNITY LIAISON

Subsidence Community Consultation Program

During 2006, Angus Place Colliery developed a Subsidence Community Consultation Process (SCCP) as required under the SMP Approval. The SCCP refers specifically to how Angus Place Colliery will consult with the relevant stakeholders regarding the management and reporting of subsidence impacts. The SCCP was reviewed in 2010 and subsequently Industry and Investment NSW did not object with its content. During 2011, the longwall 960 End of Panel Review was facilitated following the completion of the End of Panel Report required under the SMP Approval. The End of Panel Review meeting is a beyond compliance commitment made in the SCCP to discuss issues with all stakeholders (including community groups) prior to the commencement of the next longwall. The meeting was held on 5th of October 2011.

Community Consultative Committee

Schedule 5, Condition 8 of the Angus Place Colliery Project Approval 06_0021 required the establishment of a Community Consultative Committee (CCC). Nominated members of the Angus Place CCC were approved by the Director General (DoP) on 13 December 2006 and the first meeting was held on 5 February 2007. In 2011, a meeting was held on the 27th of September however there was no quorum. A second meeting was scheduled 14th of December and was rescheduled 20th of December. Neither Date was suitable due to prior commitments. Angus Place did seek additional community members in 2011 however this recruitment process is yet to be finalised and will continue throughout 2012.

Angus Place School Engagement Program

Angus Place Colliery identified an opportunity to assist local school children with their studies after a Year 6 student approached a member of staff to help with an assignment on fossil fuels and renewable fuels during the 2010. As the assignment given was linked primary school curriculum, it was believed that Centennial could provide factual information on the relevant subject in the syllabus which could benefit the community.

Angus Place Colliery approached principals of local schools who coordinated a meeting where Angus Place expressed their interest in working with the students and teachers to provide information regarding fuel sources, energy, mining techniques and their associated environmental impacts. The teachers were excited at the opportunity to work with the colliery and to discuss how centennial proposed to deliver the information to the students.

Angus Place provided proposed the following program to the teachers which was accepted and in turn delivered by colliery staff:

- School visit- Site Environmental and Community Officers to attend and deliver a presentation linked to the syllabus. Key Topics discussed included: What is energy,

Different Forms of Energy, Examples of renewable and non-renewable forms of energy, How coal is mined, Who Centennial is and what we do, why is coal a valuable resource, how is coal converted to electricity, advantages and disadvantages of coal based electricity, how they could reduce their impact on the environment and how to save energy at home.

- Teachers were provided a Handbook which provided more detailed information and activities students could complete in the classroom or for homework such as quizzes, energy source sudoku, word searches and cross words

- Angus Place provided funds to transfer students to and from the Mines Rescue Station

- At the Mines Rescue Station students were:

- Given a brief presentation on mining and the environment to recap what was learnt during the school visit

- Shown an energy, mining and spill response video

- Shown mine rescue vehicles and emergency equipment e.g. CABAs

- The students were then split into 3 groups which rotated through virtual reality software showing underground mining, 3D Dome showing open cut mining, identified how different substances can be distinguished and tested at home (e.g. litmus paper and pH probe), demonstrated how spill kits can be used to prevent harm to the environment and what can be used at home to stop and clean up spills

The program was undertaken in August 2011 and feedback from all participants was very positive. As mining is an industry many members in the Lithgow community work in exposure in safe and controlled environment provided insight to the working life of their parent, brother or sister, grandparent, aunty or uncle or neighbour.



Figure 30: Demonstration of spill clean up with school students at Mines Rescue Station

Celebrate Lithgow

Angus Place supported the Centennial marquee at Celebrate Lithgow during November 2011. Throughout the day Centennial employees were available to discuss current operations and activities occurring in the Lithgow region. A number of mine plans and images were on hand for illustrative purposes.



Figure 31: Centennial employees helping out at Celebrate Lithgow

Donations

During the reporting period, Angus Place sponsored many community events and programs including:

- Lithgow Flash gift
- Central West Supported Playgroups
- NAIDOC Week
- Rydal Show
- Community and Drug Action team
- Lithgow Tidy Town Committee
- Centennial Coal Cup Rugby League Competition

Newsletters

Throughout 2011 Angus Place Colliery contributed to the Centennial Coal Western news page, which appears monthly (third Thursday of the month) in the Lithgow Mercury. The news page provides the regional community with an update of Centennial's western operations, as well as activities taking place within the community. Also featured were the community information telephone lines specific to each operation.

