



ILLAWARRA COAL  
BULLI SEAM OPERATIONS



# ANNUAL REVIEW FY2017



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# TITLE BLOCK

## Name of operation


<b>Name of operator</b>	South32 – Illawarra Coal – Bulli Seam Operations
<b>Development consent / project approval #</b>	08_0150
<b>Name of holder of development consent / project approval</b>	Illawarra Coal Holdings Pty Ltd
<b>Mining lease #</b>	CCL 767, CCL 724
<b>Name of holder of mining lease</b>	Illawarra Coal Holdings Pty Ltd, Endeavour Coal Pty Ltd
<b>Water licence #</b>	10WA103794; 10WA118766; 10WA118778
<b>Name of holder of water licence</b>	Endeavour Coal Pty Ltd
<b>MOP/RMP start date</b>	1 Oct 2012
<b>MOP/RMP end date</b>	30 Sept 2019
<b>Annual Review start date</b>	01 July 2016
<b>Annual Review end date</b>	30 June 2017

I, Alex Parro, certify that this audit report is a true and accurate record of the compliance status of South32 – Illawarra Coal – Bulli Seam Operations for the period 01 July 2016 – 30 June 2017 and that I am authorised to make this statement on behalf of Illawarra Coal – Bulli Seam Operations.

Note.

a) The Annual Review is an 'environmental audit' for the purposes of section 122B (2) of the Environmental Planning and Assessment Act 1979. Section 122E provides that a person must not include false or misleading information (or provide information for inclusion in) an audit report produced to the Minister in connection with an environmental audit if the person knows that the information is false or misleading in a material respect. The maximum penalty is, in the case of a corporation, \$1 million and for an individual, \$250,000.

b) The Crimes Act 1900 contains other offences relating to false and misleading information: section 192G (Intention to defraud by false or misleading statement—maximum penalty 5 years imprisonment); sections 307A, 307B and 307C (False or misleading applications/information/documents—maximum penalty 2 years imprisonment or \$22,000, or both).

<b>Name of authorised reporting officer</b>	Alex Parro
<b>Title of authorised reporting officer</b>	Specialist Environment
<b>Signature of authorised reporting officer</b>	
<b>Date</b>	20/9/2017

# 1. STATEMENT OF COMPLIANCE

Table 1: Statement of compliance

Development Approval	Purpose	Issue Date	Expiry date	Compliant?
08_0150	Bulli Seam Operations Project Approval under Section 75J of the EP&A Act 1979.	22/12/2011	31/12/2041	No
EPBC 2010/5350	Federal Government approval of the Bulli Seam Operations Project under Sections 130(1) and 133 of the EPBC Act 1999.	15/05/2012	15/05/2042	Yes
10_0079	Appin Ventilation Shaft No.6 Approval under Section 75J of the EP&A Act 1979.	04/05/2011	04/05/2041	Yes <sup>1</sup>
EPBC 2010/5722	Federal Government approval of the Appin Mine Ventilation Shaft No.6 under Sections 130(1) and 133 of the EPBC Act 1999.	01/04/2011	01/04/2041	Yes
Mining Lease / Sub-Lease	Number			
Coal Lease	388	22 Jan 1992	22 Jan 2034	Yes
Mining Lease	1382	20 Dec 1995	20.12.2037	Yes
Mining Lease	1433	24 Jul 1998	23 Jul 2019	Yes
Mining Lease	1574	09 Jul 2008	30 Dec 2023	Yes
Mining Lease	1678	27 Sep 2012	26 Sep 2033	Yes
Mining Lease	1698	26 Jun 2014	26 Jun 2035	No
Consolidated Lease	Coal 724	4 Jul 1991	18 Dec 2031	Yes
Consolidated Lease	Coal 767	29 Oct 1991	08 Jul 2021	Yes
Coal Lease	381	24 Oct 1991	24 Oct 2033	Yes
Mining Purposes Lease	200	13 Jan 1982	13 Jan 2024	Yes
Mining Purposes Lease	201	1 Jan 1982	13 Jan 2024	Yes
Mining Lease	1473	20 Nov 2000	29 Nov 2021	Yes

<sup>1</sup> A notice of Modification under Section 75W of the Environmental Planning and Assessment Act 1979 28 October 2016 incorporated the VS#6 Approval requirements into the BSO Approval.

**Table 2: Non-compliances**

Relevant approval	Condition #	Condition description (summary)	Compliance status	Comment	Where addressed in Annual Review
08_0150	Sch4.15	Surface water discharges exceeding EPL 2504 concentrations limit	Non Compliant	Concentration limits were exceeded at 3 sites during the reporting period	For a summary refer to Section 6.3, Table 11 of this report
Mining Lease #1698	3	Longwall panel in Area 7 was encroaching ML 1698 which had no approved MOP.	Non Compliant	Illawarra Coal will provide an addendum to the MOP to include ML #1698.	NA

Refer to Appendix D: BSO EPBC Approval 2010/5350 Compliance Report & Appendix E: BSO Consent Compliance Report and Summary of Non-compliances for more detail. The predictions and Statement of Commitments from the BSO Environmental Assessment (EA) are incorporated into the BSO federal EPBC and state EP&A Approval conditions. Compliance with the state and federal conditions is assessed in the following documents:

- Appendix D: BSO EPBC Approval 2010/5350 Compliance Report; and
- Appendix E: BSO Consent Compliance Report and Summary of Non-compliances

## 2. INTRODUCTION

### 2.1. BACKGROUND

This Annual Review for the Bulli Seam Operations (BSO) details the environment and community performance for the 12-month period ending 30<sup>th</sup> June 2017 and meets the requirements set out in the *Annual Review Guidelines* (NSW DPE, 2015).

The Review has been prepared to meet the requirements of Schedule 6 Condition 4 of the BSO Development Consent and the Department of Resources and Energy (DRE) requirement to submit an Annual Environmental Management Report (AEMR) under the Mining Lease for the BSO.

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>.

### 2.2. 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 have transitioned wholly to the Appin areas (Area 9 and Area 7) following completion of longwall mining activities at West Cliff in early 2016. The locations of all sites associated with the BSOP are illustrated in Plan 1 - Regional Location Plan.

#### **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 (Now Appin West) 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 (Central) pit top site (Plan 2 - Appin East (Central) Mine Site), the Appin West pit top site (Plan 3 – Appin West Mine Site), the Appin East (Central) No.1 and No.2 fan site (Plan 4 – No.1 & No.2 Shaft Site), the Appin West No.3 fan site (Plan 5 – No.3 Shaft Site), No.6 fan site (Plan 6 – No.6 Shaft Site) and the Douglas Park substation site (Plan 7 – Douglas North Substation).

#### **West Cliff/Appin North**

West Cliff/Appin North 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 at West Cliff concluded in early 2016. The latest mining area, Area 5, was completed in February 2016 and 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. West Cliff merged with Appin Mine in February 2016.



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

### 2.3. MINE CONTACTS

**Table 3: Contacts.**

<b>Position</b>	<b>Name</b>	<b>Number</b>
Acting Vice President Operations Mining	Lucas Dow	(02) 4286 3437
Manager Operations - Processing	Sam Knight	(02) 4640 4130
Specialist Environment	Alex Parro	(02) 4224 6215
Environmental Supervisor	Peter McMillan	(02) 4286 3415

### 3. APPROVALS

Tables below describe the Development Approvals, Mining Leases, Licences and Exploration Leases associated with the BSO.

**Table 4: Development Approvals associated with the BSO**

Document	Issue Date	Expiry date
Appin Gas Drainage Project – Initial	Oct 2009	
Appin Gas Drainage Project – 2010	Dec 2010	
Appin Gas Drainage Project – 2012	Feb 2012	
Bulli Seam Operations Project Approval (NSW Government)	22 Dec 2011	31 Dec 2041
Bulli Seam Operations Project Approval (EPBC Act)	15 May 2012	15 May 2042
No. 6 Ventilation Shaft (NSW Government)	4 May 2011	4 May 2041 <sup>2</sup>
No. 6 Ventilation Shaft (EPBC Act)	1 Apr 2011	1 Apr 2041

**Table 5: Mining Leases and Licences associated with the BSO.**

Mining Lease / Sub-Lease	Number	Issue Date	Expiry Date
Coal Lease	388	22 Jan 1992	22 Jan 2034
Mining Lease	1382	20 Dec 1995	20.12.2037
Mining Lease	1433	24 Jul 1998	23 Jul 2019
Mining Lease	1574	09 Jul 2008	30 Dec 2023
Mining Lease	1678	27 Sep 2012	26 Sep 2033
Mining Lease	1698	26 Jun 2014	26 Jun 2035
Consolidated Coal Lease	724	4 Jul 1991	18 Dec 2031
Consolidated Coal Lease	767	29 Oct 1991	08 Jul 2021
Coal Lease	381	24 Oct 1991	24 Oct 2033
Mining Purposes Lease	200	13 Jan 1982	13 Jan 2024
Mining Purposes Lease	201	1 Jan 1982	13 Jan 2024
Mining Lease	1473	20 Nov 2000	29 Nov 2021
Environment Protection Licence	2504	---	---
NSW Office of Water Licences	10WA103794;	1 July 2011	30 June 2024
	10WA118766;	1 July 2013	24 June 2018
	10WA118778	1 July 2013	18th February 2018

**Table 6: Exploration Leases associated with the BSO.**

Mining Lease / Sub-Lease	Site	Issue Date	Expiry Date
A199	West Cliff	27 Jun 1980	27 Jun 2019

<sup>2</sup> A notice of Modification under Section 75W of the Environmental Planning and Assessment Act 1979 28 October 2016 incorporated the VS#6 Approval requirements into the BSO Approval.

**Table 6: Exploration Leases associated with the BSO.**

A201	Appin	27 Jun 1980	27 Jun 2019
A248	Appin	13 May 1981	13 May 2021
A306	West Cliff	19 Jul 1983	27 Jun 2019
A312	Appin	10 Aug 1983	10 Aug 2018
A370	Appin	8 May 1986	27 Jun 2019
A395	Appin	23 Nov 1987	10 Aug 2018
A396	Appin/West Cliff	28 Jun 1988	27 Jun 2019
A397	West Cliff	4 Aug 1987	27 Jun 2019
A432	West Cliff	12 Feb 1991	31 Aug 2018
EL 4470	Appin	5 Jan 1993	5 Jan, 2021

## 4. OPERATIONS SUMMARY

### 4.1. EXPLORATION

During the reporting period, no exploration was conducted for the BSO. No exploration activities were conducted in existing boreholes CCL767 and CCL724.

### 4.2. LAND PREPARATION

#### Mine Safety Gas Drainage

Two vertical wells, (one of which had two steered lateral branches and the other one steered lateral branch), were operated to service gas from the extraction of Longwall 707. These wells targeted the Bulgo Sandstone unit, which is in strata above the Bulli Coal seam. These wells are located on ICHPL owned property in paddocks adjacent to Menangle Road, Douglas Park. During 2016/17 two decommissioned wells were rehabilitated. Refer to section 8.1- Rehabilitation for the reporting period for more information.

#### Emplacement Operations

The following works were undertaken during the reporting period:

- Seeding of approximately 7Ha to complete rehabilitation in Stage 2;
- Extension of the emplacement underdrainage channel and relocation/re-construction of a new dam to capture the underdrainage.



Figure 1: Extending the emplacement underdrainage network as Stage 3 coalwash emplacement progresses down the valley.

Plan 11 – Land Preparation Plan, illustrates the works completed.

The rehabilitated emplacement areas were 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 Annual monitoring program was undertaken in spring FY17. The report is provided in Appendix A: Annual Rehabilitation Report.

### 4.3. CONSTRUCTION

The following construction activities were undertaken during the 2016/2017 reporting period:

#### Water Filtration Plant Expansion

Works to expand the Appin West Water Filtration Plant continued during the reporting period (Figure 2). The current status of these works is as follows:

- Bulk storage total of 2000KL and blending plant completed – enabling additional surface storage of treated water and reducing potable water usage for underground operations.
- Pretreatment system has been installed to increase the capacity to pre-treat underground pump-out water, with ongoing further scoping and design. Full plant expected to be operational in January 2018.
- The new main processing facility, Integrated Membrane Plant 2, is nearing completion. During the reporting period, civil works including clearing and reshaping of designated land at Appin West have been ongoing. Commissioning expected in August 2017.



Figure 2: Water Filtration Plant Expansion - Main processing facility

### **Appin West Gas Drainage Plant Flaring Units**

The Appin West (tower) Gas Drainage Plant (GDP) has been upgraded and commissioned to increase the mine gas extraction capacity and provide capacity to flare gas (Figure 3). The upgrade included the installation of a 900mm gas extraction pipe down the existing (unused) bulk coal winder shaft and a 5km 900mm pipe line underground. The flares abate the methane content of the gas and are used when there is more gas available from the mine than can be consumed by EDL. This flaring project generates Australian Carbon Credit Units (ACCU's) as regulated by the Commonwealth Government Clean Energy Regulator.



Figure 3: Upgraded gas drainage plant at Appin West

## Appin East (Central) Gas Drainage Plant Flaring Units and Overland Gas Extraction Pipe

The Appin East Gas Drainage Plant (GDP) is being upgraded to increase gas extraction capacity and to provide some gas flaring capability (Figure 4). As discussed for Appin West, GDP gas flares abate the methane content of the gas and are used when there is more gas available from the mine than can be consumed by EDL, and can potentially generate Australian Carbon Credit Units (ACCU's). The project scope includes the upgrade of:

- Vent Shaft #3, consisting of:
  - 900mm pipe extension to underground gas range to bottom of Vent Shaft #3;
  - 900mm pipe Gas Riser within Vent shaft #3 (downcast) to surface;
  - Water separator/valve train top of Vent Shaft #3;
- Appin Central GDP- consisting of:
  - 1x Vacuum Skid;
  - 1x Water Skid;
  - 2x Flare Skids;
  - Mechanical and electrical interconnection to existing GDP;
  - Design has included for future Vacuum and water skid connections;
- An Interconnection Suction Pipeline – approx. 4km in length along Brooks Point Road (Figure 5), consisting of:
  - A buried 1000mm high density poly-ethylene pipeline
  - A 1000mm galvanised steel pipe crossing the Water NSW channel and adjacent creek.

A modification to the Surface Gas Management Plant for Appin East GDP Stage 3 works was approved in February 2017. Prior to submission for the application for the pipeline along Brooks Point Road access agreements were sought with landholders for the location of the pipe line. These included Wollondilly Shire Council, Walker Corp and Water NSW. The Brooks Point Road gas extraction pipeline was approved by the Department of Planning on October 2016 as part of the BSO Project Modification (08\_0150 MOD 2).

The South32 project start date was 15 April 2016, commissioning of the plant is expected in November 2017.

An overview of the project area can be found in Plan 13.



Figure 4: Construction progress of gas drainage plant at Appin East



Figure 5: Buried gas pipeline along Brooks Point Road

### 4.4. MINING

#### Longwall Status

The Bulli Seam underground longwall mining operations have transitioned wholly to the Appin areas following completion of longwall mining activities at West Cliff in early 2016. Appin and West Cliff (Appin North) mines extract coal from the Bulli Seam within the Southern Coalfield.

During the reporting period, Longwall coal extraction occurred in Appin Areas 7 and 9. Appin Area 7 Longwall 707A extraction was complete at 1034m and as of the 30<sup>th</sup> June 2017, Longwall 707B had extracted approximately 1240m, with 815m remaining. As of the 30<sup>th</sup> June 2017, Longwall 901 had extracted 2020m, with 12m remaining.

## Longwall Production

Appin and Westcliff extracted 3.99 Million Tonnes of 'Run of Mine' (ROM) coal via roadway development and longwall extraction methods for the reporting period, a 35% decrease from the 2015/16 reporting period. The ROM production levels from FY09 through to the current reporting period are provided in Figure 6. Note that forecast figures for FY18 are not yet available.

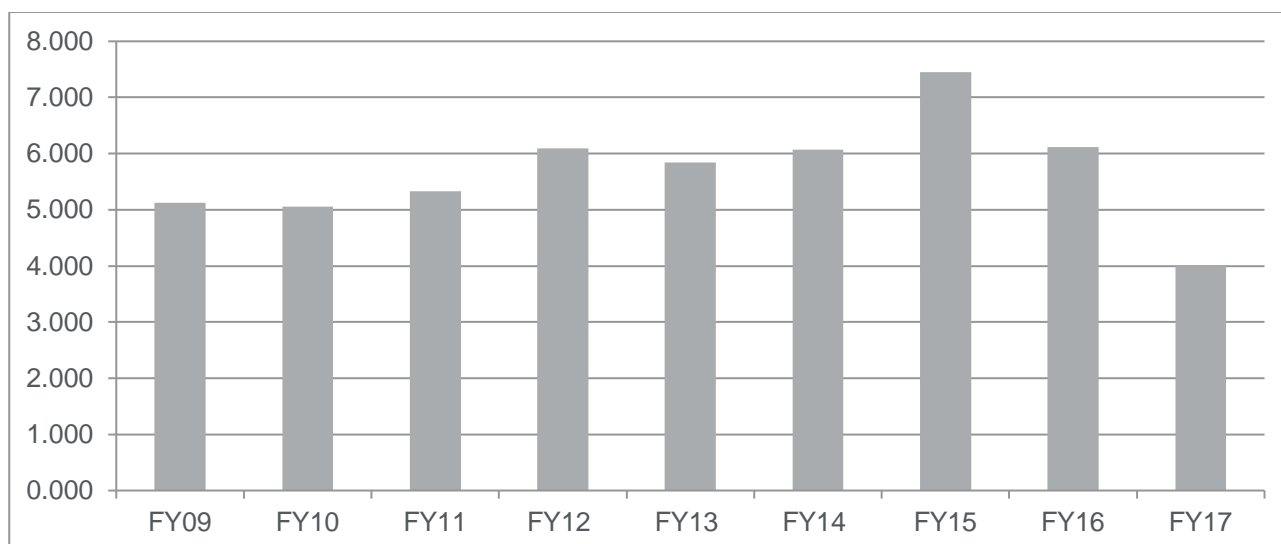


Figure 6: ROM production – BSO

The average yield for the Bulli Seam operations for the reporting period was 85%. The production and waste summary for the reporting period is provided in Table 7.

**Table 7: Production Summary**

	Approval Limit	Previous Reporting Period	This Reporting Period
Waste rock/Overburden	N/A	N/A	N/A
ROM Coal/Ore	10.5MT	6.1MT	3.995MT
Coarse Reject (Coal Wash Tonnes) <sup>3</sup>	N/A	1.6MT	.595MT
Saleable Product	9.3MT <sup>4</sup>	4.9MT	3.436MT

## 4.5. 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

<sup>3</sup> Total processing waste produced at West Cliff CPP (includes Appin Coal Wash) for Annual Review period only – does not include coal wash produced at Dendrobium CPP

<sup>4</sup> Transport Limit

Mine 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 (Central) site, along Appin and Wedderburn Roads.
- Bulk coal winder at Westcliff (Appin North) transported underground from Appin Area 7 and 9.

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.

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>

#### 4.6. ORE AND PRODUCT STOCKPILES

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

The Appin East (Central) 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 (Appin North) or Dendrobium CPP's.

West Cliff (Appin North) operates six primary coal stockpiles for both clean coal and raw coal. The stockpile capacities at West Cliff (Appin North) are outlined in Table 8.

**Table 8: West Cliff (Appin North) 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 (Appin North) 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 (Appin North) 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.



## 5. ACTIONS REQUIRED FROM PREVIOUS ANNUAL REVIEW

**Table 9: Actions from Previous Annual Review**

Action Required	Where covered in this Annual Review
<p>1. Areas mined in the reporting period and areas proposed to be mine in the next reporting period need to be shown. These were not clearly identified in the 2015/16 AEMR, although they were identified in the 2014/15 AEMR.</p>	<p>2014/2015 AEMR Extraction Plan replicated. See Plan 15: Mine Extraction Plan</p>
<p>2. More comprehensive rehabilitation plans covering all sites should be developed. At present only the West Cliff emplacement area (Plan 11) clearly shows the rehabilitation status. All other sites rely on interpretation of aerial photographs, with no legend showing rehabilitation status</p>	<p>Noted. The only major rehab works during FY17 took place at West Cliff emplacement. Minor rehab works (grass seeding) of decommissioned gas well sites is included in Plan 12.</p>
<p>3. Plans need to clearly show the location of rehabilitation progress and new disturbances during the reporting period. Section 8.3, Table 37, of the 2015/16 AEMR identifies 54 ha of new disturbance and 6 ha of additional land under rehabilitation but it is not obvious on Plans which areas these relate to nor any explanation in the text.</p>	<p>Noted. New disturbance due to the construction of the Gas Pipeline at Appin included in Plan 13.</p>
<p>4. Plans need to clearly show rehabilitation works undertaken in the reporting period, Plan 11 for West Cliff emplacement does not identify rehabilitation works undertaken in the 2015/16 reporting period. The 2014/15 AEMR had additional detail about what rehabilitation was completed in the reporting period and what was planned in the next year.</p>	<p>Refer to Plan 11 and 12 which indicate rehabilitation works completed and planned for FY18.</p>

## 6. ENVIRONMENTAL PERFORMANCE

### 6.1. 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 10: BSO Air Quality Monitoring Sites and their Function**

Location	Equipment and Monitoring Point ID	Function
Appin East (Central)	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 (Central) 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 (Central) pit top property boundary Amenity goal reference Operational Control - Stockpile and public road dust control measures performance reference
	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 (Central) 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 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 (Central) 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)	Particulate dust deposition rate at Appin West pit top

**Table 10: BSO Air Quality Monitoring Sites and their Function**

Location	Equipment and Monitoring Point ID	Function
	(Appin West pit top – adjacent mine access road, employee car park and EDL power plant)	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
Appin West	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
	Dust Deposition Gauge No.1 Gauge ID: (W-DD1) (West Cliff (Appin North) 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 (Appin North) pit-top south site)	Operational Control – Site dust control performance reference for the West Cliff (Appin North) pit-top south site
West Cliff (Appin North)	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 (Appin North) 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)	Fixed monitor for real-time monitoring of dust emissions at the Wedderburn Road and Appin Road intersection Real-time Operational Control – Roadway dust emissions

**Table 10: BSO Air Quality Monitoring Sites and their Function**

Location	Equipment and Monitoring Point ID	Function
(West Cliff (Appin North) southern property boundary at the Wedderburn and Appin Road intersection)		
Real-time Photometer (portable)	Photometer ID: (W-PS1)	Monitor real-time dust emissions at the Brennans Creek Dam locality.
(Brennans Creek Dam locality to the north of the West Cliff (Appin North) Emplacement Area)		Quarterly survey dust monitoring point Operational Control and baseline reference point
Real-time Photometer (portable)	Photometer ID: (W-PS2)	Monitor real-time dust emissions at the zone between the active emplacement area and Appin Road
(Dust emissions survey locality at the western boundary between the emplacement operations and Appin Road)		Quarterly survey dust monitoring point Operational Control
Real-time Photometer (portable)	Photometer ID: (W-PS3)	Monitor real-time dust emissions along Wedderburn Road
(Dust emissions survey locality along Wedderburn Road between the coal stockpiles and the Dharawal National Park)		
Real-time Photometer (portable)	Photometer ID: (W-PS4)	Quarterly survey dust monitoring point
(Cataract Scout Camp Reserve to the South West of the West Cliff (Appin North) Site)		Operational Control

Three weather stations and temperature inversion monitoring equipment were installed during FY14. The weather stations are located at Appin East (Central) (with mains power), West Cliff (Appin North) (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: 2016/17 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 (Central) and West Cliff (Appin North) sites non-operational gauges were below the long term criteria/amenity goal of 4 g/m<sup>2</sup>/month for deposited dust during the reporting period (Figure 7). This is evident at all sites located near the perimeter of the Appin and West Cliff (Appin North) sites (i.e. AE-DDG14, 15, 16 and 17; and AW-DD1 and 2; and WC-DD1, 3 and 8).

