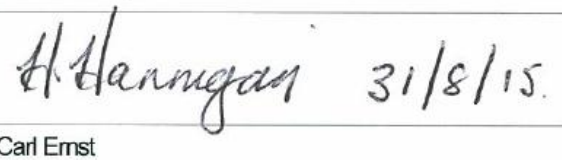
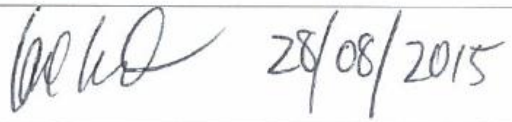
Illawarra Coal

Bulli Seam Operations

ANNUAL ENVIRONMENTAL MANAGEMENT REPORT FY15

1. Mine Details

Name of Mine	Appin Mine and West Cliff Colliery		
Titles/Mining Leases	CCL 767, CCL 724, CL 381, CL 388, ML 1382, ML 200, ML 201		
MOP Commencement Date	October 2012	MOP Completion Date	September 2019
AEMR Commencement Date	01 July 2014	AEMR End Date	30 June 2015
Name of Leaseholder	Endeavor Coal P/L		
Name of Mine Operator (if different)	Endeavor Coal P/L		
Reporting Officer	David Thomas		
Title	Environmental Officer (Air, Noise, GHG and Energy)		
Name of Mine	Appin Mine and West Cliff Colliery		
Signature			
Date	31/8/15		
General Manager Appin Mine	Heath Hannigan		
Signature & Date			
Manager West Cliff CPP	Carl Ernst		
Signature & Date			

Cover Photo: Vent Shaft 6 at dawn. *Courtesy of P. McMillan.*

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2. Introduction

Background

This Annual Environmental Management Report (AEMR) for the Bulli Seam Operations (BSO-Appin and West Cliff Mines) details the environment and community performance for the 12 month period ending 30th June 2015.

The AEMR is a requirement of the Mining Lease and has been compiled in accordance with the guidelines published by the NSW Department of Trade and Investment, (DTI) AEMR Guidelines for MOPS prepared to EDG03 Requirements. This report has also been prepared to meet the requirements of Schedule 6 Condition 4 of the BSO Development Consent.

A copy of the report is publicly available via the South32 website under Bulli Seam Operations: http://www.south32.net/our-operations/australia/illawarra-coal/regulatory-document

Within the reporting period Illawarra Coal, operator of Appin and West Cliff Mines has changed ownership through a demerger of BHP Billiton. Illawarra Coal is now a wholly owned subsidiary of South32, a publicly listed diversified resource company.

3. Overview of Operations

The NSW Government granted approval for the Bulli Seam Operations Project (BSOP) in December 2011. The BSOP combines future mining operations and provides for the continuation of coal mining operations at the Appin Mine and West Cliff Colliery. The Bulli Seam underground longwall mining operations will be transitioned wholly to the Appin areas upon completion of longwall mining activities at West Cliff. The locations of all sites associated with the BSOP are illustrated in Plan 1.

Appin

Appin Mine consists of the merged Appin and Tower collieries. Appin Mine is owned and operated by Endeavour Coal P/L, a subsidiary company of Illawarra Coal Pty Ltd (ICHPL) which is 100% owned by South32. Appin Colliery (located at Appin) commenced operations in 1962 and Tower Colliery (located at Douglas Park) commenced operation in 1978. The underground infrastructure, roadways, conveyor and ventilation systems were joined in 2003 to become the Appin Mine. The original Appin Colliery is located adjacent to Appin Village, approximately 37 kilometres Northwest of Wollongong.

Tower Colliery was officially opened in November 1978. Following the sinking of the access and ventilation shafts, underground development of the mine was undertaken from 1978 through to 1988 when longwall operations were introduced. Tower Colliery completed extraction of 20 longwall blocks between 1988 and September 2002. The mine was redeveloped underground to establish mining operations in the current longwall Area 7 mining domain.

Key areas associated with the current Appin operations include the Appin East pit top site (Plan 2), the Appin West pit top site (Plan 3), the Appin East No.1 and No.2 fan site (Plan 4), the Appin West No.3 fan site (Plan 5), No.6 fan site (Plan 6) and the Douglas Park substation site (Plan 7).

West Cliff

West Cliff Colliery is located 26km northwest of Wollongong, NSW. West Cliff Colliery is operated by Endeavour Coal Pty Ltd, a subsidiary company of ICHPL with South32 as the parent company. South32 owns 100% of the West Cliff assets.

Illawarra Coal has conducted underground coal mining operations at West Cliff since 1997. Prior to this, West Cliff was operated by Kembla Coal and Coke Pty Limited (KCC). Longwall mining is currently occurring in West Cliff Area 5. Area 5 consists of part of Consolidated Coal Lease 767 and Coal Lease 381 which were both transferred from Appin Colliery to West Cliff Colliery in 1997.

Key areas of the West Cliff Colliery Site include the pit top (South Site – Plan 8), the West Cliff Emplacement Area and Coal Preparation Plant (CPP) at the North Site (Plan 9) and the redundant North Cliff Mine site within the Dharawal National Park Area (Plan 10).

Site Names

For the majority of the reporting period the above site nomenclature was used. Changes have been made to the site names to reflect statutory responsibilities for the underground operations. The table below outlines the site names used.

Table 1: Site names for the current and future reporting periods.

Site Name for majority of reporting period 2014/2015	Site Name for future reports
West Cliff	Appin North
Appin East	Appin Central
Appin West	Appin West
West Cliff Coal Preparation Plant	West Cliff Coal Preparation Plant

4. Consents, Leases and Licences

Table 2: Development Approvals associated with the BSO

Document	Issue Date	Expiry Date
Appin Gas Drainage Project – Initial	October 2009	
Appin Gas Drainage Project – 2010	December 2010	Drilling Feb 2017
Appin Gas Drainage Project – 2012	February 2012	Extraction wells Oct 2019
Bulli Seam Operations Project Approval (NSW Government)	22 Dec 2011	31 December 2041
Bulli Seam Operations Project Approval (EPBC Act) (SEWPaC)	15 May 2012	15 May 2042
No. 6 Ventilation Shaft (NSW Government)	4 May 2011	4 May 2041
No. 6 Ventilation Shaft (SEWPaC)	1 April 2011	1 April 2041

Table 3: Mining Leases and Licences associated with the BSO.

Mining Lease / Sub-Lease	Number	Issue Date	Expiry Date
Coal Lease	388	22.1.1992	22.01.2034
Mining Lease	1382	20.12.1995	19.12.2016
Mining Lease	1433	24.7.1998	23.07.2019
Mining Lease	1574	09.07.2008	30.12.2023
Mining Lease	1678	27.09.2012	26.09.2033
Mining Lease	1698	26.06.2014	26.06.2035
Consolidated Coal Lease	724	4.07.1991	18.12.2031
Consolidated Coal Lease	767	29.10.1991	08.07.2021
Coal Lease	381	24.10.1991	24.10.2033
Mining Purposes Lease	200	13.1.1982	13.1.2024
Mining Purposes Lease	201	13.1.1982	13.1.2024
Mining Lease	1473	20.11.2000	29.11.2021
Environment Protection Licence	2504		---
NSW Office of Water Licences	10WA117285	15 Nov 2011	---

Table 4: Exploration Leases associated with the BSO.

Mining Lease / Sub-Lease	Number	Issue Date	Expiry Date
A199	West Cliff	27/06/1980	27/06/2019
A201	Appin	27/06/1980	27/06/2019
A248	Appin	13/05/1981	19/12/2015
A306	West Cliff	19/07/1983	27/06/2019
A312	Appin	10/08/1983	10/08/2018

Mining Lease / Sub-Lease	Number	Issue Date	Expiry Date
A370	Appin	8/05/1986	27/06/2019
A395	Appin	23/11/1987	10/08/2018
A396	Appin/West Cliff	28/06/1988	27/06/2019
A397	West Cliff	4/08/1987	27/06/2019
A432	West Cliff	12/02/1991	31/08/2018
EL 4470	Appin	5/01/1993	19/12/2015

5. Mine Contacts

Table 5: Contacts

Position	Name	Number
General Manager- Appin Colliery	Heath Hannigan	(02) 4640 4032
Manager Production WCCPP	Carl Ernst	(02) 4640 4130
Environmental Officer	David Thomas	(02) 4286 3368
Environmental Supervisor	Peter McMillan	(02) 4286 3415

Table 6: Actions from previous AEMR

Action Required	Where dealt with in this AEMR
Addition of Mobilisation and De-Mobilisation costs to rehabilitation cost estimate.	Costs added to rehabilitation cost estimate to reflect action required. Appendix F

6. Operations during the Reporting Period

6.1. Exploration

During the reporting period the Bulli Seam Exploration Program totalled 1 exploration borehole (coal quality) in CCL767. No exploration was conducted in CCL724. Plan 11 provides a position of the borehole. Rehabilitation of the drill site on the property has been completed.

7. Land Preparation

7.1. Mine Safety Gas Drainage

During the reporting period ICHPL continued to extract gas from the Bulli Seam and adjacent strata to provide a safe working environment underground and to reduce the greenhouse gas intensity of its operations. Where possible the methane content of this gas is fed into an extraction plant and used to generate electricity at plants operated by Energy Developments Limited (EDL). Where it is not feasible to transport this gas to an energy plant, it is preferentially flared, and finally, where there is high carbon dioxide content or cannot be flared it is vented.

At the commencement of this reporting period there was an issue with the pipework supplying gas to the EDL plant. As such temporary flaring infrastructure was installed at ICHPL property associated with existing gas infrastructure. This temporary setup was operated from the 1st to 25th July 2014 while repairs were carried out.

Appin Mine Safety Gas Drainage Activities

During this reporting period ICHPL's Mine Safety Gas Drainage activities for Appin Area 7 and Area 9 were undertaken in accordance with the relevant Gas Drainage Management Plans which have been approved by the Department of Planning and Environment (Project Numbers 08_015 and 08_0256).

Four vertical wells were constructed and were being progressively commissioned to service gas from the extraction of the finishing end of Longwall 706. These wells targeted the Bulgo Sandstone unit, which is located in strata above the Bulli Coal seam. These wells are located on ICHPL owned property in paddocks adjacent to Menangle Road, Douglas Park.

Flaring operations continued in 2014/15 at Area 9 Site 1, operating a single flare at a reduced capacity than in the previous reporting period.

During 2014/15 rehabilitation activities to address Appin operations included:

- Maintenance and monitoring of Longwall 704 wells where pads have been re-grassed.
- Removal of infrastructure and grouting of Longwall 705 wells.
- Removal of infrastructure and grouting of wells associated with Area 9 - Site 2.

West Cliff Colliery Mine Safety Gas Drainage Activities

No surface gas drainage activities were undertaken.

7.2. Emplacement Operations

During the reporting period 1 Ha of vegetation was cleared within the Stage 3 Emplacement in accordance with the two-stage clearing process outlined in the West Cliff Coal Wash Emplacement Area Management Plan. This area was surveyed during the 2014/15 reporting period. Vegetation and topsoil removed from the cleared area was relocated to the active rehabilitation sites. Plan 12 illustrates the areas that were cleared and rehabilitated during the reporting period.

The rehabilitated emplacement areas are inspected regularly to determine the progress and effectiveness of the rehabilitation. The monitoring program consists of quarterly inspections undertaken by an Illawarra Coal Environmental representative which are supplemented by a more extensive annual monitoring program. The quarterly emplacement rehabilitation inspections were undertaken during the reporting period. The Annual monitoring program was undertaken in spring FY15. The report is provided in Appendix A – Annual Rehabilitation Report.

8. Construction

The following construction activities were undertaken during the 2014/2015 reporting period:

8.1. Ventilation Shaft No.6

As of June 2015 the majority of the surface infrastructure construction for vent shaft No.6 has been completed, all surface buildings are in place in preparation for the commissioning of the vent shaft. The primary construction item yet to be completed is the earthen noise barrier. This landform is being constructed using coal washery rejects and is expected to be completed in the first half of FY16. Commissioning of the fans occurred in August 2015 and will be reported in the FY16 AEMR.

Figure 1: An elevated view of the VS#6 precinct during commissioning. Three fan housings (centre) and ducting connecting to the vent shaft (left).

Service boreholes in the VS#6 precinct were installed to supply compressed air, electricity and communications to underground. Relevant surface infrastructure has been installed such as the compressor shed below.

Figure 2: VS#6 Air Compressor Shed.

8.2. Appin East to West Cliff Underbore

An underbore running from Appin East mine site to the West Cliff site was constructed in FY14 which included a 150mm water pipe and optic fibre cable. The pipework allows for the transfer of treated water from Appin East to the Westcliff Mine area. The construction of a small shed at Appin East (to house pumps and electrical equipment) and modifications to surface pipework's was finalized in FY15.

8.3. Wedderburn Road Drainage Improvements

The following improvements to Wedderburn Road were completed during the reporting period with the aim to minimise dust in the form of drag out:

- Concrete kerb and guttering was installed along 500 metres of roadside which flowed into a new sediment trap (

-
- Figure 3) before flowing under the road in the drainage pipe line.
- As part of the road upgrades high MPA concrete was used to resurface the area form the truck turnout to the end of the trapping area (Figure 4).

Figure 3: New sediment sump near completion. Under-road drainage pipe (as per table above) exits sump on left of frame.

Figure 4: New concrete section of road at truck turn-out area.

8.4. Appin East Sewage Transfer

During FY15 works were undertaken in consultation with Sydney Water to connect the sewage system to the Appin town sewerage system. The following works were completed:

- Pipework was installed to connect the site to the Sydney Water system;
- Installation of pumps in existing tanks and recapping of concrete tanks;
- Constant PLC controls and inline flowmeters were also installed; and
- Removal of Appin East licensed irrigation area.

Appin East Pit Top previously used an ‘envirocycle’ aerobic digestion system to treated wastewater and had an EPA licensed discharge point to irrigate waste water on site.

8.5. Brennans Creek Dam Emergency Release Pipe Relining

During FY15 the emergency rapid draw down pipe at the base of Brennans Creek Dam wall was relined as part of preventative maintenance. The works involved the installation of a smaller diameter pipe and grouting between the new and existing pipeline. Repair works were also carried out on the dam wall lining membrane.

8.6. Appin West Bath House expansion

In preparation of the joining of West Cliff and Appin operations, construction commenced to expand the bathhouse at Appin West. The works will provide for capacity for increased workforce utilizing the pit top facilities once Appin Area 9 longwall becomes operational. The works are due for completion in the first half of FY16.

9. Mining

9.1. Longwall Status

Appin and West Cliff mines extract coal from the Bulli Seam within the Southern Coalfield. At the start of the reporting period Longwall 706 had extracted 367 metres, at the end of the reporting period it had extracted 2445.5 metres, with an expected 598 metres remaining.

At West Cliff Longwall 37 extraction began on the 10th of June 2014 and completed extraction on the 30th of January 2015. Longwall 38 commenced extraction on the 3rd of February 2015 and of the 30th of June had extracted 1070 metres with approximately 1053 metres remaining.

9.2. Longwall Production

Appin Mine extracted 3.8 million tonnes of 'Run of Mine' (ROM) coal via roadway development and longwall extraction methods for the reporting period, an increase of approximately 15% when compared to the 2013/14 reporting period. The ROM production levels from FY09 through to the current reporting period are provided in

Figure 5.

West Cliff Colliery extracted 3.6 million tonnes of 'Run of Mine' (ROM) coal via roadway development and longwall extraction methods for the reporting period, a decrease of approximately 17% when compared to the 2013/14 reporting period. The ROM production levels from FY09 through to the current reporting period are provided in

Figure 5.

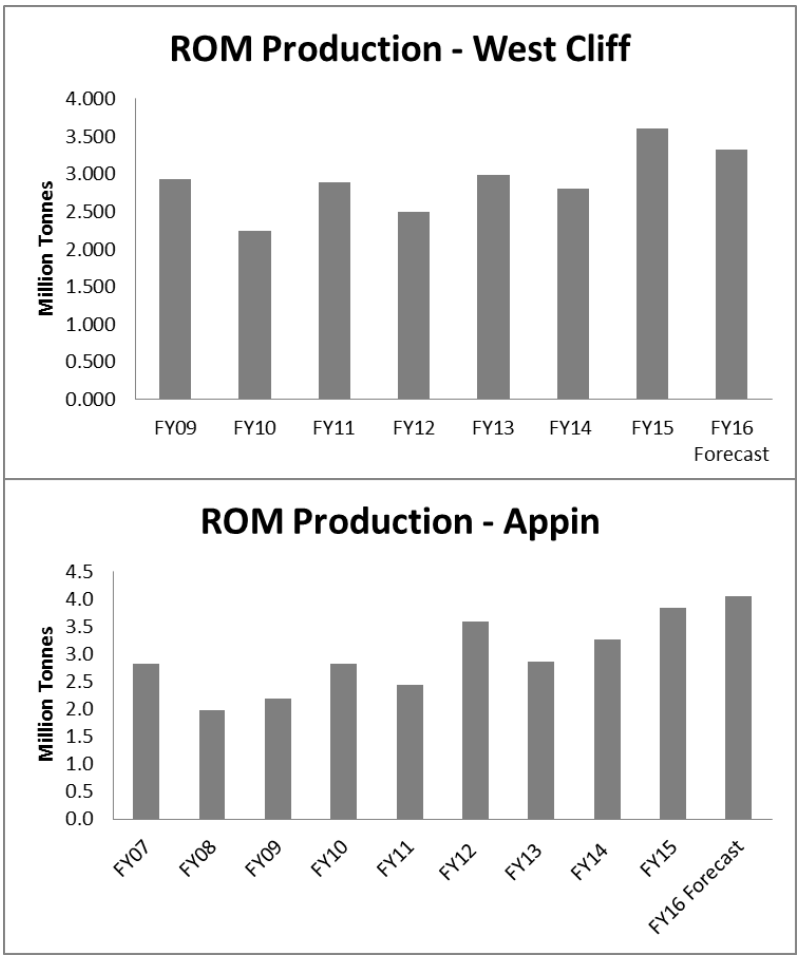


Figure 5: ROM production - BSO

The average yield for the Bulli Seam operations for the reporting period was 76%.

The production and waste summary for the reporting period is provided in

Table 7.

Table 7: Production and Waste Summary

	Site	Cumulative Production		
		Start of Reporting Period	At end of Reporting Period	End of next reporting (estimated)
Topsoil stripped (ha)	Appin[1]	13.53	13.53	13.53
	West Cliff	39.6	40.6	45.6
Topsoil used/spread (ha)	Appin[2]	3.54	3.54	3.54
	West Cliff[3]	45.3[4]	46.3[5]	53.9
Waste rock		N/A	N/A	N/A
Ore		N/A	N/A	N/A
Processing waste	Appin	N/A	N/A	N/A
	West Cliff[6]	1.9MT	1.89MT	2.5MT
Production (ROM Tonnes)[7]	Appin	3.3MT	3.8MT	4.1MT
	West Cliff	2.8MT	3.6MT	3.3MT
Product (Clean Coal)[8]	Total	4.1MT	5.6MT	5.5MT

10. Mineral Processing

Mineral processing facilities include the West Cliff Coal Preparation Plant (CPP), the West Cliff Emplacement Area and the Dendrobium CPP (located at the Port Kembla Steelworks). The majority of ROM coal from Appin and West Cliff is directed to the West Cliff CPP for processing. The Emplacement Area is used to emplace coal wash from the West Cliff CPP and Dendrobium CPP.

ROM Coal is transported to West Cliff CPP by:

- Coal trucks from the Appin East site, along Appin and Wedderburn Roads.
- Bulk coal winder from the West Cliff mining domain

ROM Coal from Appin Mine is also directed to the Dendrobium CPP on an 'as required' basis to maintain work continuity and maintain reduced stockpile sizes at the Appin Site. ROM coal is transported via Mt Ousley to the Dendrobium CPP (located within the BlueScope Steel complex). Clean coal from the West Cliff CPP is trucked to BlueScope Steel (Port Kembla Steel Works) coal handling facilities or to the Port Kembla Coal Terminal for distribution.

[1] Ventilation Shaft No.6 Construction Works only, does not include Mine Safety Gas Drainage Works
[2] Ventilation Shaft No.6 Construction Works only, does not include Mine Safety Gas Drainage Works
[3] Emplacement operations only – Does not include exploration or Mine Safety Gas Drainage works
[4] 3 Ha transient stockpiled onsite
[5] 3 Ha transient stockpiled onsite
[6] Total processing waste produced at West Cliff CPP (includes Appin Coal Wash) for AEMR period only – does not include coal wash produced at Dendrobium CPP
[7] ROM total for the AEMR period only
[8] Clean coal total for the AEMR period only

Daily road haulage volumes associated with both the Appin and West Cliff sites is available on the South32 website: http://www.south32.net/our-operations/australia/illawarra-coal/regulatory-document

11. Waste Management

11.1. General Waste

General waste is segregated on all sites to maximise reuse and recycling opportunities in accordance with the BSO Waste Management Plan. The waste streams applicable to the BSO are specified in the table below.

Table 8: The main waste streams for the BSO

Waste Stream	Treatment
Timber	Recycled off site
Cardboard and paper	Recycled off site
Printer Cartridges	Recycled off site
Oil	Recycled off site
Oily waters	Recycled or disposed off-site
Steel and Scrap Metal	Recycled off site
Sewage effluent (treated)	West Cliff – Treatment and irrigation on site. Appin West – Treatment and irrigation onsite Appin East – Disposed via town sewerage system
Industrial filters	Off-site treatment and disposal
Bathhouse water	West Cliff - Spray irrigated to land on site Appin West - Spray irrigated to land on site Appin East – Transported to licensed sewage treatment facility for first part of reporting period. Connected to town sewerage system for later part of reporting period.
Particulate filter	Off-site treatment and disposal
Hazardous waste	Off-site treatment and disposal
General Waste	Landfill

Solid waste volumes generated at the BSO (including the Appin West, Appin East and West Cliff sites) for the reporting period are provided below:

Table 9: Waste volumes – BSO

Main Waste Streams	Landfill Disposal		Recycled			
	General Waste	Industrial Waste (Filters)	Timber	Metal	Cardboard	Commingle
Quantity (Tonnes) FY14	1189	285	399	1629	31	16
Quantity (Tonnes) FY15	1146	381	234	1349	30	17

Approximately 4% more waste was disposed as landfill for the reporting period when compared to the previous financial year.

11.2. Coal Wash

Coal wash is a by-product of processing ROM coal. During the reporting period, a total of 2.9 million tonnes of coal wash (includes Dendrobium, Appin and West Cliff) was emplaced at the West Cliff Emplacement Area. Illawarra Coal received approval to expand the West Cliff Emplacement Area (i.e. Stage 3) from the DoP on the 20 December 2007. Construction works associated with the water management system and associated infrastructure for Stage 3 were finalised during the 2009/10 reporting period. The Stage 3 Emplacement Area will provide an additional 33.5 million tonnes of coal wash emplacement (refer to table below) with an expected emplacement life of 13 years (based on projected coal wash volumes).

Illawarra Coal received approval for Stage 4 of the West Cliff Emplacement Area on the 22nd December 2011. The Stage 4 Emplacement Area will provide an additional 59.4 million tonnes of coal wash emplacement (refer to table below) with an expected life to 2041.

Table 10 outlines the capacity and status of each of the West Cliff coal wash emplacement areas.

Table 10: West Cliff Emplacement Area – Capacity and status

Emplacement Stage	Estimated Capacity	Emplacement Status
1	4.6	Complete
2	20.8	Current
3	33.5	Current
4	59.4	Not Yet Commenced

11.1. Coal Wash Research

Current Research

During the reporting period, Illawarra Coal diverted 121kt of coal wash for beneficial uses including engineered fill, with over 1Mt diverted since 2009. Illawarra Coal continues to research, develop and implement alternative uses for coal wash and hence minimise the volume emplaced at the West Cliff site. Illawarra Coal is a member of 'Sustainability Advantage', a business support service.

One of the projects from the 'Sustainability Advantage' is a road base mixture which utilises coal wash with other recycled materials such as fly ash to produce a material suitable for a variety of applications. In late 2014 the RMS published a specification of this material, based on the success in trials of this product. Local councils have been engaged to commence trials in order to gain approval for the product in their respective areas. In 2014 this project was awarded a Green Globe from the NSW Government in recognition of its success in sustainable Innovation.

Other sustainable projects that look to incorporate coal wash which have yielded positive results also include cement making and brick making. We expect to see results for these projects in 2015/16.

Underground Coal Wash Emplacement

Illawarra Coal submitted a revised Underground Coal Wash Emplacement Trial to the Department in 2013. The revised Plan proposed to defer the trial for 5 years for the following reasons:

- The trial replicates what has been demonstrated by another Southern District Colliery;
- The declaration of Dharawal National Park has eliminated a significant area of potentially suitable roadways for underground coalwash emplacement; and
- Illawarra Coal's focus on diverting material from surface emplacement via alternative beneficial uses continues.

The key aspects of the Plan remained valid during the reporting period and detailed reports and presentations will be made available at the completion of major research milestones.

11.2. Sewage

During the reporting period, ongoing monitoring and inspections were conducted on all three BSO sewage treatment plants.

Appin East

At the start of the reporting period bathhouse waters (grey waters) and sewage effluents (black waters) were separated at the Appin East Site. Black water was treated via an Envirocycle System and was irrigated on site via Licenced Discharge Point (LDP) 20. Grey waters were transported to the Wollongong sewage treatment system by a licensed waste contractor. During the reporting period Illawarra Coal, with agreement from Sydney water, connected the site to town sewage facilities. Both Grey and Black wastewater now reports to the Macarthur sewage treatment.

Monitoring of the Envirocycle effluent (i.e. Point 20) was undertaken on a monthly basis during the reporting period in accordance with EPL 2504. Results of the monitoring are reported on an annual basis to the Environment Protection Authority (EPA) via the EPA Annual Return and are made available to the

public via the web based environmental monitoring report which is issued every 14 days: http://www.south32.net/our-operations/australia/illawarra-coal/regulatory-document

Appin West

There is a Smith and Loveless Sewage Treatment Plant (STP) on the Appin West site that discharges into two maturation ponds. The treated effluent is irrigated on site via LDP 22.

Monitoring of the STP effluent was undertaken on a monthly basis in accordance with conditions contained with EPL 2504. Results of the monitoring are reported on annual basis to the EPA via the EPA Annual Return and are made available to the public via the web based environmental monitoring report which is issued every 14 days.

West Cliff

There is a Smith and Loveless Sewage Treatment Plant (STP) at West Cliff with the effluent directed to two maturation ponds (Dam 1 and Dam 2), which are located adjacent to the treatment plant. Treated effluent is pumped to a network of sprinklers at a dedicated spray irrigation area. The sewage treatment and disposal system is incorporated within EPL 2504. Monitoring of the Sewage Treatment Plant and associated irrigation effluent (i.e. Point 4) has been undertaken on a monthly basis during the reporting period in accordance with conditions contained with EPL 2504. As stated above, results of the monitoring are reported on annual basis to the EPA via the EPA Annual Return and are made available to the public via the web based environmental monitoring report which is issued every 14 days.

A waste water maintenance contractor is periodically used to assist with the operational aspects of the Appin and West Cliff Sewerage treatment systems to minimise the likelihood of any issues occurring.

11.3. Appin WAC Disposal

Weak Acid Cation Regenerate (WAC), a waste stream from the Appin water treatment plant, is transported offsite to a licensed Waste Management Facility. The total volume of WAC transported off-site during the reporting period was 4.1ML, an increase of 0.2 ML when compared to the previous reporting period.

11.4. Appin Water Treatment Plant biological sludge

The Appin backwash treatment plant was commissioned in April 2009. One of the by-products of the Backwash Treatment process is an organic sludge. The total weight of sludge transported offsite during the reporting period was approximately 350 tonnes.

12. Ore and Product Stockpiles

No coal is stockpiled at the Appin West Site as ROM coal is transported underground to the Appin East Site. The Appin West coal storage bins are currently under care and maintenance.

The Appin East mine site has a total raw coal stockpiling capacity of up to 50,000 tonnes. The stockpile is recovered with front-end loaders directly into the coal haulage trucks for transport by road to either the West Cliff or Dendrobium CPP's.

West Cliff operates six primary coal stockpiles for both clean coal and raw coal. The stockpile capacities at West Cliff outlined in Table 11.

Table 11: West Cliff stockpiles capacities.

Area	Capacities
No.1 Stockpile	650,000t nominal capacity - 600,000t coking coal , 20,000t jig coal, 30,000t Middlings coal (Note: The capacity of this stockpile has been temporarily reduced to allow space for a temporary lay down area as part of the RCRIP)
No.2 Stockpile	150,000t nominal capacity – generally coking coal
No.3 Stockpile	600,000t nominal capacity – generally coking coal
No.4 Stockpile	800,000t nominal capacity – generally Appin ROM coal
No.5 Stockpile	90,000t nominal capacity – generally Appin ROM coal
No.6 Stockpile	90,000t nominal capacity – generally West Cliff ROM

A Stockpile and Slope Stability Management Plan is in place to manage the stockpile operations. This plan is a framework document where the operational risks and controls are documented. Risks associated with the stockpile operations are also detailed in the West Cliff CPP Risk Register, which is reviewed regularly by the site management team to test the effectiveness of controls.

Monitoring and management review indicates that the current plan effectively controls all potential stockpile management issues effectively.

13. Water Management

13.1. Water Supply and Use

Sydney Water Supply to the BSO

During the reporting period, meetings were held with Sydney Water regarding the future demand for potable water across the BSOP. The proposed usage figures will be used by Sydney Water in their future planning strategy.

Appin West

Mine water is processed at the Appin West Water Treatment Plant (WTP) to produce treated water. This treated water is supplied to the Appin Mine underground mining operations. Any shortfall in underground supply is made up using potable water provided by Sydney Water. Potable water is used for site administration buildings, workshops and the bathhouse.

Water Treatment Plant Improvements

The continual process improvements at the Appin West WTP has allowed for increased throughput and operational uptime of the WFP compared to last FY.