Non-governmental Organisation Consultation

Centennial personnel engage regularly with regional non-governmental organisations regarding a number of issues. Most notably are the meetings with the Colong

Foundation for Wilderness and the Blue Mountains Conservation Society. Discussions primarily focus on SMP related matters concerning Centennial Springvale and Angus Place Colliery.

5 REHABILITATION

5.1 BUILDINGS

During the reporting period, no buildings were removed. It is anticipated that no buildings will be removed from the site until mining operations are completed.

5.2 REHABILITATION OF DISTURBED LAND

5.2.1 Kerosene Vale

The decision not to open cut Kerosene Vale was finalised during 2010. Angus Place has undertaken both Phase 1 (2010) and Phase 2 (2011) contaminated land assessments at the site to enable rehabilitation activities to commence in accordance with the rehabilitation plan (Appendix 8).

5.2.2 Newnes Plateau

During 2011, one borehole site was rehabilitated in accordance with the Angus Place rehabilitation standard which was drafted by Angus Place in consultation with Forests NSW during December 2009. The standard requires consultation with the Landowner (Forests NSW) to determine an appropriate timeframe for rehabilitation activities to adhere to. The following job steps are required under the standard:

- Once exploration has been completed the site must be inspected by the Angus Place Environmental Officer (or their delegate) to ensure that there is no risk of land contamination, apparent refuse and examine the level of soil compaction.
- The initial stage requires that the dirty water sump is to be filled in without the risk of water loss. It is also important that the surface soil and sub-surface soil is not blended.
- Prior to spreading stockpiled vegetation the 30 x 30 drill site must be 'ripped' along the topographic contours to allow enhanced germination and soil aeration. This process should also be applied to any access tracks where soil compaction is evident.
- Stockpiled topsoil and vegetation should then be respread across the site and over all access tracks.
- Quarterly monitoring of sites should be conducted by the Angus Place Environmental Officer (or their delegate) to assess rehabilitation progress. This process should include observations of endemic species density and any level of soil disturbance. Photographic evidence should be taken to record findings and observations.
- If natural revegetation appears to need acceleration the following rehabilitation techniques should be implemented:
 - Mulch cover applied over site for soil protection
 - Brush matting used to import seed onto cleared areas
 - Open weave jute mesh pegged in by steel pins
 - Brush harvesting from the nearby area
 - Ripping of compacted wheel tracks (a herring bone pattern with an excavator mounted ripper)
 - Cross drains may also be required along long slopes on access tracks.

It is important that the above processes are undertaken in consultation with the landowner(s) with evidence of a written authority to undertake these tasks.

Boreholes currently being rehabilitated are from the 2010 exploration program. Initial rehabilitation activities across the 2010 Angus Places Exploration boreholes involved removing all surface infrastructure, fencing, waste and used materials from the sites upon completion of the works. Established sumps were also refilled with stockpiled

soils while topsoil and windrowed vegetation was strategically spread over the disturbed area.

The inspection undertaken on the 30th of May 2011 indicated minimal disturbance at the borehole locations. Strategically placing windrowed trees in the entry of the sites prevented vehicle access to the area after the exploration program was completed.

Presently there are very few exotic species identified in the proximity of the boreholes indicating hygiene and machine washdown methods adopted during the program were successful in preventing the introduction of weedy species.

Angus Place is continuing monitor the progress of rehabilitated sites to meet the standard required the latest round of quarterly monitoring revealed the sites rehabilitated during 2011 have progressed well. This rehabilitation process will continue throughout the 2012 reporting period.

5.2.3 Angus Place Pit Top

No rehabilitation activities were carried out at the Angus Place Colliery pit top during the reporting period. A Mine Closure Strategy is required under the 2006 Project Approval at least three years before mining ceases (Schedule 3, Condition 36). This Condition is not yet applicable, however, as requested by Industry and Investment NSW in Attachment A of the 2009 AEMR approval notice, a rehabilitation plan regarding proposed rehabilitation activities for 2011 appears as Appendix 8 for future planning purposes in line with the rehabilitation cost estimates.