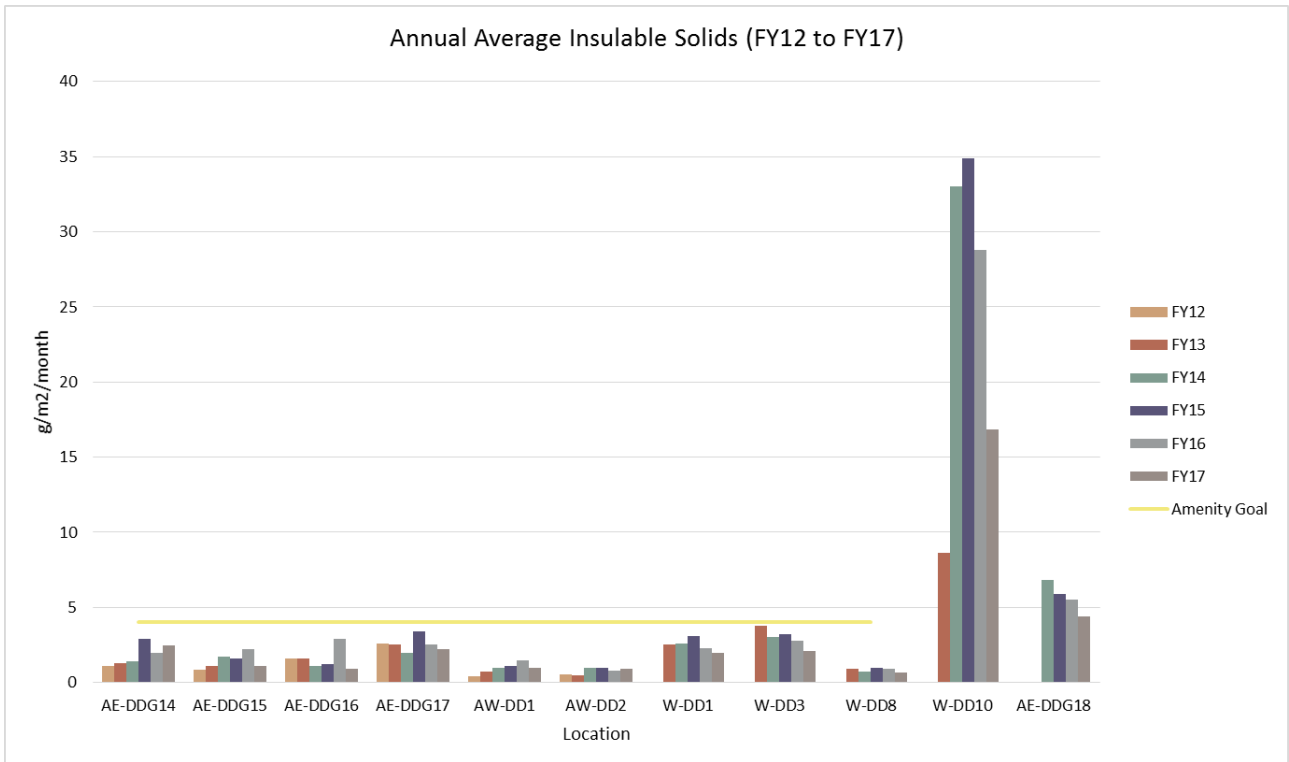


Figure 7: Comparison annual averages from FY12 to FY17 for insoluble solids across the BSO.

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 (Central) (AE-PF3) indicates average 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) to assess compliance. The apparent maximum average PM10 dust levels were measured above the 80% criteria once during 2017. This was attributed to regional bush fires and hazard reduction burning.

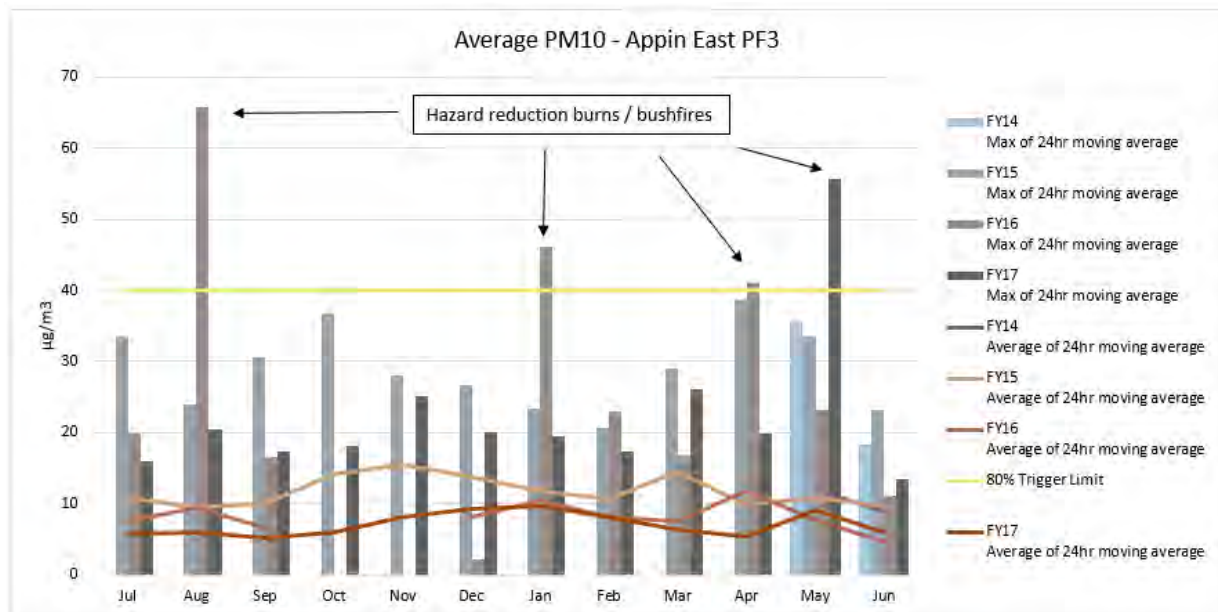


Figure 8: PM10 average 24 hour levels and maximum 24 hour levels at Appin East (Central).

## **6.2. EROSION AND SEDIMENT**

### **Environmental Management**

Most activities at the Appin East (Central), West and West Cliff pit top 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 (Appin North) 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 200 ML. 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 (Central) and West and West Cliff (Appin North) sites are operating within the licence limits for TSS.

## **6.3. SURFACE WATER**

### **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 OEHL via the EPA Annual Return (Appendix B – 2015/16 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***

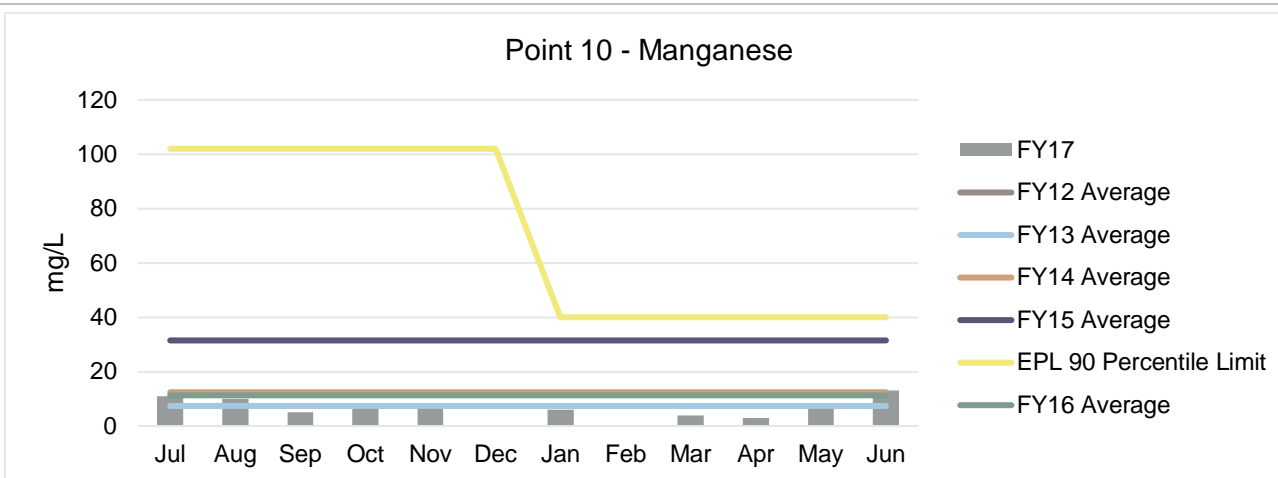
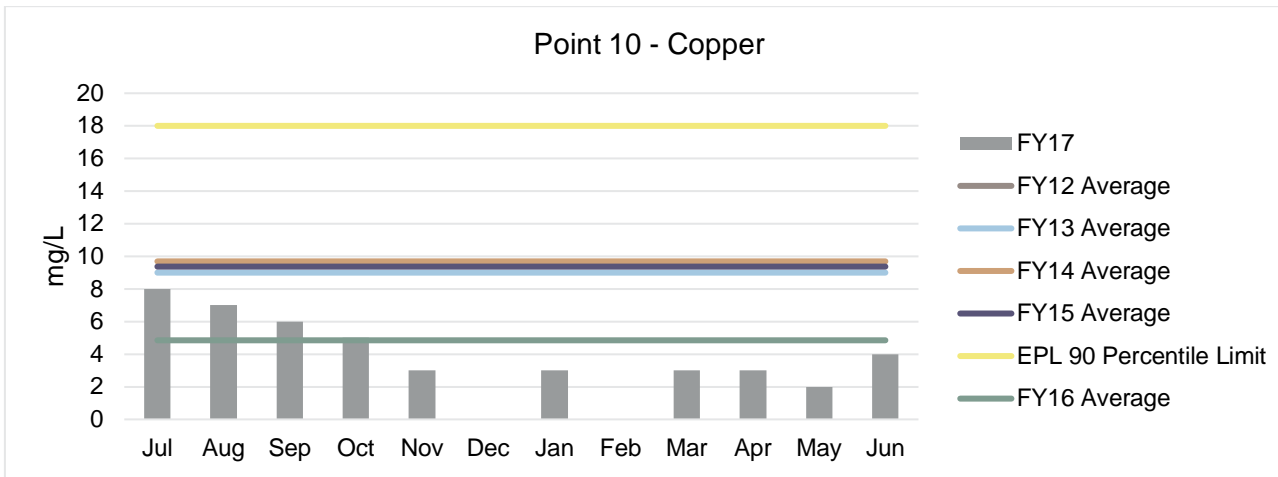
All but three of the eleven monitoring sites across the BSO achieved compliance with the EPL2504 limits during the reporting period (refer to Table 11). Non-compliances at each of the sites are discussed below.



**Table 11: Summary of Compliance with EPL Water Quality Limits Across BSO**

Monitoring Site	EPL Compliant (Y/N)	Comments	Data
Point 4	Yes		<a href="http://www.south32.net/our-operations/australia/illawarra-coal/regulatory-document">http://www.south32.net/our-operations/australia/illawarra-coal/regulatory-document</a>

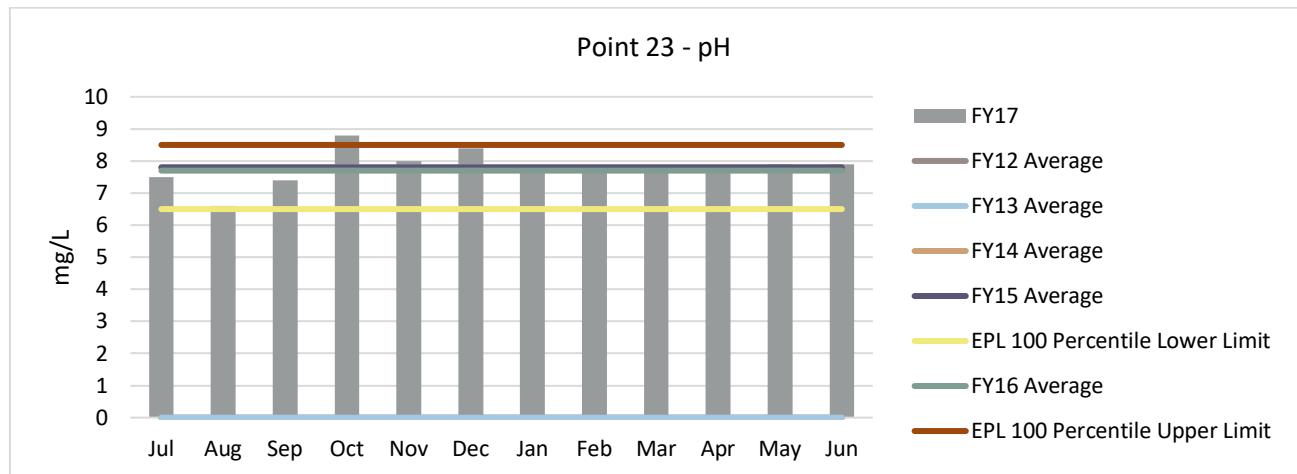
Point 10	No	Point 10 samples were collected for December and February FY17, however administration errors at the consultant laboratory meant that Copper and Manganese levels were not tested. Levels over the rest of the year were significantly below compliance limits.
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Point 11	Yes	---	<a href="http://www.south32.net/our-operations/australia/illawarra-coal/regulatory-document">http://www.south32.net/our-operations/australia/illawarra-coal/regulatory-document</a>
Point 12	Yes	---	As above
Point 18	Yes	---	As above
Point 19	Yes	---	As above
Point 20	Yes	---	As above
Point 22	Yes	---	As above

Point 23 No

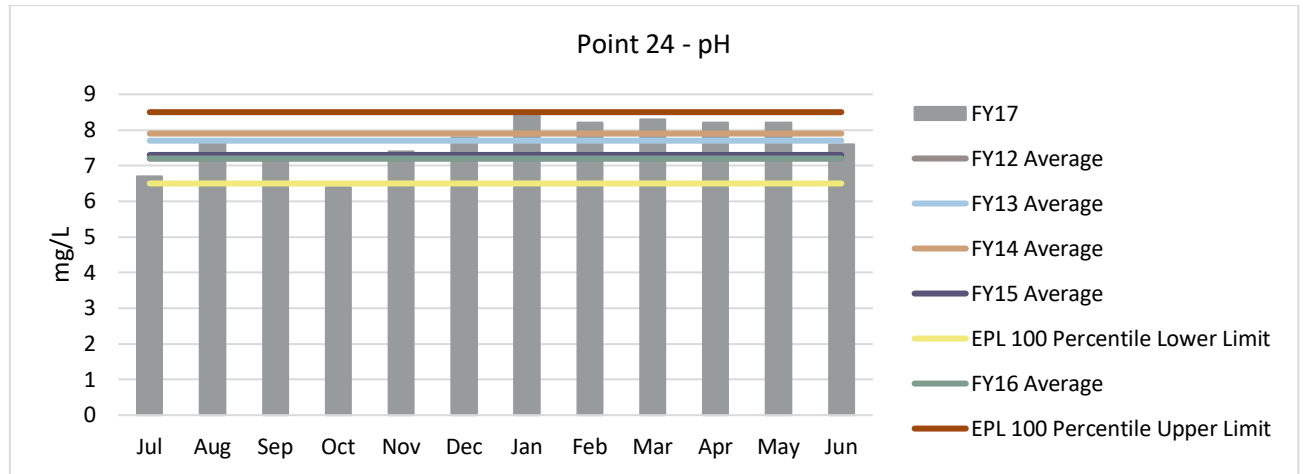
pH sample result over the EPL100 percentile limit in October. Cause unable to be determined. Results for next sample and all others for FY17 below EPL limit.



Point 24

No

pH sample result under the 100 percentile concentration limit for October. Low pH attributed to operational issue with the water treatment plant. Results the following month were within compliance limits.



Point 36

Yes

-

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

## Water Discharge

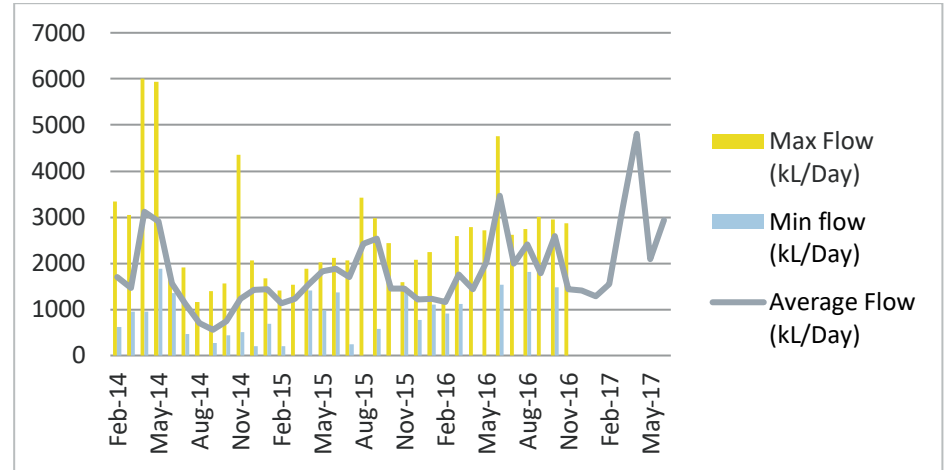
There have been no instances where discharge volume exceeded the EPL limits for discharge (see Table 12). Note: Manual readings taken from December 2016 onwards due to closure of the 2G automated logger network. Installation of 3G capable water meter loggers is estimated to be complete September 2017.