Trials of pre-treatment system (before Reverse Osmosis RO) and membrane technologies during the reporting period have informed the final concept design for planned future expansion. The upgrading of the WFP to cater for the increased processing demand is presently under way with detailed design phases expected to be completed early FY16. Key drivers for this upgrade include minimizing dependency on Sydney Water, environmental compliance and an increase in demand for underground water requirements with Area 9 mining domain commencing.

The staged upgrade process entails project components of pre-treatment, integrated membrane system and bulk storage and blending. The newly constructed plant is expected to cater a throughput capacity of 4.7ML/day with an additional 2.0 ML of surface storage. The overall upgrade is expected to be completed within FY16.

Appin East

Potable water is supplied by Sydney Water to the Appin East mine site via a 600kL surface tank. This tank provides potable water for the Bathhouse, workshops, administration buildings, Appin No.2 shaft area, Energy Development Limited Appin East Power Plant and nearby mine-owned cottages.

During this reporting period Appin East underground has been operated on recycled mine water (supplied underground from Appin West WFP) and Sydney water supplies from Appin East Pit Top tanks. Surface water runoff from rainfall is captured in the main surface dam and is used as supply for the truck washing facilities, dust suppression on haulage roads and stockpiles and dirty equipment hose down. Potable water is also supplied to the West Cliff Colliery longwall operations and WestVAMP project from the Appin East Site.

Table 12 provides an overview of the potable water usage associated with the Appin operations for the reporting period.

Table 12: Potable water usage for the Appin Operations.

Area	Usage - FY14 (ML)	Usage - FY15 (ML)	Variance	Comment
Appin East Surface & U/G	45	77	+32	Increase in supply for underground
Appin West Surface	39	31	-8	
Appin West U/G	208	77	-131	Increase in WTP operations, less reliance on potable water
No.2 Ventilation Shaft	9	6	-3	

An estimate of the volume of clean and dirty water stored on site at the end of the reporting period is provided in
Table 13.

Table 13: Stored Water - Appin

	Volumes held (cubic meters)		
	Start of Reporting Period	At End of Reporting Period	Storage Capacity
Clean water	2.8	2.8	2.8
Dirty water	30	30	33.3
Controlled discharge water (salinity trading schemes)	2.4	2.4	2.4
Contaminated water	N/A	N/A	N/A

West Cliff

West Cliff Colliery Site is primarily reliant on recycled water. Some potable water is trucked to site and stored in a surface tank for use in the bathhouse and office facilities. Potable water is pumped from Appin East to West Cliff for use in WestVAMP and the longwall hydraulics. Recycled water is sourced from Brennans Creek Dam (BCD) from where it is pumped, following chlorination treatment, for use in the following areas:

- West Cliff Underground operations;
- West Cliff Coal Preparation Plant and associated infrastructure; and
- West Cliff Pit Top.

Annual recycled water usage from BCD for the West Cliff operations for this reporting period was approximately 2099ML. Approximately 70% of this water was utilised on the surface for CPP and associated infrastructure with the remaining 30% utilised underground for mining related activities. This was a similar volume to the previous reporting period.

A total of 209ML ML of potable water was consumed during the reporting period of which 157ML was used at the WestVAMP facility, 49ML was used underground and 3ML was used in the surface amenities. A summary of the water usage for the reporting period, compared to the previous reporting period, is provided in Table 14.

In June 2015 initial works to increase the amount of recirculated water used at the West Cliff Coal Preparation Plant were undertaken. These works reduce the volume of washery waste water flowing to Brennans Creek Dam and decrease the volume of Brennans Creek Dam water required in the Washery. The works utilize existing infrastructure (no new construction footprint required). Further details are outlined in section 17.3 of this report. The project is due to be completed during the next reporting period and will be reported in the FY16 AEMR.

Table 14 Water usage comparison.

Type	Usage – FY14 (ML)	Usage – FY15 (ML)	Comment
Sydney Water	177	209	Increased transfer from Appin East.
Recycled (BCD) Water	1067	2099	Increased usage in CPP and dust control.

An estimate of the volume of clean and dirty water stored on site at the end of the reporting period is provided in the table below.

Table 15: Stored Water – West Cliff

	Volumes held (cubic meters)		
	Start of Reporting Period	At End of Reporting Period	Storage Capacity
Clean water	307	307	307
Dirty water	210	200	237
Controlled discharge water (salinity trading schemes)	N/A	N/A	N/A
Contaminated water	N/A	N/A	N/A

Appin Ventilation No.6 Shaft Site

During the reporting period water was extracted from the Nepean River and used on site for operational purposes. The water is extracted under the Surface Water License No. 10WA117285, issued by NSW Office of Water (NOW) on the 15 Nov 2011. The Licence allows up to 53ML to be diverted - Comprising of 40 ML for mining use and 13 ML for industrial use in any one year commencing 1 July. Approximately 36ML was extracted during the reporting period for mining use.

13.2. Surface Water

Surface water management at the BSO is undertaken in accordance with *EPL 2504* and the approved *BSO Water Management Plan*. Specifics of the site water management systems are provided in the BSO Water Management Plan which is available on the South32 regulatory information website.

Appin West

The filter modules at Point 23 have undergone routine maintenance. No additional works have been undertaken at the site. The active oil separator (spin separator) underwent a major service, and the passive separator (baffle plate system) also underwent routine maintenance.

Appin East

The silt trap associated with the main dam has undergone standard maintenance, the dynasand and first flush systems have undergone standard maintenance.

West Cliff

The seep that was identified in the reclaim pond at Brennans Creek Dam in March 2010 continues to be monitored on a regular basis with results including flow measurements, piezometer readings and visual inspections, reported through to the consultant geotechnical engineer periodically. There has been no change to the characteristics (i.e. volume, clarity etc.) of the seep for the reporting period.

Surveillance reports are prepared every 5 years by the consultant geotechnical engineer. The latest report was submitted to the Dam Safety Committee in August 2011. Intermediate inspections are being conducted by a consultant geotechnical engineer annually.

One action from the 2011 surveillance report was to install and outlet valve on the 600mm BCD drain pipe. During the last reporting period, in the process of setting up for this installation, some cracking was discovered in the pipe. Subsequent investigation led to a relining of the pipe, as reported in the section 8.5 of this report.

Surface run-off associated with the emplacement area, operates in accordance with the approved *Coal Wash Emplacement Area Management Plan* which is available on the South32 website.

Appin Ventilation No.6 Shaft Site

During the reporting period surface runoff was captured on site and treated with flocculent in surface dams prior to discharge into Harris Creek via LDP 36.

Groundwater Management

Appin

During this reporting period approximately 630ML of water was delivered underground with approximately 741ML of surplus underground water pumped to the surface for treatment via the Appin West WTP.

West Cliff

Water for underground use is delivered from BCD to the underground operations via a gravity fed pipeline. Groundwater and surplus mine water is collected in pits and pumped to the surface for use in the West Cliff CPP. Excess water from the West Cliff CPP is treated prior to being released to BCD for

further reuse or discharge. During the reporting period approximately 322ML of water was delivered underground with approximately 509ML of surplus underground water pumped to the surface for use in the CPP or treated and release to BCD.

14. Rainfall

Rainfall for the BSO surface facilities is recorded on a daily basis from weather stations incorporated into air quality monitoring stations. These stations were installed during the last reporting period so previous years rainfalls are characterized below. The Appin East site received a total of 804mm of rainfall during the reporting period. Table 16 below displays the annual rainfall for the since FY11 at Menangle.

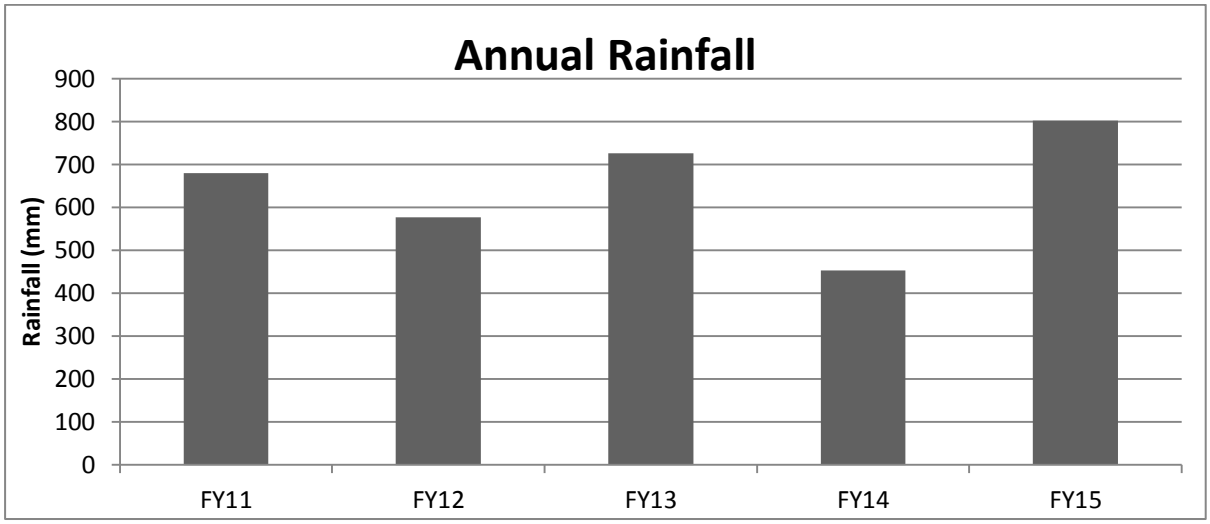


Table 16: Annual rainfall – Menangle (BOM site #68216)

15. Hazardous Material Management

15.1. Storage

Oils are stored in purpose built facilities with appropriate bunding and firefighting provision. A licensed contractor is engaged to remove and recycle and/or dispose of used oil and grease products through appropriately licensed facilities.

Diesel fuel is brought to the Appin East, Appin West and West Cliff sites by road tanker and stored in above ground bunded tanks from where it is transferred to diesel pods for underground use or direct to machinery.

The chlorine dioxide dosing plant at Brennans Creek Dam is still in use. This includes storage of approximately 5000L of Sodium Hypochlorite and 5000L of Hydrochloric Acid.

All explosives / detonators for the Appin operations are currently stored at the explosives storage facility located at the Appin West and Appin East mine site. Storage facility information is provided below.

Table 17: Explosives storage – Appin.

Site	Type	Capacity
Appin East	1.1D Explosive type E	300kg
Appin East	1.1D Explosive type A	250kg
Appin West	1.1D Explosive	2t

Table 18: Detonator storage – Appin.

Site	Type	Capacity
Appin East9	1.1B	5000 detonators
Appin West	1.1B	5000 detonators

Details of the bulk chemical storage locations associated with the Appin operation are provided in the tables below.

Table 19: Summary of Dangerous Goods storage on the Appin West Site.

Depot	Class	Type of Storage	Product Name	Maximum Volume (L)	Normal Storage (L)
2	8	Above Ground Tank	Hydrochloric acid	12,000	12,000
3	C1	Above Ground Tank	Diesel	42,200	40,000
4	8	Above Ground Tank	Sodium Chlorite	3,000	2,700
5	8	Above Ground Tank	Hydrochloric Acid	3,000	2,700

Table 20: Summary of Dangerous Goods storage on the Appin East Site.

Depot	Class	Type of Storage	Product Name	Maximum Volume (L)	Normal Storage (L)
2	C1	Above Ground Tank	Diesel	36,600	36,000
3	8	Above Ground Storage	Ferric Chloride	3000	3000
4	8	Above Ground Storage	Sodium Hypochlorite	3000	3000

There is one monitoring gauge (moisture scanner) at the Appin East Surface Elevator Belt that contains low emission radioactive isotopes. This gauge is licensed and maintained as per the legal requirements. The gauge is housed in an appropriate container and is inspected and tested in accordance with legislative requirements.

There are several monitoring gauges (moisture scanners) in the WCCPP that contain low emission radioactive isotopes and these gauges are licensed and maintained as per legal requirements. All

gauges are housed in appropriate containers and are inspected and tested in accordance with legislative requirements.

16. Other Infrastructure Management

16.1. North Cliff

The North Cliff Mine Site and access road is located between O'Hares Creek and Stokes Creek. The majority of the site is gently sloping in a northerly direction towards O'Hares Creek. The mine site covers an area of approximately 10.3 hectares of which approximately 6.5 hectares is undisturbed by mining activities. The North Cliff site is shown in Plan 10.

Access to the site is along 10B and 10C Fire Trails from an intersection on the Bulli/Appin Road, 6km northwest of Bulli Pass. The 4.5 km long access road is included in the mine site Coal Lease CCL724.

Land Ownership and Approvals

The North Cliff Mine Site and access road is subject to CCL724, which includes the surface and land below to an unlimited depth over the mine site and to a depth of 15m over the access road. Consent to establish the mine was granted in 1981 by the Minister for Planning and Environment under Section 101 of the *Environment Planning and Assessment Act 1979* and subsequently amended under Section 102 of the Act.

History

Mining operations commenced at the site in 1983, with mining operations restricted to a single unit Continuous Miner. The ROM product was brought to the surface through the No.4 shaft and into a 400t surge bin, from which the product was loaded into trucks and transported to West Cliff Colliery for processing.

Mining operations ceased at North Cliff in 1990 at which time all underground equipment was removed from the site. The two shafts were temporarily sealed with concrete caps with additional security fencing and associated signage installed to prevent unauthorised access. A number of the buildings and associated structures, and various other pieces of equipment were also removed from site. Periodic inspections are undertaken by the Site Environmental Representative.

Remaining Infrastructure

As specified above, most of the infrastructure that was located on the North Cliff site was removed following closure of the mine in 1990. The major structures remaining on the site include:

- No.3 shaft head frame;
- No.4 shaft head frame; and
- Sub-station base slabs.

There are also various items of redundant equipment on the site, however these are not posing an environmental or safety hazard. There has been no equipment removed from site during the reporting period.

Site Security

The North Cliff Site is enclosed with a 1.8 metre high fence with two locked entry gates. The site security fencing is inspected on a regular basis.

Site Rehabilitation

An area on the site between the two shafts was used for the disposal of spoil excavated from the sinking on the shafts. The spoil heap, which covers an area of approximately 3.5 Ha and containing 55,000 m^3 of loosely tipped shale and sandstone, has been graded, shaped and regenerated with local vegetation species.

The *West Cliff Conceptual Closure Plan* details the remaining site specific closure works to be undertaken at this site. A summary is provided below:

Remove infrastructure;

- Fill and seal No. 3 and No. 4 shafts in accordance with DTI requirements;
- Demolish and remove all concrete slabs and bitumen surfaces including hardstand areas;
- Remediate any contaminated soil by removal, encapsulation or land farming on site;
- Backfill lagoon with wall material and clean material;
- Topsoil bare or stripped areas, where appropriate;
- Re-profile site as per the final landform design to reduce the slope lengths by constructing contour banks and armouring channels to prevent erosion;
- Revegetate as per the final revegetation/landscape plan utilising local species. Rip and seed to stabilise the bare soil using an appropriate method (such as hydro-seeding/hydro-mulching); and
- Develop ongoing maintenance management plans.

Post Closure works will include:

- Monitor frequently until vegetation establishment, and then on a minimum 12 monthly basis for at least 5 years after works have been completed (or site sold); and
- Carry out weed control and replanting/reseeding as necessary.

Water Management

Surface drainage is mainly carried in open channels to the site pond located at the northwest corner of the site. The pond is a permeable structure that filters the water that passes through the wall. Water that overflows the dam in wet weather events or passes through the wall flows through open sedge-land before entering an unnamed creek and into O'Hares Creek. There is no environmental impact associated with these discharge events on the receiving environment. No issues were identified with the site drainage system during the reporting period. No hydrocarbons or chemicals are stored at the Site.

Air Quality

The generation of windblown dust from the North Cliff Mine Site is unlikely to cause any adverse impacts on air quality on the community due to the isolated location of the site. A large proportion of the disturbed areas are largely compacted hence further reducing the likelihood of generating significant emissions of wind blow dust.

Noxious Weeds

The site management measures to monitor and control the growth of noxious weeds on the mine site include the use of a weed control specialist to inspect the mine site periodically. No issues were identified during the reporting period.

Archaeological Sites

Archaeological surveys were carried out in 1977 and 1983. The studies identified one aboriginal site, a single axe groove on an exposed rock shelf; located within the fenced mine site area. No damage occurred to these sites during the development or operation of the mine. No damage was identified at this site during the reporting period.

Environmental Inspections

Four environmental inspections of the North Cliff site were completed during the reporting period. The quarterly inspections cover the following aspects:

- Site Security and Safety;
- Surface Drainage;
- Erosion;
- Weed Management;
- Archaeological Sites;
- Dust; and
- Hydrocarbon Management.

17. Environmental Management and Performance

17.1. Air Pollution

Environmental Management

Air quality is managed in accordance with the BSO Air Quality and Greenhouse Gas Management Plan (AQMP) which details the air quality and emissions control measures for the project, compliance procedures, monitoring programs, evaluation protocols, notification and communication processes.

The AQMP was prepared to comply with the intent and requirements of Condition 12, Schedule 4 of the BSO approval.

The objectives of the AQMP are to:

- Provide the frame work for the responsible management of air quality and emissions associated with the project;
- Describe the control measures for management of dust, odour, greenhouse gas (GHG) and other emissions to atmosphere;
- Prevent adverse air quality impacts on the local communities and environment;
- Describe the compliance criteria for air quality for the project;
- Describe the air quality monitoring program;
- Comply with the relevant requirements of Environment Protection Licence (EPL) No. 2504 and the Bulli Seam Operations (BSO) Project approval;
- Describe measures for the reduction of project GHG emissions; and
- Comply with South32 and other relevant standards and requirements.

The air quality monitoring program incorporates:

- Collection and measurement of dust samples from strategically placed dust deposition gauges at representative sites;
- Use of real-time air quality monitors: fixed Optical Photometers, portable Optical Photometers;
- Use of a High Volume Air Sampler (HVAS) to determine the land acquisition values; and
- Dust emission surveys and spot checks using hand held photometers; and
- Visual inspections and audits.

Table 21: BSO air quality monitoring sites and their function

Equipment	Monitoring Point ID and Location	Function
Appin East	Dust Deposition Gauge 14	Particulate dust deposition rate at SE corner of Stockpile at property boundary Operational Control - Stockpile and internal roadway dust control measures performance reference
	Dust Deposition Gauge 15	Particulate dust deposition rate at NE corner of Stockpile Operational Control - Stockpile and internal roadway dust control measures performance reference
	Dust Deposition Gauge 16	Particulate dust deposition rate at NW corner of Appin East pit top property boundary Amenity goal reference Operational Control - Site dust control performance reference
	Dust Deposition Gauge 17	Particulate dust deposition rate at NE corner of Appin East pit top property boundary Amenity goal reference Operational Control - Stockpile and public road dust control measures performance reference
Appin East	Dust Deposition Gauge 18	Particulate dust deposition rate at SE corner of Stockpile Operational Control - Stockpile and internal roadway dust control measures performance reference
	Real-time Photometer (fixed) Photometer ID: (AE-PF3) (NW corner of Appin East pit top boundary between nearest residential receivers)	Amenity goal reference Real Time Operational Control Site dust control performance reference
	High Volume Air Sampler High Volume Air Sampler ID:(AE-HV1)	Amenity goal reference Review against land acquisition levels Real Time Operational Control
	Real-time Photometer (fixed) Photometer ID: (AE-PF1) (NE corner of pit top property boundary – coal stockpile vehicle entry/exit point)	Real-time monitoring of dust emissions at the coal stockpile area truck entry/exit point onto public roads Real-time Operational Control – Stockpile, internal roads and public road

Equipment	Monitoring Point ID and Location	Function
		dust control measures performance reference monitor
	Real-time Photometer (portable) Photometer ID: (AE-PS1) Coal truck exit point onto Appin Road	Monitor dust emissions at the coal truck exit point onto Appin Road Quarterly survey dust monitoring point Real-time Operational Control
	Real-time Photometer (portable) Photometer ID: (AE-PS3) Residential Area to the NW of Appin East Pit Top	Monitor dust emissions at the Appin residential area immediately NW of Appin Pit Top Quarterly survey dust monitoring point Real-time Operational Control
Appin West	Dust Deposition Gauge No.1 Gauge ID: (AW-DD1) (Appin West pit top – adjacent mine access road, employee car park and EDL power plant)	Particulate dust deposition rate at Appin West pit top Operational Control – Site and road dust control measures performance reference
	Dust Deposition Gauge No.2 Gauge ID: (AW-DD2) (Appin West property boundary at Mine Entrance Point off Douglas Park Drive	Particulate dust deposition rate at the Appin West Mine Gate Entrance Point and the public road Amenity goal reference Operational Control – Site and mine access road dust control measures performance reference
	Real-time Photometer (portable) Photometer ID: (AW-PS1) Northern property boundary between Appin West Pit Top and St. Mary's Towers property	Monitor dust emissions at the Northern pit top property boundary Quarterly survey dust monitoring point Real-time Operational Control
	Real-time Photometer (portable) Photometer ID: (AE-PS2) Main mine road intersection with Douglas Park Drive	Monitor dust emissions at the mine road intersection with Douglas Park Drive Quarterly survey dust monitoring point Real-time Operational Control
West Cliff	Dust Deposition Gauge No.1 Gauge ID: (W-DD1) (West Cliff southern property boundary at the Wedderburn Rd and-Appin Rd junction)	Particulate dust deposition rate at the Wedderburn Rd and-Appin Rd junction Operational Control – Mine entrance road and coal truck dust control measures performance reference
	Dust Deposition Gauge No.3 Gauge ID: (W-DD3) (West Cliff pit-top south site)	Operational Control – Site dust control performance reference for the West Cliff pit-top south site

Equipment	Monitoring Point ID and Location	Function
	Dust Deposition Gauge No.8 Gauge ID: (W-DD8) (Brennans Creek Dam)	Amenity goal reference Operational Control – Site dust control performance reference Indicator for dust deposition rates between the emplacement area activities and the nearest Appin township residential area Baseline and historical dust deposition trends related to the expansion of the emplacement area north towards the nearest residential receivers
	Dust Deposition Gauge No.10 Gauge ID: (W-DD10) (West Cliff property boundary between the product stockpiles adjacent to Wedderburn Road and the Dharawal State Conservation Area boundary)	Site dust control performance reference for product stockpiles and Wedderburn Road coal truck transport corridor
	Real-time Photometer (fixed) Photometer ID: (W-PF1) (West Cliff southern property boundary at the Wedderburn and Appin Road intersection)	Fixed monitor for real-time monitoring of dust emissions at the Wedderburn Road and Appin Road intersection Real-time Operational Control – Roadway dust emissions
	Real-time Photometer (portable) Photometer ID: (W-PS1) (Brennans Creek Dam locality to the north of the West Cliff Emplacement Area)	Monitor real-time dust emissions at the Brennans Creek Dam locality. Quarterly survey dust monitoring point Operational Control and baseline reference point
	Real-time Photometer (portable) Photometer ID: (W-PS2) (Dust emissions survey locality at the western boundary between the emplacement operations and Appin Road)	Monitor real-time dust emissions at the zone between the active emplacement area and Appin Road Quarterly survey dust monitoring point Operational Control
	Real-time Photometer (portable) Photometer ID: (W-PS3) (Dust emissions survey locality along Wedderburn Road between the coal stockpiles and the Dharawal National Park)	Monitor real-time dust emissions along Wedderburn Road
	Real-time Photometer (portable) Photometer ID: (W-PS4) (Cataract Scout Camp Reserve to the	Quarterly survey dust monitoring point Operational Control

Equipment	Monitoring Point ID and Location	Function
	South West of the West Cliff Site)	

Three weather stations and temperature inversion monitoring equipment was installed during the last reporting period. The weather stations are located at Appin East (with mains power), West Cliff (along Wedderburn Road with solar power) and the Vent Shaft 6 precinct (with solar power).

Environmental Performance

Results of the air quality monitoring are reported online every 14 days in accordance with Section 66 (6) of the POEO Act and *Schedule 6, Condition 11* of the BSO Project Approval; and on an annual basis to the OEH via the EPA Annual Return (Appendix B – 2014/15 EPA Annual Return). The online report is available via the following link:

http://www.south32.net/our-operations/australia/illawarra-coal/regulatory-document

A comprehensive summary of all air monitoring results for the BSO is provided below:

BSO Dust Deposition Gauge Monitoring

The Appin East and West Cliff sites non-operational gauges were below the long term criteria/amenity goal of 4 g/m2/month for deposited dust (Figure 6). This is evident at all sites located near the perimeter of the Appin and West Cliff sites (i.e. AE-DDG14, 15, 16 and 17; and AW-DD1 and 2; and WC-DD1, 3 and 8).

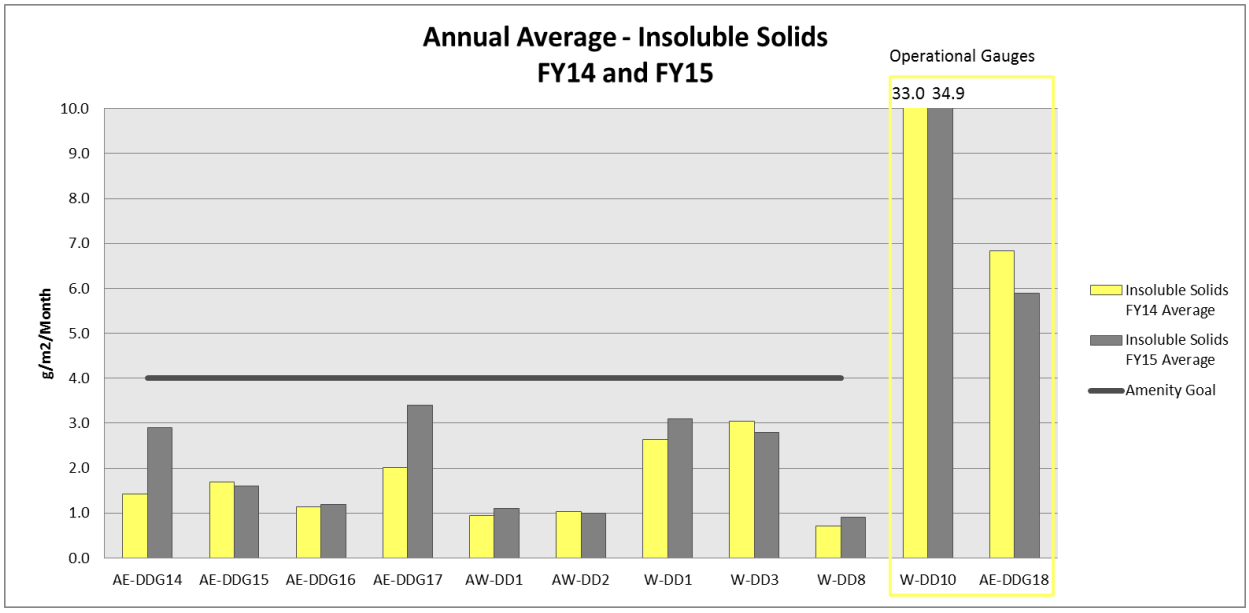


Figure 6: Comparison between FY14 and FY15 annual averages for insoluble solids across the BSO.

The long term criteria (amenity goal) applies to particulate emissions on any *residence on privately owned land* – W-DD10 and AE-DDG18 are operational gauges located within the mine site i.e. operational land, they provide an indication of effectiveness of the sites immediate dust control measures.

Real-time Monitoring

As described in the BSO AQMP, if the optical photometer at Appin East (AE-PF3) indicates dust levels greater than 80% of the Air Quality Criteria (refer to Schedule 4, condition 9 of the BSO project approval) additional monitoring will be undertaken using the HVAS (AE-HV1) in order to assess compliance. The PM_{10} levels at this site remained well below the 80% trigger (24 hour average) for the reporting period; therefore the HVAS was not required (Figure 7). Currently, the optical photometers are unable to determine the difference between dust, rain and fog. High results are, almost without exception, the result of dense fog in Appin area. A minor improvement planned for the next reporting period is the installation of a heated inlet on optical photometer AE-PF3 in an attempt to improve this weakness in the sensor design.

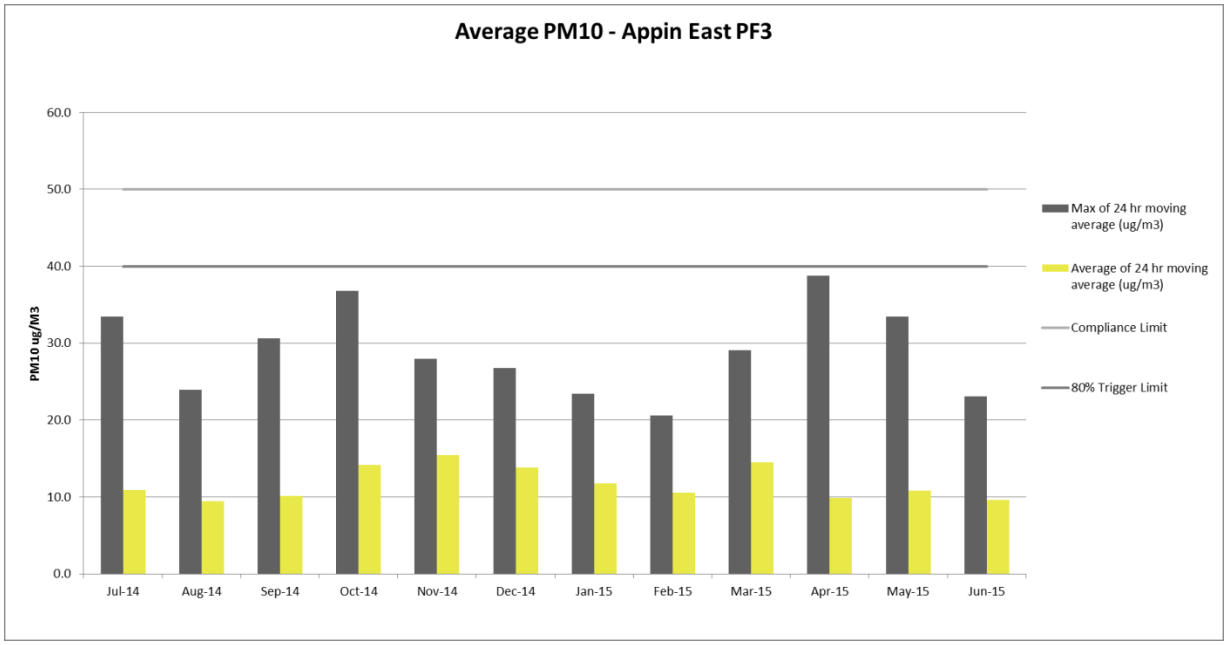


Figure 7: PM_{10} average 24 hour levels and maximum 24 hour levels at Appin East.