In anticipation of any rehabilitation activities it is proposed to undertake a Phase 2 Environmental Site Assessment were conducted at Kerosene Vale and VOC 2. These investigations targeted specific areas of contamination around the colliery enabling any required remediation to be inputted into the appropriate business plan. Further investigations are required to determine remediation works to be undertaken. Phase 2 contaminated land assessments are scheduled for both Angus Place Pit Top and Commonwealth for 2012.

5.3 OTHER INFRASTRUCTURE

Dam maintenance were undertaken at LDP002 and LDP003 during 2011. No other rehabilitation activities were undertaken during the 2011 reporting period apart from those outlined above.

5.4 REHABILITATION TRIALS AND RESEARCH

There were no rehabilitation trials or research carried out during the reporting period.

A summary of rehabilitation activities found in Table 30 and maintenance requirements on rehabilitated land found in Table 31.

5.5 REHABILITATION COST ESTIMATE

The updated Rehabilitation Cost Estimates (December 2011) for Angus Place, Kerosene Vale, Commonwealth and Vale of Clwydd Collieries are located in Appendix 10.

Table 30: Rehabilitation Summary

A: MINE LEASE AREA	Area Affected/Rehabilitated (hectares)		
	To Date	Last Report	Next Report (estimated)
A1: Mine Lease(s) Area	10,278		
B: Disturbed Areas			
B1: Infrastructure area (other disturbed areas to be rehabilitated at closure including facilities, roads)	35	1	3.5
B2: Active Mining Area, (excluding items B3-B5 below)	0	0	0
B3: Waste emplacements (active/unshaped/in or out-of-pit)	0	0	0
B4: Tailings emplacements, (active/unshaped/in or out-of-pit)	0	0	0
B5: Shaped waste emplacement (awaits final vegetation)	0	0	0
ALL DISTURBED AREAS	35	1	3.5
C: REHABILITATION PROGRESS			
C1: Total Rehabilitated Area (except for maintenance)	5	1	2.5
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	5	1	2.5
E3: Plantations and crops	0	0	0
E4: Other (include non vegetative outcomes)	0	0	0

Table 31: Maintenance Activities on Rehabilitated Land

NATURE OF TREATMENT	Area Treated (ha)		Comment/control strategies/ treatment detail
	Report Period	Next Period	
Additional erosion control (drains re-contouring, rock protection)	0.1	0.5	Following finalisation of water redirection strategy behind compressor building Pit Top area will be rehabilitated.
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	0.1	Grass area disturbed during construction of new western carpark.
Adversely Affected by Weeds (detail-type and treatment)	0.4 (Narrow Swamp)	20.0	Angus Place to be sprayed in 2012. Weed removal works to continue on Newnes Plateau with a focus on Narrow Swamp.
Feral animal control (detail – additional fencing, trapping, baiting etc)	0	0	

6. ACTIVITIES PROPOSED IN THE NEXT AEMR PERIOD

Table 32: Activities proposed for the 2012 reporting period

	Activities Proposed for 2011
1	Continue to action requirements of modified Project Approval 06_0021.
2	Manage the construction of the New Angus Place Western Carpark
3	Undertake Phase 2 contaminated Land assessments at Angus Place Pit Top and Commonwealth Colliery
4	Continue to undertake weed control works around the pit top and within Narrow Swamp in accordance with the S95 certificate.
5	Rehabilitation of drill sites on Newnes Plateau following the completion of operations.
6	Investigate acoustic treatment and negotiated agreements at receptors where evening noise criteria was exceeded.
7	Continue to improve site water management at Angus Place including establishment of drive over humps near compressor building to direct dirty water into established sumps.
8	Undertake Coal Mine Particulate Best Practice Study and action recommendations were reasonably particle
9	Expand groundwater monitoring program in terms of additional multi-level piezometers as part of the proposed 2011 exploration program.
10	Update management plans, strategies and programs as required from independent audit
11	Undertake a Dangerous Goods audit
12	Modification of currently lighting installed in Angus Place carpark to ensure compliance with requirements of AS/NZ 4282, 1997 <i>Control of the Obstructive Effects of Outdoor Lighting</i> . This will be undertaken in consultation with the Department of Planning to ensure compliance with Schedule 3 Condition 30 of Project Approval 06_0021.



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