**Table 12: Summary of Compliance with EPL Discharge Volume Limits Across BSO**

Monitoring Site	EPL Compliant (Y/N)	Comments	Data
Point 4	Yes	--	
Point 10	Yes	--	

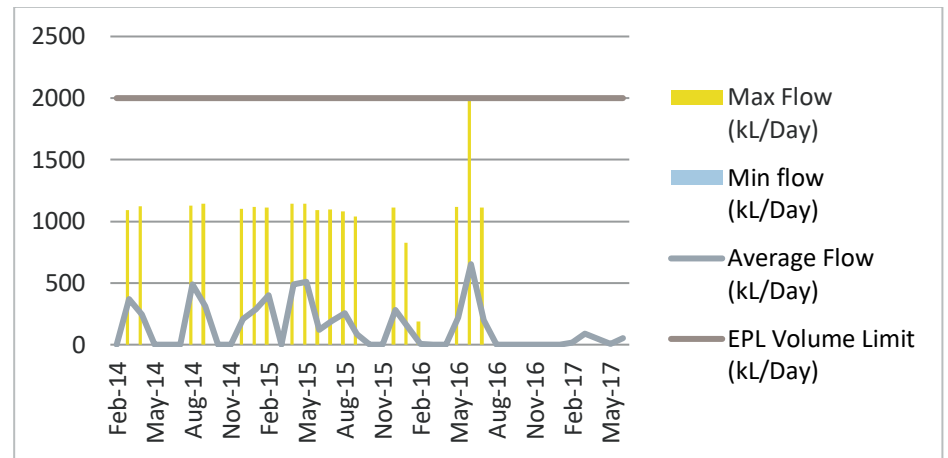
**Table 12: Summary of Compliance with EPL Discharge Volume Limits Across BSO**

Point 13                      Yes                      --



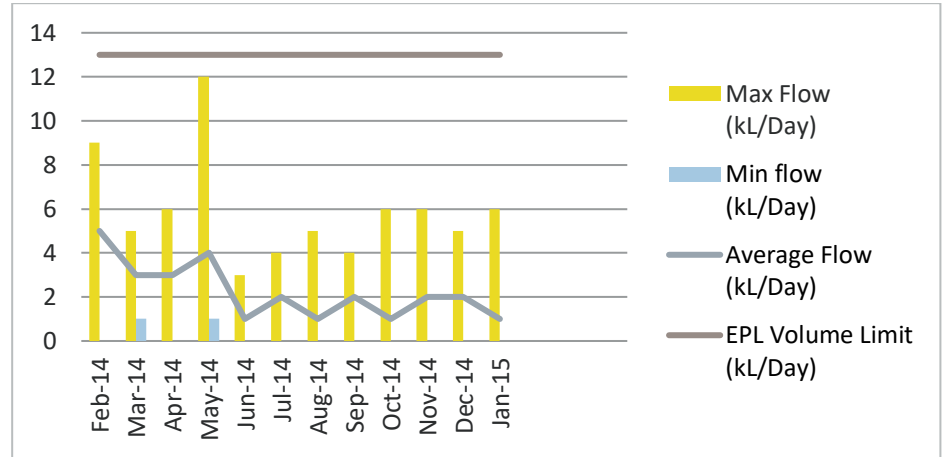
Point 18                      Yes                      ---                      No flow during the period

Point 19                      Yes                      --

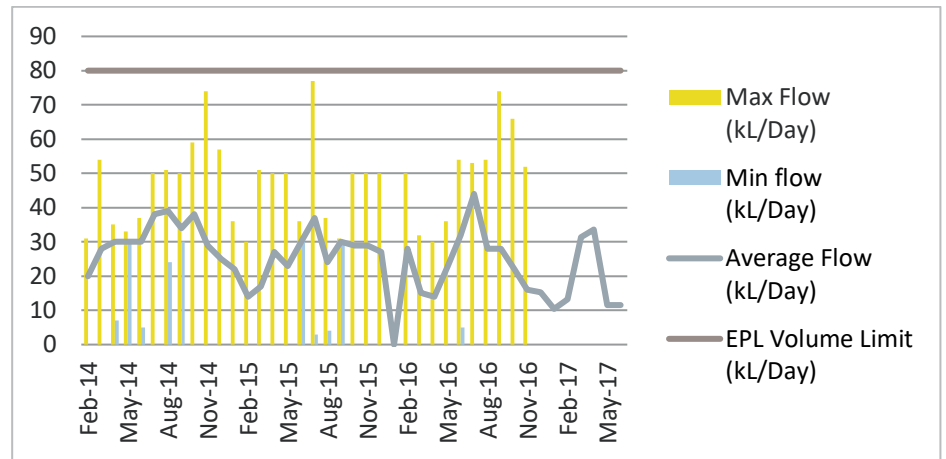


**Table 12: Summary of Compliance with EPL Discharge Volume Limits Across BSO**

Point 20                      Yes                      --

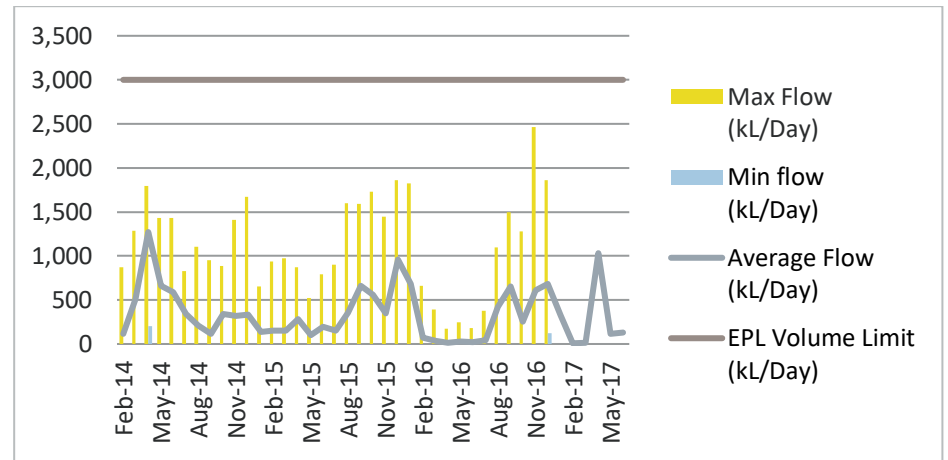


Point 22                      Yes                      --



**Table 12: Summary of Compliance with EPL Discharge Volume Limits Across BSO**

Point 24                      Yes                      ---



### ***Pollution Reduction Programs***

There are currently no PRP's underway at the BSO. PRP19 and PRP20 have been incorporated into the Georges River Environmental Improvement Program (EIP2).

### ***EIP2 – Georges River Environmental Improvement Program***

The EIP for the Georges River incorporates:

- Improvement projects as per the previous PRP19 requirements; and
- Monitoring to verify improvements to aquatic health as the above projects are commissioned. Monitoring includes (based on previous PRP20 requirements):
  - Quantitative sampling of macroinvertebrates
  - Ecological assessment processes using DNA extracted from sediment;
  - Ecotoxicity testing
  - In-stream water quality; and
  - Laboratory water testing

The EIP aims to improve the aquatic health of the Upper Georges River by reducing the concentration of pollutants discharging from Point 10; and monitor the changes to biota in-stream and within the sediment of the Upper Georges River as water quality improvement projects are commissioned.

The aims will be verified by:

- Comparing the Brennans Ck/Georges River sites with reference sites (upstream of the Brennans Creek Confluence)
- Estimating 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

The program will eventually be used to define water quality limits for Point 10 as well as flow requirements.

South32 IC holds regular meetings with community stakeholders to review progress of PRP19 projects and monitoring results from PRP20 (Table 13).

The Progress Meetings include representatives from the EPA; Georges River Combined Councils Committee (GRCCC); Wollondilly and Campbelltown local councils; The Georges River Environmental Alliance (GREA); National Parks Association of NSW (NPA NSW); Bulli Seam Operations Community Consultative Committee (BSO CCC) and Western Sydney University (WSU).

In 2015, a Technical Working Group (TWG) was established (as a subset to the above) to develop water quality and river health objectives for the Upper Georges River. The TWG includes nominated (by the community stakeholders) representatives from the above stakeholders including the GRCCC, WSU, South32 IC and the EPA.

The following community stakeholder meetings have been held since 2014:



Table 13: Summary of the Georges River Community Stakeholder Meetings held since 2014.

Date	Type	Purpose of Meeting	Outcome
Spring 2014	Progress Meeting	Review of PRP20 results (Yr1) and discuss water strategy for PRP19.	Water strategy for PRP19 endorsed by the attendees.
Spring 2015	Progress Meeting	Review of PRP20 results (Yr2) and PRP19 update.	Consensus to establish a Technical Working Group to improve monitoring program under PRP20, develop water quality limits and flow requirements for Point 10. Representatives from GRCCC and Western Sydney University nominated to attend.
Autumn 2016	Technical Working Group	1 <sup>st</sup> Technical Working Group meeting to share monitoring results and establish water quality limits and flow principals for Point 10.	Monitoring results consistent between all parties. Agreed on river health objectives.
Winter 2016	Progress Meeting followed by 2 <sup>nd</sup> Technical Working Group meeting	Site visit to Appin West Water Filtration Plant and discuss water quality and flow principals for Point 10.	In principal support for flow and water quality and endorsed changes to PRP20 monitoring program (increased monitoring frequency etc.).
Winter 2016	Technical Working Group	Further development of flow and water quality principals.	Consensus to replace PRP19/20 with Environmental Improvement Program (this document). South32 IC to submit licence amendment application to include EIP, extend deadline for water quality limits under PRP19 and extend interim limits for Point 10 (with some concentration reductions). The stakeholders will be consulted on the proposed changes.
Spring 2016	Progress Meeting	Seek endorsement for submission of the EIP.	Endorsement from attendees to submit EIP. The attendees requested that the following be noted: They recognised the value of the in-depth consultative process and the goodwill it generates; The group appreciated the effort made by South32 to improve the water quality of the Georges River; The group understood that the current targets need to be realistic

Date	Type	Purpose of Meeting	Outcome
			and look forward to further planned improvements to pH and salinity.

The major water quality improvement projects under EIP2 are summarised below:

1. Water Filtration Plant Upgrade – Appin West

The aim is to increase processing capacity of mine water and cease mine-water pump-out at West Cliff. This project along with the pre-treatment upgrade and bulk storage upgrades will increase the total treatment capacity and output capacity of the plant.

2. West Cliff Washery Closed Loop Water Management System

The aim is to reduce diversion of washery waters into BCD.

3. Coagulant/Flocculant Review

Aim is to Reduce aluminium concentration within treatment ponds, Brennans Creek dam (BCD) and discharge into the Georges River.

4. Evaporator/Water Fogger

Aim is to reduce the amount of process or mine waters entering BCD through evaporation.

Illawarra Coal will discuss results with the stakeholder groups on a regular basis and formally present progress reports in accordance with the following table:

Table 14: Summary of reporting and consultation commitments for the Georges River EIP.

Report Type or Consultation	Frequency	Report Due
Progress report to EPA on implementation of water improvement projects	6 monthly	30 Dec 2016; 30 June 2017; 30 Dec 2017.
Stakeholder progress meeting with EPA, GRCCC, CCC, Wollondilly and Campbelltown Councils, WSU, Other interest groups	6 monthly	Oct 2016, Winter and Summer 2017, Winter and Summer 2018; Winter and Summer 2019, Winter 2020 (final meeting).
Detailed scientific report on macroinvertebrate and CSIRO monitoring to EPA and loaded onto South32IC Website.	Biennial	31 March 2018; 31 March 2020.
Illawarra Coal Community Consultative Committee	Regular updates at meetings which are held every two months	N/A
Technical Working Group – Nominated representatives from Stakeholders	If monitoring TARP (Table 2) is triggered or to address issues from the Stakeholder Progress Meetings.	As required.

## 6.4. GROUNDWATER

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

At West Cliff (Appin North), 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.

## **6.5. CONTAMINATED POLLUTED LAND**

### **Environmental Management**

#### ***Appin***

During the 2010/11 reporting period, Illawarra Coal investigated a small area of the Appin East (Central) 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 9).

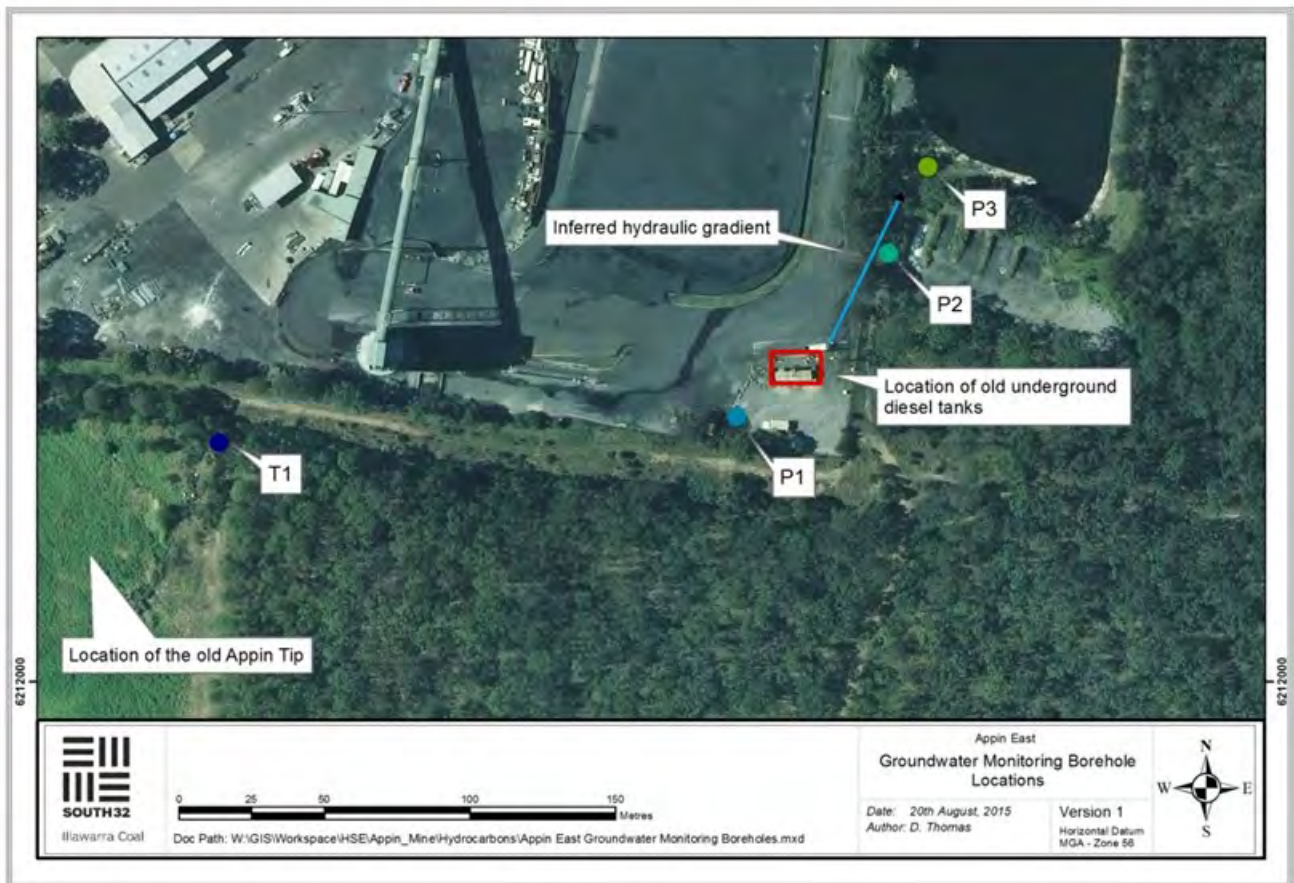


Figure 9: Groundwater Monitoring Bores locations at Appin East (Central).

**West Cliff (Appin North)**

During the 2009/10 reporting period, both West Cliff (Appin North) Colliery and West Cliff (Appin North) 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 11<sup>th</sup> 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 uncontaminated with respect to BTEX and TPH.

During the reporting period Boreholes P2 and P3 indicated elevated levels of TPH (Figure 10). Samples taken in February 2017 revealed higher levels than previously seen at any of the boreholes. These results were attributed to contamination of the samples as the most recent samples taken in May indicated TPH levels below or close to lowest observable limit (LOR- 50 µg/L). The most recent sample taken at T1 showed TPH levels below LOR indicating that there was no potential contamination from the old Appin Tip.

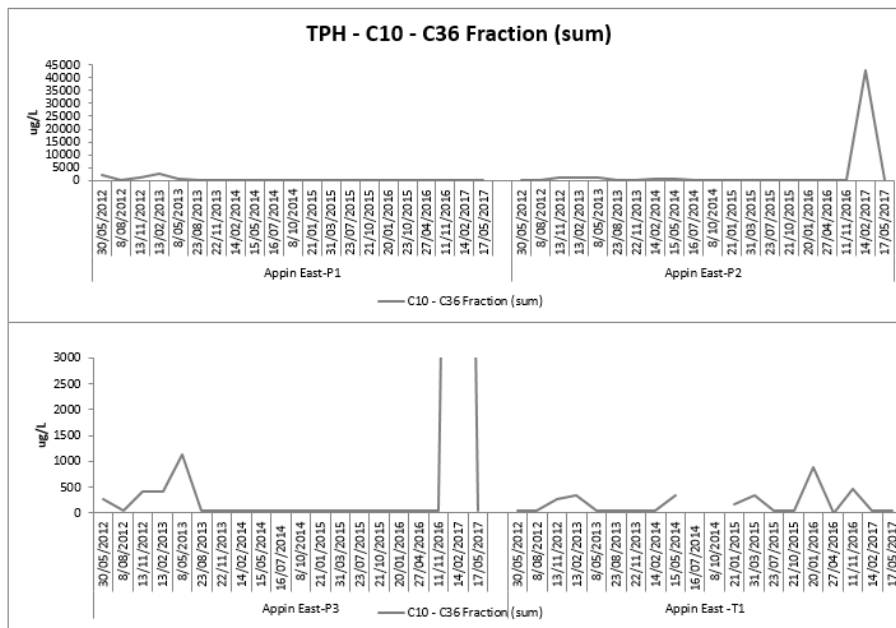


Figure 10: Total Petroleum Hydrocarbons (C10 – C36 Fraction (Sum)) since monitoring began in 2012 at Appin East (Central).

### West Cliff (Appin North)

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

Since the first sampling campaign, TPH concentrations had generally trended downwards in BH8. TPH concentrations had ranged between 2050 µg/L in Feb 2012 down to 260 µg/L in August 2012 (Figure 11). 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 TPH was below the observable limit.

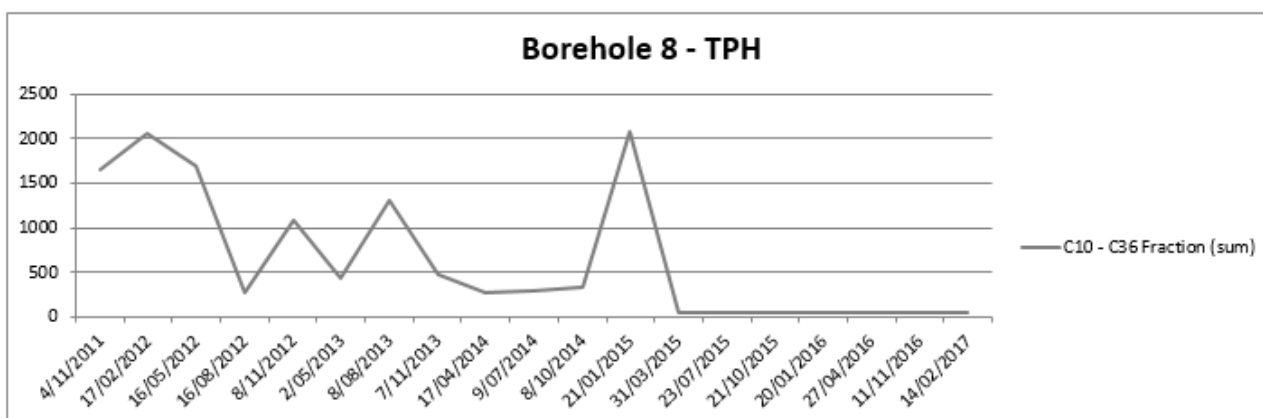


Figure 11: Total Petroleum Hydrocarbons (C10 – C36 Fraction (Sum) µg/L) since monitoring began in 2012 in BH8 at West Cliff (Appin North).

## 6.6. WASTE

### 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 Table 15 below.

**Table 15: 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 (Appin North) – Treatment and irrigation on site. Appin West – Treatment and irrigation onsite Appin East (Central) – Disposed via town sewerage system
Industrial filters	Off-site treatment and disposal
Bathroom water	West Cliff (Appin North) - Spray irrigated to land on site Appin West - Spray irrigated to land on site Appin East (Central) – 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 (Central) and West Cliff (Appin North) sites) for the reporting period are provided in Table 16.

**Table 16: Waste Volumes – BSO**

	General Waste	Industrial Waste (Filters)	Timber	Metal	Cardboard	Commingle
Quantity (Tonnes) FY15	1146	381	234	1349	30	17
Quantity (Tonnes) FY16	1323	380	225	1344	20	17
Quantity (Tonnes) FY17	1080	268	147	935	21	14

Approximately 21% less waste was disposed as landfill for the reporting period when compared to the previous financial year.

### Coal Wash

Coal wash is a by-product of processing ROM coal. During the reporting period, a total of 967,400 tonnes of coal wash (includes Dendrobium, Appin and West Cliff (Appin North)) was emplaced at the West Cliff (Appin North) Emplacement Area. Illawarra Coal received approval to expand the West Cliff (Appin North) Emplacement Area (i.e. Stage 3) from the DoP on the 20 December 2007. The Stage 3 Emplacement Area provides an additional 33.5 million tonnes of coal wash emplacement (refer to table below) with an expected emplacement life of 10 to 15 years (based on projected coal wash volumes).

Illawarra Coal received approval for Stage 4 of the West Cliff (Appin North) 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 17 outlines the capacity and status of each of the West Cliff (Appin North) coal wash emplacement areas.

**Table 17: West Cliff (Appin North) Emplacement Area – Capacity and Status.**

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

### Coal Wash Research

During FY17, Illawarra Coal diverted approx. 860,000T of coal wash for beneficial uses in the local region (i.e. as an engineered fill, and for the development of arterial and agricultural roads), with over 3Mt diverted since 2009. Illawarra Coal currently has a long-term contract in place with Lend Lease to provide large volumes of engineered fill for a new housing estate at Calderwood. Illawarra Coal is also looking to provide Coal Wash as an engineered fill for a major RMS road infrastructure project, starting in 2018.

Illawarra Coal is continuing with its Coal Wash Road Base project, 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, and local councils have undertaken trials of this product in their respective areas. Following on from the success of these trials, Illawarra Coal has aligned itself with three universities (University of Wollongong, University of Sydney and University of Newcastle) and 4 other industry partners (RMS, Douglas Partners, Infratech and Stabilco) and has been successful in securing an ARC-Linkage Project grant of \$590k to conduct research into the long term performance of this material in roads and railways. The project kicked off in 2017, and will take 3 years to complete.

Illawarra Coal will continue to research, develop and implement alternative uses for coal wash in order to minimise the volume emplaced at the West Cliff (Appin North) site in future.

### **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:

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

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.

### **Sewage**

During the reporting period, ongoing monitoring and inspections were conducted on the two BSO sewage treatment plants (Appin West and West Cliff (Appin North)). Appin East (Central) is connected to town sewage.

There is a Smith and Loveless Sewage Treatment Plant (STP) on the Appin West and West Cliff (Appin North) sites that discharge into maturation ponds. The treated effluent is irrigated on site via LDP 22 (Appin West) and LDP 4 (West Cliff (Appin North)). A waste water maintenance contractor is periodically used to assist with the operational aspects of the Appin and West Cliff (Appin North) Sewerage treatment systems to minimise the likelihood of any issues occurring.

During FY17 an additional 5.6 ha of land adjacent to the existing treated effluent irrigation area at Appin West was used for effluent irrigation. The rented land is owned by the Catholic Church and is known as St Mary's Tower. An Environmental Assessment of the land was prepared by Illawarra Coal prior to commencement of effluent irrigation. Land monitoring and soil testing will be ongoing for the duration of irrigation on the area to ensure any potential damage is identified and mitigated.

Monitoring of the STP effluent at both sites is undertaken on a monthly basis in accordance with conditions contained with EPL 2504. Results of the monitoring are reported on an 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.

### **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 3.78 ML, an increase of 0.18 ML when compared to the previous reporting period.

### **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 volume of sludge reused as a soil conditioner offsite at the Emplacement Operations during the reporting period was approximately 407.55 KL.

## **6.7. 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 (Appin North) Coal Wash Emplacement Area Management Plan;



- Broad-headed Snake Management Plan;
- Southern Brown Bandicoot Management Plan;
- *Persoonia hirsuta* Offset Management Plan;
- Strategic Biodiversity Offset 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>

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 (Appin North) 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 (Appin North).

*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* have been identified within the rehabilitating emplacement area (See Appendix A: Annual Rehabilitation Report).

Flora and Fauna aspects associated with mine subsidence are detailed in section 6.15.

## **Environmental Performance**

### ***Broad-headed Snake and Southern Brown Bandicoot***

There have been no instances that required the implementation of mitigation measures for Broad-headed Snakes (as outlined in the approved management plan).