PRP21 – Implementation of Dust Control Best Management Practices

PRP21 was completed during the reporting period. The requirement of the PRP was to implement best practice measures for dust minimisation.

Table 22: PRP21 Implementation Details

Dust Control Measure	Implementation Details
Implementation of Dust Forecast Ranking System	Notification of adverse weather condition (trigger point: wind speeds > 40km/hr) are received by a number of personnel at the West Cliff site, listed below: Environmental Superintendent; Environmental Supervisor; Emplacement Operations Manager (Contract Role); Emplacement Operations Supervisor (Contract Role); Emplacement Operations Leading Hand on-shift (Contract Role); and Logistics Supervisor. The Emplacement Operations Manager (or delegate) reviews the notifications and assign sufficient resources (including deployment of up to two water carts) based on the forecast conditions. The process has been incorporated into the Daily Emplacement Inspection documents (Ref: 14-04-02C and 14-04-03C).
Retrofit two water tankers with water cannons	The site has two water carts fitted with water cannons. The deployment of the second watercart occurs if deemed appropriate following the assessment of the forecast weather conditions (as per process above). The water carts are managed through the Emplacement Contractor.
Haul Road Resurfacing	The following internal haul roads have been resurfaced with the stabilised waste material: Front Road (ie. entry road to Stockpile 3; Middle Road (ie. main haul road between Stockpile 1 and 2/3); and Back Road (ie. main haul between Stockpile 3 and Road Receival). A plan showing the location of these roads is provided as Attachment 1.

PRP 22 – Investigation to Reduce Coal Dust Tracked Onto Roads from West Cliff Colliery

Illawarra Coal undertook an investigation into measures that would reduce the dust tracked onto roads from West Cliff Colliery. Recommendations were prepared for infrastructure improvements that would reduce the dust being tracked onto Appin Road. Environmental Improvement Program 1 was subsequently implemented and the construction completed during the reporting period.

Information regarding EIP1 is reported briefly below and in greater detail in section 8.3 of this report.

Reportable Incidents

No reportable incidents have occurred during the reporting period.

Wedderburn Road Improvements

As described in section 8.3 of this report, EIP1 required a schedule of works to be completed to improve the drainage and dust control structures on Wedderburn road. Summarily the following were installed:

- Over 400 metres of Kerb and Guttering
- Drive-in sediment sump
- 450mm under-road drainage pipe

- Over 40m3 of high MPA concrete
- 3 Hectares of “hydromulch” native seed mix applied to combat erosion on road side.

These improvements should contribute to a reduction in dust drag out.

17.2. Erosion and Sediment

Environmental Management

Most activities at the Appin East and West sites are undertaken on relatively flat areas. In addition, high activity areas are sealed. There are minimal exposed earthen areas at both sites. Internal unsealed roads are maintained to prevent dust, primarily through dust suppression sprays and water carts. Sediment fences are installed where required to filter sediment from drainage / seepage. Sediment is controlled by a series of dams and water treatment facilities at both sites. Water discharged is monitored for suspended solids.

Areas that have the potential to be contaminated by the surface operations at the Appin West Pit Top are contained within the catchment of the Surface Water Dams which are designed to capture and treat a 1:10 year, 72 hour rainfall event. The Surface Water Dam contains a spillway designed for a 1:1000 year rainfall event to maintain the engineering integrity of the structure and reduce the risk of erosion and sediment release. Prior to the release of surface water from the Surface Water Dam (via LDP 23), water passes through a filter unit which is designed to remove suspended solids, oil and grease.

The potential for erosion at the emplacement area is managed in accordance with the *West Cliff Coal Wash Emplacement Area Management Plan*. The following activities are undertaken to minimise the likelihood of erosion within the emplacement area:

- Compaction of emplaced material;
- Profiling of finished areas to designed gradients; and
- Revegetation of emplaced area.

Sediment is controlled by a series of sedimentation ponds, which have a combined capacity in excess of 200ML. Treatment of the water is undertaken at a number of locations across the site prior to release to BCD to meet compliance with EPL limits.

The water management system is regularly inspected by the site environmental representative to ensure the system is operating as efficiently as possible.

Environmental Performance

Routine water quality monitoring of Total Suspended Solids (TSS) across the BSO has not identified any issues associated with erosion and sedimentation. The Appin East and West and West Cliff sites are operating within the licence limits for TSS.

Reportable Incidents

There were no reportable incidents during the reporting period.

17.3. Surface Water Pollution

Environmental Management

Surface water management across the BSOP is undertaken in accordance with *EPL 2504* and the approved *BSO Surface Water Management Plan*. The Surface Water Management Plan (SWMP) details the control measures, compliance procedures, monitoring programs, evaluation protocols, notification and communication processes for surface water management for the BSO. This plan has been prepared to satisfy Schedule 4, Condition 16 of the BSO approval.

The objectives of the SWMP are to:

- Provide a water balance for the project including sources, usage and discharge quality;
- Outline the process to reduce the impacts on biota from the Brennans Creek dam discharge;
- Establish responsibilities for the surface water management at the BSO operations;
- Comply with all relevant regulatory requirements, Environmental Protection Licence 2504 and South32 policies and standards for water management;
- Describe the water management systems including measures to comply with discharge limits and minimise potable water usage;
- Outline the framework for water monitoring, auditing and reporting; and
- Specify investigation and communication processes in response to water related issues and complaints.

For specific surface water management strategies and controls, please refer to the SWMP found at:
http://www.south32.net/our-operations/australia/illawarra-coal/regulatory-document

Environmental Performance

Results of the surface water monitoring are reported online every 14 days as per the requirements of Section 66 (6) of the POEO Act and *Schedule 6, Condition 11* of the BSO Project Approval; and on an annual basis to the OEH via the EPA Annual Return (Appendix B – 2014/15 EPA Annual Return). The online report is accessible via the following link:
http://www.south32.net/our-operations/australia/illawarra-coal/regulatory-document
A summary of results from the BSO monitoring program is included in the following sections.

Water Quality

All but two of the eleven monitoring sites across the BSO achieved compliance with the EPL2504 limits during the reporting period (refer to

Table 23), three of the sites were not utilised for discharge during the reporting period. Sites where an exceedance of the EPL has occurred are discussed in more detail below.

Table 23: Summary of Compliance with EPL water quality limits across the BSO

Monitoring Site	EPL Compliant Y/N	Comments
Point 4	Yes	---
Point 10	No	Refer to paragraph below
Point 11	Yes	---
Point 12	Yes	---
Point 18	Yes	---
Point 19	Yes	---
Point 20	Yes	---
Point 22	Yes	---
Point 23	No	Refer to details below
Point 24	Yes	---
Point 36	Yes	---

License Exceedances at Point 10 – Conductivity

During 2014 the discharge rates were increased from Brennans Creek Dam (BCD) to more than 2ML/day over short periods to manage subsidence induced impacts in the Georges River and minimise issues around pool connectivity. These elevated discharge events were in line with the requirements of the Georges River TARP from the approved Subsidence Management Plan. The conductivity of the discharge water was above 2500 µS/cm for three of these 'high' discharge events which had an impact to the 90th percentile results for high flow events.

Low periods of rainfall (which cause the conductivity to increase) combined with subsidence induced impacts in the Georges River required more than 2Ml/day of flow to be discharged from BCD (to minimise issues around pool connectivity). These discharge events were in line with the requirements of the Georges River TARP from the approved Subsidence Management Plan.

During the second half of 2014 the flow from LDP10 was significantly restricted due to structural issues with the upstream face of the dam and the scour-line. These issues resulted in the scour-line being taken off-line with the floating off-take used to supply operational water – this change meant that the availability of water for environmental discharge was reduced to approximately 1-1.5 ML/day. This unfortunately coincided with periods where the conductivity was relatively low (ie. < 2,500 uS/cm) and hence impeded the ability to manage discharge flows and instantly restore compliance with the 90th percentile limit.

Detailed works are underway as part of PRP19 and the broader Bulli Seam water strategy to reduce conductivity in BCD.

The details of the non-compliance were discussed with the EPA (Wollongong Office) during a meeting on the 14th January 2015.

For further information please refer to the 2014/2015 Annual Returns document, attached as an appendix to this report.

License Exceedance at Point 23 – pH

On the 9th January 2015 an exceedance of the pH 100th Percentile pH limit at monitoring Point 23 (Piped discharge outlet for storm water at Appin West) Result: 9.2pH, with a Limit: of 8.5pH.

A detailed investigation was unable to determine the root cause of the apparent increase in the pH level. The non-compliance was confirmed when the results from the laboratory were received on the 27th of January 2015 at which point in time an in-situ 're-test' was undertaken in the dam – pH readings were all found to be within compliance of the discharge limits (all lower than 8.5). In addition to the in-situ test, an additional water sample was also collected on the 27th January and analysed by a NATA accredited laboratory, returning a pH result of 7.4 pH units.

For further information please refer to the 2014/2015 Annual Returns document, attached as an appendix to this report.

Water Discharge

There have been nil instances where discharge volume exceeded the EPL limits for discharge. See table below.

Table 24: Summary of Compliance with EPL discharge volume limits across the BSO

Monitoring Site	EPL Compliant Y/N	Comments
Point 4	Y	---
Point 10	Y	---
Point 13	Y	---
Point 18	Y	---
Point 19	Y	---
Point 20	Y	---
Point 22	Y	---
Point 24	Y	---

Ecotoxicity

In accordance with EPL 2504 Condition M2.4, Illawarra Coal is conducting acute and chronic (sub-lethal) toxicity testing of the discharges from Point 10. Samples are collected four times per year; the program commenced in June 2013. A summary of the results from the four FY15 sampling events is provided below. Monitoring will continue throughout FY16.

Table 25: Ecotoxicity results summary (NOEC). Samples collected from LDP10, Brennans Creek Dam.

Test and Spp.	Highest Mine Water Concentration where there was No Observable Impact (NOEC) over a Full or Partial Life Cycle.			
	Jul-14	Oct-14	Jan-15	Apr-15
Partial life-cycle toxicity test using the freshwater cladoceran *Ceriodaphnia dubia*	50%	100%	50%	25%
48hr Acute Toxicity Test using the freshwater cladoceran *Ceriodaphnia dubia*	50%	100%	50%	50%
10 day Acute Survival Test using the freshwater shrimp *Paratya australiensis*	50%	50%	50%	50%
96 hour fish imbalance test - *Melanotaenia* duboulayi	50%	100%	100%	25%
7-day Growth Inhibition of the freshwater aquatic duckweed *Lemna disperma*	24.20%	24.20%	6.10%	12.10%
72-hour microalgal growth inhibition test - *Selenastrum capricornutum* (green alga)	6%	25%	<6.3	<6.3

Pollution Reduction Programs

PRP19

PRP 19 (condition U2.1) aims to protect and / or restore the environmental values of the receiving waters affected by the discharge of waters from Brennans Creek Dam (BCD) into the Georges River. Stage 1 of the project was completed in December 2012 and involved the transfer of mine water from underground directly to the West Cliff Washery to be used as process water. Stage 2 of the project is due for completion by December 2016 and involves carrying out a program of works which may include minimisation or avoidance of a discharge, installation of a water treatment plant, or a combination of a water treatment plant and other discharge improvement options to achieve specified discharge quality. Stage 2 requires the licensee to provide six monthly progress reports (30 June and 30 December) until the completion of the project. Progress as at the end of the reporting period is as follows:

- Regular water strategy meetings have commenced to discuss and plan suitable options to address the requirements of PRP19.
- Completion of year one base-line aquatic health monitoring (PRP20).
- Construction of an under bore connecting Appin East to West Cliff. This will enable the transfer of treated water via a pipe range. Further design work is being undertaken to ensure adequate quality and volumes of discharge are met in accordance with relevant requirements.
- Review of chemicals used for surface water treatment at West Cliff. In-situ trials of alternate water treatment chemicals are expected to be completed in the near future (outcomes of review to be reported in next 6 monthly update report).

- Six monthly progress reports have been submitted to the EPA in December 2014 and June 2015 as per the requirements of the PRP.

With regards to the six monthly progress reports, the table below is an extract from the June 2015 update.

Table 26: PRP19 six monthly update table.

Works	Purpose	Status
Stage 1. Transfer of mine water from underground directly to the West Cliff Coal Preparation Plant (Washery)	Reduce Brennans Creek dam (BCD) water taken for process water in the Washery. Reduce higher salinity water diverted into BCD by reducing mine water diverted into BCD.	Stage 1 of the project was completed in December 2012.
Flocculent review. Trial of non-aluminium based flocculants at West Cliff Coal Preparation Plant.	Reduction of the aluminium concentration in water treatment chemicals to reduce aluminium levels within treatment ponds and therefore Brennans Creek dam (BCD).	Trials of non-aluminium based flocculants have not met expectations which may be due to the current flocculent delivery system. Further modifications to the flocculent delivery system are planned during the next six months.
Modification to the Washery water management system to create a 'semi-closed loop'.	Reduce BCD water taken for process water in the Washery. Reduce diversion of Washery waters into BCD Slurry pipeline will improve Washery solids management and increase potential for further water reuse.	Infrastructure was installed. New 'semi-closed loop' was commissioned in early June 2015. This project has resulted in a reduction of BCD water used by the Washery by approximately 1 ML/day. Construction of the slurry pipeline has commenced.
Water treatment capacity and technology review	Review of water treatment technologies to increase the capacity of the current Water Filtration Plant and reduce potable water usage.	Technology trials for the following have been completed and technologies selected: Mine water initial pre-treatment; Backwash treatment; Micro / ultra-filtration medias and processes; Membrane cleaning chemicals and process; and Water softeners. The scoping and design of the project has commenced and is expected to be finalised by September 2015.
Water supply line from Appin East Mine to West Cliff.	This project allows salinity levels to be met to maintain Environmental Protection Licence and development consent conditions.	The underbore and pipework from Appin East Mine to West Cliff Mine has been installed. The project was wet commissioned in April 2015.

PRP20

A study was developed to meet the aquatic health monitoring requirements of EPL2504 Condition U3 - PRP 20 Aquatic Health Monitoring Plan (see below).

1) Prepare Aquatic Health Monitoring Program Plan

The licensee must provide an aquatic health monitoring program plan to the EPA for review and approval. The program must require the monitoring and assessment of the aquatic health of Brennans Creek and the Upper Georges River between 1 September and 30 November (monitoring period) in the years 2013, 2015, 2017 and 2019.

The monitoring program must include, but is not limited to, chemical analysis and in-stream biota assessment, including representative macroinvertebrate, algal and vertebrate species. The monitoring program must be carried out at five or more locations including discharge point 10, discharge point 11, discharge point 12 and the Upper Georges River to the confluence with O'Hares Creek.

The aim of the study is to monitor the changes to biota in-stream and within the sediment within the Upper Georges River as Water Projects required by PRP 19 are commissioned.

The aim will be achieved by:

- Comparing the Brennans Ck/Georges River site with reference sites
- Estimate changes over time in the composition and abundance of in-stream and sediment biota; and
- Assessing the downstream gradient changes in composition and abundance of in-stream and sediment biota

We predict that the abundance and composition of aquatic biota will become more similar to the reference sites as Water Projects required by PRP 19 are commissioned.

The Program includes the following:

- Quantitative sampling of macroinvertebrates
- Ecological assessment processes using DNA extracted from sediment samples;
- In-stream water quality testing; and
- Laboratory water testing.

The study area is located within the Upper Georges River Catchment, commencing at GR_UFS and runs for 18 kilometres to site GRQ19, 3.5 km upstream of the confluence with O'Hares Creek. Site GRQ18 is located approximately 8 kilometres downstream of the West Cliff licensed discharge Point 10. Seven sites are located in pool habitats downstream of Licence discharge point 10. Three reference sites are also sampled, GRUFS, GRQ1 and Point 11 (upstream Georges River). Site 11 is upstream of Brennans Creek however is potentially impacted from Appin Mine East drainage. Analysis determined the site is appropriate to use as a reference site.

The first years (baseline) monitoring was completed in November 2013. The report was submitted to the EPA on 26 March 2014. The results of this study were published in last year's AEMR. The next round of monitoring will occur in spring 2015. The result of this study will be reported in the next AEMR.

Reportable Incidents

Non-compliances with EPL 2504 were reported in the Annual Return to the EPA (Appendix B – 2014/15 EPA Annual Return). No other reportable incidents occurred during the reporting period.

Further Improvements

No further improvements for the reporting period.

17.4. Groundwater

No groundwater pollution issues were associated with the BSOP during this reporting period.

At West Cliff, water make resulting from strata water inflow is collected in pits and low points in the underground workings where it is mixed with water delivered underground from surface storage. This strata water is brought to the surface either as moisture contained within the coal or as surplus underground water which is pumped to the surface. Once on the surface, the water is piped to the concrete settling tanks where it is used as the main supply for the WCCPP. There were no incidents of ground water pollution within the report period.

At Appin, mine water is pumped from the underground working to the surface for treatment in the Appin West WTP from where it is either fed back underground for use or blended with mine water and discharged via LDP24.

17.5. Contaminated Polluted Land

Environmental Management

Appin

During the 2010/11 reporting period, Illawarra Coal investigated a small area of the Appin East site that had formerly been used as a fuel dispensing station which comprised two bowsers, a bunded above ground diesel tank, and a bunded refuelling pad. The decommissioned fuelling area was being excavated for the purpose of road construction to upgrade coal loading facilities at the site.

Preliminary investigations found the decommissioned fuelling area contained elevated concentrations of TPH C10-C36. In response to this finding, Illawarra Coal endeavoured to remove the majority of contaminated material from the decommissioned fuelling area to reduce environmental and health risks and ensure the site is suitable for continued industrial land use.

During the excavation and grading works, three previously unknown underground diesel storage tank pits (including a total of four UST's) were discovered. Leakage of diesel was evident in all three UST pits, so after the tanks were removed from site, 0.5-1.0m of soil was excavated from the walls and floor of each tank pit excavation.

Validation sampling of the floor of the excavated area continued to show elevated concentrations of Total Petroleum Hydrocarbons but concentrations of aliphatic and aromatic hydrocarbon compounds were below the NEPC (1999) guidelines for human health. The consultant's validation report indicated that the land remaining in the investigation area and around the UST excavations is suitable for continued industrial land use based on application of the NEPC (1999) guidelines and that the remaining in-situ contamination is not perceived to compromise the ongoing use of the site for industrial purposes. A

quarterly monitoring program was established in 2011, with sampling conducted at four locations – T1, P1, P2 and P3. T1 is used to monitor for potential contamination from the old Appin Tip which is located upstream of the site (Figure 8).

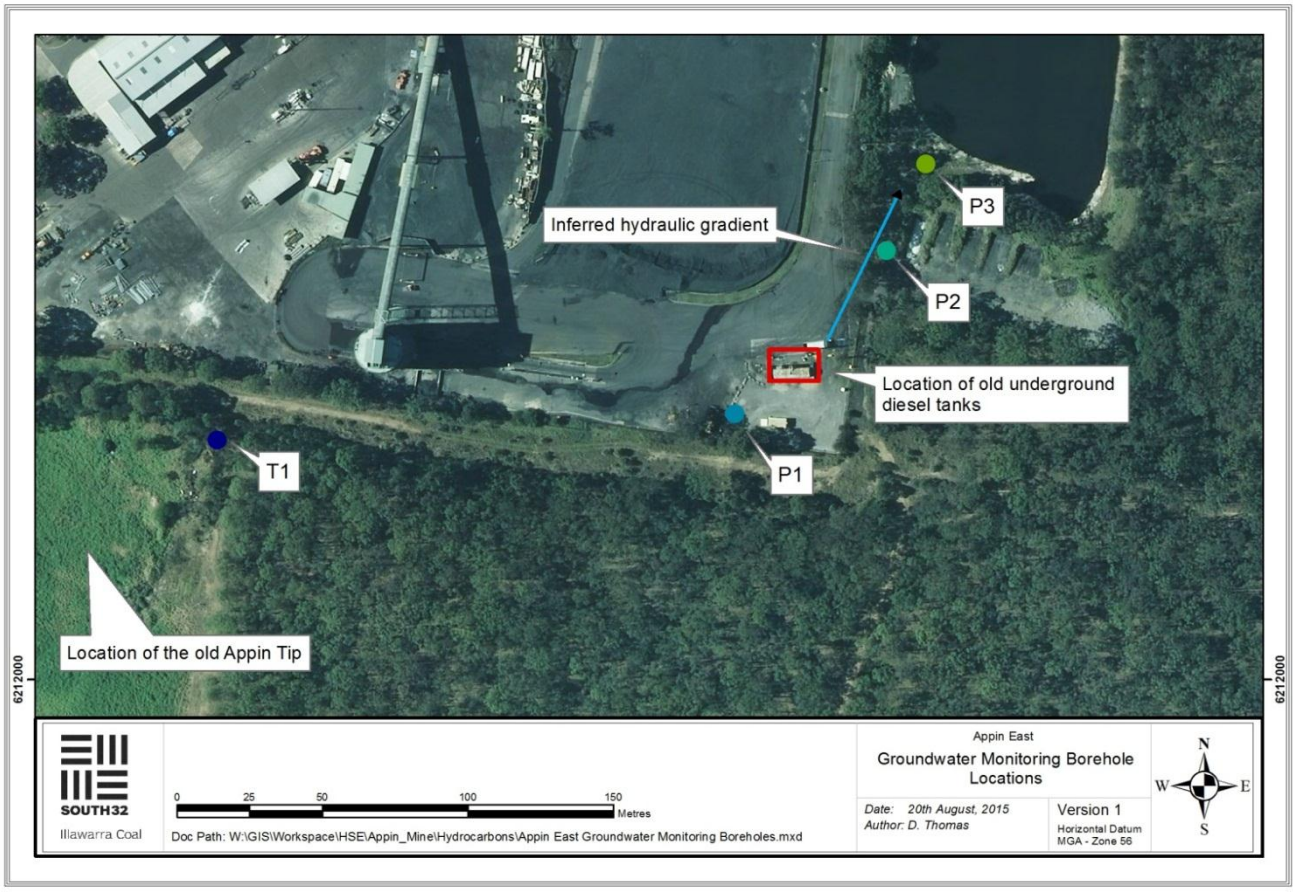


Figure 8: Groundwater Monitoring Bores locations at Appin East.

West Cliff

During the 2009/10 reporting period, both West Cliff Colliery and West Cliff CPP underwent 'Preliminary Contamination Assessments' were undertaken to review site activities and history, a site inspection to look for indicators of contamination followed by a Risk Assessment conducted with relevant site staff.

The site inspection identified a small groundwater seep which was discharging into one of the site dirty water catchment ponds (i.e. Pond P3). The lab analysis of the seep confirmed that the seep contained traces of hydrocarbons and therefore triggered the reporting requirements under Section 60 of the *Contaminated Land Management Act 1997* (CLM Act).

As part of the notification, Illawarra Coal proposed to undertake a Comprehensive Contamination Assessment to determine the level and extent of contamination (both groundwater and soil) prior to determining an appropriate management strategy. This approach was endorsed by DECCW (now EPA) on the 11th May 2010.

The Comprehensive Contamination Site Assessment was completed by an environmental consultant during the 2010/11 reporting period. The assessment involved drilling of nine boreholes (BH1 to BH9), screening of 39 soil samples and laboratory analysis of 15 soil samples. Two groundwater bores (BH8 and BH9) were also installed as part of the investigation.

The analysis of the results suggested that the majority of the investigation area appeared to be free of contamination with only four of the samples indicating relatively low levels of contamination, three of which were located within 2.5 metres of a recently decommissioned and removed UPSS. The concentrations were relatively low in the context of an industrial site and analysis indicates the concentrations were likely to be well below NEPM health investigation guidelines for the industrial land use. In addition, a preliminary assessment of the soils waste classification suggested that the soil is likely to be classified as general solid waste. Ongoing monitoring of BH8 has been carried out during the reporting period.

Environmental Performance

Appin

Since the first round of monitoring, all samples across all sites have been essentially uncontaminated with respect to BTEX.

During the reporting period all boreholes showed below or close to lowest observable response for TPH of 50 µg/L. The small rise in TPH observed at T1 in quarters two and three of the reporting period has been unable to be attributed to site as it is upslope of the inferred hydraulic gradient. The result was below observable limit for the most recent sample.

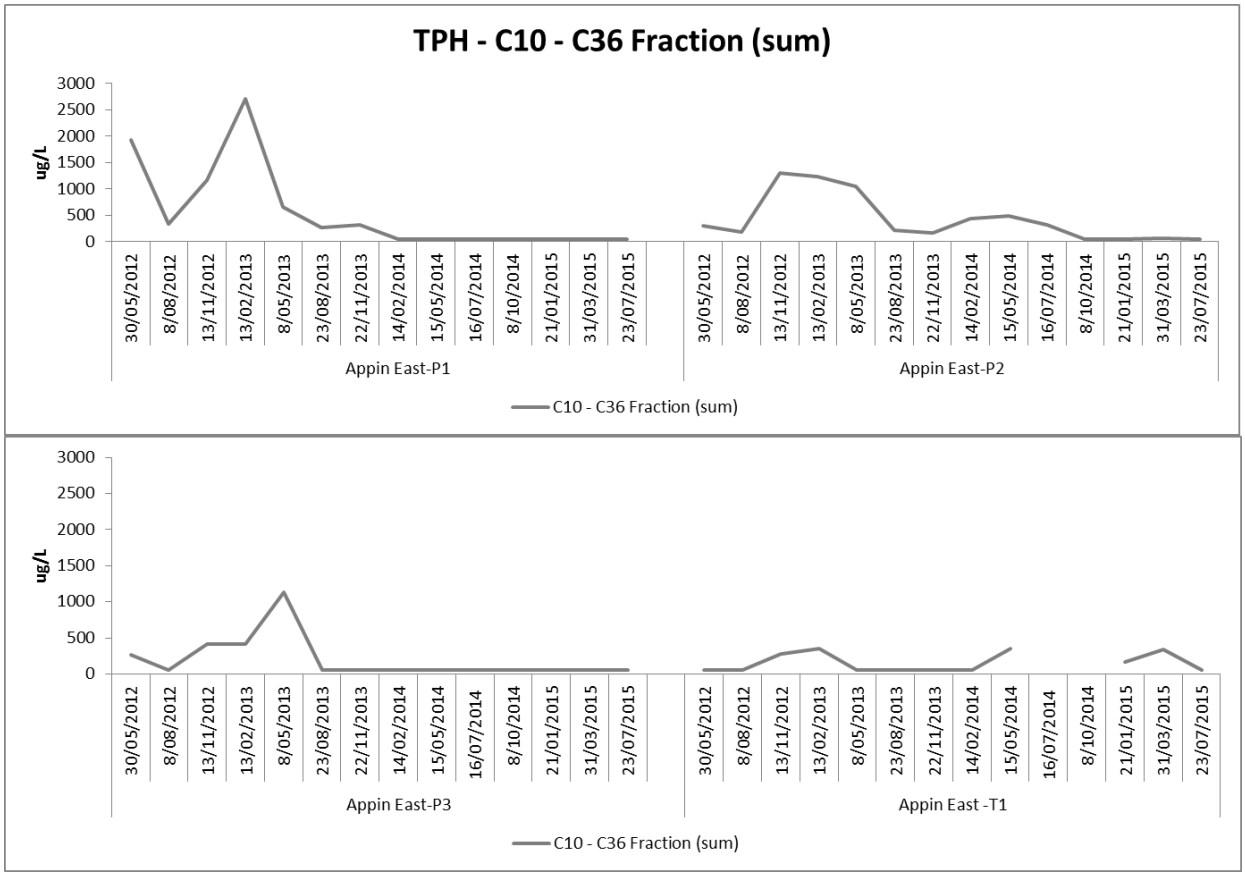


Figure 9: Total Petroleum Hydrocarbons (C10 – C36 Fraction (Sum)) since monitoring began in 2012 at Appin East.

West Cliff

During the reporting period, all samples from BH8 were uncontaminated with respect to BTEX.

Since the first sampling campaign, TPH concentrations had generally trended downwards in BH8. TPH concentrations had ranged between 2050µg/L in Feb 2012 down to 260 µg/L in August 2012. The carbon chain range for BH8 are between C10 – C28 indicating that diesel is a potential source of contamination at this location. This is consistent with data reported in the validation report which was submitted to the EPA in August 2010 which indicated there was a small hot spot of contamination remaining.

During the reporting period a spike in TPH was observed. Subsequent samples were below observable limit and an investigation could not attribute the spike to site conditions.

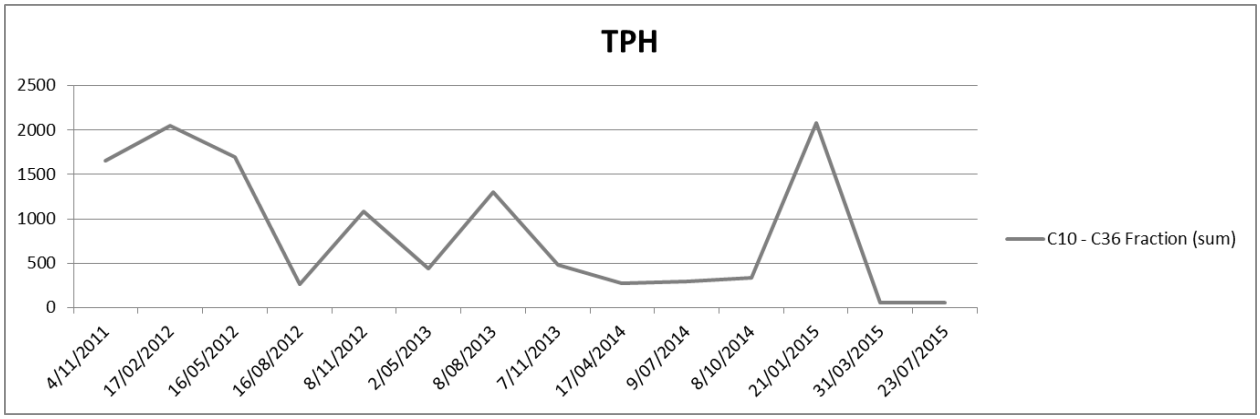


Figure 10: Total Petroleum Hydrocarbons (C10 – C36 Fraction (Sum) µg/L) since monitoring began in 2012 in BH8 at West Cliff.

17.6. Threatened Flora and Fauna

Environmental Management

Threatened Flora and Fauna communities at the BSO are managed in accordance with the following approved plans:

- West Cliff Coal Wash Emplacement Area Management Plan
- Broad-headed Snake Management Plan
- Southern Brown Bandicoot Management Plan
- *Persoonia hirsuta* Offset Management Plan
- Ventilation Shaft No.6 Biodiversity Management Plan
- Sandstone Shale Transition Forest Offset Management Plan; and
- Surface and Groundwater Quality Monitoring and Adaptive Management Plan for Water Sensitive EPBC Listed Species

These plans include the management and mitigation measures for threatened species or habitats that occur on our sites and are available on the South 32 website:

http://www.south32.net/our-operations/australia/illawarra-coal/regulatory-document

Environmental Performance

No new threatened flora and fauna communities were identified during the reporting period. There have been no impacts to the existing communities, with the exception of natural attrition to the above populations during the reporting period.

The surface areas at the Appin Mine and infrastructure sites are largely cleared. There was no significant clearing on site during the reporting period, only maintenance associated with property asset protection zones, maintaining safe clearances from infrastructure and traffic zones, and garden maintenance.

The *Persoonia hirsuta* is listed as Endangered under both the NSW Threatened Species Conservation Act and Commonwealth EPBC. A substantial population of the *Persoonia hirsuta* is known to exist on the West Cliff Colliery Lease. A number of the *Persoonia hirsuta* are located within operational areas such as high voltage transmission lines on site.

Acacia bynoeana is listed as Threatened under the NSW Threatened Species Conservation Act and Vulnerable under the Commonwealth EPBC. The species has previously been recorded along existing roads, tracks and disturbed areas at West Cliff.

Pultenaea aristata is listed as Vulnerable under the NSW Threatened Species Conservation Act and the Commonwealth EPBC. The species has been recorded in areas of impeded drainage in woodland adjoining the main access road and in the vicinity of the southern extent of Stage 3 Emplacement Area. 41 *P. aristata* were identified within the rehabilitating emplacement area (See Appendix A – Annual Rehabilitation Report).

Flora and Fauna aspects associated with mine subsidence are detailed in the **Error! Reference source not found.** section.

There have been no instances that required the implementation of mitigation measures for Broad-headed Snakes or Southern Brown Bandicoots (as outlined in the approved management plans). The West Cliff emplacement clearing has been undertaken in accordance with the two-stage clearing procedures as outlined in the Plans.

Persoonia hirsuta Offset Monitoring

Overview

During the reporting period, Illawarra Coal conducted monitoring under approval of the West Cliff Emplacement *Persoonia* Offset under EPBC 2010/5350 Condition 1. The monitoring is also undertaken in accordance with the approved *P. hirsuta* Offset Management Plan, which complies with EPBC Approval Condition 2.

The total count of live plants in spring 2014 was 36; 16 plants have died since baseline (2012); 3 new plants were identified in 2014.

A further 28 individuals are being monitored within the surrounding West Cliff lease, 10 of which were recorded in 2012; five in 2013. This includes one plant in the Stage 2 emplacement rehabilitation, another within the future Stage 4 boundary, 12 plants on the Brennans Creek Dam access road (and in bushland to the north), and 14 along the south-west boundary of the Appin Road easement.

Total Site Count

The total count for *P.hirsuta* plants at West Cliff in spring 2014 was 64, a net increase of 4 plants when compared to the 2013 survey. Discounting the 8 plants that have been identified in the Offset since baseline (2012), the Offset area has experienced an overall population decline of 16 plants. It is likely the majority of the *P. hirsuta* plants in the Offset are reaching the end of their natural lifecycle. There were no visible impacts from dust or apparent disease.

Three immature plants were identified at West Cliff (estimated age between 1 and 2.5 years). All are situated on cleared easement. It appears that recruitment within the population of *P. hirsuta* is limited to previously disturbed areas.

The discovery of the mature plant within the Stage Two emplacement rehabilitation is a first for the site. Illawarra Coal will continue to monitor the rehabilitating areas for additional plants.

Persoonia hirsuta Research

Under the BSO EPBC Approval Condition 3, Illawarra Coal is required to conduct specific research on *P. hirsuta*.

To date, the following has been undertaken:

Project No.1 - Habitat and Demography:

The University of Wollongong (UOW) were engaged to investigate the plants distribution and abundance, Seed bank dynamics and habitat requirements. The project was conducted as an honours thesis and was completed in October 2013. This study is part of a number of studies that will be conducted over the next 3 years.

Project No.2 – Population Genetics

The UOW have been engaged to investigate population genetics at both a local and regional scale. The project was conducted as an honours thesis and was completed in June 2015; however further research in this area is being undertaken.

Project No.3 – Propagation

Mt Annan Royal Botanic Gardens have been engaged to undertake trial ex-situ propagations of *P. hirsuta* cuttings (collected from West Cliff). The first round of cuttings were collected late 2013. To date there has been one successful vegetative propagation (Figure 11). The successful clone was from a population of Persoonia hirsuta located in Couridjah, NSW.

Figure 11: first successful vegetative propagation of *P. hirsuta*.

Potential Future Research

IC will be undertaking a controlled ecological burn in the West Cliff offset. At this stage the burn is planned for spring 2015 or autumn 2016. Developing a Burn Plan for the West Cliff Offset will promote new growth of dormant *P. hirsuta* seeds.

In spring 2013, a known NSW population was destroyed by wildfire; this presents a unique opportunity to monitor the site for emergent seedlings. IC engaged UOW to undertake a monitoring program, the results of which were included in the thesis published for Project No.2 above.

Reportable Incidents

There were no reportable incidents during the reporting period.

Further Improvements

There were no further improvements during the reporting period.

17.7. Weeds

Environmental Management

Appin

Monthly environmental inspections (which include weed identification) are undertaken at the Appin East and Appin West sites. When noxious weeds are identified they are removed and treated as per the approved Waste Management Plan. Maps outlining the weed growth areas are provided to the grounds maintenance personnel to assist with identifying the target locations. During the reporting period active weed management included:

- Regular spaying of weed zones by licensed contractors;
- Regular audits of the effectiveness of weed management activities

West Cliff

Ongoing grounds maintenance is undertaken by a contractor who has a regular schedule of work. The annual emplacement rehabilitation monitoring program includes the identification and proposed management strategies to control weed growth within the emplacement areas. Focus areas for weed control are determined through this program. Records of areas targeted are maintained for future reference. Targeted weed control within the emplacement area is undertaken by suitably qualified site environmental representatives.

17.8. Blasting

No surface blasting activities are undertaken on site. Minor blasting activities underground are undertaken using approved management plans.

17.9. Operational Noise

Environmental Management

Noise across the BSOP is managed in accordance with the approved BSO Noise Management Plan. The Plan was prepared to satisfy Schedule 4, Condition 5 of the BSO approval and details the relevant noise criteria, compliance procedures and controls relating to the mining operations.

The objectives of this plan are to:

- Provide the frame work for the responsible management of noise emissions associated with the project;
- Describe the control measures for management of noise emissions;
- Prevent adverse noise impacts on the amenity of local communities and environment;
- Describe compliance criteria for noise for the project;
- Describe compliance criteria exceedance assessment protocols;
- Describe the noise monitoring program;
- Comply with the relevant requirements of Environment Protection Licence (EPL) No. 2504 and the BSO Project approval;
- Describe measures for the reduction of noise emissions; and
- Comply with South32 and other relevant standards and requirements.

A copy of the Plan is available on the South32 website:
http://www.south32.net/our-operations/australia/illawarra-coal/regulatory-document

Noise Monitoring Program

A noise monitoring program has been developed to comply with Condition 5(f) of Schedule 4 of the Project Approval.

The objectives of the noise monitoring program are to:

- Measure noise levels experienced by nearby residential receivers;
- Assess the effectiveness of the existing noise controls;
- Measure project related noise levels;
- Detect any adverse developments in Project noise;

- Measure Residential Background Level (RBL) noise; and
- Acquire sufficient and reliable data to inform the assessment of compliance with noise criteria

Assessment criteria have been established for each monitoring location, as outlined in Table 27. The criteria enable an assessment of compliance to be made against the noise levels outlined in the Project Approval. The site specific assessment criteria were developed using the following methodology:
Adoption of the most stringent noise levels as outlined in the Development Consent noise criteria; and
Where relevant, the noise levels were adjusted (to take into account monitoring location verse receivers) using the noise contours from the BSO Noise Impact Assessment.

Table 27: Noise Survey Points

Survey Point ID	Type	Receivers	Assessment Criteria		Locality	Function
			LAeq(15 min)	LA1(1 min)		
AE-NS4	Real-time and attended	Appin township	43 (day, evening and night)	52 (night)	Located in paddock between Illawarra and Toggarai St North of Pit Top behind receiver 137	Noise from AE
AE-NS5	Attended	Appin No.1 and No.2 receivers	40 (day, evening and night)	50 (night)	Northampton Dale Road between the No.2 Shaft Site and power plant project and the nearest residential receivers in the South to East quadrant from site.	Noise levels between Shaft Site and the nearest residential receivers to the SE
AW-NS5	Real-time and attended	All other Appin West receivers	39 (day and evening) 35 (night)	53 (night)	Between nearest residential receivers on Douglas Park Drive and the Appin West Pit Top	Noise level at AW property boundary; Noise levels between AW and nearest residential receivers on Douglas Park Drive
AW-NS4	Attended	Appin West receivers South-west of Appin West; and Appin West receivers near Hume Highway	39 (day and evening) 35 (night)	49 (night)	Ashwood Road, South-west of Appin West Pit Top	Noise level for Appin West Receivers South-west of Appin West; and Appin West Receivers near Hume Highway
AW-NS3	Attended	Appin No.3 receivers	41 (day, evening and night)	49 (night)	Appin No.3 Shaft site at end of Brookes Pt Road	Noise level at Brookes Pt Road and nearest residential receivers to the East of the shaft site
W-NS1	Attended	N/A – Baseline data for West Cliff only	N/A	N/A	West Cliff Brennans Creek Dam	Noise level between the West Cliff emplacement area and the nearest residential receivers to the North of site

The program consists of continuous, real-time noise monitoring and attended monitoring using handheld portable monitors. The attended monitoring is undertaken at the nominated monitoring locations to confirm compliance.

Environmental Performance

Quarterly attended and real-time monitoring was conducted in accordance with the approved management plan for the reporting period.

The assessed noise levels generated from the Bulli Seam Operations were below the Day, Evening and Night assessment criteria in Table 27.

Reportable Incidents

There were no reportable incidents during the reporting period.

Further Improvements

Vent Shaft #6 fan ducting has been engineered to provide substantial inbuilt noise attenuation. The site design also includes earthen noise barriers to reduce noise emissions to nearby residential receivers. Monitoring prior to and subsequent to commissioning is planned to ensure compliance to applicable limits.

17.10. Visual, Stray Light

The Appin West Mine Site is not directly visible by residential receivers. Lighting located on the Man and Materials Winder is partially visible by some residences at Wilton, but has not been raised by the community as an issue.

At Appin East, operations are not directly visible by residential receivers. Lighting located at the top of the coal storage bins is partially visible by some residences but has not been raised by the community as an issue.

Due to the relatively remote locality of West Cliff Colliery there are no significant issues in regard to lighting pollution. There were no lighting impacts from the construction activities undertaken during the reporting period.

Emissions of stray light continued to be assessed quarterly in conjunction with other monitoring outside of daylight hours.

Mine Safety Gas Drainage

During the 2014/15 reporting period, no lighting was operated for Mine Safety Gas Management operations as no 24/7 drilling activities were undertaken.

During the 2014/15 reporting period, the aesthetics of Mine Safety Gas Drainage activities were addressed by:

- Shielding wells from residences as practicable. This included utilising natural topography and vegetation to screen operations and optimising the position of pad infrastructure;
- Where possible infrastructure was green coloured, or housed in a green coloured compound;
- Green coloured noise barriers were installed at the perimeter of sites within sight of residences. During 2014/2015 noise barriers remained in place around Area 9 operational sites; and
- Revegetation of exposed areas as soon as practicable. Pads associated with Longwall 705 were re-vegetated in 2014/15.

Figure 12: LW 704 pads during rehabilitation works

Ventilation Shaft No.6

Drilling of the No 6 Vent Shaft (VS#6) commenced in December 2012 and continued through to 2014. The shaft lining sections were then installed; surface buildings (fan housings, tube bundle shed, transformer housings) have been progressively installed. Ongoing revegetation is occurring as the final landform is being created.

During 2014/15 lighting was progressively installed to service permanent facilities such as the electrical substation, switchyard and office facilities. This lighting will be installed to the applicable standards and to minimise light spill. Surface facility lighting is installed with the aim of creating a safe working environment for 24 hour activities, while preventing light spill towards adjacent properties.

Construction activities for the VS#6 precinct continued throughout 2014/15. To minimise the visual disturbance from these activities, exposed areas were revegetated progressively as final landform is achieved. The most significant feature still to be revegetated is the earthen noise barrier that is currently under construction using coal wash.

Figure 13: VS#6 Spoil revegetation.

17.11. Aboriginal Heritage and Natural Heritage

Aboriginal and natural heritage at West Cliff is managed in accordance with the approved *West Cliff Coal Wash Emplacement Area Management Plan*. **Error! Reference source not found.** This Plan outlines the management/mitigation measures relating specifically to each heritage site located within or in close proximity to the West Cliff Coal Wash Emplacement. A copy of the Plan is available at http://www.south32.net/our-operations/australia/illawarra-coal/regulatory-document

During the reporting period, no sites were consumed by the emplacement operations. Site BC2 is likely to be consumed by the emplacement operation during the next reporting period. The following management actions have been completed for this site:

- Detailed recording – including scale photographic recording of the art and the sandstone overhang (art recoding will be undertaken using methods that do not involve touching the art surface).
- Facilitating the agreed Aboriginal Community Enhancement Program with the Tharawal LALC which included funding for: 3D imaging and recording of the landscape; research and sponsorship; and training and employment.
- Excavation – The archaeological deposits at BC2 have been entirely salvage excavated as per the Preliminary Research Permit #2908.

The following activities are planned to be undertaken prior to emplacement of the site:

- Protection of site using geo-textile and clean sand fill prior to emplacement.
- Signage and appropriate interpretation on the final emplacement landform indicating the location of the site below the emplacement.

The location of all heritage sites at West Cliff is outlined in Plan 13.

Aboriginal and natural heritage aspects associated with subsidence from the underground mining activities are detailed in the **Error! Reference source not found.** section of this report.

17.12. Spontaneous Combustion

No incidence of spontaneous combustion occurred within this reporting period.

Bulli seam coal has a very low propensity to spontaneous combustion. Sampling programs (at Appin and West Cliff) are in place to detect any changes in coal quality that could potentially lead to spontaneous combustion occurring in coal stockpiles or refuse emplacements.

Routine and Statutory Inspections are used to identify any heating or spontaneous combustion events. In addition, a real time CO monitoring system exits, and all mine officials carry CO handheld monitors.

17.13. Bushfire

The risk of bushfire at Appin West, Appin East and West Cliff is managed by a combination of preventative and ready response activities. Bushfire management on both sites is achieved through the formation of a “fire break” around the site perimeters fence-line and the establishment of an extensive firefighting water pipeline around the sites (with booster pump facilities).

Appropriate site personnel are trained in emergency response and firefighting and have a large supply of readily available firefighting equipment on the sites.

18. Mine Subsidence

18.1. Approvals

Appin Area 7 Longwalls 705 – 710

The SMP for Appin Area 7 Longwalls 705 to 710 was approved by the Department of Trade, Investment, Regional Infrastructure and Services (DTIRIS) on the 28th February 2012 (for Longwalls 705 and 706) and 28th of September 2012 (for Longwalls 707 to 710). The Longwalls 705 to 710 SMP is supported by a number of management plans addressing social, cultural, environmental and infrastructure aspects of the mining area.

During the reporting period, Appin Mine continued extracting coal from Longwall 706. As of 30th June 2015, Longwall 706 had extracted 2445.5m, with 598.5m remaining.

West Cliff Area 5 Longwalls 37 – 38

The West Cliff Area 5 Extraction Plan (EP) for Longwalls 37 and 38 was approved by the Department of Planning and Infrastructure - DoPI (now the Department of Planning and Environment – DPE) on the 24th March 2014. Subsidence Management Plan (SMP) approval was granted by the Department of Trade and Investment (T&I) on 28th March 2014. The EP is supported by a number of management plans addressing cultural, environmental and infrastructure aspects of the mining area.

A variation to reduce the length of Longwall 37 by 223m at the commencing end was approved on the 6th June 2014 (by DoPI and T&I). Longwall 37 commenced extraction on the 10th of June 2014.

During the reporting period, Longwall 37 completed extraction on the 30th January 2015. Longwall 38 commenced extraction on the 3rd of February 2015, and as of the 30th of June 2015 had extracted 1070.7m with 1053.7m remaining.

18.2. Appin Area 7 Monitoring and Management Programs

The surface features in the vicinity of mining during the reporting period include:

- The Nepean River and associated tributaries;
- Harris Creek and associated tributaries;
- Cliffs, rocky outcrops and steep slopes;
- Aboriginal and European heritage;
- Buildings and infrastructure.

Monitoring activities within the SMP area includes:

- Water flow, pool water levels and water quality monitoring;
- Photographic and observational monitoring to identify mining-induced fractures, strata gas releases, iron staining and rock falls;
- Aquatic ecology monitoring;
- Terrestrial ecology monitoring;
- Aboriginal and European heritage items; and
- Built features.

The results of these monitoring programs are provided below.

Landscape Features

During the reporting period monitoring of environmental features was carried out in accordance with the Appin Longwall 705 to 710 Subsidence Management Plan (SMP) , and Longwall 705 and 706 Environmental Monitoring Program. Monitoring was conducted for landscapes within the zone of influence for Longwalls 705 and 706 during baseline, mining and post-mining periods (where applicable).

One gas release was identified in the Nepean River during the reporting period, and was likely a reactivated gas release from the mining of Longwall 16 (from 1998) due to its proximity to Appin Area 7 mining. For all observed impacts, the appropriate TARP's were applied, actions implemented and key stakeholders notified as required by the approved SMP.

Impacts associated with Longwalls 706 are summarised in Table 28 below.

Table 28: Predicted vs Observed Impacts for Landscape Features for Appin Area 7

Aspect	Predicted Impacts	Observed Impacts
Nepean River water levels	Unlikely for any significant change in water level along the Nepean River	No impacts observed
Surface waters in the mining areas	Potential for surface water diversion directly above or adjacent the mining area	No impacts observed
Gas releases	Likely that gas emissions could occur in the Nepean River	One new gas releases identified
Iron staining	Minor iron flocs are expected to occur in the Nepean River. No change in water quality is predicted	No impacts observed
Fracturing	Minor fracturing may occur in the bed of the Nepean River	No impacts observed
Creeks	Possible for localised increase in ponding, flooding or scouring	No impacts observed
Cliffs	Possible minor isolated rock falls. Unlikely that any large cliff instabilities would occur	No impacts observed
Steep Slopes	Unlikely that there would be any significant impacts to steep slopes	No impacts observed

Surface Water

Field inspections carried out by the IC Environmental Field Team included monitoring for iron staining and gas releases in the river and tributaries. Areas of iron staining were identified during the mining of Longwall 701, however no new iron staining associated with Longwall 706 has been observed.

Data for pH, Electrical Conductivity, Dissolved Oxygen, Total Iron and Total Manganese were compared at sites upriver and downriver of Longwall 706 in order to identify any significant water quality change due to Longwall 706. TARP limits were established by the EMP for water quality adjacent to the mining and downriver at monitoring sites.

No TARP trigger level has been identified to date for Longwall 706. A full assessment of water quality will be undertaken as part of the Longwall 706 End of Panel assessment. Table 29 provides a summary of the predicted and observed impacts for surface waters during the reporting period.

Table 29: Predicted vs Observed Impacts for Surface Water for Appin Area 7

Aspect	Predicted Impacts	Observed Impacts
Nepean River	Unlikely for any significant change in water level along the Nepean River	No mining-induced water level change has been observed – natural fluctuations with rainfall and SCA dam water releases
	Potential for surface water flow diversion is very low	No surface water flow diversion has been observed
	Strata gas emissions into the river likely, with some associated reduction in dissolved oxygen possible	One new gas zone was observed during the mining of Longwall 706 and is likely a reactivation from Longwall 16 (1998). Two gas releases from previous longwalls, that were active, ceased on 13/08/14 and 3/11/15. No associated reduction in dissolved oxygen has been observed
	Low likelihood of ferruginous springs. Significant impacts on Nepean River pH, iron and dissolved oxygen not predicted	No new iron staining or seeps resulting from the extraction of Longwall 706 were identified
Harris Creek	Mine subsidence induced ferruginous springs possible, with potential impacts on water quality	No subsidence induced fracturing or iron staining has been observed in Harris Creek

Groundwater

The piezometer and bore monitoring data has been used to determine the pre Longwall 706 status of groundwater level and quality. Monitoring undertaken includes deep groundwater (e.g. Bulgo Sandstone and coal seams) and the Hawkesbury Sandstone (shallow groundwater). Targeted monitoring to a depth of approximately 10m below the level of the Nepean River has been established to determine if there are any changes to groundwater contributions to base flow of the river resulting from mining.

Groundwater levels are logged hourly using vibrating wire piezometers in the NGW and EAW series piezometers.

One piezometer was directly undermined by Longwall 706 (EAW7). This piezometer measured groundwater level in the Hawkesbury sandstone and has experienced a decline in standing water level since being undermined by Longwall 706 in April 2014. The standing water level has shown some recovery in June 2015, a full assessment of the groundwater impacts as a result of Longwall 706 will be provided in the Longwall 706 End of Panel Report.

Aquatic Ecology

Within the Area 7 mining domain significant aquatic habitat is limited to the Nepean River and its tributaries. Four species of aquatic macrophytes and five species of native fish were identified in the EIS and SMP studies. No threatened fish or invertebrate species were identified.

The area is potentially within the range of two threatened species (Macquarie Perch and Sydney Hawk Dragonfly) listed under the Threatened Species Conservation Act. 'Assessments of Significance' concluded that mining within Area 7 is unlikely to have a significant impact on these species.

Mine subsidence can result in a net vertical uplift of the river bed, resulting in reductions in water depth. It was predicted that these effects could impact on components of aquatic ecology including flow, connectivity and water quality and could also reduce the availability of aquatic habitat. The baseline investigations showed that the Nepean River within the SMP Areas was generally a deep, continuous slow-flowing pool created by the damming effect of Menangle Weir. This would minimise the potential impacts on aquatic ecology resulting from reduced water flow and/or depth caused by any net uplift of the river bed. Any impacts on water flow and water loss caused by fracturing would also be expected to be minimal due to the flooded nature of the river system.

Cardno (2015) completed the latest aquatic ecology field survey in December 2014 at ten sites on the Nepean River in accordance with recommendations made in the SMPs for Longwalls 701 to 704 and 705 to 710. Data collected includes post-extraction data for Longwalls 701 to 705, during extraction data for Longwall 706, and pre-extraction data for Longwalls 707 to 710. Comparisons have also been made with data collected during previous surveys in 2003, 2005, 2008, 2010, 2011, 2012 and 2013(Refer to End of Panel report for more detail).

Table 30 provides a summary of predicted and observed impacts on aquatic ecology for the reporting period.

Table 30: Predicted vs Observed Impacts for Aquatic Ecology for Appin Area 7

Aspect	Predicted Impacts	Observed Impacts
Aquatic Ecology	Exposure of wetted substrata in some limited shallow areas of the river, potentially arising due to minor reductions in water depth caused by net uplift of the river bed	No reported change in water level apart from the normal fluctuations associated with rainfall and Sydney Catchment Authority releases. No exposed wetted substrata observed
	Potential water loss or reduced flow due to fracturing of the river bed. However, this was not expected to result in significant water loss or reduced flow due to the flooded nature of this reach	No fracturing observed in the Nepean River and no water loss observed
	Components of aquatic ecology such as flow characteristics, connectivity and water quality should not be impacted by any predicted subsidence	No reported surface water flow diversions, impacts on water quality or connectivity of aquatic plant components
	Alterations to the composition of macrophyte beds due to small reductions in water depth. However, this is not expected to have a significant impact on the overall habitat in the survey area	No alterations to the composition of macrophyte beds observed. No mining induced dieback has been observed
	Possible that gas emissions may have impacts on water quality	No evidence of significant impacts on water quality due to gas releases
	Potential impacts on fish and macroinvertebrates due to mine	No evidence of mining induced impact on either

	subsidence are considered unlikely	fish or macroinvertebrates

Terrestrial Ecology

Assessments of significance were undertaken for an endangered community and threatened flora and fauna species within Area 7. The assessment focused on flora and fauna that could potentially be impacted by subsidence. The following aspects were assessed:

- Native vegetation communities;
- Threatened flora; and
- Threatened fauna and fauna habitat.

Plant communities, fauna habitats, threatened species, populations and ecological communities have not been significantly impacted by subsidence during the reporting period as outlined in Table 31 below.

Table 31: Predicted vs Observed Impacts for Terrestrial Ecology for Appin Area 7

Aspect	Predicted Impacts	Observed Impacts
Vegetation communities and fauna habitat	Minor impacts to riparian habitats on the Nepean River through changes in water levels, desiccation, gas release and minor fracturing	No impacts observed
	Minor impacts to vegetation due to rock falls, an increase in ponding, flooding or cracking to drainage lines and creeks	No impacts observed
Threatened flora	Unlikely that any threatened flora would be significantly impacted	No impacts observed
Threatened fauna	Unlikely that threatened fauna or habitats will be significantly impacted	No impacts observed

Cultural Heritage

European Heritage

No historical sites are located above Longwall 706.

Aboriginal Heritage

Based on the subsidence predictions provided by MSEC (2008) for Longwalls 705 to 710, it is unlikely that there will be impacts to the archaeological sites resulting from the extraction of the longwalls (Biosis, 2008). Aboriginal archaeological sites that have some potential, however unlikely, to be impacted by Longwalls 705 to 710, will be subject to monitoring (where access to the sites is granted). An assessment of any Aboriginal Heritage items potentially affected by Longwall 706 will be undertaken as part of the Longwall 706 End of Panel assessment.

Surface Infrastructure

The items of surface infrastructure which are located within either the 35 degree angle of draw line from Longwall 706 or within the predicted incremental 20 mm subsidence contour resulting from the extraction of Longwall 705 include the following:

- Optical fibre cables (Telstra, Optus, NextGen and Powertel);
- Main Southern Railway and associated infrastructure;

- HW2 Hume Highway and associated infrastructure;
- Moreton Park Road and drainage culverts;
- Low voltage power lines;
- Copper telecommunications cables;
- Building structures, pools, water tanks and farm dams;
- Groundwater bores;
- Heritage structures; and
- Survey control marks.

The items of surface infrastructure which are located in the vicinity of Longwall 706 and are considered sensitive to far-field or valley related movements include:

- The Nepean Twin Bridges at Douglas Park;
- Moreton Park Road Bridge (South);
- Pumps in the Nepean River;
- The Upper Canal, Cataract Tunnel and associated infrastructure; and
- Survey Control Marks.

The predicted and observed impacts for the surface infrastructure, resulting from the extraction of Longwall 706 will be assessed as part of the Longwall 706 End of Panel Report. A summary of the observed impacts during the FY15 reporting period is provided in

Table 32

Table 32: Predicted vs Observed Impacts for Surface Infrastructure for Appin Area 7

Aspect	Predicted Impacts	Observed Impacts
Moreton Park Road	Minor cracking and localised heaving of the road surface in some locations above the longwall	No reported impacts.
HW2 Hume Highway	No impacts on the safety or serviceability of the highway after the implementation of the management strategies	No adverse impacts to safety or serviceability. Bumps formed on both carriageways and these were remediated in accordance with Management Plan responses
Main Southern Railway	No impacts on the safety or serviceability of the railway after the implementation of the management strategies	Changes in track geometry recorded and remediated in accordance with the established Management Plan. No adverse impacts to safety and serviceability
Douglas Park Twin Bridges	Impacts unlikely after the implementation of the TARP	No reported impacts
Moreton Park Road Bridge (south)	Impacts unlikely after the detailed investigation, analysis and implementation of the TARP	No reported impacts
Low voltage power lines	Impacts unlikely, but minor mitigation measures may be required	No reported impacts
Copper telecommunications	Impacts unlikely	No reported impacts

Aspect	Predicted Impacts	Observed Impacts
cables		
Optical fibre cables	Impacts unlikely with the implementation of the management strategies including OTDR monitoring and mitigation	Some loss in signal experienced in AAPT & Optus cables, which was remediated. No further impacts experienced.
Building structures	Typically Category A Tilt Impacts, with 1 x Category B Tilt Impact. Typically Category 0 Strain Impacts, With 6 x Category 1 Strain Impacts, 4 x Category 2 Strain Impacts	Houses and Non-Residential Structures Building structures remained in safe and serviceable condition during mining. To date, no known claims to the Mine Subsidence Board (MSB) for impacts to building structures due to the mining of Longwall 706. *Other Features* No known claims to the MSB for impacts relating to mining of Longwall 706 and for FY15.
Pools	In ground pools could be more susceptible to ground strains	No reported impacts
Water tanks	Impacts unlikely	No reported impacts
Farm dams	Potential for minor cracking or leakage	One claim to the MSB for impacts to a dam
Heritage structures	Impacts unlikely	No reported impacts
Groundwater bores	Potential for blockage or reduction in the capacity of the groundwater bores	No reported impacts
Pumps in the Nepean River	Impacts unlikely	No reported impacts
The Upper Canal, Cataract Tunnel and associated infrastructure	Impacts unlikely	No reported impacts
Survey control marks	Small far-field horizontal movements which could require re-establishment	Small far-field horizontal movements

18.3. West Cliff Monitoring and Management Programs

The surface features in the vicinity of mining during the reporting period include:

- The Georges River and associated tributaries;
- Mallaty Creek, Leafs Gully and associated tributaries;
- Rocky outcrops, steep slopes;
- Aboriginal and European heritage; and
- Buildings and infrastructure.