There were no instances that required implementation of mitigation measures for the Southern Brown Bandicoot.

### **SBB and BHS Monitoring Program – NSW OEH**

In accordance with Condition 7(b) of the EPBC Approval 2010/5350, South32IC has provided funding of \$250,000 towards the NSW OEH Broad-headed Snake and Southern Brown Bandicoot Program.

A summary of the results from the program is as follows (information provided by OEH):

The southern brown bandicoot and broad-headed snake offset project aimed to improve our understanding of the distribution and threats operating on these two species across the Woronora Plateau over a three year. Systematic survey. For the broad-headed snake, this was undertaken across 259 sites and 97 individuals were located over 59 sites scattered across the study area. Threats to individuals and their habitat identified include coal mining activity and infrastructure, predation from introduced predators (foxes, feral cats); poaching/reptile

searching, rock displacement & disturbance from recreation activities, disturbance from feral herbivores (deer, goats), fire and road kill. On-ground works undertaken as part of this project attempted to address habitat disturbance and collection within Dharawal National Park where access to the public is not prohibited, by the installation of a new locking system across the reserve, targeted reinforcement of entry points via placement of concrete blocks and habitat deterrent signage. Although opportunities for habitat restoration was limited one large restoration site was established within the Metropolitan catchment lands where a large cache of bushrock was detected. This bushrock was redeployed across nearby rock platforms to recreate winter refugia habitat. Monitoring of this site is ongoing with early colonisation of habitat by common BHS prey species. Management and monitoring of this species across the study area has substantially informed future management and monitoring across this area and is currently funded under the OEH Saving our Species program.

To investigate the distribution of the southern brown bandicoot across the study area 591 representative sites were sampled via remote cameras over the life of the project. These investigations sampled all broad vegetation types and resulted in a sampling effort of 25,115 trapnights and analysis of 770,312 images. This camera work was supplemented by the opportunistic collection of over 350 predator scats during camera deployment. Despite this extensive survey effort no evidence of the southern brown bandicoot was detected. However, a substantial dataset was collected of other vertebrate fauna across the study area whereby 95 different species were detected on camera. This included seven threatened species, namely the koala, heath monitor, eastern bristlebird eastern pygmy possum, long-nosed potoroo, squirrel glider and chestnut quail-thrush. Unfortunately introduced predators particularly the fox and feral cat are also prevalent across the study area with detections at 249 and 79 of the 591 cameras sites respectively. In addition, 299 of the 352 scats collected where fox while a further 16 were cat. Information from both components of this project will be shared with the land owners and is intended inform land management particularly around threatened species and their habitat.

## ***Persoonia hirsuta***

### Overview

Illawarra Coal conducted its fourth round of annual condition monitoring of the *Persoonia hirsuta* population at West Cliff. The monitoring was undertaken in accordance with the approved *P. hirsuta* Offset Management Plan, which complies with EPBC Approval Condition 2. The monitoring was completed over 2 days in December 2016 during the peak flowering period for the species.

### Results

#### *Offset Population*

The total count of live plants within the Offset in 2016 was 11:

- 26 plants have died likely due to age related causes (since the baseline in 2012);
- 16 plants were burned as part of the approved conservation burn trial in April 2016; and
- No new plants were identified in the Offset during 2016.

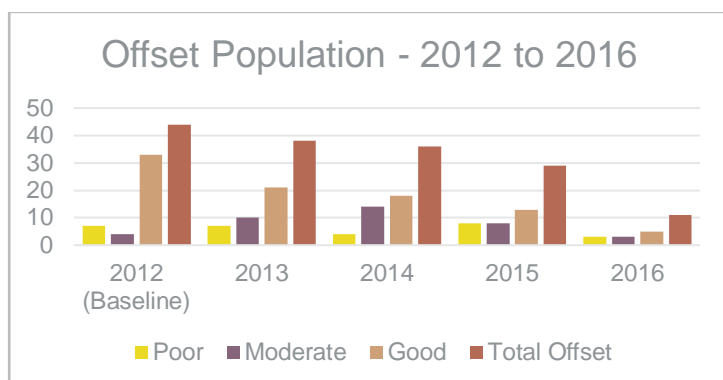


Figure 12: Comparison of *Persoonia hirsuta* condition and population within the Offset across years.

*West Cliff Other Areas*

A further 32 individuals were monitored within the surrounding West Cliff lease:

- 10 of which were recorded in 2012;
- 5 in 2013;
- 13 in 2014 (includes 1 plant identified in the Stage 2 emplacement rehabilitation);
- 4 in 2015; and
- 2 in 2016.

Three of the plants listed above have died:

- One of the plants was unable to be re-located in 2016 and is presumed dead (for reasons unknown);
- Two of the plants have died, potentially due to increased exposure to higher temperatures and sunlight due to nearby approved vegetation management activities (under powerlines).

*Total Site Count*

The total count for *P.hirsuta* plants at West Cliff in spring 2016 was 40, including 24 plants that have been identified post baseline. Excluding these, there has been a decrease of 47 plants when compared to the 2012 baseline population of 63. The 47 includes the 16 plants that were burned as part of the conservation burn trial in April 2016. This was in accordance with Illawarra Coal’s research strategy as stated in the approved *P. hirsuta* Offset Management Plan.

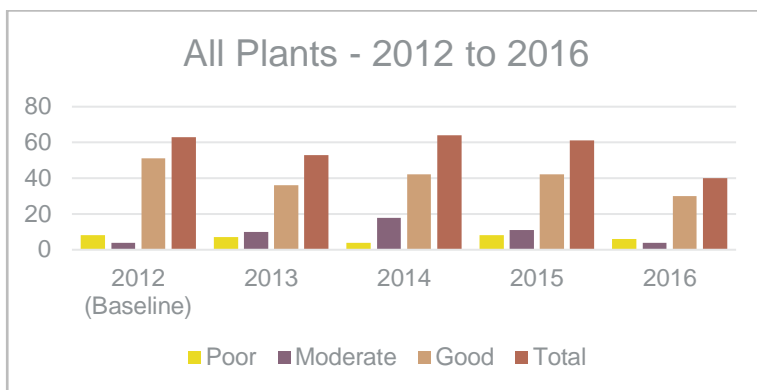


Figure 13: Comparison of condition and population of all plants across years

Discussion

The vegetation in the Offset and surrounding West Cliff site remains in good condition. The conservation burn area is regenerating well. Illawarra Coal is monitoring the site for emergent seedlings.

The overall health of the core population of *P. hirsuta* is declining as the plants are reaching the end of their natural lifecycle.

As per previous years, recruitment is limited to previously disturbed areas and the majority of adult plants (in good condition) are situated either below a powerline easement or adjacent to a fire trail.

### Ongoing Research and Conservation Management

In accordance with EPBC 2010/5350 Condition 3, Illawarra Coal is undertaking targeted research on *Persoonia hirsuta*. The research consists of a series of honours projects by University of Wollongong and research undertaken by Mt Annan Royal Botanic Gardens.

The following UOW projects have been completed to date:

1. Honours project #1 titled *The Demography and Habitat Characteristics of the Endangered Persoonia hirsuta* (completed 2013)
2. Honours project #2 titled *Conservation genetics of the rare and endangered plant, Persoonia hirsuta (proteaceae)* (completed 2015)
3. Honours Project #3 (Continuation of #2) titled *Can the seed bank act as a reservoir of genetic diversity? A Conservation genetic study of Persoonia hirsuta* (Completed 2016).

UOW will publish the outcomes from this work. We expect the final paper/s to be available late 2017.

In addition, Mt Annan Royal Botanic Gardens (RBG) are undertaking trial propagation using cuttings collected from the West Cliff and other populations. The aim is to develop a population of stock plants at the nursery, which will be used to collect seed for germination trials and translocation. This project is ongoing; progress has been slow due to the overall success rate for this species.

Mt Annan RBG (in collaboration with Illawarra Coal and Centennial Coal) has been granted ACARP funding to conduct research on seed germination biology and alternative ex situ storage of *Persoonia* germplasm for restoration. This project will address two main questions: 1) how to effectively propagate *Persoonia* species (both rare and common) for mine rehabilitation work; and, 2) what are the most appropriate ex situ conservation options to ensure restoration success. The project commenced February 2015 and was partially completed in March 2017. This project was granted further funding in 2016 and will be extended for two years (conclude 2019) to include high interest native plants in mine site restoration programs and propagation, translocation and re-introduction of plants for the establishment of offset populations.

IC requested an extension to the research report deadline to 15 May 2019. The extension was granted on 15<sup>th</sup> May 2017.

### *Persoonia Ecological Burn*

In April 2016, Illawarra Coal engaged the NSW Rural Fire Service to conduct an ecological burn in the West Cliff (Appin North) *Persoonia* Offset. The aim of the burn was to promote germination of *P. hirsuta* and increase the density of the species within the area.

The burn site is being monitored for new seedlings; however, no new seedlings have been found to date.

### **Shale Sandstone Transition Forest Offset**

The EPBC Approval conditions for the Bulli Seam Operations (BSO) require a biodiversity offset of at least 44.9 Ha of Shale Sandstone Transition Forest (SSTF) as well as an Offset Management Plan. In 2012, IC identified a suitable site in Douglas Park NSW, within the Wollondilly Local Government Area (LGA). The land is approximately 86 hectares in size which includes bushland, a transmission line easement, a small paddock, and several access tracks. The Offset area is comprised of two parcels of land, separated from each other by Douglas Park Drive.

In-line with the EPBC conditions at the time (2012), IC provided an Offset Management Plan as well as ecological survey information. The original SSTF Offset Plan was approved by the Department of the Environment (DOTE) in June 2013. In 2014, IC was granted an additional 18 months to secure the Offset for long term conservation purposes.

The northern area is located within Lot 1 DP 1101129. It is bordered to the north by private property, the Cataract River to the east and south, and Douglas Park Drive to the west. The southern area is located within Lot 1 DP216237 and Lot 7 DP1082237. It is bordered by Douglas Park Drive to the east, Clements Creek to the north and west, and private property to the south. The Appin West Colliery Pit-top is located approximately 200 metres to the north on the opposite side of Clements Creek. The land is currently owned by Illawarra Coal (Refer to Plan 3 – Appin West Mine Site and Plan 16 – Biodiversity Offset Locations).

Past land use of the study area involved agricultural practices and probably timber cutting.

The study area is connected to other vegetated areas along the Cataract River to the north and Clements Creek to the south.

In October 2015, IC made an application to NSW Office of Environment & Heritage (OEH) to have the SSTF offset secured via a BioBanking Agreement under Part 7A Division 2 of the *Threatened Species Conservation Act 1995*. The BioBanking Agreement was finalised and executed on 1st February 2017. The Offset is now managed in accordance with the BioBanking Agreement, ID Number 215.

### ***Ventilation Shaft No.6 Offset***

The Appin No. 6 Ventilation Shaft Site project approval requires Illawarra Coal Illawarra Coal to secure, manage and monitor an 8.7 hectare offset of Cumberland Plain Woodland (CPW) such that an improve or maintain outcome would be achieved for threatened biodiversity.

The offset area is known as MZ5 and is located to the north of the Appin No. 6 Ventilation Shaft site on the property known as Mountbatten Stud at Douglas Park NSW (Figure 1). An initial assessment of the proposed offset area was conducted by Niche in December 2010 to assess the suitability of the site to be used as an offset for the unavoidable impacts associated with the development site. Niche determined that the site was indeed CPW and, under management, would improve to benchmark condition over time. The initial inspection of MZ5 also resulted in the discovery of a population of the threatened plant, *Pimelea spicata*, adding significant conservation value to the offset area.

In accepting the offset proposal, the DOPE and DOTEE, provided a number of approval conditions relating to the reservation, management and monitoring of management actions within MZ5. One of the conditions required Illawarra Coal to implement a formal monitoring program for both the management of the native vegetation on the site and the extent and health of the *Pimelea spicata* population.

The results of the monitoring survey in relation to the floristic composition and improvement through the site, indicate that, on average, the bushland on the site is outside of benchmark attribute values for the Cumberland Plain Woodland but is showing trends towards benchmark values. An assessment of the change in size and distribution of the threatened plant population of *Pimelea spicata* (spiked rice-flower) was undertaken as part of the 2016/17 monitoring program. The local population within MZ5 in 2017 is estimated at 9,702 individuals. This is an increase from an estimated population of 6,260 individuals in 2012. This increase in population demonstrates that site management to date has been beneficial to the species.

### ***Dendrobium and BSO Project Strategic Biodiversity Offset***

In 2016, the DOPE approved Illawarra Coals proposal to provide an offset for mining impacts from the Dendrobium Coal Mine and Bulli Seam Operations Project through the conservation of a 598 hectare site at Maddens Plains near Helensburgh. DOPE and the Office of Environment and Heritage (OEH) support South32's intention to secure the Maddens Plains site in perpetuity by transferring this land to the National Park estate.

The offset land at Maddens Plains meets the offset requirements for any impacts on:

- The upland swamps at the Dendrobium Coal Mine; and
- The vegetation communities at the BSO

Refer to Plan 16 for the locations of all biodiversity offsets across the BSO.

## **6.8. WEEDS**

### **Environmental Management and Performance**

#### ***Appin***

Environmental inspections (which include weed identification) are undertaken at the Appin East (Central) 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 (Appin North)***

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 was undertaken by a licenced contractor during the year which included weed spraying and slashing of perennial grasses.

## **6.9. BLASTING**

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

## **6.10. 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>

### ***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 18. The criteria enables 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.

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.

Table 18: Noise Survey Points and Results.

Survey Point ID	Type	Receivers	Assessment Criteria		Locality	Function	Data Summary	Comments																
			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 Toggara St North of Pit Top behind receiver 137	Noise from AE	<table border="1"> <caption>Noise - AE-NS4 Data</caption> <thead> <tr> <th>Time</th> <th>FY15</th> <th>FY16</th> <th>FY17</th> </tr> </thead> <tbody> <tr> <td>Day</td> <td>37</td> <td>35</td> <td>35</td> </tr> <tr> <td>Evening</td> <td>39</td> <td>36</td> <td>38</td> </tr> <tr> <td>Night</td> <td>36</td> <td>38</td> <td>38</td> </tr> </tbody> </table>	Time	FY15	FY16	FY17	Day	37	35	35	Evening	39	36	38	Night	36	38	38	Compliant
Time	FY15	FY16	FY17																					
Day	37	35	35																					
Evening	39	36	38																					
Night	36	38	38																					
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	<table border="1"> <caption>Noise - AE-NS5 Data</caption> <thead> <tr> <th>Time</th> <th>FY15</th> <th>FY16</th> <th>FY17</th> </tr> </thead> <tbody> <tr> <td>Day</td> <td>38</td> <td>36</td> <td>37</td> </tr> <tr> <td>Evening</td> <td>37</td> <td>36</td> <td>36</td> </tr> <tr> <td>Night</td> <td>37</td> <td>35</td> <td>34</td> </tr> </tbody> </table>	Time	FY15	FY16	FY17	Day	38	36	37	Evening	37	36	36	Night	37	35	34	Compliant
Time	FY15	FY16	FY17																					
Day	38	36	37																					
Evening	37	36	36																					
Night	37	35	34																					
AW-NS5	Real-time and attended	All other Appin West receivers	39 (day and evening)	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	<table border="1"> <caption>Noise - AE-NS5 Data</caption> <thead> <tr> <th>Time</th> <th>FY15</th> <th>FY16</th> <th>FY17</th> </tr> </thead> <tbody> <tr> <td>Day</td> <td>38</td> <td>36</td> <td>37</td> </tr> <tr> <td>Evening</td> <td>37</td> <td>36</td> <td>36</td> </tr> <tr> <td>Night</td> <td>37</td> <td>35</td> <td>34</td> </tr> </tbody> </table>	Time	FY15	FY16	FY17	Day	38	36	37	Evening	37	36	36	Night	37	35	34	Compliant
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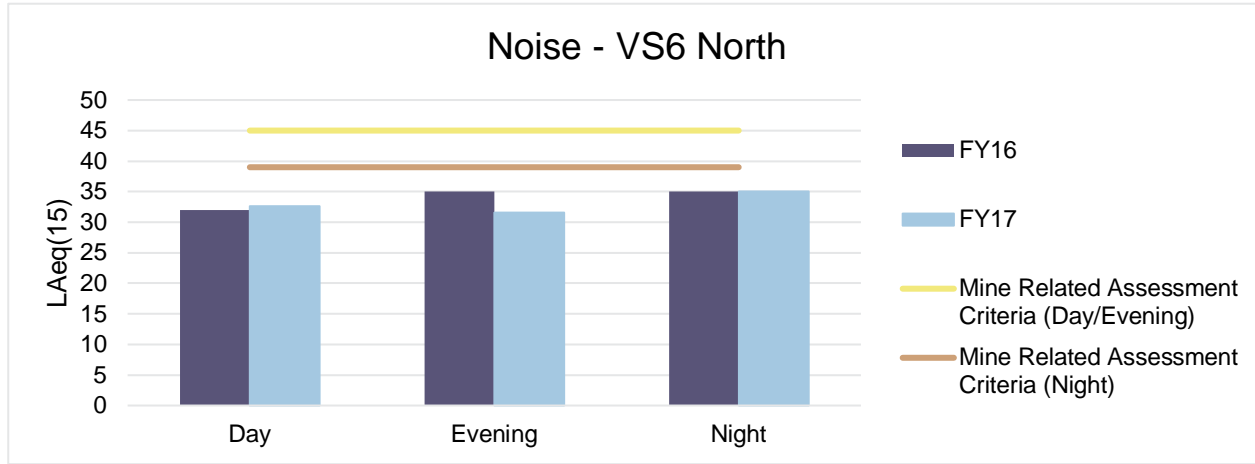


Table 18: Noise Survey Points and Results.

<p>AW-NS4</p> <p>Attended</p>	<p>Appin West receivers South-west of Appin West; and Appin West receivers near Hume Highway</p> <p>39 (day and evening) 49 (night)</p> <p>35 (night)</p>	<p>Ashwood Road, South-west of Appin West Pit Top</p> <p>Noise level for Appin West Receivers South-west of Appin West; and Appin West Receivers near Hume Highway</p>	<p><b>Noise - AW-NS4</b></p> <table border="1"> <thead> <tr> <th>Period</th> <th>FY15</th> <th>FY16</th> <th>FY17</th> <th>Criteria (Day/Evening)</th> <th>Criteria (Night)</th> </tr> </thead> <tbody> <tr> <td>Day</td> <td>35</td> <td>37</td> <td>35</td> <td>40</td> <td>35</td> </tr> <tr> <td>Evening</td> <td>33</td> <td>33</td> <td>35</td> <td>40</td> <td>35</td> </tr> <tr> <td>Night</td> <td>33</td> <td>34</td> <td>32</td> <td>-</td> <td>35</td> </tr> </tbody> </table>	Period	FY15	FY16	FY17	Criteria (Day/Evening)	Criteria (Night)	Day	35	37	35	40	35	Evening	33	33	35	40	35	Night	33	34	32	-	35	<p>Compliant</p>
Period	FY15	FY16	FY17	Criteria (Day/Evening)	Criteria (Night)																							
Day	35	37	35	40	35																							
Evening	33	33	35	40	35																							
Night	33	34	32	-	35																							
<p>AW-NS3</p> <p>Attended</p>	<p>Appin No.3 receivers</p> <p>41 (day, evening and night) 49 (night)</p>	<p>Appin No.3 Shaft site at end of Brookes Pt Road</p> <p>Noise level at Brookes Pt Road and nearest residential receivers to the East of the shaft site</p>	<p><b>Noise - AW-NS3</b></p> <table border="1"> <thead> <tr> <th>Period</th> <th>FY15</th> <th>FY16</th> <th>FY17</th> <th>Criteria</th> </tr> </thead> <tbody> <tr> <td>Day</td> <td>34</td> <td>-</td> <td>31</td> <td>41</td> </tr> <tr> <td>Evening</td> <td>33</td> <td>35</td> <td>34</td> <td>41</td> </tr> <tr> <td>Night</td> <td>33</td> <td>33</td> <td>33</td> <td>-</td> </tr> </tbody> </table>	Period	FY15	FY16	FY17	Criteria	Day	34	-	31	41	Evening	33	35	34	41	Night	33	33	33	-	<p>Compliant</p>				
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Evening	33	35	34	41																								
Night	33	33	33	-																								
<p>W-NS1</p> <p>Attended</p>	<p>N/A – Baseline data for West Cliff (Appin North) only</p> <p>N/A N/A</p>	<p>West Cliff (Appin North) Brennans Creek Dam</p> <p>Noise level between the West Cliff (Appin North) emplacement area and the nearest residential receivers to the North of site</p>	<p><b>Noise - WC-NS1</b></p> <table border="1"> <thead> <tr> <th>Period</th> <th>FY15</th> <th>FY16</th> <th>FY17</th> </tr> </thead> <tbody> <tr> <td>Day</td> <td>38</td> <td>32</td> <td>40</td> </tr> <tr> <td>Evening</td> <td>36</td> <td>35</td> <td>37</td> </tr> <tr> <td>Night</td> <td>37</td> <td>32</td> <td>30</td> </tr> </tbody> </table>	Period	FY15	FY16	FY17	Day	38	32	40	Evening	36	35	37	Night	37	32	30	<p>Compliant</p>								
Period	FY15	FY16	FY17																									
Day	38	32	40																									
Evening	36	35	37																									
Night	37	32	30																									

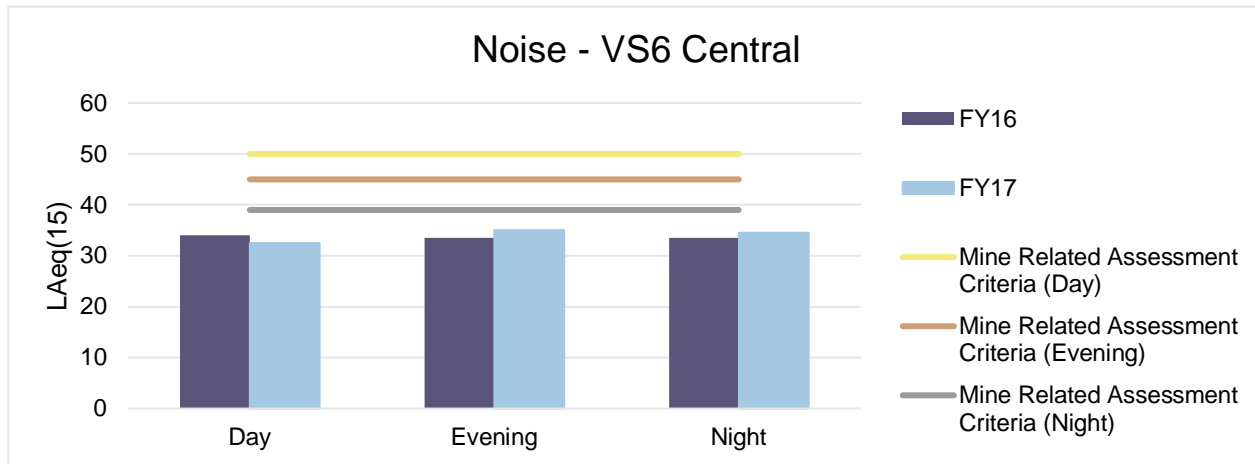
Table 18: Noise Survey Points and Results.