Monitoring activities within the Extraction Plan (EP) area includes:

- Water flow, pool water levels and water quality monitoring;

- Photographic and observational monitoring to identify mining-induced fractures, strata gas releases, iron staining and rock falls;
- Aquatic ecology monitoring;
- Terrestrial ecology monitoring;
- Aboriginal and European heritage items; and
- Buildings and infrastructure.

The results of these monitoring programs are provided below.

Landscape Features

Monitoring of natural features above and adjacent to Longwall 37 and 38 includes regular inspections of the Georges River, Mallaty Creek, Nepean River and Nepean Creek as well as riparian features and cliffs.

Pool water levels, flows, water quality, photographic and observational monitoring is undertaken to identify any mining-induced impacts such as fractures, strata gas releases, iron staining or rock falls from cliffs, steep slopes or rock outcrops. Detailed analysis and reporting of water quality data can be found in the Surface Water section of the Longwall 37 EoP report. Table 33 summarises predicted and observed impacts from Longwall 37 and Longwall 38 (up until 30th June 2015).

Table 33: Predicted vs Observed Impacts for Landscape Features for West Cliff Area 5

Aspect	Performance Measure	Observed Impacts
Georges River – Appearance and pool water levels/ flows	Negligible environmental consequences including: negligible diversion of flows or changes in the natural drainage behaviour of pools; negligible gas releases and iron staining; and negligible increase in water cloudiness. over at least 80% of the stream length subject to vertical subsidence >20mm. No subsidence impact or environmental consequence greater than minor.	No impacts observed as a result of Longwall 37, Ongoing impacts from Longwall 35 continued to be monitored (i.e. fracturing, pool water level loss, surface flow diversion).
Cliffs	Cliffs of "special significance": Negligible impact (that is occasional rock falls displacement or dislodgement of boulders or slabs, or fracturing, that in total do not impact more than 0.5% of the total face area of such cliffs) within any longwall mining domain. Other cliffs: Minor impacts (that is occasional rock falls, displacement or dislodgement of boulders or slabs, or fracturing, that in total do not impact more than 3% of the total face area of such cliffs within any longwall mining domain)	No impacts observed as a result of Longwall 37. Two surface impacts observed during the extraction of Longwall 37; rock fracturing and uplift and a rockfall from an overhang, were attributed to Longwalls 36 and 35 respectively due to location and distance from the Longwall 37 face.

Surface Water

The monitoring program provides a basis for the comparison of flow, pool level and water quality in the area before, during and after mining as outlined in the West Cliff Colliery Area 5 Longwalls 37 to 38 EP.

An assessment of the surface water quality was undertaken as part of the Longwall 37 EoP report. A summary of the observed surface water impacts for Longwall 37 is provided in Table 34. An assessment of the surface water quality will be repeated following the extraction of Longwall 38 as part of the End of Panel Report.

Table 34: Predicted vs Observed Impact for Surface Water for West Cliff Area 5

Aspect	Performance Measure	Observed Impacts
Georges River water quality	Negligible environmental consequences including: negligible diversion of flows or changes in the natural drainage behaviour of pools; negligible gas releases and iron staining; and Negligible increase in water cloudiness. Over at least 80% of the stream length subject to vertical subsidence >20mm. No subsidence impact or environmental consequence greater than minor.	Based on analysis of the long-term water quality records for designated upstream and downstream sites of Longwall 37, no significant water quality impacts were observed or measured within the Georges River as a result of the mining of Longwall 37.

Groundwater

Groundwater monitoring includes water level readings from a network of monitoring boreholes either via the use of a dip meter or vibrating wire piezometers. Boreholes near the Georges River are screened in a section of strata equivalent to the base of the river in that location. During the mining of Longwall 37, there was no evidence that any significant comparable impact on water levels had occurred. During the extraction of Longwall 38, the groundwater level in one borehole had measured a decline throughout May and June 2015, however no groundwater level trigger had been reached. An assessment of groundwater will be undertaken as part of the Longwall 38 End of Panel Report.

Aquatic Ecology

Cardno Ecology Lab (CEL) was commissioned by IC to assess the potential impact of mining-related subsidence on the aquatic ecology of the Georges River. The condition of the aquatic macroinvertebrate fauna in the baseline assessments indicated that the Georges River had experienced some degree of environmental stress before mining commenced and that it continues to do so.

Data collected during the current survey (December, 2014) suggests that the indicators of aquatic ecology affected by the extraction of Longwall 35 during the previous survey (November 2013) are recovering from previous disturbance (CEL, 2015). This is attributed to the additional releases of water from Brennans Creek Dam which was implemented as an ameliorative measure following the physical mining impacts associated with the extraction of Longwall 35 (CEL, 2015). These findings are supported by statistical analysis, which does not indicate that any widespread or persistent impacts have occurred following extraction of Longwall 35 (CEL, 2015). There is no evidence to suggest the extraction of Longwalls 36 or 37 has had any impact on aquatic ecology.

A summary of predicted and observed impacts on aquatic ecology is provided in Table 35.

Table 35: Predicted vs Observed Impacts for Aquatic Ecology for West Cliff Area 5

Aspect	Performance Measure	Observed Impacts
Aquatic Ecology	Threatened species, threatened populations, or endangered ecological communities: - negligible environmental consequences	Reduction in aquatic habitat was observed during the survey undertaken in November 2013 (for 2 sites) and related to impacts associated with Longwall 35. The most recent survey (December 2014) showed a recovery of aquatic habitat at these sites. No other sites displayed potential impacts.

Terrestrial Ecology

A baseline Terrestrial Flora and Fauna Assessment (Flora Search, 2009; Biosphere, 2009) was undertaken in support of the Bulli Seam Operations Environmental Assessment, the Study Area for these assessments included the Longwalls 37 and 38 Study Area. Supplementary field surveys for terrestrial biodiversity were undertaken by Niche (2013), for the purposes of the Longwall 37 and 38 EP.

Subsidence effects are unlikely to have a significant impact on any threatened flora or fauna species (Niche, 2013). However, impacts may lead to the alteration of habitat and the alteration of the natural flow regimes of rivers, stream, floodplains and wetlands following longwall mining (Niche, 2013).

Visual inspections of vegetation communities within the Longwalls 37 and 38 Study Area are undertaken as a part of routine landscape and water monitoring programs. Monitoring focuses on detecting significant changes to vegetation communities and fauna habitat present within the Longwalls 37 and 38 Study Area.

No impacts were observed to the vegetation within the study area during inspections undertaken throughout the Longwall 37 extraction period.

A detailed assessment of the terrestrial flora and fauna will be completed as part of the Longwall 38 EoP report. Table 36 summarises the predicted and observed impacts for the reporting period.

Table 36 – Predicted vs Observed Impacts for Terrestrial Ecology at West Cliff Area 5

Aspect	Performance Measure	Observed Impacts
Ecology	Threatened species, threatened populations, or endangered ecological communities: - negligible environmental consequences	No impacts observed.

Cultural Heritage

European Heritage

No historical site is located above Longwall 37.

Aboriginal Heritage

Aboriginal shelters with art and/or deposits, which are located within the valleys of the Georges River and Mallaty Creek, can potentially be impacted by mine subsidence movements including fracturing of sandstone, rock falls, or water seepage through joints which may affect artwork (MSEC, 2007). Where

longwall mining has previously been carried out in the Southern Coalfield, beneath 52 shelters, approximately 10% of the shelters have been affected by fracturing or shear movements along bedding planes; however none of the shelters have collapsed (MSEC, 2007 & Sefton, 2000).

An assessment of cultural heritage and archaeological sites potentially impacted by Longwall 37 was conducted by Niche as part of the Longwall 37 End of Panel Report. Three Aboriginal archaeological sites were inspected as part of this assessment and included: AHMS #52-2-2243 an Aboriginal shelter with art and deposit, a shelter with art AHIMS #52-2-2242 and AHMS #52-2-2244 an Aboriginal shelter with art and axe grinding grooves. These sites were inspected because one was located within the possible zone of subsidence movements associated with Longwall 37; the other two were noted to be impacted by subsidence movements associated with Longwalls 35 and 36. There were no European heritage sites identified as being potentially affected by the extraction of Longwall 37. Hence, no sites were included in the assessment undertaken by Niche (2014).

There were no impacts or changes to the archaeological sites observed as a result of the extraction of Longwall 37 (Niche, 2015). A detailed assessment of the relevant Aboriginal archaeological sites associated with Longwall 38 will be undertaken as part of the Longwall 38 EoP report.

A summary of the inspection on archaeological sites from the extraction of Longwalls 37 is outlined in Table 37 below.

Table 37 Summary of the site visits to the Aboriginal Heritage Sites in Proximity to Longwall 37.

AHIMS Site Number	Site Name	Results of Inspection
52-2-2243	Georges River 2	Impacts to this shelter had been noted in Niche (2014). Observations found that impacts had not worsened and remained in the same condition as described by Niche 2014, due to the extraction of Longwall 36. The thin, vertical cracking previously observed in the shelter roof to the right side of the art panel remains the same as previously described. The cracking does not appear to have altered seepage or water movements in the shelter, and there is no evidence of water flow or recent micro-vegetation growth associated with the cracking. The art panel remains in the same condition as described in Biosis Research 2007 and Niche 2013b and 2014 and has not been affected by the observed changes.
52-2-2244	Georges River 3	This shelter was in the same condition as described by Niche 2014. There has been no further movement of the horizontal bedding plane joints of the shelter and the cracking and exfoliation observed in relation to LW35. The site remains the same as previously described. The cracking does not appear to have altered seepage or water

AHIMS Site Number	Site Name	Results of Inspection
		movements in the shelter, and there is no evidence of water flow or recent micro-vegetation growth associated with the cracking. The art panel remains in the same condition as described in Biosis Research 2007 and Niche 2013b.
52-2-2242	Georges River 4	Shelter and Art are in the same condition as described by Biosis Research 2007 and Niche Environment and Heritage 2011, 2013 and 2014. The art has started to loose granular substrate and there has been some cracking and flaking to the panel due to case hardening. Artefacts were not observed in the drip-line of the shelter.

Surface Infrastructure

Subsidence monitoring programmes are implemented for each longwall. The monitoring programmes, which are developed in consultation with key stakeholders, ensure that all key infrastructure and other surface features located above the extraction areas are closely monitored to assess the level of subsidence movements and any impacts from subsidence.

Monitoring frequency varies in relation to the proximity of mining to the features in accordance with the agreed monitoring plans. Frequencies vary from weekly during periods when subsidence is most active, to monthly or pre and post longwall extraction for some types of infrastructure.

All survey reports are checked, reviewed and assessed by the Illawarra Coal Survey Team with additional reviews undertaken by the Illawarra Coal Subsidence Management Review Committee which meets on a monthly basis.

A summary of the predicted and observed impacts for surface infrastructure is provided in

Table 38 below. For more detail, refer to the West Cliff Longwall 37 EoP report.

Table 38 – Summary of the Assessed and Observed Impacts for Surface Infrastructure for FY15

Surface Infrastructure	Predicted Impacts	Observed Impacts
Appin Road	Cracking and minor localised buckling which are likely to be infrequent and minor in nature.	Minor cracking and buckling of road surface. Previous impact areas in Wollondilly LGA fully remediated.
Other Public Roads	Impacts unlikely, however may present as cracking and heaving which would be minor in nature.	Minor bump on Exley Road.
The Upper Canal, Devines Tunnels and Associated Infrastructure	Impacts unlikely after the implementation of necessary preventive measures at the concrete and wrought iron aqueducts.	No reported impacts.
Sydney Water Service Line along Appin Road	Impacts unlikely.	No reported impacts.
Macarthur Water 1200mm diameter Treated Water Gravity Main	Impacts unlikely after the implementation of preventive measures at Mallaty Creek.	No reported impacts.
Alinta EGP and AGN Natural Gas and Gorodock Ethane Pipelines	Impacts unlikely after the implementation of preventive measures at Mallaty Creek.	No reported impacts.
TransGrid 330 kV Transmission Line	Impacts unlikely after the implementation of preventive measures including roller sheaves.	No reported impacts.
Endeavour Energy 66 kV, 11 kV and low voltage power lines	Impacts unlikely.	No reported impacts.
Telstra Optical Fibre Cable along Appin Road	Impacts unlikely.	No reported impacts.
Telstra Copper Cables	Impacts unlikely.	No reported impacts.
Rural Building Structures	Category A or B Tilt Impacts Category 0 to 1 Strain Impacts Negligible to very slight impacts.	No reported impacts.
Tanks	Tilts up to 4.0 mm/m Systematic strains up to 1.1 mm/m Impacts unlikely.	No reported impacts.
Farm Dams	Tilts up to 6.5 mm/m Systematic strains up to 1.8 mm/m Potential for some minor cracking or leakage in farm dams.	No reported impacts.
Houses	Category A or B Tilt Impacts Category 0 to 2 Strain Impacts Negligible to slight impacts.	*Houses and Non Residential Structures* Two landholders have reported impacts to houses during the reporting period. However, one of these properties is being dealt with separately between the

Surface Infrastructure	Predicted Impacts	Observed Impacts
		home owner and Campbelltown Council rather than the MSB. *Other features* One private borehole impacted. IC has been providing water to landholder since March 2015. One claim has been lodged to MSB regarding potential impact to dam. One claim has been lodged to MSB regarding fencing and transpiration bed.
Pools	Tilt could be visible along waterline and inground pools could be more susceptible to strain impacts.	No reported impacts.
Fences	Possible that some fences could experience slight impacts.	No reported impacts.
Survey control marks	Small far-field horizontal movements which could require re-establishment.	Small far-field horizontal movements.

18.4. Environmental Research Program

During the reporting period Illawarra Coal undertook research into an improved understanding and prediction of subsidence impacts. Understanding strata conditions and properties contributes significantly to the prediction of subsidence impacts through understanding the mechanisms causing impacts. Testing of overburden strata (core and in situ) has been completed during the exploration program to further define the mechanical, hydrogeological and geochemical properties of rock strata. This work has been undertaken in the Area 7 and 9 mining domains.

A regional network of pore pressure monitoring bores with vertical arrays of transducers has been installed to assess and quantify the height and impacts of subsurface fracturing. This network was further developed during the reporting period as part of the exploration program.

A regional groundwater model has been developed for the BSOP. The model was reviewed to determine if any enhancements, calibrations or verifications were required. The review examined all monitoring data for evidence of mining effects and then to compare actual groundwater response with what was predicted in the groundwater assessment report for the Environmental Assessment (EA) for the BSO Project (Heritage Computing, 2010).

Analysis of the available groundwater level data from shallow and deep groundwater systems indicates that mining is not having an unexpectedly strong influence on groundwater levels in the deep groundwater systems, e.g. the Bulli Seam and Scarborough Sandstone. These depressurisation effects are in areas and horizons where there is very little productive groundwater resource or extraction for anthropogenic purposes. Furthermore, and more importantly for environmental and anthropogenic groundwater users, the data shows that the mining impact on groundwater levels in the Bulgo Sandstone

and the shallow Hawkesbury Sandstone is in line with predictions and the approved BSO environmental approvals.

Drawdowns of up to 10 metres are observed in the Hawkesbury Sandstone, however these mining influences are temporary, and water levels generally recover within months of longwalls being completed. Based on the analysis of heads around the Nepean River and Cataract River piezometers, gradients toward the river were preserved, which maintains base flows to the rivers. Along the Georges River there were a couple of sites between which gradients appeared to have been reversed by mining. In one case the reversal has been corrected.

Comparison of the predicted groundwater levels and drawdowns from the EA Groundwater Assessment (Heritage Computing, 2010) with observed data for the period 2010-2013 suggests that the model is a useful tool for the management of the Appin and West Cliff Mine areas of the BSO. The match between modelled and observed water levels is generally good to fair, with the model typically erring on the side of over-predicting drawdowns in the Bulli Coal than under-predicting those effects. Water levels at a couple of boreholes are poorly matched. Of the eight bores that were not available at the time of model calibration (2009-2010) and for which vertical head profiles are available, five were rated as 'good' (one with only very limited data), while two were 'Fair' and one 'Poor'.

Illawarra Coal implements targeted research to improve the understanding and prediction of environmental consequences on significant natural features resulting from subsidence impacts. The research is directed at improving the prediction, assessment, remediation and/or avoidance of subsidence impacts and environmental consequences on significant natural features.

During the reporting period Illawarra Coal submitted a Swamp Rehabilitation Research Plan (SRRP) to the Department of Planning and Environment. The objectives of the SRRP are to:

Investigate methods to rehabilitate swamps subject to subsidence impacts and environmental consequences;

- Establish a field trial (for a 5 year duration or longer) for rehabilitation techniques at a swamp or swamps that have been impacted by subsidence; and
- Include a schedule for subsequent trials, development of work plans and ongoing reporting.

Detailed monitoring programs have been implemented to provide a basis for the design and implementation of any swamp mitigation or remediation required. Swamp rehabilitation options have been developed from rehabilitation programs in the Georges River and from swamp rehabilitation techniques used for non-mining related impacts in the Blue Mountains and other areas. Research programs and projects undertaken by Illawarra Coal will develop further understanding of the factors which influence swamp health and function, if and how swamps have been changed due to mining and what rehabilitation methods may be required for swamp restoration.

Remediation works were undertaken from 2002 – 2005 to reduce impacts to the Georges River at Pools 8, 9, 14, 15 and 16, Marhnyes Hole and Jutts Crossing. These previous mitigation works demonstrate that remediation of mining induced subsidence impacts can be achieved within acceptable environmental limits. The following grouting techniques have previously been implemented:

- hand mortaring;

- pattern grouting; and
- deep angled hole grouting.

The works have proven successful, with flows and water levels during low flow conditions being restored in areas where rehabilitation has been completed. Further rehabilitation is proposed for the Georges River where impacts occurred from Longwall 35. This proposal is currently with key Government stakeholders for review and assessment. As part of these works Illawarra Coal will undertake research into the implementation and effectiveness of the rehabilitation techniques.

19. Hydrocarbon Contamination

Refer to section on **Error! Reference source not found.**.

20. Methane Ventilation

The in-seam gas content of the Bulli Seam in the Appin and West Cliff areas is in the order of 12 to 14 cubic metres of methane per tonne of in-situ coal. Both operations maintain a comprehensive underground methane drainage program which includes a network of drill holes and pipes to recover a large proportion of this gas by in-seam and cross-measure drainage. Methane drainage is necessary to provide a safe, compliant and productive underground mining environment.

Drainage gas extraction, utilisation and venting rates are reported on a monthly basis and these readings are used by Illawarra Coal for Greenhouse Gas (GHG) accounting. During this period the Appin and West Cliff monitoring systems, procedures and figures reported were audited (reasonable assurance) as required by statutory and internal requirements.

20.1. Mine Safety Gas Drainage

Details of the goaf gas drainage activities, including current status of each of the established well sites, is provided in Mine Safety Gas Drainage section of this report.

At West Cliff, the surface gas drainage activities ceased operations with no gas flaring during the reporting period.

At Appin, surface gas drainage activities occur above the Appin Area 9 mining domain. An approximate total of 1.67 million normalised cubic meters of CH4 and 0.13 million normalised cubic meters of CO2 were abated through flaring.

Mine Methane Extraction

Appin

The methane gas extracted from the coal seam by the underground gas extraction network is directed to the surface, via the gas drainage plant, from where it is piped to the electricity generation plants and used to generate electricity. The electricity generation plants are operated by EDL.

A total of 1,358 ktCO2e was recovered and transferred (ie. abated) to the EPL Power Plant.

West Cliff

The mine methane drainage gas extracted from Area 5 (the current longwall mining area) had an average CH4 concentration of 57.6% and a CO2 concentration of 5.6%. The extracted drainage gas was transported by a 6.8 km overland pipeline for utilisation at the Appin East EDL Power Plant. The West

Cliff Methane Drainage Extraction Plant and the gas blower station that are part of the infrastructure to transport the drainage gas via the overland pipeline is shown in the figure below.

A total of 536 ktCO2e was recovered and transferred (ie. abated) to the EPL Power Plant which equates to a 4% decrease when compared to the previous reporting period.

Figure 14: Methane extraction plant – West Cliff

Mine Ventilation Fans

Appin

During the reporting period, approximately 1,302 kt CO2e was emitted to atmosphere from the Appin Mine Ventilation System, down 1% when compared to FY14. The average CH4 concentration was 0.64% (similar to FY14) and the average CO2 concentration was 0.35% (similar to FY14).

West Cliff

During the reporting period, approximately 775 kt CO2e was emitted to atmosphere from the West Cliff Mine Ventilation System, within 1% of FY14. The average CH4 concentration was 0.59% (rise of 0.04% from FY14) and the average CO2 concentration was 0.34% (drop of 0.04% on FY14).

WestVAMP

The WestVAMP project was designed to consume low purity methane in air mix (mine vent air) to produce electricity. The project was completed during the 2007/08 reporting period. The plant is scaled to utilise approximately 20% of the available mine vent air with a generation capacity of 6MWh. WestVAMP consumed 16,588,869Nm3 of coal mine waste gas (CMWG). The WestVAMP power generator produced 38,264 MWh (net) of electricity which was wholly utilised by the West Cliff Colliery. This is a slight decrease when compared to the previous periods' abatement and generation performance but still a positive result from abatement and electricity generation perspective. The project has been a significant Greenhouse Gas reduction initiative, which complements the reductions presently achieved by the Appin and Tower Power Plant Projects.

Public Safety

No incidents involving the general public occurred during the reporting period. Safety risks associated with the site activities are addressed and controlled by the mechanisms listed in Table 39**Error! Reference source not found.**.

Table 39: Site safety risks and control mechanisms,

Potential Safety Risk	Control Mechanism
External persons attending site	Site reception office – sign in/out procedure in place for visitors. Site inductions / awareness sessions for persons undertaking activities on site. Company representative accompanies visits to the North Cliff site.
General vehicle traffic	Designated and sign posted roads and rules. Periodic speed monitoring along Wedderburn Road. Key locked gates to site (North Cliff).
Public roadway conditions	Routine daily inspections of public roads for evidence of coal spilled from trucks. Use of road sweepers to clean roads as required Coal Trucks - Loads covered before travelling on public roads. All truck leaving the West Cliff site must pass through the truck wash located to the east of the clean coal bins.
Exposure to hazardous chemicals	Designated storage facilities and signage. Chemalert system in place. Rules and procedures in place for bringing chemicals into site.
Personnel Health and Hygiene	Surveillance / monitoring program in place for noise, reparable dust, hazardous materials exposure. PPE requirements enforced and periodically audited. Hazardous areas are delineated with warning signs and notices.
Radiation apparatus	Certified and registered installations – annual inspections by certifying officer. Licences in place for all radiation apparatus.
Heavy vehicle movements on site	Reversing alarms. South32 Fatal Risk standards. Authorised / licensed operators.
Working at heights	Standards and procedures for working at height activities.
Confined Spaces	Standards and procedures for working in confined spaces.
Explosive atmospheres	Explosion protected and intrinsically safe equipment – monitoring of the underground environment.
Fire	Firefighting infrastructure in place to protect persons and property.
Potential at risk activities	Formal risk assessment / task analysis process in place to assess risks and ensure sufficient controls are in place prior to the work/activity commencing.
Surface and underground vehicles	Vehicle standards in place - rotating beacons / seat belts / roll bar protection where relevant. Light vehicle policy for surface vehicles.

21. Other Issues and Risks

21.1. Environmental Audits

The Illawarra Coal Environmental Management System was certified to the International Standard ISO14001 in May 2003.

The Appin East and West sites, West Cliff Colliery and the West Cliff CPP are included in Illawarra Coal's schedule of certified ISO 14001:2004 sites. Each of these operational sites, as well as the Emplacement Area has been regularly audited for compliance against this Standard.

KPMG undertook a reasonable assurance audit for NGERs (National Greenhouse and Energy Reporting) for the reporting period.

The audits/management reviews undertaken during the reporting period are provided in Table 40.

Table 40: Environmental audits undertaken during the reporting period.

Date	Type	Internal	External	Comments
Jul-14	ISO14001 Surveillance Audit		X	Illawarra Coal, P&L
Dec-14	ISO14001 Triennial Recertification		X	Appin, WCCPP
Nov-14	EMS	X		Illawarra Coal
May-15	Reasonable assurance audit for NGERs		X	Conducted by KPMG

The auditing process requires demonstration of adequacy of systems to manage environmental aspects and impacts related to site activities. The systems audited include legal compliance, document control, records, corrective action, monitoring and control, training and management of risks.

Non-conformances and/or improvement opportunities identified during audits, both internal and external, are recorded and tracked via the 1SAP reporting system utilised by Illawarra Coal operations.

During the reporting period SAI Global has endorsed a "governance check" process as a part of the ISO14001 certification. This process involves reviewing relevant environmental management plans annually and incorporates both a desktop review and in-field verification. This process has reduced the frequency of SAI Global ISO14001 surveillance audits from six monthly to yearly.

22. Community Liaison

At the completion of this reporting period the Appin and West Cliff Mines employed 916 full time employees. In addition 400 full time contractors were working across the operations.

The closest township to the Appin West surface operations is the village of Douglas Park, which is located approximately 4km to the north west of the surface operations. The current underground mining operation (i.e. Area 7) is located on the outskirts of the Douglas Park village.

The closest township to the West Cliff surface operations is the village of Appin, which is located approximately 4km to the north west of the operations. The current underground mining operations (i.e. Longwall 38) are located approximately 5km to the north of Appin.

Appin East Pit Top is located on the outskirts of Appin.

22.1. Environmental Complaints

During this reporting period 29 complaints were received in relation to BSO operations (including Pit Tops, Mine Safety Gas Drainage projects, exploration work and coal transportation). Details of the complaints received and the actions taken are provided in Appendix C – FY15 Complaints. A summary of all complaints received across the BSO is included in refer to Figure 14.

All complaints received are recorded in the South32 information management system in accordance with the Environmental Protection Licence and Development Consent conditions. The Illawarra Coal Community Call Line is a 24 hour, 7 day per week call centre for enquiries and complaints. A Company representative responds to the contact and liaises with operational personnel to attend to any issue/s of concern within a reasonable timeframe.

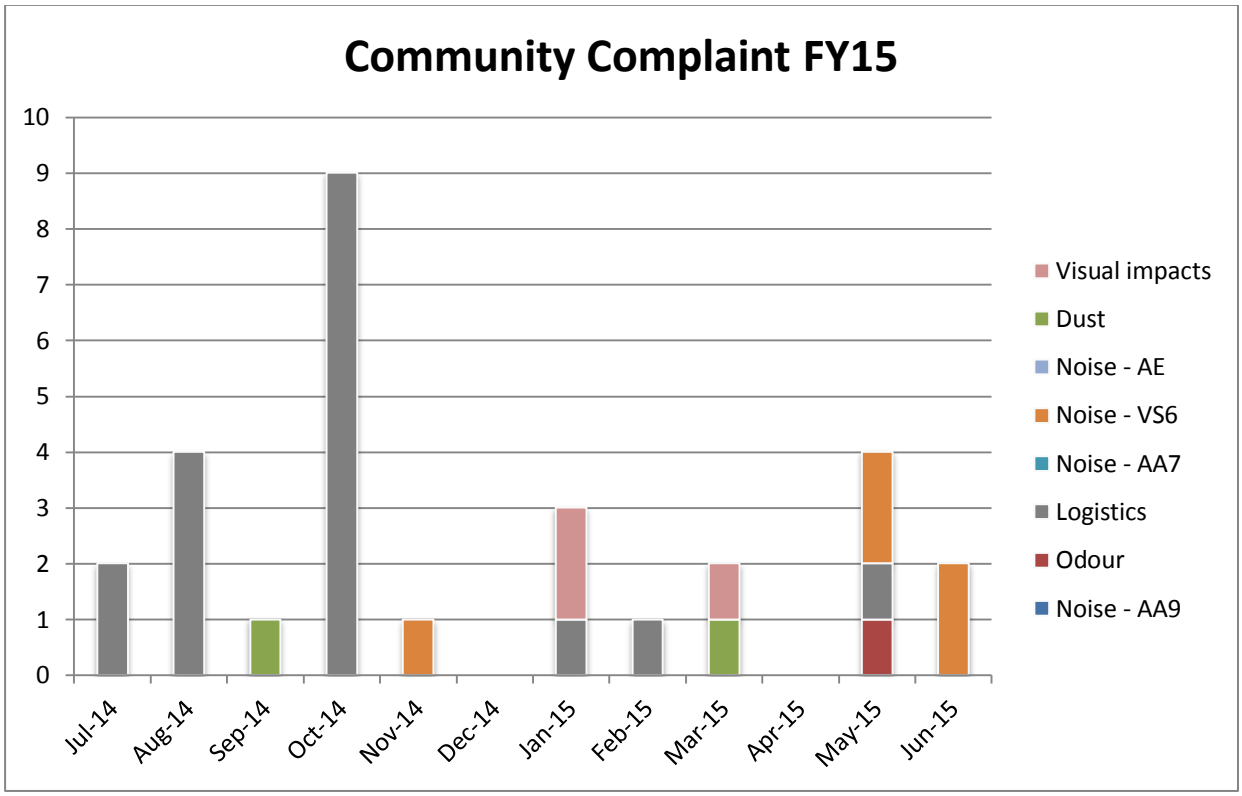


Figure 15: Summary of complaints for FY15.

22.2. Community Liaison

Community consultation is undertaken on an Illawarra Coal group basis, with support of operational and functional team members. Community liaison is managed as per the Illawarra Coal Stakeholder Engagement Management Plan. The plan, which was reviewed during the reporting period, identifies key stakeholders and appropriate communication and consultation processes.