VS6 North Attended Douglas Park Township and Receivers 45 (day and evening) 49 (night) Residential area between Camden Rd and Harris Ck North West of VS6 Noise level between VS6 area and the nearest residential receivers to the North West of site



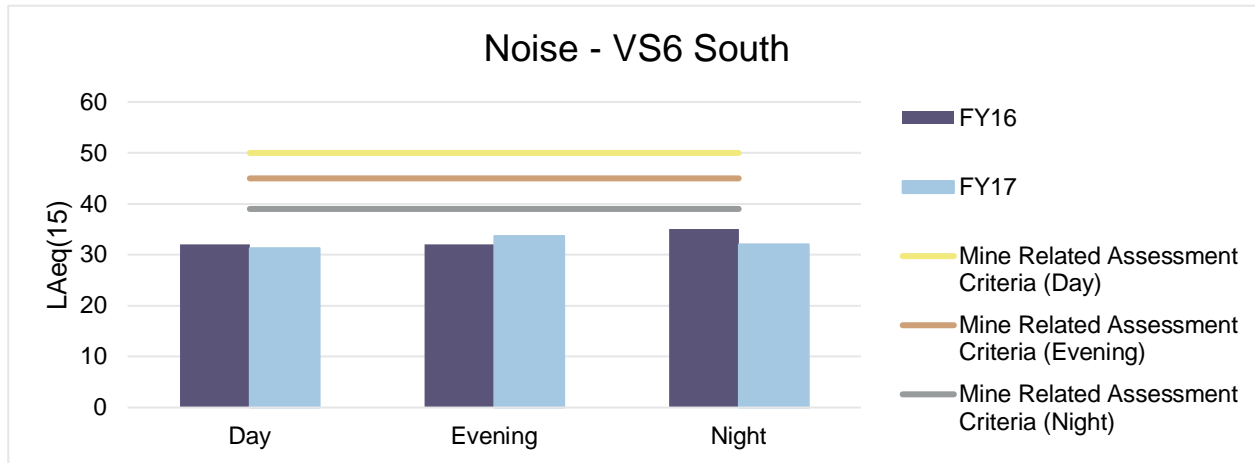
Compliant

VS6 Central Attended Douglas Park Township and Receivers 50 (day) 45 (evening) 49 (night) Duggan street behind Douglas Park Public School Noise level between VS6 area and the nearest residential receivers to the West of site



Compliant

VS6 South Attended Douglas Park Township and Receivers 50 (day) 45 (evening) 49 (night) Adjacent to rail corridor on Station Street, Douglas Park Noise level between VS6 area and the nearest residential receivers to the South West of site



Compliant

## Environmental Performance

Quarterly attended and real-time monitoring was conducted in accordance with the approved management plan for the reporting period. Results of the monitoring are reported online and summarised in Table 18.

The assessed noise levels generated from the Bulli Seam Operations were below the Day, Evening and Night assessment criteria in Table 18.

During the reporting period a noise wall was erected at Appin West Mine Site between the Gas Drainage Plant Flaring Units and the direction of Wilton Township after a noise complaint by a resident. Noise levels were recorded as within compliance before and after the installation of the noise wall barrier.

### 6.11. 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 (Central), 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 (Appin North) 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.

Aesthetics of Mine Safety Gas Drainage activities are 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 is green coloured, or housed in a green coloured compound;
- Green coloured noise barriers are installed at the perimeter of sites within sight of residences; and
- Revegetation of exposed areas as soon as practicable.

To minimise the visual disturbance from the Vent Shaft No.6 site, exposed areas have been revegetated progressively as final landform is achieved. The most significant feature is the earthen noise barrier that is was constructed using coal wash. This site has been revegetated.

### 6.12. ABORIGINAL HERITAGE AND NATURAL HERITAGE

Aboriginal and natural heritage at West Cliff (Appin North) is managed in accordance with the approved West Cliff (Appin North) Coal Wash Emplacement Area Management Plan. This Plan outlines the management/mitigation measures relating specifically to each heritage site located within or in close proximity to the West Cliff (Appin North) Coal Wash Emplacement. A copy of the Plan is available at

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

The location of all heritage sites at West Cliff (Appin North) is outlined in Plan 14.

Aboriginal and natural heritage aspects associated with subsidence from the underground mining activities are detailed in section 6.15 of this report.

### **6.13. 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 (Appin North)) 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 exists, and all mine officials carry CO handheld monitors.

### **6.14. BUSHFIRE**

The risk of bushfire at Appin West, Appin East (Central) and West Cliff (Appin North) 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.

### **6.15. MINE SUBSIDENCE**

#### **Approvals**

#### ***Appin Area 7 Longwalls 705 – 710***

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

Approval was granted by the DRE on 9 July 2016 to vary the SMP Approval for Longwalls 707 to 710 in order to split Longwalls 707 and 708 into Longwall 707 A&B and Longwall 708 A&B. The change was made in order to avoid an intrusive dyke in the Bulli Coal Seam during the longwall mining process.

During the reporting period Appin Mine continued extracting coal from Longwalls 707A and 707B. As of 30 June 2017 Longwall 707B had extracted approximately 1240m, with 815m remaining.

#### ***Appin Area 9 Longwalls 901 - 904***

The Extraction Plan (EP) for Appin Area 9 Longwalls 901 - 904 was approved by the DPE on 10 September 2014. The Longwalls 901 – 904 EP is supported by a number of management plans addressing social, cultural, environmental and infrastructure aspects of the mining area.

Illawarra Coal applied to the DPE to vary the EP Approval for Longwalls 901 - 904 on 24 March 2015 to shorten the commencing end of Longwall 901 by 418m. DRE approved the variation on the 29 April 2015.

Longwall 901 commenced extraction on the 23 January 2016, and as of the 30th June 2017 had extracted 2020m, with 12m remaining.

#### ***West Cliff (Appin North) Area 5 Longwalls 37 – 38***

The West Cliff (Appin North) 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. 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.

Longwall 38 commenced extraction on the 3rd of February 2015 and was completed on the 1st of February 2016. The area has undergone post-mining monitoring in the reporting period as part of the approved monitoring program.

### **Appin Area 7 and 9 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; and
- 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;
- 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 SMP and Longwall 901 to 904 EP. Monitoring was conducted within the zone of influence during baseline, mining and post-mining periods (where applicable).

Five previously reported gas zones on the Nepean River adjacent to the Appin Area 7 mining area were active at some point during the reporting period.

During the most recent inspection by the Illawarra Coal Environmental Field Crew (ICEFT), thirteen of the twenty three gas release zones attributed to LW901 were identified as active. As LW901 extraction moves further away from the river the number of active gas zones, as well as the area and intensity of zones, is decreasing.

For all observed impacts, the appropriate TARP's were applied, actions implemented and key stakeholders notified as required by the approved SMP and EP. Landscape Impacts associated with Longwalls 707A, 707B and 901 are summarised in Table 19.

**Table 19: Predicted vs Observed Impacts for Landscape Features for Appin Area 7 and Appin Area 9.**

Aspect	Predicted Impacts	Observed Impacts	Completed Actions
Nepean River water levels	Unlikely for any significant change in water level along the Nepean River	No impacts observed	n/a
Surface waters in the mining areas	Potential for surface water diversion directly above or adjacent the mining area	No impacts observed	n/a
Gas releases	Likely that gas emissions could occur in the Nepean River	Gas releases identified	<ul style="list-style-type: none"> <li>Continued monitoring program</li> <li>Reported impacts to key stakeholders</li> <li>Summarised impacts and recorded in End of Panel Report and AEMR</li> </ul>
Iron staining	Minor iron flocs are expected to occur in the Nepean River. No change in water quality is predicted	No impacts observed	n/a
Fracturing	Minor fracturing may occur in the bed of the Nepean River	No impacts observed	n/a
Creeks	Possible for localised increase in ponding, flooding or scouring	No impacts observed	n/a
Cliffs	Possible minor isolated rock falls. Unlikely that any large cliff instabilities would occur	No impacts observed	n/a
Steep Slopes	Unlikely that there would be any significant impacts to steep slopes	No impacts observed	n/a

### Surface Water

Inspections carried out by the IC Environmental Field Team include monitoring for iron staining and gas releases in the river and tributaries. No areas of iron staining were identified during the reporting period.

Data for pH, Electrical Conductivity, Dissolved Oxygen, Total Iron and Total Manganese are compared at sites upriver and downriver of mining in order to identify any significant water quality change. TARP limits have been established for water quality adjacent to the mining and downriver at monitoring sites.

No TARP trigger levels for water quality have been identified to date for Longwall 706 or Longwall 901. Table 20 provides a summary of the predicted and observed impacts for surface waters during the reporting period.

**Table 20: Predicted vs Observed Impacts for Surface Water for Appin Area 7 and Appin Area 9.**

Aspect	Predicted Impacts	Observed Impacts	Completed Actions
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 WaterNSW dam releases	n/a
	Potential for surface water flow diversion is very low	No surface water flow diversion has been observed	n/a

	Strata gas emissions into the river likely, with some associated reduction in dissolved oxygen possible	Gas zones observed in the Nepean River and the tributary Allens Creek. No associated reduction in dissolved oxygen has been observed	<ul style="list-style-type: none"> <li>• Continued monitoring program</li> <li>• Reported impacts to key stakeholders</li> <li>• Reported in End of Panel Report and AEMR</li> </ul>
	Low likelihood of ferruginous springs. Significant impacts on Nepean River pH, iron and dissolved oxygen not predicted	No new iron staining or seeps identified	n/a
Harris River	Mine subsidence induced ferruginous springs possible, with potential impacts on water quality	No subsidence induced fracturing or iron staining observed in Harris Creek	n/a

## **Groundwater**

Piezometer and bore monitoring data has been used to determine pre-mining groundwater levels 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 10 m 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 data is collected during the mining period, then analysed and interpreted for reporting in the End of Panel Report as outlined in the relevant Subsidence Management and Extraction Plans. There was no completion of planned longwalls during the reporting period and a consultant groundwater analysis report has not been finalised. A summary of groundwater behaviour during extraction of Longwalls 707 and 901 will be available in the relevant End of Panel report/s. Previous groundwater trends during extraction in Appin Area 7 are summarised as follows.

Bore EAW5 [S1913] is located approximately 1.5 km to the northwest of Longwall 707. During extraction of Longwall 706 water head declined linearly at EAW5 in the Hawkesbury Sandstone. There is a clear difference in the behaviour of groundwater pressures above and below the Bald Hill Claystone, evidence of the contiguous nature of the claystone across the general Appin mining area and indication of the pre-mining separation between shallow and deep aquifer heads.

The EAW5 water levels were essentially unaffected by Longwall 706 extraction, outside of a gradual water level decline in the Bulli Seam, Scarborough Sandstone (505mbgl [meters below ground level]), Bulgo Sandstone (274mbgl) and a rise in the Hawkesbury Sandstone at 65mbgl.

EAW7 (S1936) is located over Longwall 706. A decline of approximately 30m was observed in the Scarborough Sandstone, which was a clear mining effect of Longwall 705. No groundwater level reduction TARP triggers were exceeded during extraction of Longwall 706 and no changes outside of predictions for the monitoring bores occurred.

Loss of standing water level in one borehole approximately 460m from extraction of Longwall 706 was identified with no loss of groundwater recharge. An alternative water supply has been provided to the landholder.

## **Aquatic Ecology**

Within the Appin Areas 7 and 9 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 during field surveys. The area is potentially within the range of two threatened species (Macquarie Perch and Sydney Hawk Dragonfly) listed under the Threatened Species Conservation Act.

Mine subsidence can result in fracturing and a net vertical uplift of the river bed, resulting in reductions in water depth. It was predicted that these effects could impact flow, connectivity and water quality and could also reduce availability of aquatic habitat. The Nepean River within the mining areas is generally a deep,

continuous slow-flowing pool created by the damming effect of Douglas Park and Menangle Weirs. This would minimise the risk the potential impacts on aquatic ecology resulting from reduced water flow and / or depth caused by any fracturing or net uplift of the river bed. Any impacts on water flow would be expected to be minimal due to the flooded nature of the river system.

The latest round of aquatic ecology monitoring was undertaken in November 2016, as part of the ongoing aquatic ecology monitoring program. At this time Longwall 707A had been extracted. The assessment focused on the effects of extraction on aquatic habitats and biota in relevant sections of the Nepean River, comparing results from surveys undertaken since 2002 (CEL, in preparation). No new gas zones were identified on the Nepean directly related to LW 707. However, gas releases at four previously identified gas zones downstream of Douglas Park were observed. Biennial monitoring for Appin Area 9 was not undertaken in November 2016.

The preliminary data analysis did not indicate any change in indicators of aquatic ecology (number of taxa and biotic indices derived from macroinvertebrate sampling) in November 2016 that could be attributed to mining. During this survey AUSRIVAS OE50 Taxa Scores (a biotic index of habitat and water quality) at impact sites (0.70 to 0.87) were equivalent to or greater than those at the control sites (0.70 to 0.81). SIGNAL2 Scores (a biotic index of water quality) and the number of taxa in AUSRIVAS samples were also comparable across all sites. Examination of trends in these data collected since December 2010 did not indicate any evidence of changes that could be indicative of an impact.

Similarly, there was no evidence of any changes to fish and aquatic macrophytes attributable to mining. The fish assemblage sampled in the Nepean River following the commencement of extraction was comparable with that sampled prior to extraction and no fish kills or any other observations that may suggest an impact due to mining have been observed. The species composition and coverage of aquatic macrophytes in November 2016 was also comparable to that in previous surveys, aside from some changes in distributions that appeared associated with recent high flows in the river. These observations were not surprising given no physical mining impacts such as fracturing and pool water loss have been observed.

Table 21 provides a summary of predicted and observed impacts on aquatic ecology for the reporting period.

<b>Table 21 : Predicted vs Observed Impacts for Aquatic Ecology for Appin Area 7.</b>			
<b>Aspect</b>	<b>Predicted Impacts</b>	<b>Observed Impacts</b>	<b>Completed Actions</b>
	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 WaterNSW releases. No exposed wetted substrata observed	n/a
Aquatic Ecology	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	n/a
	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	n/a
	Alterations to the composition of macrophyte beds due to small reductions in water depth. However, this is not	No alterations to the composition of macrophyte beds observed. No mining induced dieback has been observed though some changes in	n/a



expected to have a significant impact on the overall habitat in the survey area	distributions likely associated with recent high flow events and associated scouring of banks.	
Possible that gas emissions may have impacts on water quality	No evidence of significant impacts on water quality due to gas releases	n/a
Potential impacts on fish and macroinvertebrates due to mine subsidence are considered unlikely	No evidence of mining induced impact on either fish or macroinvertebrates	n/a

### **Terrestrial Ecology**

Assessments of significance have been completed for an endangered community and threatened flora and fauna species in the mining area. The assessments 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 22 below. No future terrestrial monitoring is required in Appin Area 7.

**Table 22: Predicted vs Observed Impacts for Terrestrial Ecology for Appin Area 7 and Area 9.**

<b>Aspect</b>	<b>Predicted Impacts</b>	<b>Observed Impacts</b>	<b>Completed Actions</b>
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	n/a
	Minor impacts to vegetation due to rock falls, an increase in ponding, flooding or cracking to drainage lines and creeks	No impacts observed	n/a
Threatened flora	Unlikely that any threatened flora would be significantly impacted	No impacts observed	n/a
Threatened fauna	Unlikely that threatened fauna or habitats will be significantly impacted	No impacts observed	n/a

### **Cultural Heritage**

#### *European Heritage*

No historical sites are located above the mining area.

## 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).

Bradcorp 1 is an Aboriginal site located over 500m south-west of the commencing (western) end of Longwall 901. The site is outside the area predicted to experience subsidence, tilts, curvatures or strains (MSEC 2012).

No impacts to aboriginal heritage sites were recorded during the reporting period.

## Surface Infrastructure

Surface infrastructure located within or near the mining areas includes the following:

- Optical fibre cables (Telstra, Optus, NextGen and Powertel);
- Main Southern Railway and associated infrastructure;
- HW2 Hume Highway and associated infrastructure;
- Local roads and drainage culverts;
- Power Infrastructure;
- Copper telecommunications cables;
- Potable water and Sewerage networks
- Building structures, pools, water tanks and farm dams;
- Groundwater bores;
- Heritage structures;
- The Nepean Twin Bridges at Douglas Park;
- Pumps in the Nepean River;
- The Upper Canal, Cataract Tunnel and associated infrastructure; and
- Survey Control Marks.

A summary of the observed impacts during reporting period for Appin Area 7 is provided in Table 23. Impacts attributed to Appin Area 9 are summarised in Table 24.

**Table 23: Predicted vs Observed Impacts for Surface Infrastructure for Appin Area 7 FY17**

Aspect	Predicted Impacts	Observed Impacts	Completed Actions
Local Road	Minor cracking and localised heaving of the road surface in some locations above the longwall	Cracking and localised heaving was observed as a result of LW707A extraction	WSC has undertaken several patches of remediation work to the pavement in this area
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.	n/a

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	Track geometry realigned in accordance with Management Plan.
Douglas Park Twin Bridges	Impacts unlikely after the implementation of the TARP	No reported impacts	n/a
Moreton Park Road Bridge (south)	Impacts unlikely after the detailed investigation, analysis and implementation of the TARP	No reported impacts	n/a
Power Infrastructure	Impacts unlikely, but minor mitigation measures may be required	No reported impacts	n/a
Copper telecommunications cables	Impacts unlikely	No reported impacts	n/a
Optical fibre cables	Impacts unlikely with the implementation of the management strategies including OTDR monitoring and mitigation	Small levels of signal loss measured	n/a
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	Six claims made to SA NSW for impacts to houses, due to the extraction of longwall 707	Structural stabilisation work undertaken on property
Pools	In ground pools could be more susceptible to ground strains	Two impacts have been reported and lodged with SA NSW	n/a
Water tanks	Impacts unlikely	No reported impacts	n/a
Farm dams	Potential for minor cracking or leakage	No reported impacts	n/a
Heritage structures	Impacts unlikely	No reported impacts	n/a
Groundwater bores	Potential for blockage or reduction in the capacity of the groundwater bores	One reported private bore impact affecting the water supply due to the extraction of Longwall 707.	Temporary water supplied and boreholes decommissioned
Pumps in the Nepean River	Impacts unlikely	No reported impacts	n/a
The Upper Canal, Cataract Tunnel and associated infrastructure	Impacts unlikely	No reported impacts	n/a
Survey control marks	Small far-field horizontal movements which could require re-establishment	Small far-field horizontal movements	n/a

**Table 24: Predicted vs Observed Impacts for Surface Infrastructure for Appin Area 9 FY17**

Aspect	Predicted Impacts	Observed Impacts	Completed Actions
Local Road	Minor cracking and localised heaving of the road surface in some locations above the longwall	No reported impacts	n/a
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	Track geometry realigned in accordance with Management Plan.
Douglas Park Twin Bridges	Impacts unlikely after the implementation of the TARP	Small amount of closure recorded across the valley (~5mm). No reported impacts	n/a
Moreton Park Road Bridge (south)	Impacts unlikely after the detailed investigation, analysis and implementation of the TARP	No reported impacts	n/a
Power Infrastructure	Impacts unlikely, but minor mitigation measures may be required	No reported impacts	n/a
Copper telecommunications cables	Impacts unlikely	No reported impacts	n/a
Optical fibre cables	Impacts unlikely with the implementation of the management strategies including OTDR monitoring and mitigation	No reported impacts	n/a
Potable Water network	Impacts unlikely, but minor mitigation measures may be required	No reported impacts	n/a
Sewerage Network	Impacts unlikely, but minor mitigation measures may be required	No reported impacts	n/a
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	Two claims made to SA NSW for impacts to house has been made, due to the extraction of Longwall 901	n/a
Pools	In ground pools could be more susceptible to ground strains	One claim made to SA NSW for impacts to a pool has been made, due to the extraction of Longwall 901 (claim included with house impact mentioned above)	n/a
Water tanks	Impacts unlikely	No reported impacts	n/a
Farm dams	Potential for minor cracking or leakage	No reported impacts	n/a
Heritage structures	Impacts unlikely	No reported impacts	n/a

Groundwater bores	Potential for blockage or reduction in the capacity of the groundwater bores	One reported private bore impact affecting the water supply due to the extraction of Longwall 901.	Provided Water Management plan to landholder.
Pumps in the Nepean River	Impacts unlikely	No reported impacts	n/a
The Upper Canal, Cataract Tunnel and associated infrastructure	Impacts unlikely	No reported impacts	n/a
Survey control marks	Small far-field horizontal movements which could require re-establishment	Small far-field horizontal movements	n/a

### West Cliff (Appin North) Monitoring and Management Programs

Longwall 38 ceased extraction on February 1<sup>st</sup>, 2016. West Cliff (Appin North) subsidence monitoring has moved into the post-mining phase and inspections are being carried out in accordance with the Longwall 37-38 Extraction Plan.

The surface features in the vicinity of mining include:

- The Georges River and associated tributaries;
- Rocky outcrops and steep slopes;
- Local roads;
- An aero-club airfield;
- Aboriginal and European heritage; and
- Buildings and infrastructure.
- Monitoring activities include:
  - 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;
  - Aboriginal and European heritage items; and
  - Buildings and infrastructure.

### ***Landscape Features***

Eleven landscape impacts were identified and attributed to Longwall 38 extraction. One of these impacts was iron staining identified in the Georges River, the rest were rock fractures and surface cracking on or around the river. Post-mining monitoring of natural features above and adjacent to Longwall 37 & 38 includes regular inspections of the Georges River as well as riparian features and cliffs.

Pool water levels, flows, water quality, photographic and observational monitoring are undertaken to identify any impacts such as fractures, strata gas releases, iron staining or rock falls from cliffs, steep slopes or rock

outcrops. There were no new impacts identified as the level of subsidence for Longwall 38 has diminished (Table 25).

**Table 25: Predicted vs Observed Impacts for Landscape Features for West Cliff (Appin North) Area 5 during the reporting period.**

Aspect	Predicted Impacts	Observed Impacts	Completed Actions
Georges River and tributaries	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 new impacts observed	n/a
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	n/a
Access Track	Minor impacts	No impacts observed	n/a

### **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 (Appin North) Colliery Area 5 Longwalls 37 to 38 EP.

During the reporting period the pH, DO, ORP and salinity levels in the Georges River and tributary sites maintained a similar variability, with no significant change from the baseline range, along with no significant change in trend or extended adverse changes being observed. No TARP trigger levels were attained for pH.

The levels of Mn, Ni and Zn in Georges River maintained similar pre Longwall 38 variability, with no significant change to the observed ranges as a result of extraction of Longwall 38.

During monitoring for Longwall 38, below baseline levels were reported for Georges River pools; GR\_Pool 60, GR\_Pool 59, GR\_Pool 58, GR\_Pool 57, GR\_Pool 56, GR\_Pool 54 and GR\_Pool 44. These pools have been reported during the extraction of previous longwalls and have been attributed to Longwall 35 impacts. During

significant rainfall events and increased mitigatory flow from Brennans Creek Dam these pools continue to show water levels similar to baseline. However, these water levels decrease during periods of low rainfall and reduced releases from Brennans Creek Dam.

Remediation options for impacted sections of the Georges River as a result of Longwalls 32 to 38 will be addressed in the Georges River Remediation Plan (submitted to government).

A summary of the observed surface water impacts for Longwall 38 is provided in Table 26.

**Table 26: Predicted vs Observed Impacts for Surface Water for West Cliff (Appin North) Area 5.**

Aspect	Predicted Impacts	Observed Impacts	Completed Actions
Georges River	<p>Negligible environmental consequences including:</p> <ul style="list-style-type: none"> <li>negligible diversion of flows or changes in the natural drainage behaviour of pools;</li> <li>negligible gas releases and iron staining;</li> </ul> <p>Negligible increase in water cloudiness.</p> <p>Over at least 80% of the stream length subject to vertical subsidence &gt;20mm.</p> <p>No subsidence impact or environmental consequence greater than minor.</p>	<p>Based on analysis of the long-term water quality records for designated upstream and downstream sites of Longwall 38, no significant water quality impacts were observed or measured within the Georges River.</p> <p>Fracturing and diversion of flow with lower pool levels. Pool water levels respond to increased releases from Brennans Creek Dam.</p>	<ul style="list-style-type: none"> <li>Monitoring program continued</li> <li>Reported to key stakeholders</li> <li>Reported in End of Panel Report and AEMR</li> <li>Monitoring program reviewed</li> <li>Impacts reviewed against Performance Measures</li> <li>Technical specialist notified and advice on CMA's sought</li> <li>Impacts to Georges River included in Remediation Plan- to be approved and implemented</li> </ul>

### **Groundwater**

Post mining monitoring of groundwater in the Hawkesbury Sandstone in the Westcliff/Appin North subsidence area has continued as outlined in the Longwall 37-38 Extraction Plan.

No adverse interconnection of aquifers and aquitards has been observed within 20m of the plateau surface and no increased rate of groundwater recharge into the plateau has been observed in the post-mining period.

No TARP trigger levels related to aquifer or aquitard interconnection or changes in recharge have been observed in the post-mining period.

Water levels in Piezometers GR27, GR28, GR70 and WC54 were not affected by subsidence during or after extraction of Longwall 38. GR28 was affected by an approximately 6m drop associated with subsidence in August 2011. Water level has been consistently increasing since 2013. The water level in WC95 fell by approximately 9m and was reported as a Level 1 TARP during Longwall 38 extraction. During the reporting period the water level in WC95 reacted positively to rainfall events, exhibited a decreased rate of recession and showed a general increase of higher water levels.

The landowner at Lot 10, DP3221 who reported an impact to the bore GW72454 in November 2015 is continuing to get portable water delivered from South32 Illawarra Coal as per their Water Management Plan. Plans to redrill the borehole are being discussed in consultation with SA NSW.

The Landholder at Lot 18, DP622780 who reported impacts to the bore K10bh01 in March 2016 are experiencing improvements to the water supply. The Landowner is still getting water deliveries, however performance of the bore is beginning to improve. South32 Illawarra Coal, will continue to monitor the borehole and measure changes.

No further impacts to boreholes have been reported.

No increased groundwater inflow to the West Cliff (Appin North) mine workings following extraction of Longwall 38 has occurred and no TARP trigger levels have been reached or exceeded.

### ***Aquatic Ecology***

The latest round of aquatic ecology monitoring was undertaken in November 2016. The monitoring program focuses on three main indicators:

- Aquatic habitat, including fish habitat, aquatic macrophytes and riparian vegetation;
- Aquatic macroinvertebrates sampled in accordance with the Australian River Assessment System (AUSRIVAS); and
- Fish sampled using backpack electrofishing.

The results of the November 2016 survey were compared with those obtained in May 2002, March 2005, November 2007, September 2008, May 2010, May 2012, December 2012, November 2013, December 2014 and November 2015 (Cardno, in preparation). The November 2016 survey provided the second year of post-extraction monitoring for Longwall 37 and the first year of post-extraction monitoring for Longwall 38.

During the November 2016 survey, flow diversions and reductions in pool water levels were observed at Site 9, which is adjacent to Longwalls 35 and 36. These physical impacts were observed here previously during the November 2013 aquatic ecology survey and were associated with extraction of Longwall 35. Observed impacts included a direct loss of aquatic habitat, a potential reduction in numbers of macroinvertebrate taxa, evidence of a reduction in aquatic habitat quality and the desiccation of macrophytes adjacent to affected areas. During the December 2014 survey, pool water levels at this site were similar to that seen prior to the observed impacts. This was attributed to additional flow releases from Brennans Creek Dam. However, the low pool water levels and flow observed here in November 2015 and November 2016 suggests that impacts to aquatic habitat and connectivity at Site 9 at least, may be persistent. During the November 2016 survey AUSRIVAS OE50 Taxa Scores (a biotic index of habitat and water quality) at Site 9 (0.66) was the lowest of all sites sampled. The sample collected here also had the lowest number of taxa (19, compared with 22 to 26 at the other 5 sites sampled), though the SIGNAL2 Index here (3.7) was comparable to that at other sites (3.5 to 4.5). If physical mining impacts did influence indicators at Site 9, this appeared restricted to the area directly affected by mining, as these indicators were found to greatest at downstream Sites 10 and 11 in November 2016.

While these impacts were first attributed to extraction of Longwall 35, it is likely that a cumulative effect of extraction of subsequent longwalls 36 to 38 may have contributed to the severity, extent and rate of recovery of impacts to aquatic ecology attributed to Longwall 35. Nevertheless, impacts appear to be restricted to areas directly affected by mining and no changes to aquatic indicators have been observed at sites further downstream. However, it is noted that there was iron staining present in the river downstream of Site 9 downstream to Site 10, located adjacent to Longwalls 36 and 37, in November 2016. The most recent rock fractures associated with flow diversions were identified in the river channel and rockbars in late 2015, and were attributed to Longwall 38. No further fractures have been identified since this time and since Longwall 38 is the final longwall to be extracted from West Cliff Area 5 the risk of further fracturing and flow diversions would be expected to be low.

A summary of predicted and observed impacts on aquatic ecology is provided in Table 27.



**Table 27: Predicted vs Observed Impacts for Aquatic Ecology for West Cliff (Appin North) Area 5.**

Aspect	Predicted Impacts	Observed Impacts	Completed Actions
Aquatic Ecology	Threatened species, threatened populations, or endangered ecological communities: - negligible environmental consequences	<p>Mining impacts in the Georges River due to extraction of Longwall 35, recovered to some degree in December 2014, but have persisted in subsequent surveys.</p> <p>There is no evidence to suggest the extraction of Longwalls 36 to 38 has had any impact on aquatic ecology, though it is possible that extraction of these longwall may have contributed to the severity, extent and rate of recovery of impacts to aquatic ecology attributed to Longwall 35.</p> <p>At this stage impacts to aquatic ecology appear restricted to the areas directly affected by physical mining impacts, though there was iron staining present in the river downstream of Site 9 downstream to Site 10, located adjacent to Longwalls 36 and 37. No impacts have been detected at downstream control Site 11.</p>	n/a

**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 water monitoring programs. Post-mining monitoring focuses on detecting changes to vegetation communities and fauna habitat present within the Longwalls 37 and 38 Study Area.

The most recent terrestrial monitoring survey was undertaken by Niche on February 17<sup>th</sup> 2016, and findings were reported in the Longwall 38 End of Panel Report. No impacts to vegetation were observed. Table 28 summarises the predicted and observed impacts for the reporting period.

**Table 28: Predicted vs Observed Impacts for Terrestrial Ecology for West Cliff (Appin North) Area 5.**

Aspect	Predicted Impacts	Observed Impacts	Completed Actions
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Ecology	Threatened species, threatened populations, or endangered ecological communities: - negligible environmental consequences	No impacts observed.  n/a
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## **Cultural Heritage**

### *European Heritage*

No historical sites were located above Longwall 38.

### *Aboriginal Heritage*

There were no post mining impacts identified as a result of Longwall extraction in the reporting period. Impacts have previously been noted to Aboriginal shelter sites Georges River No. 2 (AHIMS # 52-2-2243) and Georges River No. 3 (52-2-2243). These impacts were a result of subsidence movements from Longwall 35 (Niche 2013) and Longwall 36 (Niche 2014). See relevant End of Panel reports for more information.

## **Surface Infrastructure**

Subsidence monitoring programmes are developed in consultation with key stakeholders and ensure that all key infrastructure and other surface features located above the extraction areas are closely monitored to assess subsidence movements and impacts.

Appin Area 5 concluded active mining with the completion of Longwall 38 on 1/2/2016. The area has undergone post mining monitoring as part of the approved monitoring program and no survey monitoring has been undertaken in FY17. There were no reported impacts to any built features in FY17 in Appin Area 5.

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.

## **Environmental Research Program**

Illawarra Coal has undertaken research to develop an improved understanding and prediction of subsidence impacts. Understanding strata conditions and properties contributes significantly to the prediction of subsidence impacts. Testing of overburden strata (core and in situ) has been completed during the review period 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.

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 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 piezometers, gradients toward the river were preserved, which maintains base flows to the rivers.

Comparison of the predicted groundwater levels and drawdowns from the EA Groundwater Assessment (Heritage Computing, 2010) with observed data for previous reporting periods suggesting that the model is a useful tool for groundwater assessment. The match between modelled and observed water levels is generally good to fair.

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 continued to develop the Swamp Rehabilitation Research Plan (SRRP) in consultation with 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 Longwalls 35 and 38. The plan has been developed in consultation with key Government stakeholders. As part of these works Illawarra Coal will undertake research into the implementation and effectiveness of the rehabilitation techniques.

Illawarra Coal submitted a revised Underground Coal Wash Emplacement Trial 13<sup>th</sup> October 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
- Illawarra Coal's focus on diverting material from surface emplacement via alternative beneficial uses continues.

Illawarra Coal supported a number of research projects relating to beneficial coalwash use during the reporting period and this has opened up significant potential for diverting coalwash from emplacement. An endeavour will be made to divert the majority of coalwash from Dendrobium mine for engineering uses in FY18.

## **6.16. HYDROCARBON CONTAMINATION**

Refer to section 6.5.

## **6.17. METHANE VENTILATION**

The in-seam gas content of the Bulli Seam in the Appin and West Cliff (Appin North) 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 (Appin North) monitoring systems, procedures and figures reported were audited (reasonable assurance) as required by statutory and internal requirements.

## **6.18. 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 (Appin North), no surface gas drainage activities were undertaken as underground operations have ceased.

In Appin Areas 7 and 9, gas drainage is now entirely undertaken by the underground gas drainage network before being piped to the surface and utilized by the offsite EDL Plants (West and Central). When there is more gas available from the mine than can be consumed by EDL, the flaring systems are initiated to abate the methane content of the gas.

Based on gas flow and initiation of the flares at any one point during the day, the flares were operational for 280 days of the reporting period.

### **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 plants, 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 1435 ktCO<sub>2</sub>-e was recovered and transferred (i.e. abated) to the EDL Power Plant.

#### ***West Cliff (Appin North)***

The West Cliff (Appin North) Methane Drainage Extraction Plant and the gas blower station was decommissioned following the completion of Longwall mining in Area 5 in FY16.

### **Mine Ventilation Fans**

#### ***Appin***

During the reporting period, approximately 1488 kt CO<sub>2</sub>-e was emitted to atmosphere from the Appin Mine Ventilation System, down 14% when compared to FY16. The average CH<sub>4</sub> concentration was 0.36% (down from 0.64% in FY16) and the average CO<sub>2</sub> concentration was 0.19% (down from 0.32% in FY16).

## West Cliff (Appin North)

During the reporting period, approximately 655 kt CO<sub>2</sub>-e was emitted to atmosphere from the Appin North Mine Ventilation system. The average CH<sub>4</sub> concentration was 0.43% and the average CO<sub>2</sub> concentration was 0.25%.

## 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 and was decommissioned during FY16 as a result of decreased power generation performance and the impending movement of underground mining operations to the Appin Areas. The project was a significant Greenhouse Gas reduction initiative that complemented the ongoing reductions achieved by the Appin and Tower Power Plant Projects.

The CSIRO are conducting tests on 3 Ventilation Air Methane units which can abate methane, produce power and purify the gas in the ventilation air to produce a fuel. This testing will continue through FY18.

## 6.19. HAZARDOUS MATERIAL MANAGEMENT

### 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 (Central), Appin West and West Cliff (Appin North) 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 5000 L of Sodium Hypochlorite and 5000 L 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 (Central) mine site. Storage facility information is provided below.

**Table 29: Explosives and Detonator Storage – Appin**

Site	Type	Capacity
Appin East (Central)	1.1D Explosive type E	300 kg
	1.1D Explosive type A	250 kg
	1.1B Detonators	5000 detonators
Appin West	1.1D Explosive	2000 kg
	1.1B Detonators	5000 detonators

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

**Table 30: 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 31: Summary of Dangerous Goods Storage on the Appin East (Central) 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 (Central) 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.

## 6.20. 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, 6 km 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 400 t surge bin, from which the product was loaded into trucks and transported to West Cliff (Appin North) 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<sup>3</sup> of loosely tipped shale and sandstone, has been graded, shaped and regenerated with local vegetation species.

The West Cliff (Appin North) 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**

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

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

## **6.21. 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 32.



**Table 32: Site Safety Risks and Control Mechanisms**

<b>Potential Safety Risk</b>	<b>Control Mechanism</b>
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 (Appin North) 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. Chernalert system in place. Rules and procedures in place for bringing chemicals into site.
Personnel Health and Hygiene	Surveillance / monitoring program in place for noise, respirable 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.

## 7. WATER MANAGEMENT

### 7.1. WATER SUPPLY AND USE

#### 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, the bathhouse and as a back-up for underground operations.

#### Water Treatment Plant Improvements

The upgrading of the WTP to cater for the increased processing demand is presently under way with commissioning expected to be completed FY18. Key drivers for this upgrade include minimising dependency on Sydney Water, environmental compliance and an increase in demand for underground water requirements with the Area 9 mining domain.

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 4.7 ML/day with an additional 2.0 ML of surface storage.

#### Appin East (Central)

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

During this reporting period Appin East (Central) underground has been operated on recycled mine water (supplied underground from Appin West WTP) and Sydney water supplies from Appin East (Central) 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. In addition, a pipeline has been installed to temporarily dilute discharge from Brennans Ck Dam to reduce salinity levels in-line with the EPL. This pipeline will be used as future water supply to the West Cliff (Appin North) Washery during drought as projects under PRP19 are completed (Section 0).

Table 33 provides an overview of the potable water usage associated with the Appin operations for the reporting period.

**Table 33: Potable Water Usage for the Appin Operations**

Area	Usage FY16 (ML)	Usage FY17 (ML)	Variance (ML)	Comments
Appin East (Central) & West	480	692	212	Increased due to a greater volume of water being pumped to the West Cliff (Appin North) washery to reduce increased salinity levels

An estimate of the volume of clean and dirty water stored on site at the end of the reporting period is provided in Table 34.

**Table 34: Stored Water - Appin**

Water Type	Volumes Held (m3)		
	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 (Appin North)

West Cliff (Appin North) 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 was pumped from Appin East (Central) for use in WestVAMP (now redundant) and the longwall until operations ceased in Feb 2016. 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 (Appin North) Underground operations;
- West Cliff (Appin North) Coal Preparation Plant and associated infrastructure; and
- West Cliff Pit Top (Appin North).

Annual recycled water usage from BCD for the West Cliff (Appin North) surface operations for this reporting period was approximately 674 ML. Approximately 27.36ML of water from BCD was utilised underground for mining related activities. This is significantly less than the previous reporting period due to longwall operations in Area 5 concluding and underground operations moved wholly to Appin Areas 7 and 9, and the increased use of recycled water at the Washery.

A total of 1.88 ML of potable water was consumed at Appin during the reporting period which is significantly less than the previous year due to longwall operations in Area 5 concluding in Feb 2016, and the decommissioning of WestVAMP in FY16.

A summary of the water usage for the reporting period, compared to the previous reporting period, is provided in Table 35.

Type	Usage FY16 (ML)	Usage FY17 (ML)	Comment
Sydney Water	107	1.88	WestVAMP ceased operations in FY16
Recycled (BCD) Water	718	674	WC Longwall operations ceased Feb 2016

An estimate of the volume of clean and dirty water stored on site at the end of the reporting period is provided in Table 36.

Water Type	Volumes Held (m3)		
	Start of Reporting Period	At End of Reporting Period	Storage Capacity
Clean water	307	307	307
Dirty water	200	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**

Under Surface Water License No. 10WA117285, issued by NSW Office of Water (NOW) on the 15 November 2011, water can be pumped from the Nepean River and used on Ventilation No.6 Shaft site for operational purposes. The Licence allows up to 53 ML to be diverted - Comprising of 40 ML for mining use and 13 ML for industrial use in any one year commencing 1 July. During the reporting period 0.2 ML was pumped from the Nepean.

### **7.2. 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, including replacement of the filters and screens. No additional works have been undertaken at the site. The active oil separator (spin separator) underwent routine service, and the passive separator (baffle plate system) also underwent routine maintenance.

#### **Appin East (Central)**

The silt trap associated with the main dam has undergone standard maintenance including silt removal and the dynasand and first flush systems have undergone standard maintenance to ensure systems are fully operational.

#### **West Cliff (Appin North)**

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. A V notch weir and concrete bunding was installed in the previous financial year to improve the accuracy of monitoring. 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 March 2017. Intermediate inspections are being conducted regularly by Illawarra Coal.

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 surface dams prior to discharge into Harris Creek via LDP 36. Water quality checks were carried out prior to any discharge.

### **7.3. GROUNDWATER MANAGEMENT**

#### **Appin**

During the reporting period excess groundwater from the Appin operations was pumped to the surface at Appin West for treatment via the Appin West WTP. The treated water is re-used underground and/or discharged via LDP24. Discharge volumes at LDP24 are made available to the public via the web based environmental monitoring report which is issued every 14 days.

#### **West Cliff (Appin North)**

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 (Appin North) CPP. During the reporting period approximately 27.36ML of water was delivered underground

with approximately 579 ML of surplus underground water pumped to the surface for use in the CPP or treated and release to BCD.

#### 7.4. RAINFALL

Figure 14 below displays the annual rainfall for the region since FY11 at Menangle, NSW.

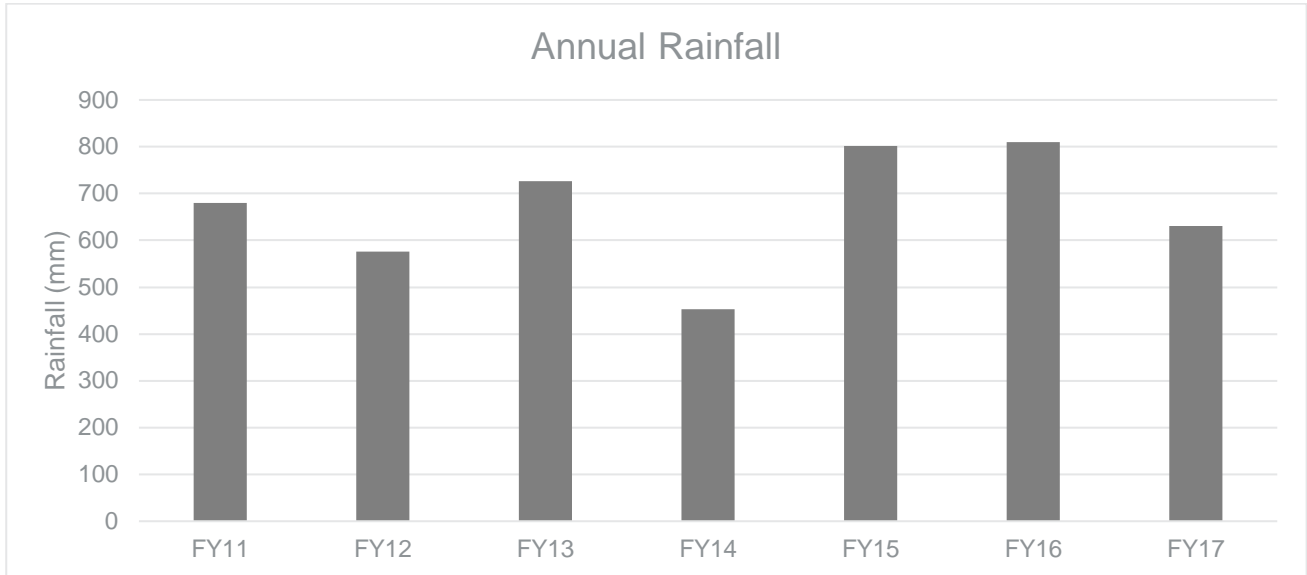


Figure 14: Annual rainfall – Menangle (BOM site #68216).