Key regional stakeholders include:

Communities surrounding the Appin and West Cliff operations;

- Local government
- State government agencies and authorities including DTIRIS, OEH, SCA, and MSB;
- Employees and contractors;
- Local and regional business groups;
- Community and Environmental groups;
- The indigenous community – Tharawal Aboriginal Land Council and others;
- Local schools and volunteer groups; and
- The broader regional community.

Community information is provided in accordance with the Illawarra Coal Stakeholder Engagement Management Plan. The mechanisms utilised include:

- Community newsletters and information sheets via letter box drops;
- Door knocks;
- Media releases and other media activities;
- Community notice boards;
- Community perception surveys and
- Coalition News –Illawarra Coal publication;
- The 'Regulatory Information' webpage on the South32 website;
- Stakeholder group presentations and information sessions; and
- Community Information days.

Illawarra Coal directly manages the following stakeholder committees and working groups:

- Illawarra Coal Community Consultative Committee
- Douglas Park Advisory Panel; and
- Illawarra Coal Community Partnership Board.

Illawarra Coal is also represented at other stakeholder committees in the area of the Bulli Seam Operations, including the Appin Chamber of Commerce and Wollondilly Council's Economic Development Advisory Group.

Table 41 provides a summary of the information presented to the Illawarra Coal Community Consultative Committee during the reporting period.

Table 41: Summary of the information presented to the Illawarra Coal Community Consultative Committee during the reporting period.

Month	Presentation
29 July 2014	MEETING – Items discussed: Guest speaker: Darren Bullock, District Manager, Mine Subsidence Board provided an overview of what the MSB do and answered members questions Questions answered in relation to Subsidence, Mine Safety Gas Drainage Program Operational update on Appin Area 7 LW706, West Cliff Area 5 LW37, Appin Area 9, Ventilation Shaft No. 6. Environment overview, including update on dust monitoring, ISO14001 audit, diesel tank rehabilitation West Cliff. Update on community initiatives and concerns, including e newsletter, Community Partnership Program, Stakeholder Survey update
30 September 2014	MEETING – Items discussed: Members visited Vent Shaft construction site northwest of Douglas Park area, to view current progress of work, and understand next phase of work to be undertaken on site Operational update on Appin Area 7 LW706, West Cliff Area 5 LW37, Appin Area 9, Ventilation Shaft No. 6. Environment overview Operation of the water filtration plant, currently undertaken by Worth Recycling, will be handed back to Illawarra Coal by the end of October 2014. Annual Environmental Management Plan update Overview on community matters and initiatives
25 November 2014	MEETING – Items discussed: Members visited the West Cliff Emplacement Area to inspect progress of rehabilitation of Stage 2, current emplacement area Stage 3, and approved future area Stage 4. Members also visited Brennans Creek Dam to inspect the water storage of the dam and its outflow, which ultimately flows into the Georges River. Members of Illawarra Coal's Dendrobium CCC also attended the site visit. Operational update on Appin Area 7 LW706, West Cliff Area 5 LW37, Appin Area 9, Ventilation Shaft No. 6., Mine Safety Gas Management- gas extraction facility and power generation discussed Discussion regarding Longwall 37/38 Extraction Plan. Update on Appin Area 9 Longwall 901-904 Extraction Plan Environment overview, including update on impacts on the Georges River Update on community initiatives including the closure of the Appin Community Office, as the Company resolved to close the Community Office at the end of its lease (January 2015)
27 January 2015	MEETING – items discussed: Questions mainly around coal wash from the West Cliff site visit were answered Discussions around long term subsidence data Operational update on Appin Area 7 LW706, West Cliff Area 5 LW37 and LW38 , Appin Area 9, Ventilation Shaft No. 6., Mine Safety Gas Management Environment overview, including persoonia hirsuta monitoring, Pollution Reduction Program (PRP)19 update- Water quality improvement strategy at Brennans Creek Dam discharge , PRP21- Dust control improvements, PRP22- Investigate dust track out form West Cliff to Appin Road

Month	Presentation
	Mountbatten house conservation management update Overview on community matters and initiatives Illawarra Coal's Community Office at Appin has been closed and vacated.
31 March 2015	MEETING – Items discussed: Long-term subsidence data – Illawarra Coal presented data points pervious 11 years Operational update on Appin Area 7 LW706, West Cliff Area 5 LW37, Appin Area 9, Ventilation Shaft No. 6., Mine Safety Gas Management Environment overview, including information on persoonia hirsute research Overview on community matters and initiatives, including projects supported through Community Partnerships Program. Administrative matters (including discussion of new members)
26 May 2015	MEETING – Items discussed: Additional Long-term subsidence data presented and questions answered Interaction of LW901 extraction and Southern Rail Line Operational update on Appin Area 7 LW706, West Cliff Area 5 LW38, Appin Area 9, Ventilation Shaft No. 6. Also discussed: information on Illawarra Coal business performance, and an update on the North Cliff site. Environment overview, Wedderburn Road improvements PRP22, PRP19 update on water strategy. Overview on community matters and initiatives. Administrative matters (welcome to new members, change to South32 organisation structure)

During the reporting period, members of the Community Consultative Committee were also kept informed of operational matters via email.

The minutes of community meetings are made available to the public primarily in two ways: placed (as 'draft') on the South32 "Regulatory Information" webpage; and distributed via email to a stakeholder notification list (meeting minutes are emailed directly to persons who have expressed an interest to receive a copy).

22.3. Douglas Park Advisory Panel

A purpose-formed community representative group, the Douglas Park Advisory Panel, was established by Illawarra Coal in April 2010 to provide input to the preparation of the Ventilation Shaft No. 6 Environmental Assessment. Since approval and commencement of construction, meetings have continued with other local issues discussed including Mine Safety Gas Drainage. The Douglas Park Advisory Panel operates under agreed Terms of Reference and is facilitated by Illawarra Coal. The Panel comprises 10 representatives of the Douglas Park Township.

The table below provides a summary of the information presented to the Douglas Park Advisory Panel during the reporting period.

Table 42: Douglas Park Advisory Panel Meetings – 2014/15.

Month	Presentation
22 July 2014	MEETING Items discussed: Operational update on Ventilation Shaft No 6 construction work Operational update on Mine Safety Gas Drainage Update on Illawarra Coal activity: other operations in Douglas Park and other community initiatives. An overview of the recent 2014 Stakeholder Perception Survey was provided
23 September 2014	MEETING Items discussed: Operational update on Ventilation Shaft No 6 construction work and other infrastructure supporting the vent shaft. Operational update on Mine Safety Gas Drainage Update on Illawarra Coal activity: other operations in Douglas Park and other community initiatives.
3 November 2014	MEETING Mine Safety Gas Management Items discussed: Principles of mine safety gas management Project concepts for gas extraction plan , gas utilisation facility and associated infrastructure Infrastructure Selection community workshops
3 February 2015	MEETING Items discussed: Operational update on Ventilation Shaft No 6 construction work and other infrastructure supporting the vent shaft. Operational update on Mine Safety Gas Drainage, and application for MSGD on future Appin Area 7 longwalls Dyke backfill work batch plant and drilling Update on Illawarra Coal activity: other operations in Douglas Park and other community initiatives Mine Safety Gas Management consultation process and site.
20 May 2015	MEETING Items discussed: Operational update on Ventilation Shaft No 6 construction work and other infrastructure supporting the vent shaft. Focus on connection of Vent Shaft to mine workings. Operational update on Mine Safety Gas Drainage. Update on Illawarra Coal activity: other operations in Douglas Park and other community initiatives.
2 June 2015	MEETING Items discussed: Operational update on Ventilation Shaft No 6 construction work and other infrastructure supporting the vent shaft. Drill rig has been removed and underground has holed through Landscaping progress at Shaft No.6 Operational update on Mine Safety Gas Drainage. Update on Illawarra Coal activity: other operations in Douglas Park and other community initiatives.

During the reporting period, members of the Douglas Park Advisory Panel were also kept informed of operational matters relating to Douglas Park through email updates.

22.4. Community Partnerships Program

Illawarra Coal has an overriding commitment to supporting the communities in which we operate. As part of this commitment, the Company established the Illawarra Coal Community Partnerships Program (CPP) to provide support for community projects and initiatives in the regions surrounding the Bulli Seam operations.

Since being established in 2004, the program has provided support to a range of community groups and not-for-profit organisations.

The CPP is funded by three cents per saleable tonne of coal from Illawarra Coal's Bulli Seam operations. The program is administered by a board of community and Illawarra Coal representatives, which ensures community-based decision making on the allocation of funds.

During 2014/15, the Board committed over $100,000 for community projects in the local Wollondilly area. Some local not-for-profit groups to benefit from program funding in 2014/15 included:

- Appin Men's Shed (Construction of Shed)
- First Appin Scout Group (Hall Upgrade)
- Lifeline Macarthur (Telephone Crisis Support Training Course)
- Douglas Park Little Athletics (New long jump pits)
- Macarthur District Model Railway Club (Improved amenities and security)
- St Marks Anglican Church – Appin (Restoration of historic cemetery)
- Campbelltown Uniting Care (Focus on New Families Program in Appin, Wilton and Douglas Park)

The CPP Board continued its support for Life Education with funding to Appin, Douglas Park and Wilton Public Schools to enable children to visit the Life Education mobile learning centre. Life Education aims to empower the young to make the best choices for a safe life, through leading drug and health education programs. Illawarra Coal has supported Life Education in the Wollondilly area since 2008.

22.5. Camp Quality Convoy

For the tenth consecutive year, Illawarra Coal has helped raise money for children with cancer and launch another successful i98FM Camp Quality Convoy for Kids. Held in November 2014, West Cliff's access road became the muster ground and starting point for the Convoy and the mine's external truck movements were stopped for approximately five hours to avoid heavy traffic travelling in opposite directions on the mine access road. More than 700 trucks and 1,200 motorbikes participated in the Convoy which is organised by local radio station i98FM, to raise funds for Camp Quality Illawarra, which helps provide access to a variety of activities and resources to help brighten the lives of kids living with cancer and their families in the local regions.

Over $1.5 million was raised during the 2014 Convoy, with over $5 million raised since the inaugural event in 2005.

22.6. Complaints/Enquiries Management

Illawarra Coal maintains a 24 hour Community Call Line (freecall 1800 102 210) and a general email address ICEnquiries@South32.net. These avenues are promoted as the primary point of contact throughout Illawarra Coal's suite of communications for persons who seek to lodge a complaint or make a general enquiry.

Complaints and enquiries are recorded in an internal event reporting system, and processes in place ensure the complaint/enquiry is responded to and actioned. Complaints, and its resolution, are reported on the South32 website each month in the Community Complaints Report.

All complaints recorded during the reporting period are attached at Appendix C – FY15 Complaints.

23. Rehabilitation for reporting period

23.1. Buildings

No rehabilitation of buildings was completed for this period.

23.2. Rehabilitation of Disturbed Land

Progressive rehabilitation of the West Cliff Emplacement has been undertaken during the reporting period in accordance with the approved *West Cliff Coal Wash Emplacement Area Management Plan.* Refer to Appendix A -*Rehabilitation Monitoring Report* for further detail of the success of the rehabilitation of the Emplacement area. Plan 12 outlines the rehabilitation undertaken over the reporting period.

Exploration activities are undertaken on an ongoing basis following completion of associated activities.

The rehabilitation summary is provided in Table 41.

23.3. Rehabilitation Trials and Research

No rehabilitation trials were conducted during the reporting period.

23.4. Further Development of the Final Rehabilitation Plan

The BSO *Mining Operations Plan* (also known as the *Rehabilitation Management Plan*) addresses the rehabilitation requirements and objectives for all domains associated with the Appin and West Cliff combined BSO. The MOP outlines a range of post land use options that are potentially available for the BSO sites upon completion of operations. The future final land use objectives are yet to be decided upon and agreed due to timing of the eventual closure of BSO related sites. There has been no further development of this plan.

In-line with consolidating the MOP/Closure Plans, the Rehabilitation Cost Estimate (RCE) for the BSO was reviewed during FY15 and is attached as appendix F to this document.

Table 41: Rehabilitation Summary

	Area Affected/Rehabilitated (hectares)		
	To Date	Last Report	Next Report (estimated)
A: MINE LEASE AREA			
A1 Mine Lease (s) Area	46580	46580[10]	46580
B: DISTURBED AREAS			
B1 Infrastructure Area (other disturbed areas to be rehabilitated at closure including facilities, roads)	67	114	67
B2 Active Mining Areas (excluding items B3-B5 below) N/A	N/A	N/A	N/A
B3 Waste Emplacements (active/unshaped/in or out of pit)	19	19	19
B4 Tailings emplacements (Active/unshaped/uncapped) N/A	N/A	N/A	N/A
B5 Shaped Waste Emplacement (awaits final vegetation)	6	5	6
All DISTURBED AREAS	92	179	175
C: REHABILITATION PROGRESS			
C1 Total Rehabilitated Area (except for maintenance)	55	63	60
D: REHABILITATION ON SLOPES			
D1 10 to 18 Degrees	17	17	22
D2 Greater than 18 degrees	0	6	0
E: SURFACE OF REHABILITATED LAND			
E1 Pasture and Grasses	4	6	4
E2 Native Forest/Ecosystems	51	57	56
E3 Plantations and Crops N/A	N/A	N/A	N/A
E4 Other (include nonvegetative outcomes N/A	N/A	N/A	N/A

Note: Rehabilitation Cost Estimate reviewed FY15, figures updated based upon recalculation of areas. Calculation does not include temporary rehabilitation.

[10] ML1698 granted 26 June 2014 for AA9.
Emplacement grade not greater than 1:3, Approximately 1/3rd of emplacement is between 1:10 and 1:3.

Table 42: Maintenance Activities on Rehabilitated Land

	Area Treated		
	Report Period	Next Period	Comments/Control strategies/treatment detail
Additional erosion control works (drains re-contouring, rock protection)	0	0	No additional works required
Re-covering (detail - further topsoil, subsoil sealing etc.)	2.5	2	2.5 Ha stockpiled at West Cliff for future use in rehab.
Soil treatment (detail - fertiliser, lime, gypsum etc)	N/A	N/A	N/A
Treatment/Management (detail - grazing, cropping, slashing etc)	4	4	West Cliff Effluent Irrigation Area – Slashing undertaken as required.
Re-seeding/Replanting (detail - species density, season etc)	0	0	No emplacement rehab seeding undertaken during FY15
Adversely Affected by Weeds (detail - type and treatment)	0	0	No areas adversely affected
Feral animal control (detail - additional fencing, trapping, baiting etc)	0	0	Undertaken on as needed basis

24. Activities Proposed in the Next AEMR Period

24.1. Mine Operations

During the next reporting period several operational changes are expected to occur across the Bulli Seam Operations. The changes listed below do not extend to a change in mining or processing method.

Vent Shaft No.6 Commissioning

Between the end of the FY15 reporting period and the submission of this report Vent Shaft No.6 was successfully commissioned as an upcast shaft, supporting current and future development of Appin Area 7 and Area 9.

West Cliff End of Longwall 38

Planned extraction of Longwall 38 is due for completion during FY16. Longwall 38 is the final planned longwall to be extracted from Westcliff Area 5. Subsequently, longwall operations will move to Appin Area 9.

Appin Area 9 Extraction of Longwall 901

The commencement of extraction of the first panel of Appin Area 9 is expected during the next reporting period.

24.2. Projects

Ventilation Shaft No.6

Activities proposed for the 2015/16 reporting period will include:

- Continued construction of the noise barrier around the fan site.

Mine Safety Gas Drainage – LW707

Activities proposed for the 2015/16 reporting period include:

- Continued operation of existing wells; and
- Potential construction of wells to service LW 707.

Service Boreholes – Vent Shaft No.6 precinct

During 2015/16 further work on installation of service boreholes is expected in the Vent Shaft 6 precinct, specifically concrete and ballast, along with existing compressed air, electrical and communications boreholes.

Appin West Gas Plant Upgrade

In response to future mining in Appin Area 9 and increased gas drainage activities, the gas drainage plant and utilisation capacity of the Appin West EDL are undergoing an upgrade throughout 2015/2016.

Appin West Bath House Extension

As mentioned in section 8.6 the works on the Bath House Extension are due for completion in the first half of FY16.

24.3. Environmental Management

In conjunction with existing environmental management projects outlined in section 8 of this document, the next reporting period will have the following project activities:

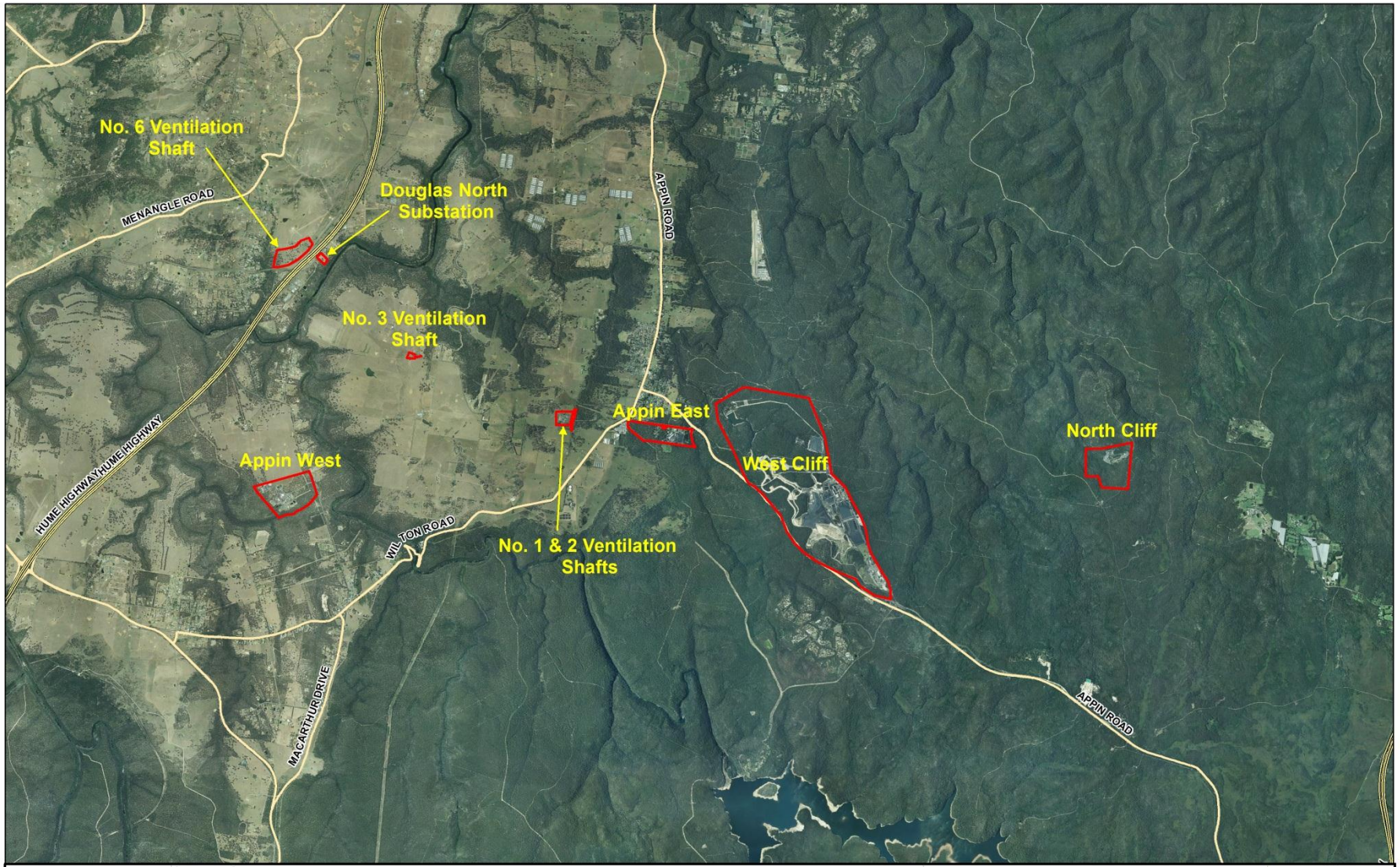
- Appin West Water Filtration Plant upgrade
- Completion of PRP19 improvement projects (refer to section 17.3 of this report)
- Minor Appin West Sewerage Treatment Plant improvements

25. References

- Illawarra Coal, Bulli Seam Operations Air Quality and Greenhouse Gas Management Plan
- Illawarra Coal, Bulli Seam Operations Environmental Management Strategy
- Illawarra Coal, BSO Mining Operations Plan – October 2012 – September 2019
- Cardno Pty Ltd (2010), Appin Mine Conceptual Closure Plan.
- Cardno Pty Ltd (2010), West Cliff Colliery Conceptual Closure Plan.
- Illawarra Coal, West Cliff Stockpile and Slope Stability Management Plan.
- Illawarra Coal, BSO Water Management Plan.
- Illawarra Coal, West Cliff Coal Wash Emplacement Area Management Plan.
- Illawarra Coal, BSO Waste Management Plan.
- NSW Office of Environment and Heritage (2014), Environment Protection Licence No.2504.
- NSW Trade and Investment, EDG03 Guidelines to the Mining Rehabilitation and Environmental Management Process.

Plans

Plan 1 – Regional Location Plan



SOUTH32 Illawarra Coal

Legend

- Domain Boundaries
- Highways
- Main Roads

Bulli Seam Operations

Regional Location Plan

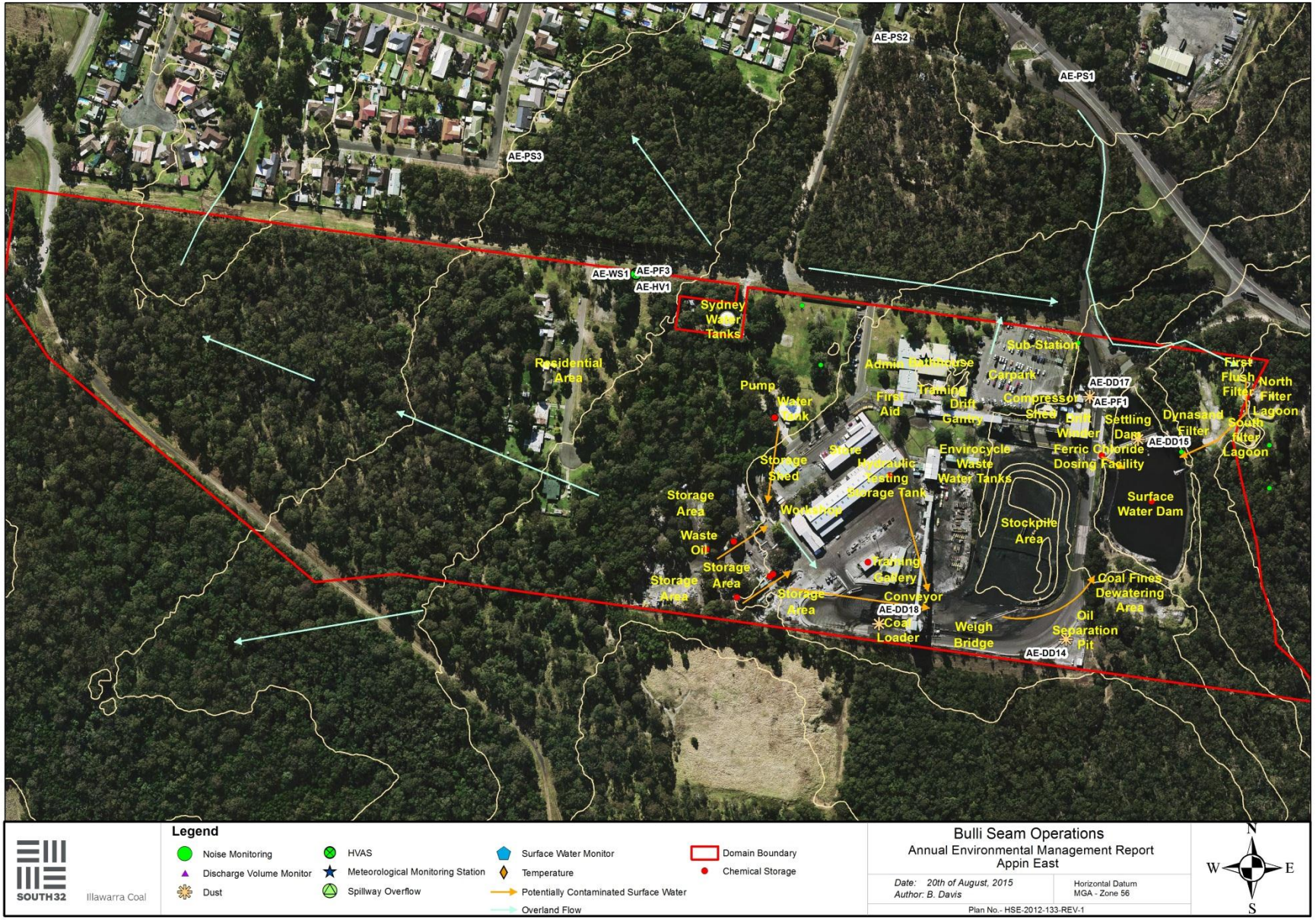
Date: 20th of August, 2015
Author: B. Davis

Horizontal Datum
MGA - Zone 56

Plan No.- HSE-2012-95-REV-1

N W E S

Plan 2 – Appin East Mine Site


AE-PS2
AE-PS1
AE-PS3
AE-WS1
AE-PF3
AE-HV1
Sydney Water Tanks
Residential Area
Sub-Station
Admin
Bathhouse
Carpark
Pump
Water Tank
First Aid
Training
Drift
Gantry
Compressor Shed
AE-DD17
AE-PF1
Bore Water
Settling Dam
Dynasand Filter
AE-DD15
First Flush Filter
North Filter Lagoon
South filter
Lagoon
Ferric Chloride Dosing Facility
Envirocycle Waste Water Tanks
Store
Hydraulic Testing Storage Tank
Storage Shed
Workshop
Storage Area
Surface Water Dam
Stockpile Area
Waste Oil
Storage Area
Storage Area
Storage Area
Training Gallery
Conveyor
AE-DD18
Coal Loader
Weigh Bridge
Coal Fines Dewatering Area
Oil Separation Pit
AE-DD14
Legend
Noise Monitoring
Discharge Volume Monitor
Dust
HVAS
Meteorological Monitoring Station
Spillway Overflow
Surface Water Monitor
Temperature
Potentially Contaminated Surface Water
Overland Flow
Domain Boundary
Chemical Storage
SOUTH32
Illawarra Coal
Bulli Seam Operations
Annual Environmental Management Report
Appin East
Date: 20th of August, 2015
Author: B. Davis
Horizontal Datum
MGA - Zone 56
Plan No.- HSE-2012-133-REV-1
N
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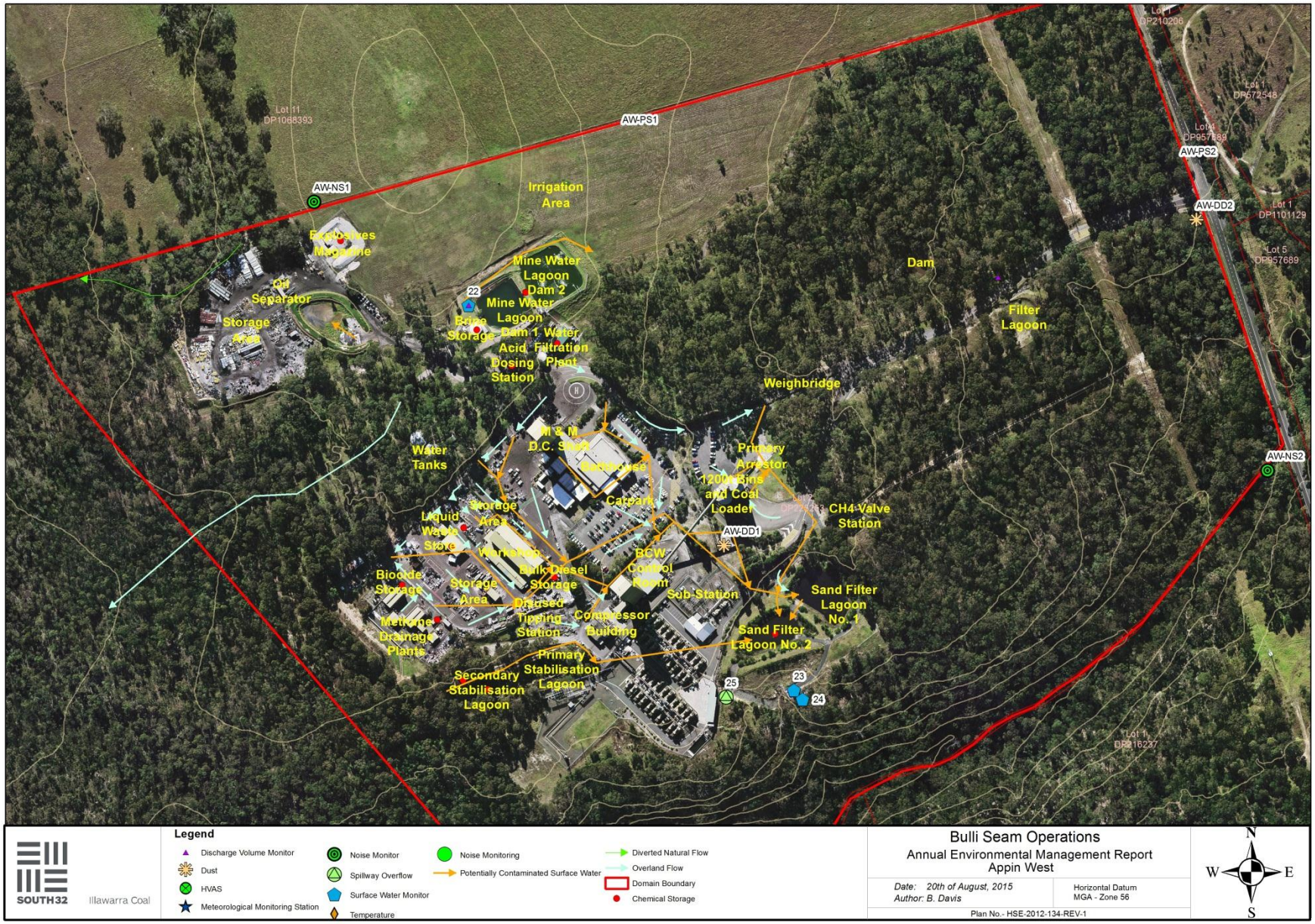
Plan 3 – Appin West Mine Site