## 8. REHABILITATION

### 8.1. REHABILITATION FOR THE REPORTING PERIOD

#### Buildings

No rehabilitation of buildings was undertaken during the reporting period.

#### Rehabilitation of Disturbed Land

Progressive rehabilitation of the West Cliff (Appin North) Emplacement has been undertaken during the reporting period in accordance with the approved West Cliff (Appin North) Coal Wash Emplacement Area Management Plan. Refer to Appendix A: Annual Rehabilitation Report for further detail of the success of the rehabilitation of the Emplacement area. Plan 11 – Land Preparation Plan outlines the rehabilitation undertaken over the reporting period.

The rehabilitation summary is provided in Table 37.



Figure 15: Stage 2 emplacement rehabilitation after two years showing dense cover of shrubs and high native species diversity.

During 2016/17 rehabilitation activities to address Appin Surface Mine Safety Gas Drainage Well operations included:

- Grouting of all four Longwall 706 wells to surface and one site has been rehabilitated with topsoil emplacement and grass seeding (Figure 16).
- Grouting of both Longwall 707 wells to surface and one site has been rehabilitated with topsoil emplacement and grass seeding (Figure 17).

There are no further gas wells in the Appin operations. Plan 12 – Appin Mine Safety Gas Drainage Rehabilitation illustrates rehabilitation of the Mine Safety Gas Drainage Wells.



Figure 16: Longwall 706 Well site during rehabilitation

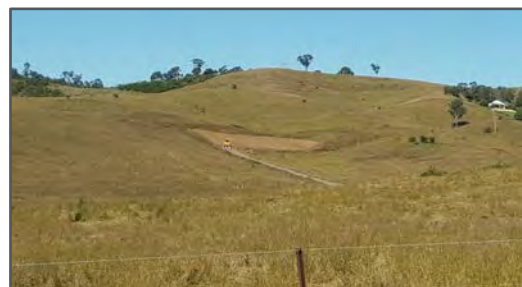


Figure 17: Rehabilitated LW 707 Well site

## 8.2. REHABILITATION TRIALS AND RESEARCH

No rehabilitation trials were conducted during the reporting period.

## 8.3. 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 (Appin North) 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.

The Rehabilitation Cost Estimate (RCE) for the BSO was reviewed and updated during FY17 as per requests made by DRE in relation to the BSO Project Approval Modification 2. The changes made were:

- Account for the new Gas Pipeline approval (BSO Approval Mod 2);
- Estimated cost to grout exploration boreholes now included;
- Rate for Mobilisation/Demobilisation costs changed to account for 1% of the domains total and split by CCL;
- Revised RCE now accounts for all disturbance (156 Ha) and includes all rehab *in progress* (26 Ha).
- Rate for “DRE Tender Preparation and Assessment” and “Development of Unplanned Closure Plan” now split by CCL;
- *Contingency and Third Party Project Management* amounts now split by CCL.
- Increased security deposit amount

The current RCE and above changes were approved in January 2017.

The latest RCE is attached as Appendix F to this document.

**Table 37: Rehabilitation Status.**

Location	Area Affected/Rehabilitation (ha)		
	Previous Report (FY15)	This Report (FY16)	Forecast (FY17)
A Total Mine Footprint	46580	46580	46580
B Total Active Disturbance	146	156	156
C Land Being Prepared for Rehabilitation	6	5	5
D Land Under Active Rehabilitation	61	26	26
E Completed Rehabilitation	0	36	36

## 9. COMMUNITY

At the completion of this reporting period the Appin and West Cliff (Appin North) Mines employed approximately 800 full time employees and 400 full time contractors across the operations.

The closest township to the Appin West surface operations is the village of Douglas Park, which is located approximately 4 km to the north west of the surface operations. The current underground mining operations (i.e. Area 7 and Area 9) are located on the outskirts of the Douglas Park village.

The closest township to the West Cliff (Appin North) surface operations is the village of Appin, which is located approximately 4 km to the north west of the operations.

Appin East (Central) Pit Top is located on the outskirts of Appin.

### 9.1. ENVIRONMENTAL COMPLAINTS

During this reporting period 24 complaints were received in relation to BSO operations (including Pit Tops, Mine Safety Gas Drainage projects, and exploration work). Details of the complaints received and the actions taken are provided in Appendix C: BSO Community Complaints Report FY17. A summary of all complaints received across the BSO in FY17 is included Figure 18. An analysis of complaints since 2012 is included in Figure 19.

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.

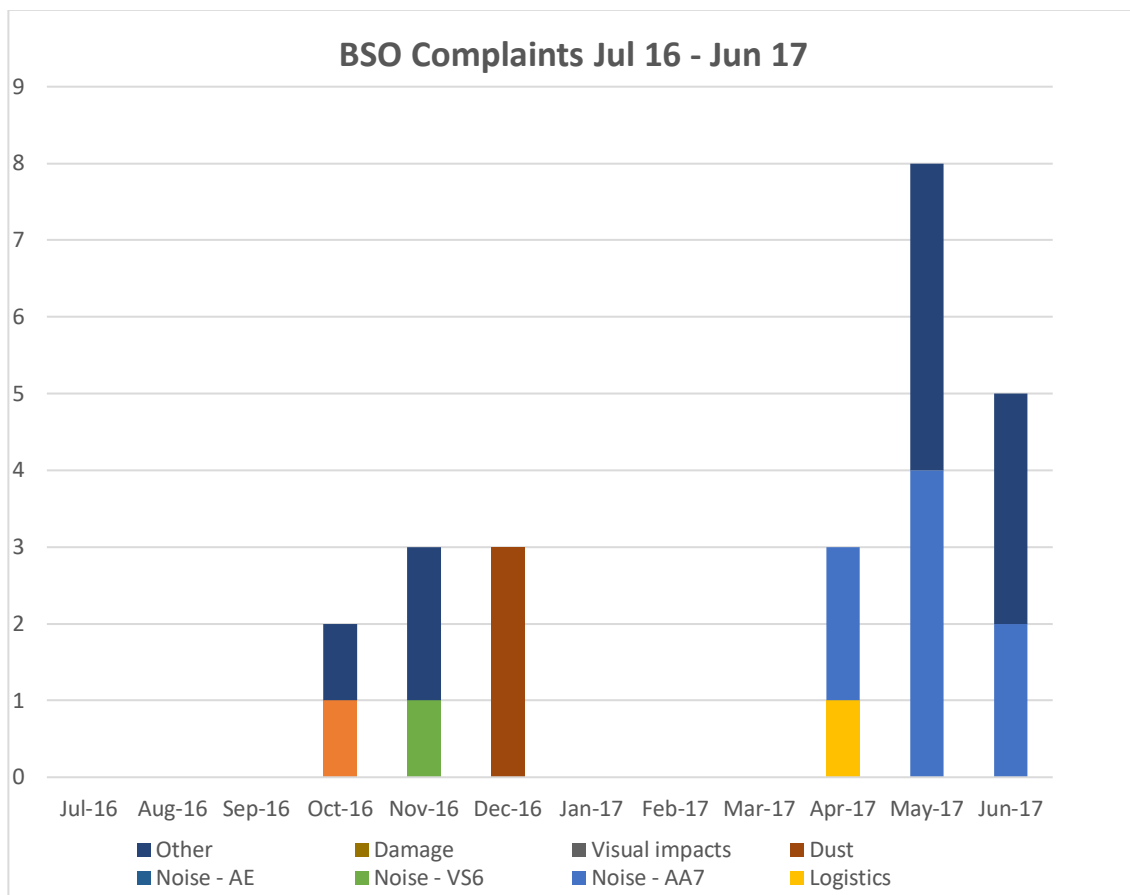


Figure 18: Summary of complaints for FY17



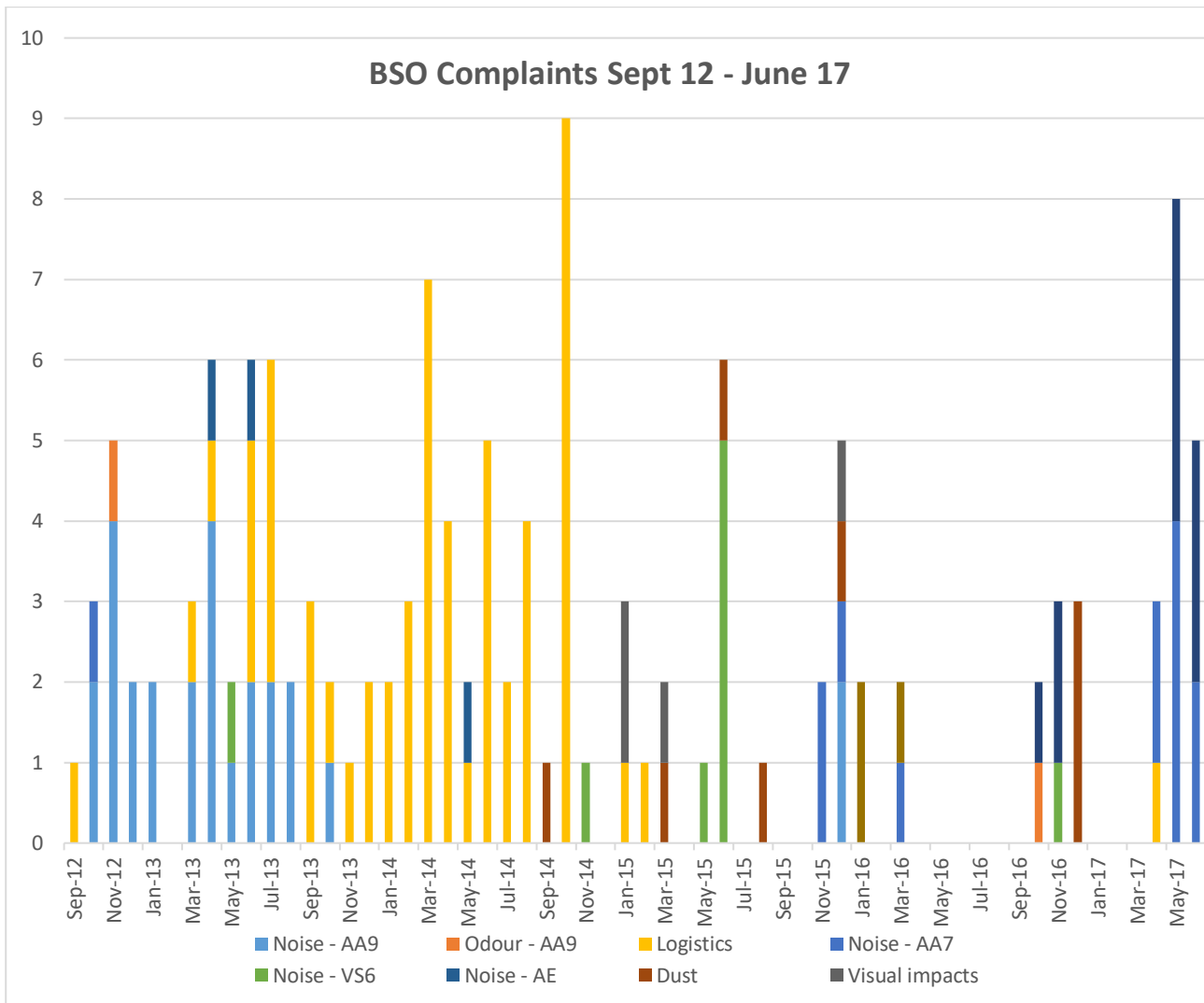


Figure 19: Analysis of community complaints since 2012 for the BSO.

## 9.2. 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 identifies key stakeholders and appropriate communication and consultation processes.

Key regional stakeholders include:

- Communities surrounding the Appin and West Cliff (Appin North) operations;
- Local government;
- State government agencies and authorities including DTIRIS, OEH, SCA, and SA NSW;
- Employees and contractors;
- Local and regional business groups;
- Community and Special Interest 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;
- 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 Partnerships Program Board.

Illawarra Coal is also represented at other stakeholder committees in the area of the Bulli Seam Operations, including the Appin Chamber of Commerce.

Table 38 provides a summary of the information presented to the Illawarra Coal Community Consultative Committee during the reporting period.

**Table 38: Summary of Information Presented to the Illawarra Coal Community Consultative Committee during the Reporting Period.**

<b>Month</b>	<b>Presentation</b>
July 2016	Discussed the following: Illawarra Coal update on mining operations. Longwall 38 End of Panel Report; damage to boreholes; and community complaints to date.
September 2016	Discussed the following: Illawarra Coal update on mining operations; Mine Safety Gas Management; community complaints to date; and community investment.
November 2016	Discussed the following: Illawarra Coal update on mining operations; Mine Safety Gas Management; community complaints to date; and community investment.
January 2017	Discussed the following: Illawarra Coal update on mining operations; environmental audits; Mine Safety Gas Management; community complaints to date; and community Investment.

**Table 38: Summary of Information Presented to the Illawarra Coal Community Consultative Committee during the Reporting Period.**

March 2017	Discussed the following: Illawarra Coal update on mining operations; proposed changes to the Mine Subsidence Compensation Act 1961 and its administration; Ballast Borehole update; proposed Cumberland Plain Woodland Enhancement project in Douglas Park; Mine Safety Gas Management; community complaints to date; and community investment.
April 2017	Special meeting combined with DPAP and discussed the following: Proposed Cumberland Plain Woodland Enhancement project in Douglas Park.
May 2017	Discussed the following: Illawarra Coal update on mining operations; impacts to Nepean River (gas bubbling); Ballast Borehole update; Mine Safety Gas Management; community complaints to date; and community investment.

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

### 9.3. 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 8 representatives of the Douglas Park Township.

Table 39 below provides a summary of the information presented to the Douglas Park Advisory Panel during the reporting period.

**Table 39: Douglas Park Advisory Panel Meetings – 2016/17.**

Month	Presentation
August 2016	Discussed the following: Ventilation Shaft 6 update; update on Illawarra coal mining operations; environmental impacts; Mine Safety Gas Management update; and community investment.
October 2016	Discussed the following: Ventilation Shaft 6 update; update on Illawarra coal mining operations; Mine Subsidence Board changes; environmental impacts; Mine Safety Gas Management update; and community investment.
December 2017	Discussed the following: Ventilation Shaft 6 update; update on Illawarra coal mining operations; environmental impacts; Mine Safety Gas Management update; and community investment.
March 2017	Discussed the following: Ventilation Shaft 6 update; Update on Illawarra coal mining operations; environmental impacts; rail mitigation work; Built Feature Management plans; Mine Safety Gas Management update; and community investment.

April 2017	Special meeting combined with DPAP and discussed the following: Proposed Cumberland Plain Woodland Enhancement project in Douglas Park; Ventilation Shaft 6 update; update on Illawarra coal mining operations; environmental impacts; Mine Safety Gas Management update; and community investment.
June 2017	Discussed the following: Ventilation Shaft 6 update; update on Illawarra coal mining operations; environmental impacts; Mine Safety Gas Management update; and community investment.

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.

#### **9.4. 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 the past 12 months the Board has committed over \$120,000 for community projects in the local Wollondilly area.

Some local not-for-profit groups to benefit from program funding in 2016/17 included:

- Lifeline Macarthur (Telephone Crisis Support Training Course)
- Wollondilly White Waratahs Rugby Club – refurbishment of amenities block
- First Appin Scouts – Hall upgrade
- Wilton Volunteer Rural Fire Brigade – Stage 3 upgrade
- Stewart House – Respite for two Children in Appin
- Appin Men's Shed – Construction of a new shed

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.

#### **9.5. CAMP QUALITY CONVOY**

For the twelfth consecutive year, Illawarra Coal has helped raise money for children with cancer and launch another successful i98FM Illawarra Convoy. Held in November 2016, 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 720 trucks and 1,000 motorbikes participated in the Convoy which is organised by local radio station

i98FM, to raise funds for the Illawarra Community Foundation, which helps provide access to a variety of activities and resources to help brighten the lives of families living in the Illawarra and South Coast regions who are suffering from a potentially life threatening illness.

Over \$1.8 million was raised during the 2016 Convoy, with over \$9 million raised since the inaugural event in 2005.

## **9.6. COMPLAINTS/ENQUIRIES MANAGEMENT**

Illawarra Coal maintains a 24 hour Community Call Line (freecall 1800 102 210) and a general email address [ICEnquiries@South32.net](mailto: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 as Appendix C: BSO Community Complaints Report FY17.

## 10. INDEPENDENT AUDIT

The Illawarra Coal Environmental Management System has been certified to the International Standard ISO14001 since May 2003. The BSO operations were recertified with ISO14001 environmental certification following an external audit in December 2016.

The Appin East (Central) and West sites, West Cliff (Appin North) Colliery and the West Cliff (Appin North) 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 NGER (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 reporting Period**

<b>Date</b>	<b>Type</b>	<b>Internal</b>	<b>External</b>	<b>Comments</b>
Dec 2016	Annual ISO14001		x	Recertified
Feb 2017	Triennial Independent Environmental Audit		x	
Ongoing	Management plan governance checks (Internal EMS audits)	x		

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.

An Independent Environmental Audit of the BSO is undertaken every three years. The most recent Audit was conducted in January-March 2017. The review identified 10 medium level non-conformances, 5 administrative non-conformances and 5 observations. Eight of the ten non-conformances related to exceedances of water discharge concentration limits; the other two reported non-conformances related to project noise exceedances.

## **11. INCIDENTS AND NON-COMPLIANCES DURING THE REPORTING PERIOD**

There were no reportable incidents during the reporting period.

Please refer to the following reports for compliance information:

Appendix B: 2016/17 EPA Annual Return for details of non-compliances against EPL2504.

Appendix D: BSO EPBC Approval 2010/5350 Compliance Report; and

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

## **12. ACTIVITIES TO BE COMPLETED IN THE NEXT REPORTING PERIOD**

### **12.1. MINE OPERATIONS**

During the next reporting period underground operations will continue in Area 7 and Area 9.

### **12.2. PROJECTS**

The Appin West Water Filtration Plant will continue to be upgraded with expected completion in FY18. The gas extraction pipeline from No3 Vent Shaft to the Appin East Drainage Plant is also due for completion in FY18.

### **12.3. ENVIRONMENTAL MANAGEMENT**

The next reporting period will have the following activities:

- Commissioning of the upgraded Appin West Water Filtration Plant;
- Commissioning of Appin East mine safety gas management project (gas pipe from VS3 to Appin Central GDP);
- Continuation of the Environment Improvement Program (EIP2) to improve water quality and aquatic health in the Georges River downstream of licensed discharge point 10 (refer to section 6.3 of this report);
- Post-fire monitoring for *Persoonia hirsuta* seedlings in the Offset area at West Cliff (Appin North);
- Continuation of *Persoonia hirsuta* Research Program; and
- Improving process control system for BCD discharge which includes:
  - Modifications to discharge pipework to better manage flow volumes during high rainfall events
  - PLC upgrades to automate flow volumes and dilution.
  - Fogger cannon trial for evaporating BCD water as well as use for dust suppression on coal stockpiles



## 13. 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

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.

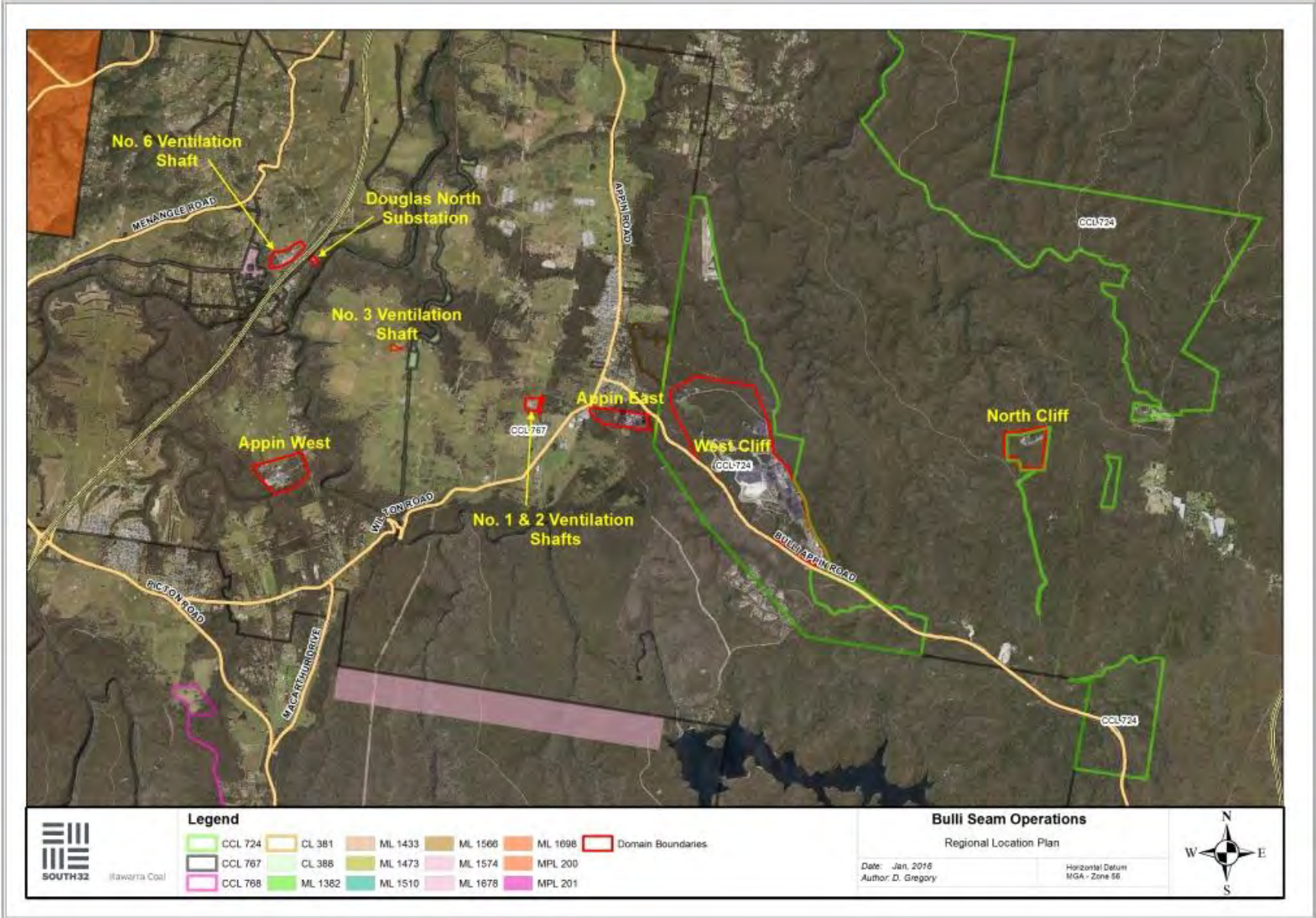
Illawarra Coal, BSO Waste Management Plan.