Lot 11
DP1068393
AW-PS1
AW-NS1
Irrigation
Area
Explosives
Magazine
Oil
Separator
Storage
Area
Mine Water
Lagoon
Dam 2
22
Mine Water
Lagoon
Dam 1
Brine
Storage
Water
Filtration
Plant
Acid
Dosing
Station
Dam
Filter
Lagoon
Weighbridge
M & M
D.C. Shed
Bathhouse
Water
Tanks
Primary
Arrestor
1200t Bins
and Coal
Loader
Carpark
CH4 Valve
Station
Storage
Area
Liquid
Waste
Store
Workshop
AW-DD1
BCW
Control
Room
Biocide
Storage
Bulk Diesel
Storage
Storage
Area
Sub-Station
Sand Filter
Lagoon
No. 1
Diffused
Tipping
Station
Compressor
Building
Methane
Drainage
Plants
Sand Filter
Lagoon No. 2
Primary
Stabilisation
Lagoon
Secondary
Stabilisation
Lagoon
25
23
24
Lot 1
DP210206
Lot 1
DP672548
Lot 1
DP957689
AW-PS2
AW-DD2
Lot 1
DP1101129
Lot 5
DP957689
AW-NS2
Lot 1
DP216237
Legend
Discharge Volume Monitor
Dust
HVAS
Meteorological Monitoring Station
Noise Monitor
Spillway Overflow
Surface Water Monitor
Temperature
Noise Monitoring
Potentially Contaminated Surface Water
Diverted Natural Flow
Overland Flow
Domain Boundary
Chemical Storage
SOUTH32
Illawarra Coal
Bulli Seam Operations
Annual Environmental Management Report
Appin West
Date: 20th of August, 2015
Author: B. Davis
Horizontal Datum
MGA - Zone 56
Plan No.- HSE-2012-134-REV-1
N
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Plan 4 – No.1 & No.2 Shaft Site

SOUTH32 Illawarra Coal

Legend

- Cadastral Parcels
- Crown Land
- Domain Boundary
- Creeks
- Bull Seam 5m Contours

Responsible Officer	Job Title	Date

Bulli Seam Operations
Annual Environmental Management Report
Domain 6 - Appin No. 1 & No. 2 Shafts

Date: 20th of August, 2015
Author: B. Davis

Horizontal Datum
MGA - Zone 56

Plan No.- HSE-2012-136-REV-1

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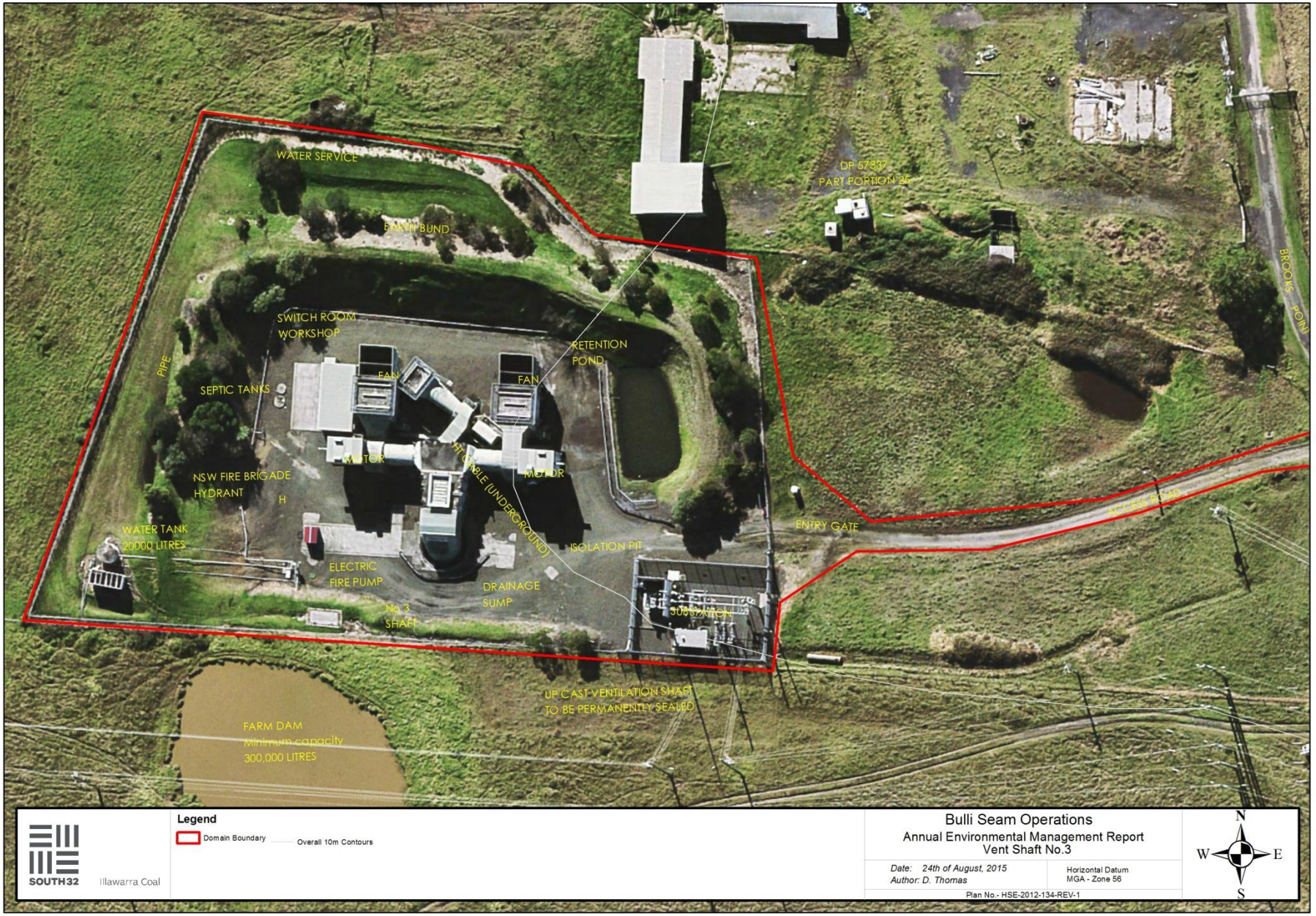
Plan 5 – No.3 Shaft Site



SOUTH32 Illawarra Coal

Legend

Domain Boundary — Overall 10m Contours

Bulli Seam Operations

Annual Environmental Management Report
Vent Shaft No.3

Date: 24th of August, 2015
Author: D. Thomas

Horizontal Datum
MGA - Zone 56

Plan No.- HSE-2012-134-REV-1

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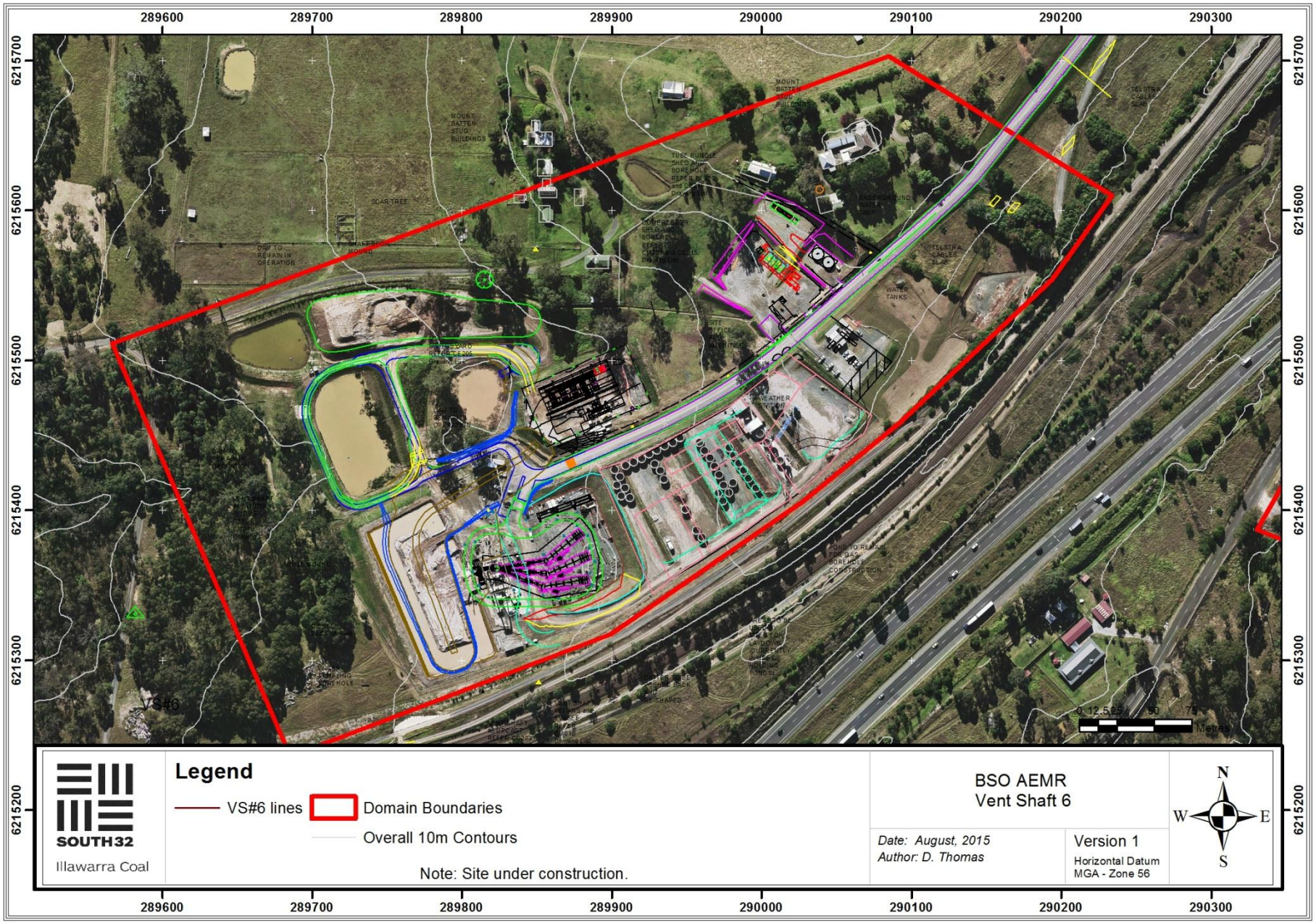
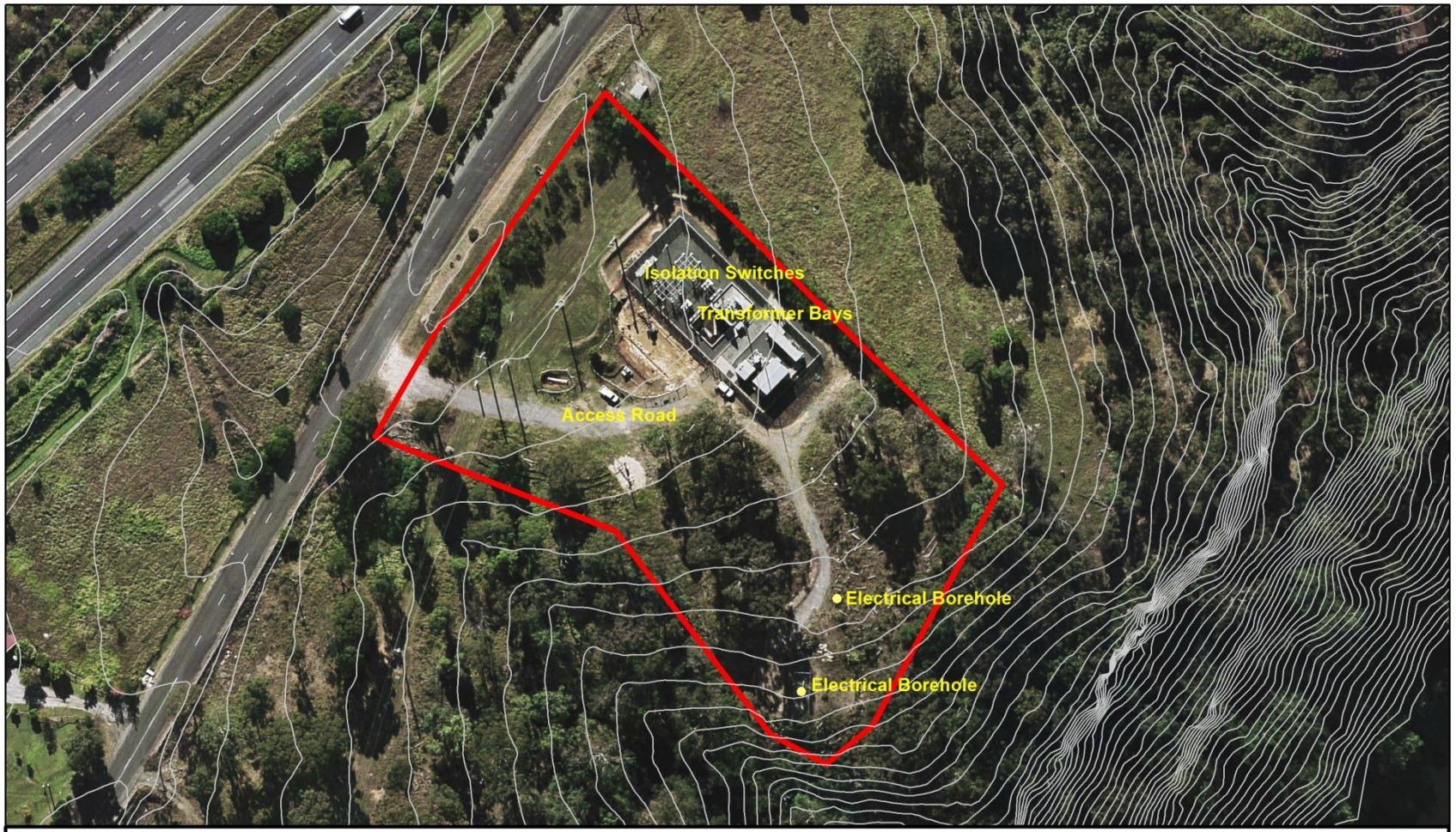
Plan 6 – No.6 Shaft Site


289600
289700
289800
289900
290000
290100
290200
290300
6215700
6215600
6215500
6215400
6215300
6215200
VS#6
0 12.5 25 50 75
Metres
Legend
VS#6 lines
Domain Boundaries
Overall 10m Contours
Note: Site under construction.
SOUTH32
Illawarra Coal
BSO AEMR
Vent Shaft 6
Date: August, 2015
Author: D. Thomas
Version 1
Horizontal Datum
MGA - Zone 56
N
W
E
S

Plan 7 – Douglas North Substation



SOUTH32
Illawarra Coal

Legend

1m Contours

Domain Boundary

0 10 20 40 60 80 Meters

Douglas North Substation

Date: 20th of August, 2015
Author: B. Davis

Version 1
Horizontal Datum
MGA - Zone 56

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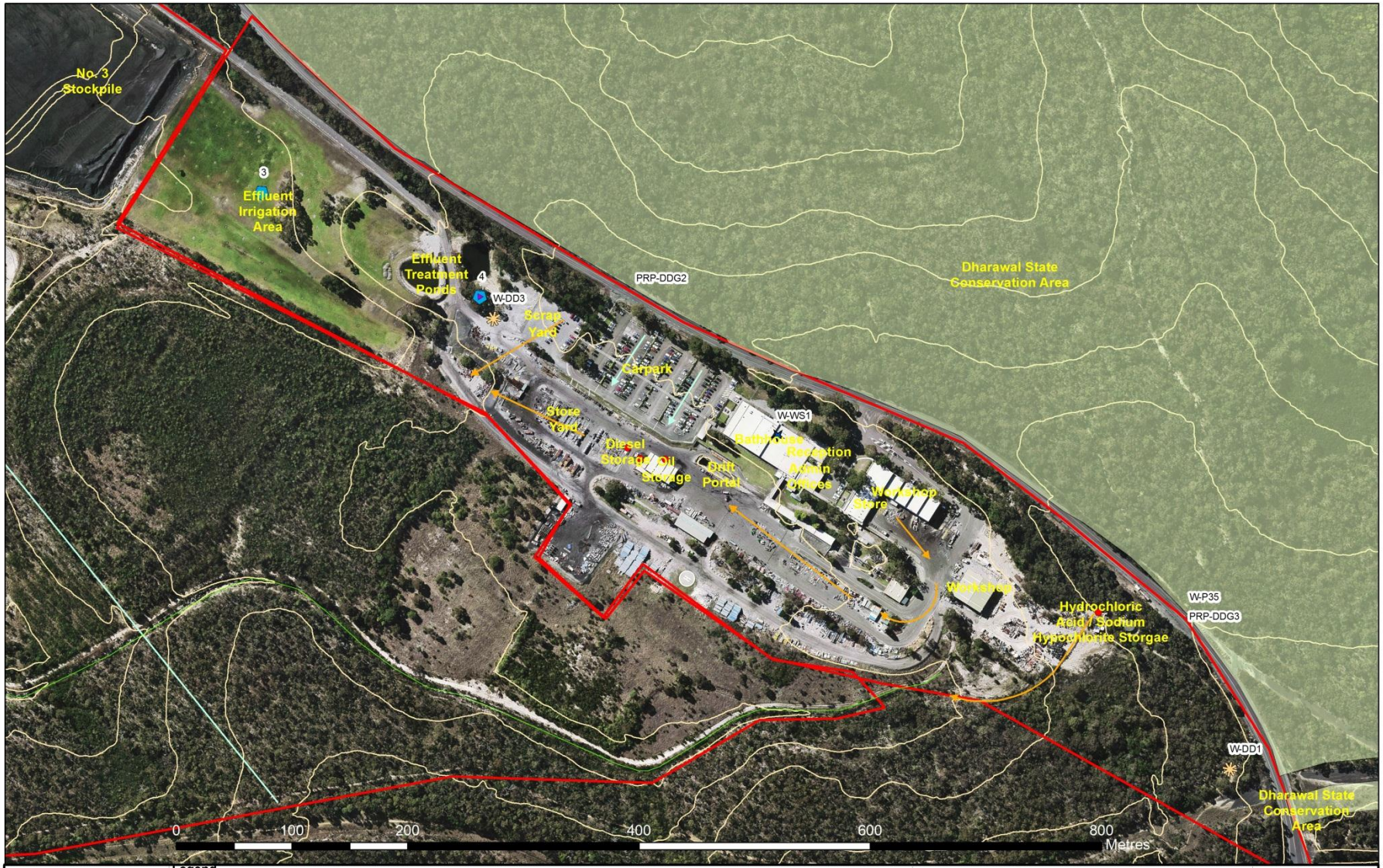
HSE-2014-139-Rev 1

Plan 8 – West Cliff South site


No. 3 Stockpile
3
Effluent Irrigation Area
Effluent Treatment Ponds
4
W-DD3
PRP-DDG2
Dharawal State Conservation Area
Scrap Yard
Carpark
Store Yard
Diesel Storage
Oil Storage
Drift Portal
W-WS1
Bathhouse
Recreation
Admin
Offices
Workshop Store
Workshop
Hydrochloric Acid / Sodium Hypochlorite Storgae
W-P35
PRP-DDG3
W-DD1
Dharawal State Conservation Area
0
100
200
400
600
800
Metres
Legend
Discharge Volume Monitor
Dust
HVAS
Meteorological Monitoring Station
Noise Monitor
Spillway Overflow
Surface Water Monitor
Temperature
Potentially Contaminated Surface Water
Diverted Natural Flow
Overland Flow
Domain Boundary
Chemical Storage
SOUTH32
Illawarra Coal
Bulli Seam Operations
Annual Environmental Management Report
West Cliff South
Date: 20th of August, 2015
Author: B. Davis
Horizontal Datum
MGA - Zone 56
Plan No.- HSE-2012-132-REV-1
N
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W

Plan 9 – West Cliff North Site


Dharawal State Conservation Area
PRP-DDG1
W-PS3
W-DD10
W-T1
Point 9
Point 6
No. 2 Shaft Winder Building
Sub-station Compound
455 000 Litre Water Tank
Cogeneration Plant
Weigh Bridge
Trash Screen
No. 1 Shaft
Gas Turbine
Water Cooler
Gasometer
2-Ethylbenzol
No. 2 Compressor Station
Crane
Offices
Coal Product Bins
Magnaflos 1510
Coal Preparation Plant
Coal Thickener
Primary Screen House
Raw Coal Bins
Magnetite Storage Area
Magnasol 572
Raw Coal Delivery and Handling Area
Surface Water Pond P3
Settling Tanks
No. 5 Stockpile
No. 6 Stockpile
Magnasol Store
Surface Water Pond P4A
Legend
Discharge Volume Monitor
Dust
HVAS
Meteorological Monitoring Station
Noise Monitor
Spillway Overflow
Surface Water Monitor
Temperature
Potentially Contaminated Surface Water
Overland Flow
West Cliff North
Chemical Storage
SOUTH32
Illawarra Coal
Bulli Seam Operations
Annual Environmental Management Report
West Cliff North
Date: 20th of August, 2015
Author: B. Davis
Horizontal Datum
MGA - Zone 56
Plan No.- HSE-2012-131-REV-1
N
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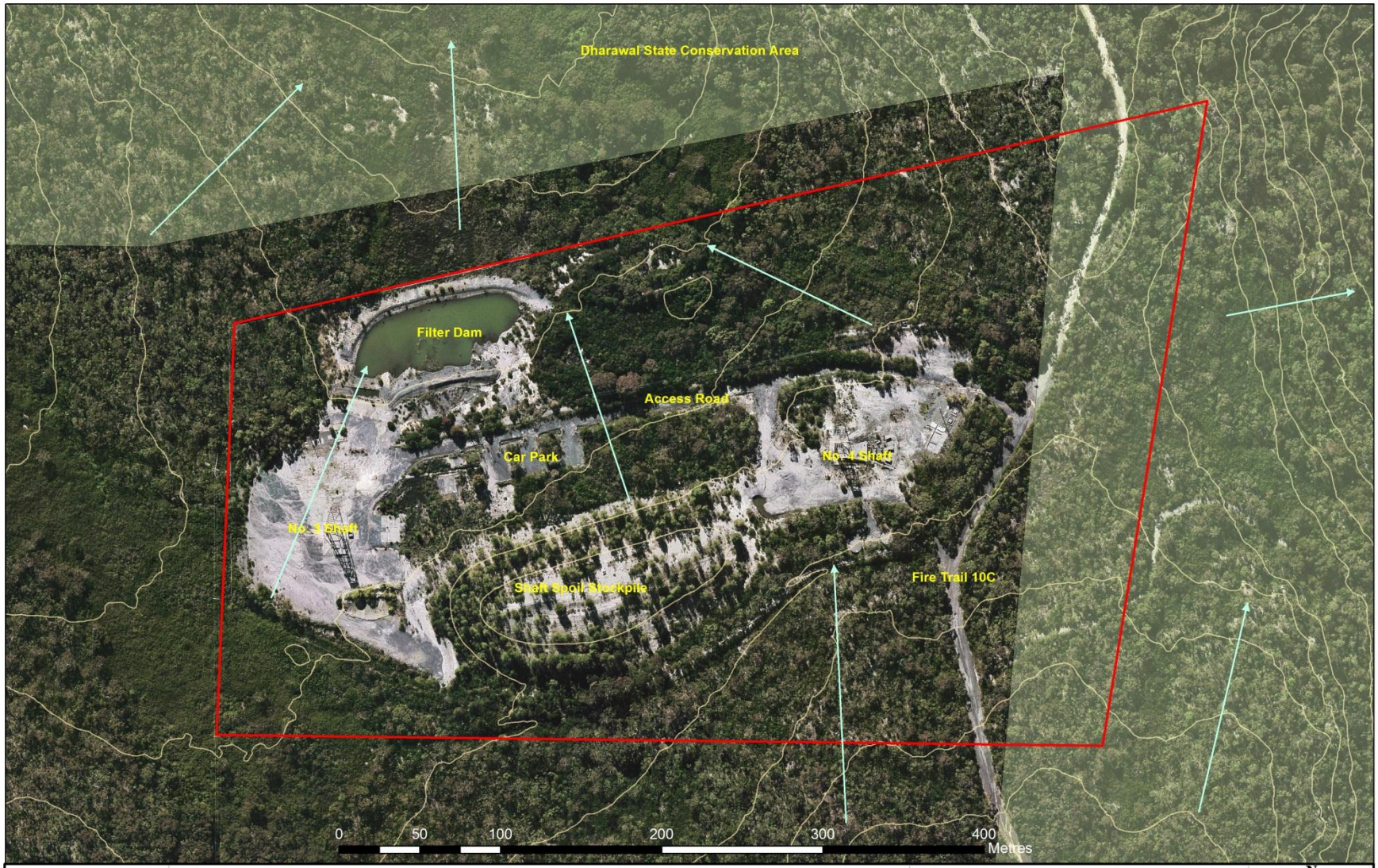
W

Plan 10 – North Cliff Site



SOUTH32 Illawarra Coal

Legend

Domain Boundary
Overland Flow
National Parks
5m Contours

Responsible Officer	Job Title	Date

Bulli Seam Operations
Annual Environmental Management Report
Domain 5 - North Cliff

Date: 20th of August, 2015
Author: B. Davis

Horizontal Datum
MGA - Zone 56

Plan No.- HSE-2012-135-REV-1

N
W E
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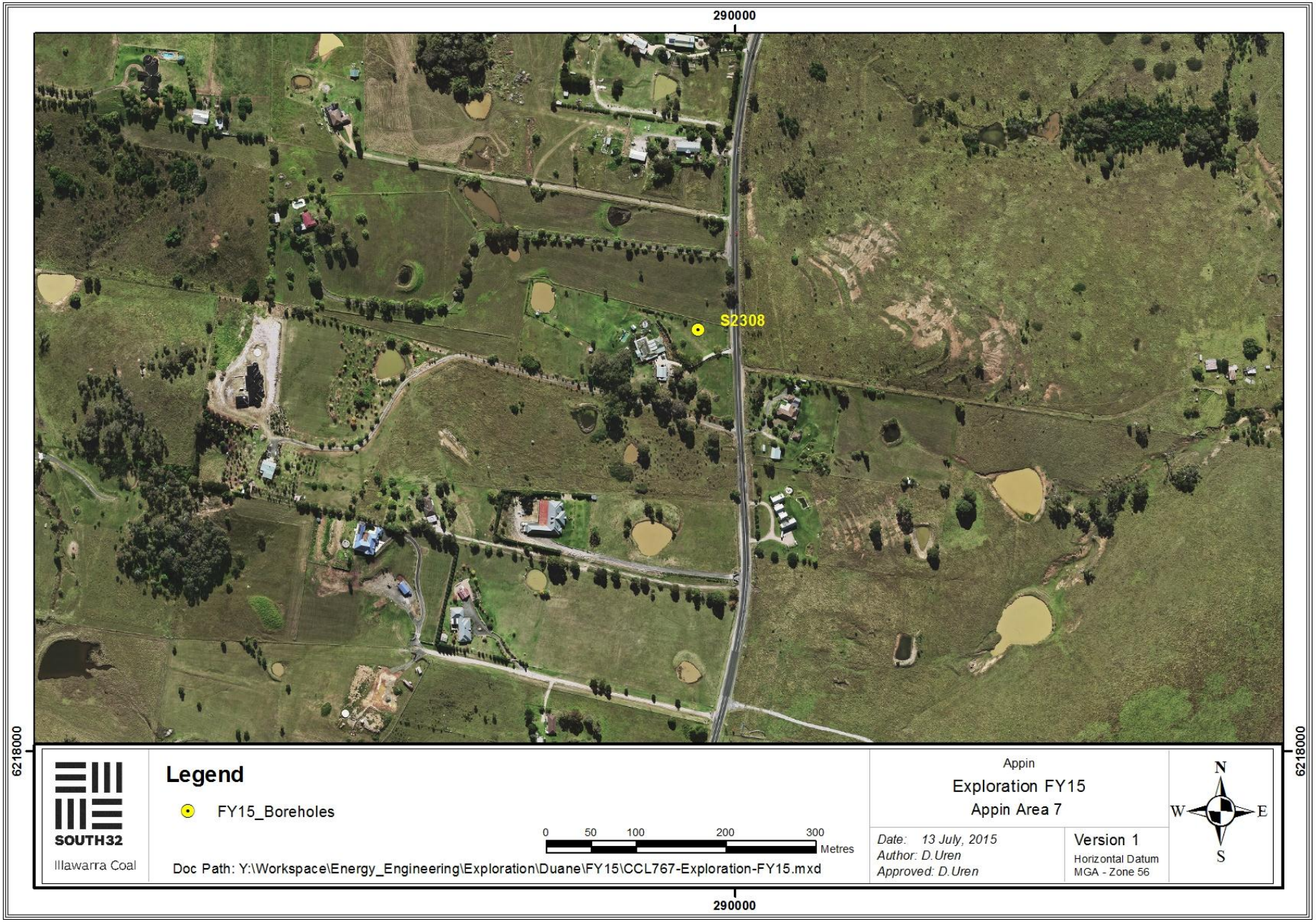
Plan 11 – Exploration for the AEMR Period



SOUTH32
Illawarra Coal

Legend

FY15_Boreholes

0 50 100 200 300 Metres

Doc Path: Y:\Workspace\Energy_Engineering\Exploration\Duane\FY15\CCL767-Exploration-FY15.mxd

Appin
Exploration FY15
Appin Area 7

Date: 13 July, 2015
Author: D.Uren
Approved: D.Uren

Version 1
Horizontal Datum
MGA - Zone 56

N
W E
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Plan 12 – Land Preparation Plan

SOUTH32
Illawarra Coal

Legend

- FY16 Rehab
- Active Coalwash Emplacement
- Previous Rehabilitation
- Rehabilitated During FY15
- Soil Stockpiles

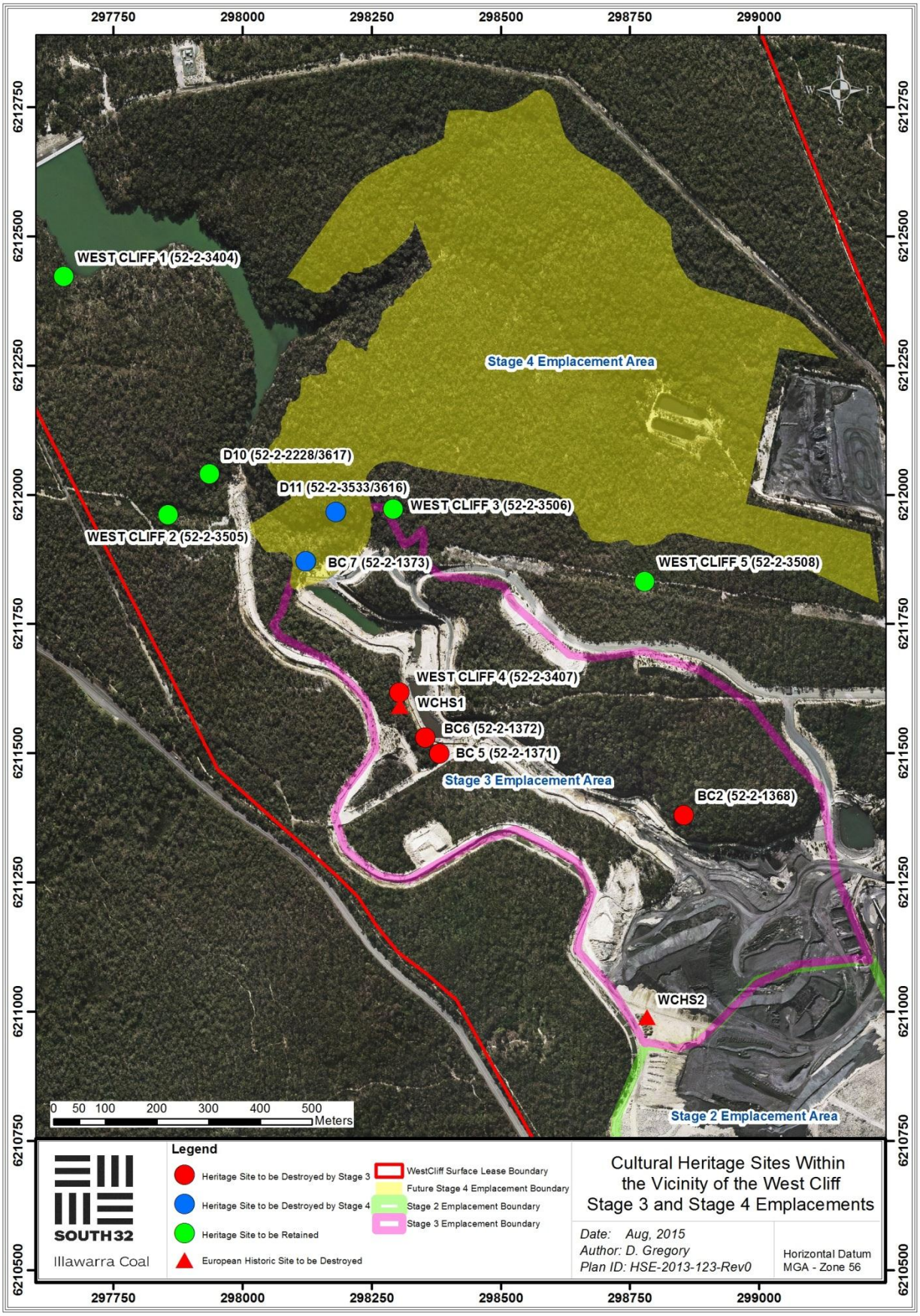
AEMR Land Preparation Plan FY15
West Cliff Operations

Date: August 2015
Author: D. Gregory
Plan ID:

Version 1
Horizontal Datum
MGA - Zone 56

Doc Path: W:\Workspace\HSE\BSO\AEMR\AEMR FY15\LandPrepPlanWestCliff.mxd

Plan 13 – West Cliff Emplacement Cultural Heritage Sites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298250
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298750
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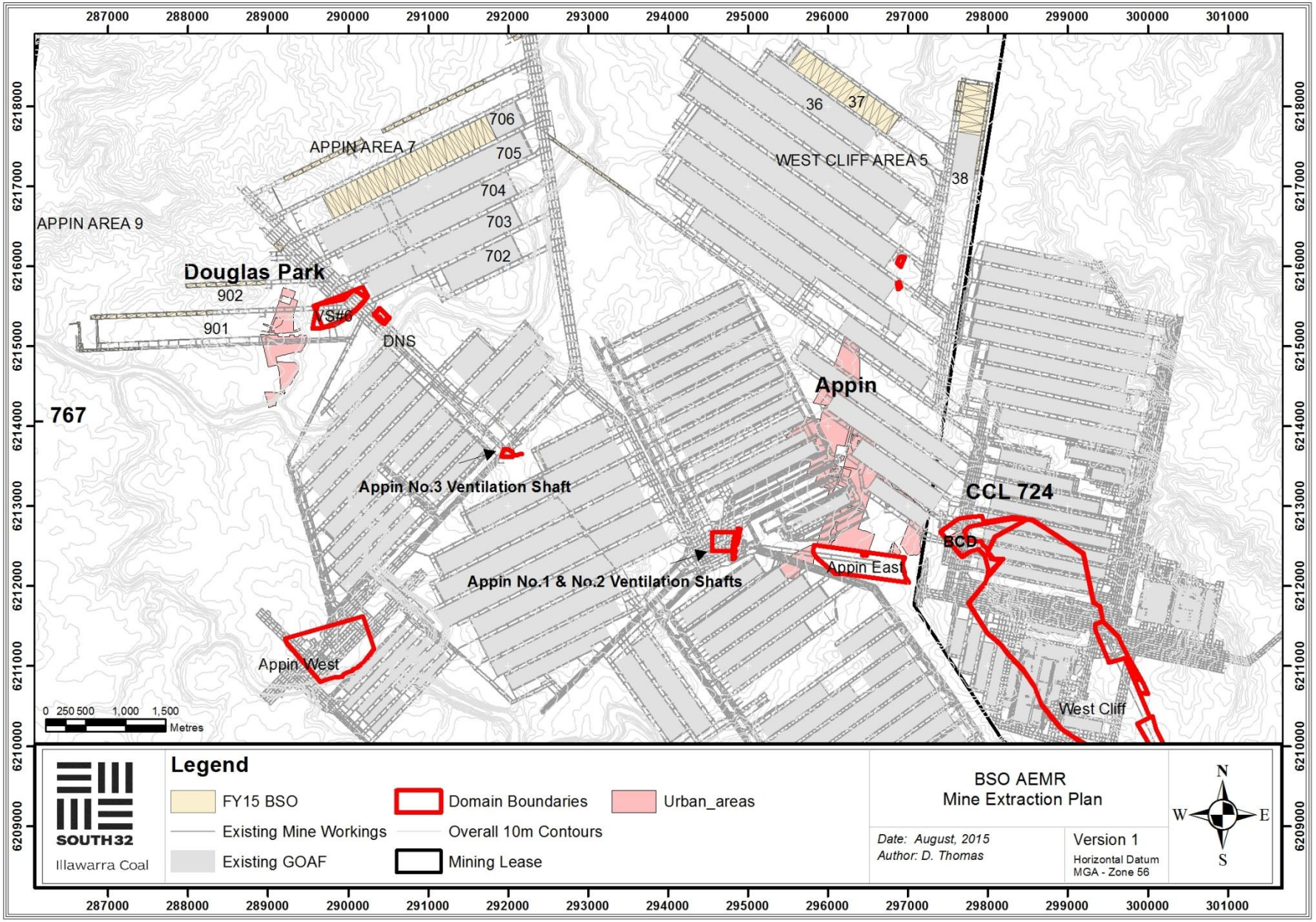
6212750
6212500
6212250
6212000
6211750
6211500
6211250
6211000
6210750
6210500
N
W
E
S
WEST CLIFF 1 (52-2-3404)
Stage 4 Emplacement Area
D10 (52-2-2228/3617)
D11 (52-2-3533/3616)
WEST CLIFF 3 (52-2-3506)
WEST CLIFF 2 (52-2-3505)
BC 7 (52-2-1373)
WEST CLIFF 5 (52-2-3508)
WEST CLIFF 4 (52-2-3407)
WCHS1
BC6 (52-2-1372)
BC 5 (52-2-1371)
Stage 3 Emplacement Area
BC2 (52-2-1368)
WCHS2
Stage 2 Emplacement Area
0 50 100 200 300 400 500
Meters
SOUTH32
Illawarra Coal
Legend
Heritage Site to be Destroyed by Stage 3
Heritage Site to be Destroyed by Stage 4
Heritage Site to be Retained
European Historic Site to be Destroyed
WestCliff Surface Lease Boundary
Future Stage 4 Emplacement Boundary
Stage 2 Emplacement Boundary
Stage 3 Emplacement Boundary
Cultural Heritage Sites Within the Vicinity of the West Cliff Stage 3 and Stage 4 Emplacements
Date: Aug, 2015
Author: D. Gregory
Plan ID: HSE-2013-123-Rev0
Horizontal Datum
MGA - Zone 56

Plan 14 – Mine Extraction Plan


287000
288000
289000
290000
291000
292000
293000
294000
295000
296000
297000
298000
299000
300000
301000
6218000
6217000
6216000
6215000
6214000
6213000
6212000
6211000
6210000
6209000
APPIN AREA 7
APPIN AREA 9
WEST CLIFF AREA 5
706
705
704
703
702
36
37
38
Douglas Park
902
901
VSH0
DNS
767
Appin
Appin No.3 Ventilation Shaft
Appin No.1 & No.2 Ventilation Shafts
CCL 724
ECD
Appin East
Appin West
West Cliff
0 250 500 1,000 1,500
Metres
Legend
FY15 BSO
Existing Mine Workings
Existing GOAF
Domain Boundaries
Overall 10m Contours
Mining Lease
Urban_areas
SOUTH32
Illawarra Coal
BSO AEMR
Mine Extraction Plan
Date: August, 2015
Author: D. Thomas
Version 1
Horizontal Datum
MGA - Zone 56
N
W
E
S

Appendices

Appendix A – Annual Rehabilitation Report

Appendix B – 2014/15 EPA Annual Return

Appendix C – FY15 Complaints

Appendix D – BSO EPBC Approval 2010/5350 Compliance Report

Appendix E – BSO Consent Compliance Report and Summary of Non-compliances.

BSO Consent Condition Checklist

Project Approval – Environmental Planning and Assessment Act 08_0150

Schedule 2 – Administrative Conditions

Condition	Condition Summary	Status
	Obligation to Minimise Harm to the Environment Prevent and/or minimise any harm to the environment.	Management Plans developed and implemented to minimise harm to the environment.
	Terms of Approval Carry out projects in accordance with the EA, Statement of Commitments, PPR and conditions of this approval.	Management Plans and monitoring developed to meet EA, Statement of Commitments, PPR and conditions of this approval.
	Terms of Approval If there is any inconsistency between the above documents, the more recent document shall prevail to the extent of the inconsistency. However, the conditions of this approval shall prevail to the extent of any inconsistency.	Not triggered during the Reporting Period.
	Terms of Approval Comply with any reasonable requirement/s of the Director-General arising from the Department's assessment of: (a) any strategies, plans, programs, reviews, audits, reports or correspondence that are submitted in accordance with this approval; and (b) The implementation of any actions or measures contained in these documents.	Requirements from Director General included in the Management Plans.
	Limits on Approval – Mining Operations Carry out mining operations on the site until 31 December 2041.	Not triggered during the Reporting Period.
	Limits on Approval – Coal Extraction and Production Ensure that no more than 10.5 million tonnes of ROM coal is extracted from the site in a financial year, or transport more than 9.3 million tonnes of product coal from the site in a financial year.	FY15 – ROM Coal – 7.4 MT. Appin Mine extracted 3.8 million tonnes of 'Run of Mine' West Cliff Colliery extracted 3.6MT of 'Run of Mine' FY15 – Product Coal transported – 7.4MT
	Limits on Approval – Hours of Operation Undertake mining operations 24 hours a day, 7 days a week.	Mining operations are in accordance with hours of operation.
	Surrender of Consents and Approval Surrender all existing development consents and	Letters sent on 29 July 2014 to DoPE and 1 Aug 2014 to WSC advising that Illawarra Coal Holdings Pty Ltd surrenders

	project approvals for mining operations relied on by the Proponent for the site (other than this approval) in accordance with Sections 75YA and 104A of the EP&A Act.	all existing development consents and project approvals for mining (including Wollondilly Shire Council approvals for: Shaft and Electrical Substation 22 January 1972; Appin Mine 22 February 1972; West Cliff Mine 17 April 1975; West Cliff Extended 3 September 1986; Washing of Appin Coal at West Cliff 25 March 1997) operations relied on by the Proponent for the site (other than the Bulli Seam Operations Approval), subject to and in accordance with the regulations.
	Surrender of Consents and Approval Prior to the surrender of these consents and/or approvals, the conditions of this approval (including any notes) shall prevail to the extent of any inconsistency with the conditions of these consents and/or approvals.	Conditions transferred to updated management plans.
	Structural Adequacy Ensure all new buildings and structures, and any alterations or additions to existing buildings and structure that are part of the project are constructed in accordance with the relevant requirements of the BCA and any additional requirements of the MSB where the building or structure is located on land within declared Mine Subsidence Districts.	New buildings and structures were project managed by the engineering team to the relevant building codes.
	Demolition Ensure that all demolition work is carried out in accordance with *Australian Standard AS 2601-2001: The Demolition of Structures,* or its latest version.	No demolition carried out in the reporting period.
	Operation of Plant and Equipment Ensure that all plant and equipment used at the site is maintained in a proper and efficient condition and is operated in a proper and efficient manner.	Operations are conducted in accordance with approved management plans. Daily, weekly and monthly inspections of plant, equipment and site areas are conducted. This includes a number of system generated maintenance work orders. Regular site environmental inspections are undertaken to address inspections for leaking machinery and equipment. Mine machinery and equipment are maintained and serviced accordingly.
	Staged Submission of Strategies, Plans or Programs Submit any strategies, plans or programs required by this approval on a progressive basis.	Management Plans submitted as required.

Schedule 3 – Specific Environmental Conditions – Underground Mining

Condition	Condition Summary	Status / Other documents
1.	Subsidence – Performance Measures – Natural and Heritage Features, etc. Ensure that the project does not cause any exceedances.	Condition not triggered during Reporting Period.
2.	Offsets Provide a suitable offset to compensate for the impact or environmental consequence.	Condition not triggered during Reporting Period.
3.	Performance Measures – Built Features Ensure that the project does not cause any exceedances of performance measure.	Condition not triggered during Reporting Period.
4.	Performance Measures – Built Features Any dispute between the Proponent and the owner of any built feature over the interpretation is to be settled by the Director-General.	Condition not triggered during Reporting Period.
5.	Extraction Plans Prepare and implement an Extraction Plan for first and second workings within each longwall mining.	SMP's and Extraction Plans prepared as required. Approved plans are available on the regulatory website. http://www.south32.net/our-operations/australia/illawarra-coal/regulatory-document
6.	Extraction Plans Ensure that the management plans include an assessment of the potential environmental consequences of the Extraction Plan, incorporating any relevant information that has been obtained since this approval and a detailed description of the measures that would be implemented to remediate predicted impacts.	Link to Subsidence Management Plans and Extraction Plans http://www.south32.net/our-operations/australia/illawarra-coal/regulatory-document
7.	First Workings Carry out first workings within the project area, other than in accordance with an approved extraction plan.	Link to Subsidence Management Plans and Extraction Plans http://www.south32.net/our-operations/australia/illawarra-coal/regulatory-document
8.	Payment of Reasonable Costs Pay all reasonable costs incurred by the Department to engage suitably qualified, experienced and independent experts to review the adequacy of any aspect of an Extraction Plan.	Condition not triggered during Reporting Period.
9.	Improved Understanding and Prediction of Subsidence Impacts Prepare and implement a program to improve its prediction and understanding of subsidence impacts (in particular sub-surface impacts and impacts on groundwater resources).	BSO Environmental Research Program submitted to the Director General and other government agencies for consideration (12th September 2012). No feedback to date.

10.	Improved Understanding and Prediction of Environmental Consequences on Significant Natural Features Prepare and implement a Research Program and allocate $1,000,000 in total to this program for expenditure over a period of seven years from the date of the program's approval.	BSO Environmental Research Program submitted to the Director General and other government agencies for consideration (12th September 2012). No feedback to date.

Schedule 4 – Specific Environmental Conditions - General

Condition	Condition Summary	Status / Other documents
1.	Noise – Noise Impact Assessment Criteria Ensure that the noise generated does not exceed the identified criteria at any residence on privately-owned land or on more than 25 percent of any privately-owned land.	No exceedances of the noise criteria LAeq (15min) (for Appin East receivers) are attributed to mine related noise.
2.	Noise – Noise Impact Assessment Criteria Ensure noise generated does not exceed the identified criteria at any residence on privately-owned land or on more than 25 percent of any privately-owned land.	As above.
3.	Noise Mitigation Implement noise mitigation measures upon receiving written request from identified residents.	No requests received during the Reporting Period.
4.	Operating Conditions The Proponent shall: (a) implement best management practice, including all reasonable and feasible noise mitigation measures, to minimise the construction, operational and road traffic noise generated by the project; (b) operate a comprehensive noise management system on site that uses real-time noise monitoring data for mining operations and the implementation of noise mitigation measures to ensure compliance with the relevant conditions of this approval; and (c) regularly assess the real-time noise monitoring to ensure compliance with the relevant conditions of this approval, to the satisfaction of the Director-General.	Link to Noise Mgmt. Plan http://www.south32.net/our-operations/australia/illawarra-coal/regulatory-document
5.	Noise Management Plan Prepare and implement a Noise Management Plan.	Plan submitted and approved. http://www.south32.net/our-operations/australia/illawarra-coal/regulatory-document
6.	Road Traffic Noise Mitigation If after the end of June 2013, road traffic noise generated by the project (including employee vehicles) results in an exceedance by more than 2 dB(A) of the NSW criteria for road traffic noise on Douglas Park Drive or Macarthur Road at any residence on privately-owned land, then the Proponent shall, upon receiving a written request from the landowner, implement reasonable and feasible noise mitigation measures (such as double-glazing, insulation, and/or air conditioning) at the residence in consultation	Condition not triggered during Reporting Period.

	with the landowner. If within 3 months of receiving this request from the landowner, the Proponent and the landowner cannot agree on the measures to be implemented, or there is a dispute about the implementation of these measures, then either party may refer the matter to the Director-General for resolution.	
7.	Air Quality & Greenhouse Gas – Odour Ensure that no offensive odours are emitted from the site.	Condition not triggered during Reporting Period. One complaint received for odour during the reporting period it was transient in nature.
8.	Greenhouse Gas Emissions Implement all reasonable and feasible measures to minimise the release of greenhouse gas emissions from the site.	Link to Air Quality and GHG Mgmt. Plan http://www.south32.net/our-operations/australia/illawarra-coal/regulatory-document
9.	Air Quality Criteria Ensure all reasonable and feasible avoidance and mitigation measures are employed so that the particulate emissions generated by the project do not exceed the criteria.	Link to Air Quality and GHG Mgmt. Plan http://www.south32.net/our-operations/australia/illawarra-coal/regulatory-document
10.	Air Quality Acquisition Criteria If the particulate matter emissions generated by the project exceed the criteria in Tables 7, 8 and 9 at any residence on privately-owned land or on more than 25 percent of any privately owned land, then upon receiving a written request for acquisition from the landowner the Proponent shall acquire the land in accordance with the procedures in Conditions 5 - 6 of Schedule 5.	Condition not triggered during Reporting Period.
11.	Operating Conditions Implement best practice air quality management on site, including all reasonable and feasible measures to minimise the off-site odour, fume and dust emissions generated by the project, including from any spontaneous combustion on site.	Link to Air Quality and GHG Mgmt. Plan http://www.south32.net/our-operations/australia/illawarra-coal/regulatory-document
12.	Air Quality & Greenhouse Gas Management Plan Prepare and implement a detailed Air Quality & Greenhouse Gas Management Plan.	Link to Air Quality and GHG Mgmt. Plan http://www.bhpbilliton.com/home/society/regulatory/Documents/ coal/illawarra/bulliseam/131113 coal illawarra bulliseam AirQualityandGreenhouseGasManagementPlanV2.pdf
13.	Meteorological Monitoring Ensure that there is a suitable meteorological station operating in the vicinity of the site.	Weather station installed at West cliff Mine. Additional weather stations were installed at Appin Mine and No. 6 Shaft Site during next Reporting Period.
14.	Compensatory Water Supply Provide a compensatory water supply to any owner of	Water supplied as per the management plan.

	privately-owned land whose water supply is adversely impacted (other than an impact that is negligible) as a result of the project.	
15.	Surface Water Discharge Ensure all surface water discharges from the site (including from the Brennans Creek Dam) comply with the discharge limits (both volume and quality) set for the project in any EPL.	Surface water discharge monitored in accordance with the EPL. http://www.south32.net/our-operations/australia/illawarra-coal/regulatory-document
16.	Surface Water Management Plan Prepare and implement a Surface Water Management Plan.	Plan submitted and approved. Link to Surface Water Mgmt. Plan http://www.south32.net/our-operations/australia/illawarra-coal/regulatory-document
17.	West Cliff Coal Wash Emplacement Area – West Cliff Coal Wash Emplacement Area Management Plan Prepare and implement a West Cliff Coal Wash Emplacement Area Management Plan.	Plan submitted, and approved by the DoPE. http://www.south32.net/our-operations/australia/illawarra-coal/regulatory-document f
18.	West Cliff Coal Wash Emplacement Area Biodiversity Offset Strategy Provide a suitable biodiversity offset strategy to compensate for the impacts of Stage 4 of the West Cliff Coal Wash Emplacement Area.	The West Cliff Coal Wash Emplacement Area Offset Strategy is currently in preparation. Preliminary consultation has been undertaken with DoPI and OEH.
19.	West Cliff Coal Wash Emplacement Area Biodiversity Offset Strategy Provide appropriate long-term security for the offset areas by 31 December 2012.	On 20 December 2012, the Director-General of Planning and Environment granted an extension to 31 December 2014 for the submission of the West Cliff Coal Wash Emplacement Area Biodiversity Offset Strategy.
20.	Underground Coal Wash Emplacement Trial Prepare and undertake an Underground Coal Wash Emplacement Trial.	IC is yet to receive feedback on the draft plan that was provided. We will re-engage the Dept. outlining our preferred Consent Condition - Meeting held with DoPE in May 2014. Discussions ongoing.
21.	Project Surface Infrastructure Management – Gas Drainage Management Plan Prepare and implement a Gas Drainage Management Plan.	Plans submitted and approved. http://www.epa.nsw.gov.au/prpoeoapp/ViewPOEOLicence.aspx?DOCID=33589&SYSUID=1&LICID=2504
22.	Service Boreholes Management Plan Prepare and implement a Service Boreholes Management Plan.	Link to Borehole Mgmt. Plan http://www.south32.net/our-operations/australia/illawarra-coal/regulatory-document
23.	Personal Emergency Device (PED) Communication Management Plan Prepare and implement a PED Communications Management Plan.	Plan has not been required. There are no plans to install a PED cable as technology has advanced and the BSO communications systems are being installed underground.

24.	Heritage – Heritage Management Plan Prepare and implement a Heritage Management Plan.	Plan submitted and approved. Link to Heritage Mgmt. Plan http://www.south32.net/our-operations/australia/illawarra-coal/regulatory-document
25.	Transport – Monitoring of Coal Transport Keep accurate records of the amount of coal transported from the site (on a daily basis) and make these records publicly available on its website at the end of each financial year.	Documents are maintained in the Illawarra Coal document registers. Records are on our website: http://www.south32.net/our-operations/australia/illawarra-coal/regulatory-document
26.	Traffic Management Plan Prepare and implement a Traffic Management Plan.	Plan was developed and submitted to the Director General on 21/12/2013; however, the plan has not been formally approved. RMS is reviewing the concept for the road intersection with Appin and Wedderburn Roads prior to endorsement.
27.	Visual – Visual Amenity and Lighting Minimise the visual impacts, and particularly the off-site lighting impacts, of the main infrastructure area and associated ancillary surface works.	Lighting setup in accordance with consent conditions. During the next reporting period, Illawarra Coal will undertake assessments of visual lighting. The assessments will be done in accordance with the requirements of the relevant Australian Standard.
28.	Waste Minimise the waste (including coal reject) and ensure that the waste generated by the project is appropriately stored, handled and disposed of.	Waste management in accordance with the waste management plan.
29.	Waste Prepare and implement a Waste Management Plan.	Link to Waste Mgmt. Plan http://www.south32.net/our-operations/australia/illawarra-coal/regulatory-document
30.	Bushfire Management Ensure that the project is suitably equipped to respond to any fires on site; and assist the Rural Fire Service and emergency services as much as possible if there is a fire in the surrounding area.	Sites are equipped to manage bushfires. Asset protection zones are maintained.
31.	Rehabilitation – Rehabilitation Objectives Rehabilitate the site to describe satisfactory level.	Rehabilitation conducted in accordance with rehabilitation management plan.
32.	Progressive Rehabilitation Carry out the rehabilitation of the site progressively.	Rehabilitation conducted in accordance with rehabilitation management plan.
33.	Rehabilitation Management Plan Prepare and implement a Rehabilitation Management Plan.	Plan submitted and approved in 2012. Link to Mining Operations Plan/RMP http://www.south32.net/our-operations/australia/illawarra-coal/regulatory-document

Schedule 5 – Additional Procedures

Condition	Condition Summary	Status / Other documents
1.	Notification of Landowners Notify affected landowners in writing of the exceedance, and provide regular monitoring results to each affected landowner until the project is again complying with the relevant criteria.	Condition not triggered during Reporting Period.
2.	Independent Review As required commission a suitably qualified, experienced and independent person, to consult with the landowner to determine his/her concerns, conduct monitoring to determine whether the project is complying with the relevant criteria.	Condition not triggered during Reporting Period.
3.	Independent Review If the independent review determines that the project is complying with the relevant criteria in Schedule 4, then the Proponent may discontinue the independent review with the approval of the Director-General. If the independent review determines that the project is not complying with the relevant impact assessment criteria in Schedule 4, and that the project is primarily responsible for this non-compliance, then the Proponent shall: (a) implement all reasonable and feasible mitigation measures, in consultation with the landowner and appointed independent person, and conduct further monitoring until the project complies with the relevant criteria; or (b) secure a written agreement with the landowner to allow exceedances of the relevant criteria, to the satisfaction of the Director-General. If the independent review determines that any relevant acquisition criteria in schedule 4 are being exceeded and that the project is primarily responsible for this non-compliance, then upon receiving a written request from the landowner, the Proponent shall acquire all or part of the landowner's land in accordance with the procedures in Conditions 4-5 below.	Condition not triggered during Reporting Period.
4.	Land Acquisition Make a binding written offer to the landowner within 3 months of receiving a written request.	Condition not triggered during Reporting Period.
5.	Land Acquisition Pay all reasonable costs associated with the land acquisition process.	Condition not triggered during Reporting Period.

Schedule 6 – Environmental Management, Reporting and Auditing

Condition	Condition Summary	Status / Other documents
1.	Environmental Management Strategy Prepare and implement an Environmental Management Strategy for the project.	Strategy submitted and approved. Link to Environmental Management Strategy. http://www.south32.net/our-operations/australia/illawarra-coal/regulatory-document
2.	Management Plan Requirements Ensure management plans required under this approval are prepared in accordance with any relevant guidelines.	Management Plans are prepared in accordance with relevant guidelines.
3.	Adaptive Management Assess and manage project-related risks.	Condition not triggered during Reporting Period.
4.	Annual Review Review the environmental performance of the projects.	Refer to 2015 AEMR
5.	Revision of Strategies, Plans and Programs Review and revise strategies, plans and programs within 3 months of the annual review, the submission of an incident report, submission of an audit report and/or modification to the conditions of this approval.	Plans were reviewed as required by the recommendations in the Triennial Audit Report. The BSO noise MP was resubmitted and approved by the DoPE.
6.	Community Consultative Committee Establish and operate a new Community Consultative Committee (CCC) which must be operated in general accordance with the *Guidelines for Establishing and Operating Community Consultative Committees for Mining Projects* (Department of Planning, 2007, or its latest version), and be operating by 30 September 2012.	Community Consultative Committee is operational in accordance with the Guidelines for Establishing and Operating Community Consultative Committees for Mining Projects.
7.	Reporting – Incident Reporting Notify the Director-General and any other relevant agencies of any incident that has caused, or threatens to cause, material harm to the environment and provide a detailed report on the incident.	Condition not triggered during Reporting Period.
8.	Regular Reporting Regularly report on the environmental performance on the website.	Link to BSO 14 Day EPL Reporting and BSO Project Approval monitoring requirements. http://www.south32.net/our-operations/australia/illawarra-coal/regulatory-document
9.	Independent Environmental Audit Commission and pay the full cost for independent environmental auditor of the project.	URS Australia Pty Ltd was engaged by IC to carry out an Independent Environmental Audit of the BSO. The audit commenced December 2013 and was completed in February 2014; the report was provided to IC on 2nd April 2014. Overall good compliance levels were achieved across approval and licence conditions with only 4 non-

		compliances and 3 indeterminates. 3 out of the 4 non-compliances related to previously reported EPL 2504 non-compliances; and Other non-compliance related to submission of 2013 Annual Report (EPBC approval) being 5 days late.
10.	Independent Environmental Audit Within 6 weeks of the completion of this audit provide a copy of the audit report.	As above.
11.	Access to Information From 30 June 2012, make copies of specified documents publically available on the website and keep them up to date.	All approved plans, strategies and monitoring results are on the south32 Regulatory Webpage. http://www.south32.net/our-operations/australia/illawarra-coal/regulatory-document

Appendix F – Rehabilitation Cost Estimate

Rehabilitation cost estimate provided only for Department of Industry, Division of Resource and Energy. Cost estimate is commercial in nature. Please contact the Department or Illawarra Coal representative for further information.