NSW Department of Planning & Environment (2015). Annual Review Guideline, Post approval requirements for State Significant Developments, October 2015.

NSW EPA (2016), Environment Protection Licence No.2504.

## **14. PLANS**

### **PLAN 1 - REGIONAL LOCATION PLAN**

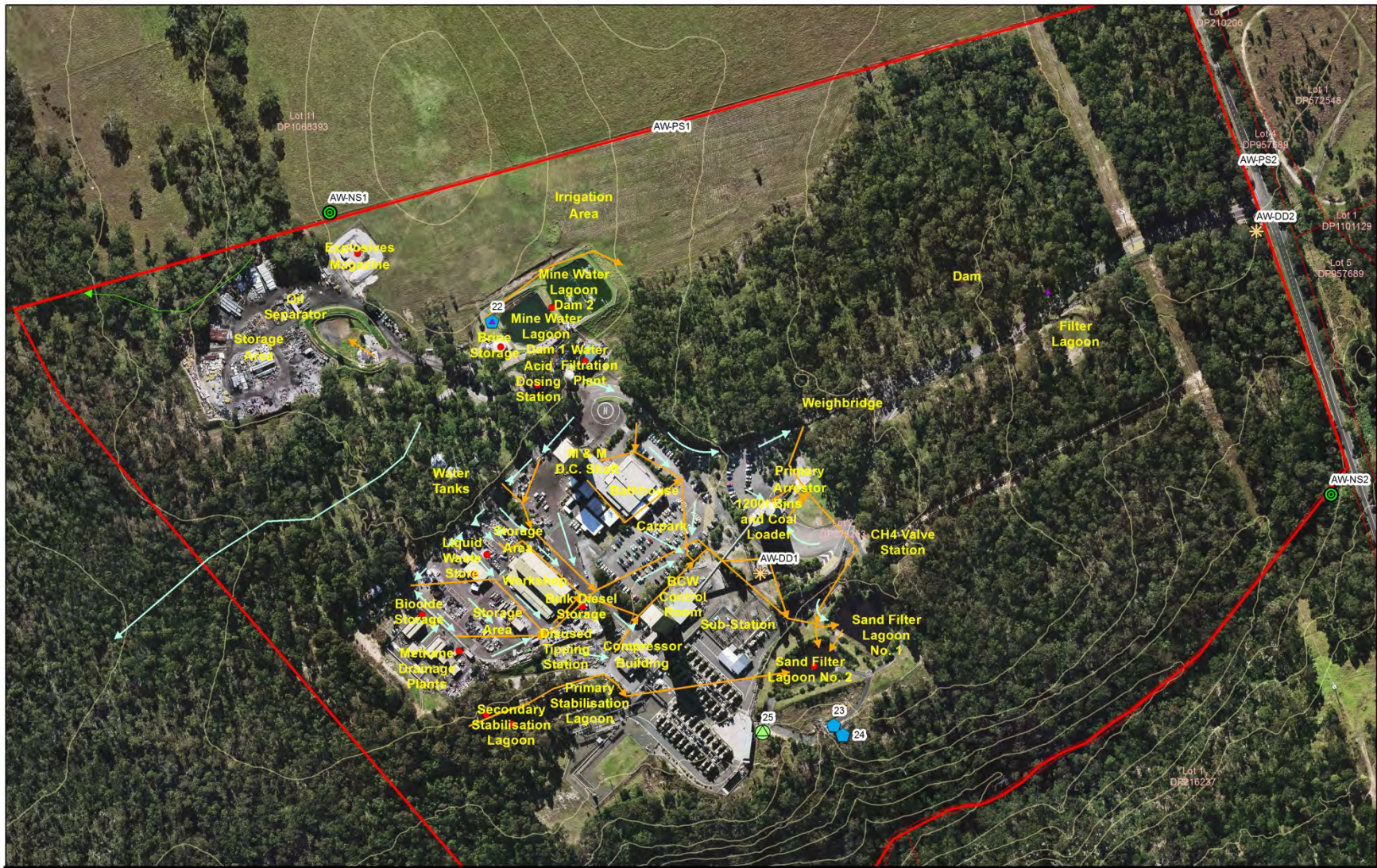


**PLAN 2 - APPIN EAST (CENTRAL) MINE SITE**



	<b>Legend</b>				<b>Bulli Seam Operations</b> Annual Environmental Management Report Appin East		
	<ul style="list-style-type: none"> <li><span style="color: green;">●</span> Noise Monitoring</li> <li><span style="color: purple;">▲</span> Discharge Volume Monitor</li> <li> Dust</li> </ul>	<ul style="list-style-type: none"> <li><span style="color: green;">●</span> HVAS</li> <li><span style="color: blue;">★</span> Meteorological Monitoring Station</li> <li> Spillway Overflow</li> </ul>	<ul style="list-style-type: none"> <li><span style="color: blue;">◆</span> Surface Water Monitor</li> <li><span style="color: orange;">◆</span> Temperature</li> <li> Potentially Contaminated Surface Water</li> <li> Overland Flow</li> </ul>	<ul style="list-style-type: none"> <li><span style="border: 1px solid red; display: inline-block; width: 10px; height: 10px;"></span> Domain Boundary</li> <li><span style="color: red;">●</span> Chemical Storage</li> </ul>			
Plan No. - HSE 2012-133-REV-1							

**PLAN 3 – APPIN WEST MINE SITE**



Legend			
	Discharge Volume Monitor		Noise Monitor
	Dust		Noise Monitoring
	HVAS		Spillway Overflow
	Meteorological Monitoring Station		Surface Water Monitor
	Temperature		Potentially Contaminated Surface Water
	Domain Boundary		Chemical Storage
	Diverted Natural Flow		
	Overland Flow		

**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



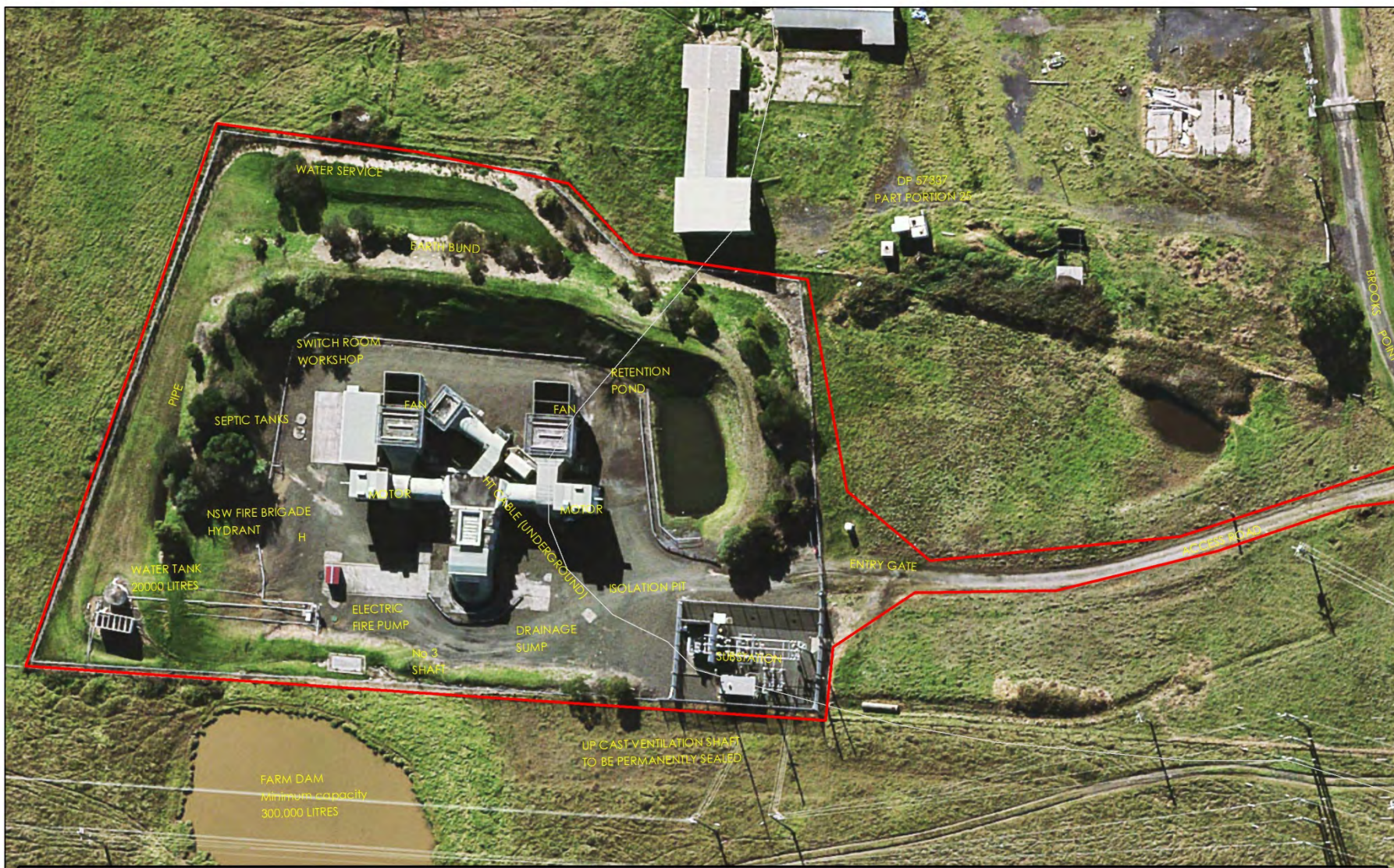
**PLAN 4 – NO.1 & NO.2 SHAFT SITE**





	<b>Legend</b>	<ul style="list-style-type: none"> <li><span style="border: 1px solid red; display: inline-block; width: 15px; height: 10px; margin-right: 5px;"></span> Cadastral Parcels</li> <li><span style="background-color: #f0f0f0; border: 1px solid red; display: inline-block; width: 15px; height: 10px; margin-right: 5px;"></span> Crown Land</li> <li><span style="border: 2px solid red; display: inline-block; width: 15px; height: 10px; margin-right: 5px;"></span> Domain Boundary</li> </ul>	<ul style="list-style-type: none"> <li><span style="color: blue; font-weight: bold;">—</span> Creeks</li> <li><span style="color: yellow; font-weight: bold;">—</span> Bull Seam 5m Contours</li> </ul>	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 33%; height: 20px;">Responsible Officer</td> <td style="width: 33%;">Job Title</td> <td style="width: 33%;">Date</td> </tr> </table>	Responsible Officer	Job Title	Date	<p><b>Bulli Seam Operations</b>          Annual Environmental Management Report          Domain 6 - Appin No. 1 &amp; No. 2 Shafts</p> <p><small>Date: 20th of August, 2015          Author: B. Davis</small></p> <p><small>Horizontal Datum          MGA - Zone 56</small></p> <p><small>Plan No. - HSE-2012-136-REV-1</small></p>	
	Responsible Officer	Job Title	Date						

**PLAN 5 – NO.3 SHAFT SITE**



**Legend**  
 Domain Boundary     Overall 10m Contours

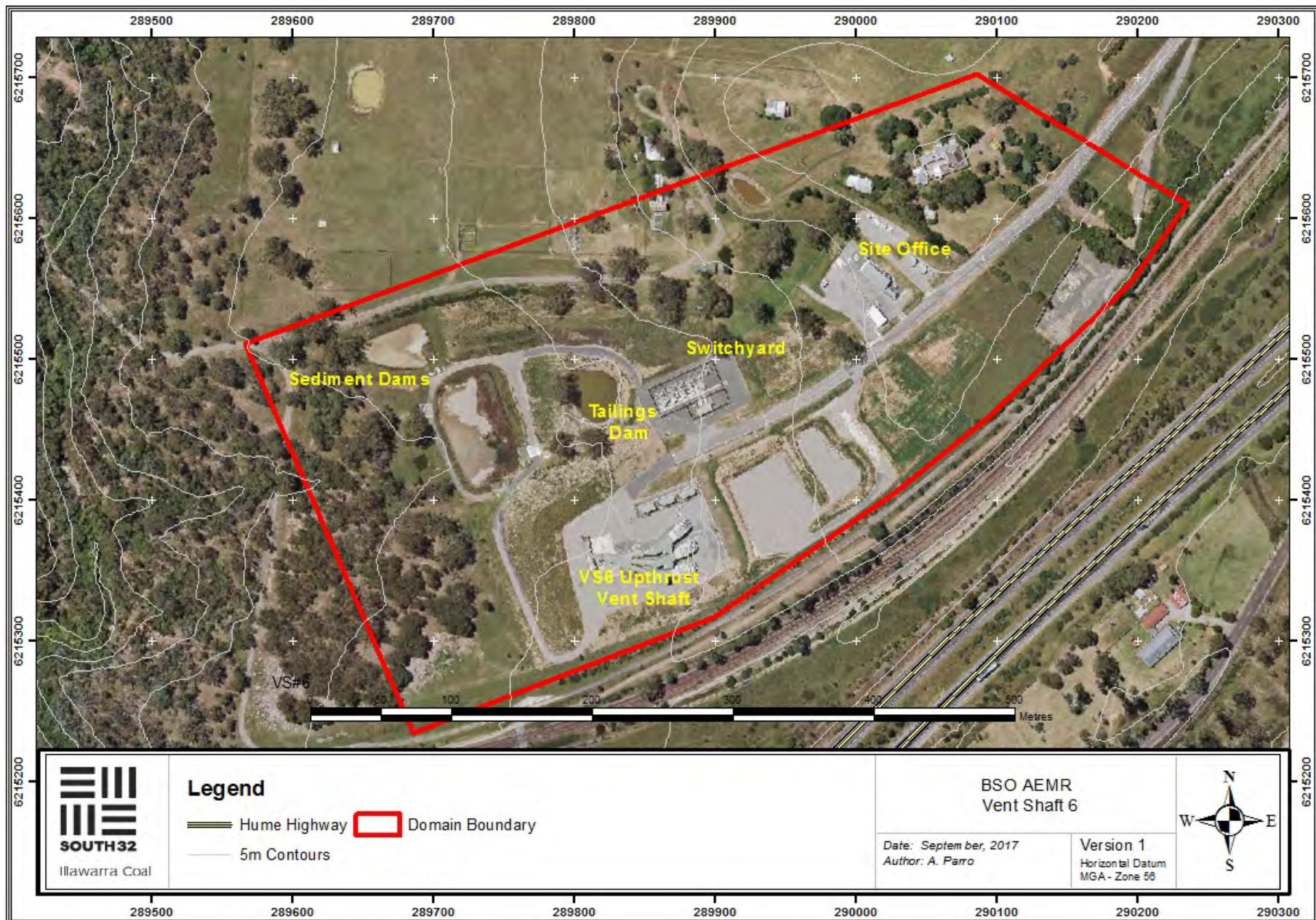
**Bulli Seam Operations**  
**Annual Environmental Management Report**  
**Vent Shaft No.3**

Date: 24th of August, 2015	Horizontal Datum MGA - Zone 56
Author: D. Thomas	

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





**PLAN 6 – NO.6 SHAFT SITE**

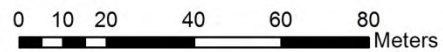


**PLAN 7 – DOUGLAS NORTH SUBSTATION**



**Legend**

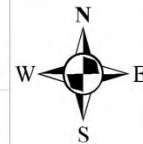
-  1m Contours
-  Domain Boundary



**Douglas North Substation**

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

Version 1  
Horizontal Datum  
MGA - Zone 56



HSE-2014-139-Rev 1

**PLAN 8 – WEST CLIFF SOUTH SITE**





	<b>Legend</b>			
	<ul style="list-style-type: none"> <li> Discharge Volume Monitor</li> <li> Dust</li> <li> H/VAS</li> <li> Meteorological Monitoring Station</li> </ul>	<ul style="list-style-type: none"> <li> Noise Monitor</li> <li> Spillway Overflow</li> <li> Surface Water Monitor</li> <li> Temperature</li> </ul>	<ul style="list-style-type: none"> <li> Potentially Contaminated Surface Water</li> <li> Diverted Natural Flow</li> <li> Overland Flow</li> </ul>	<ul style="list-style-type: none"> <li> Domain Boundary</li> <li> Chemical Storage</li> </ul>
<p align="center"> <b>Bulli Seam Operations</b>  <b>Annual Environmental Management Report</b>  <b>West Cliff South</b> </p>				
<p>Date: 20th of August, 2015 Author: B. Davis</p>		<p>Horizontal Datum MGA - Zone 56</p>		
<p align="center">Plan No. - HSE-2012-132-REV-1</p>				

**PLAN 9 – WEST CLIFF NORTH SIDE**



**Legend**

Discharge Volume Monitor	Noise Monitor	Potentially Contaminated Surface Water	Chemical Storage
Dust	Spillway Overflow	Overland Flow	
HVAS	Surface Water Monitor	West Cliff North	
Meteorological Monitoring Station	Temperature		

**Bulli Seam Operations**  
**Annual Environmental Management Report**  
**West Cliff North**

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

Horizontal Datum  
 MGA - Zone 56

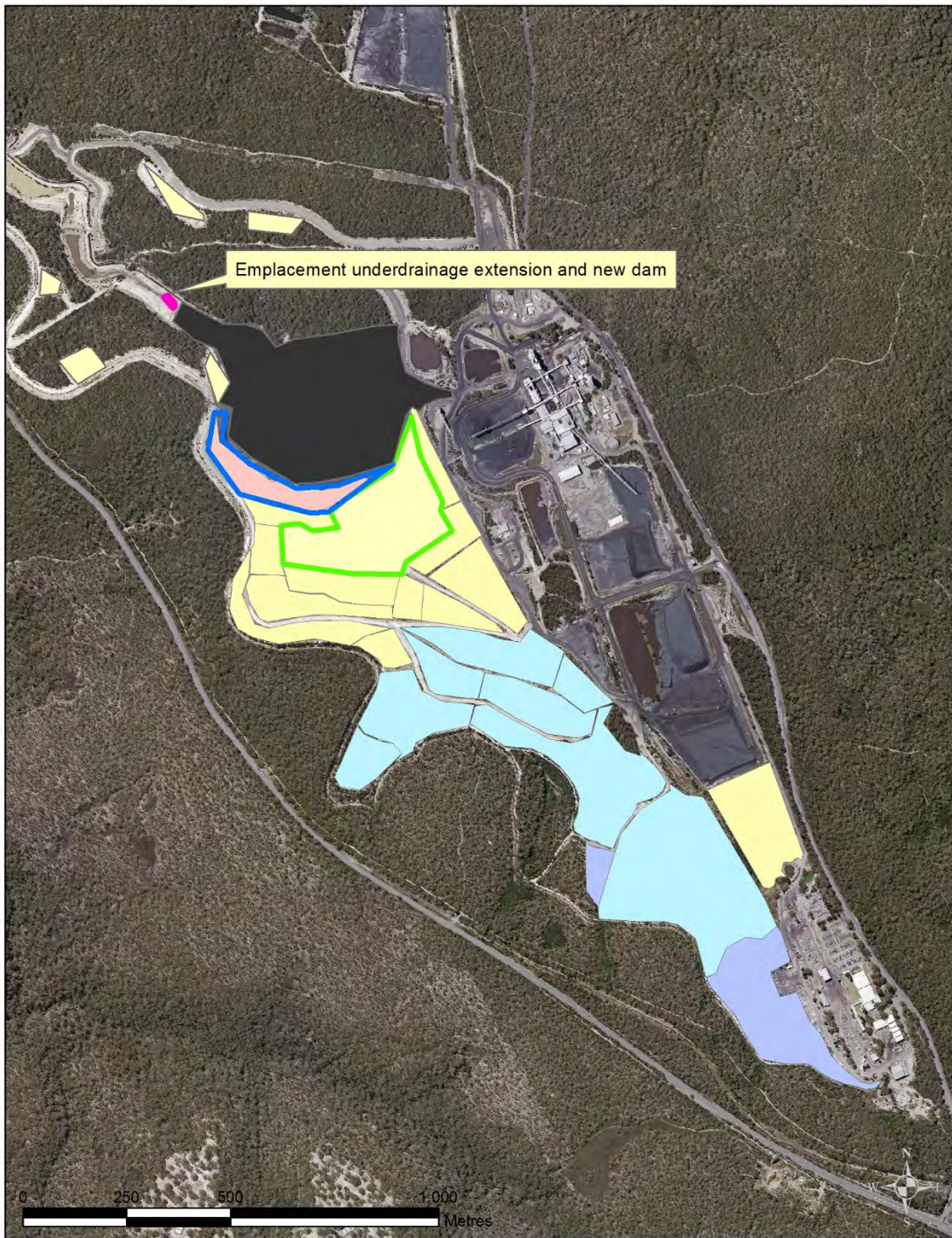
Plan No. - HSE-2012-131-REV-1



**PLAN 10 – NORTH CLIFF SITE**



**PLAN 11 – LAND PREPARATION PLAN – WEST CLIFF EMBLACEMENT**



Illawarra Coal

**Legend**

- Soil Stockpiles FY17
- Active Coalwash FY17
- Rehab Work to be completed FY18 (Seeding and Topsoil)
- Rehab Works (Seeding) completed FY17
- Ecosystem Development
- Ecosystem Establishment
- Growth Medium Development
- Landform Establishment

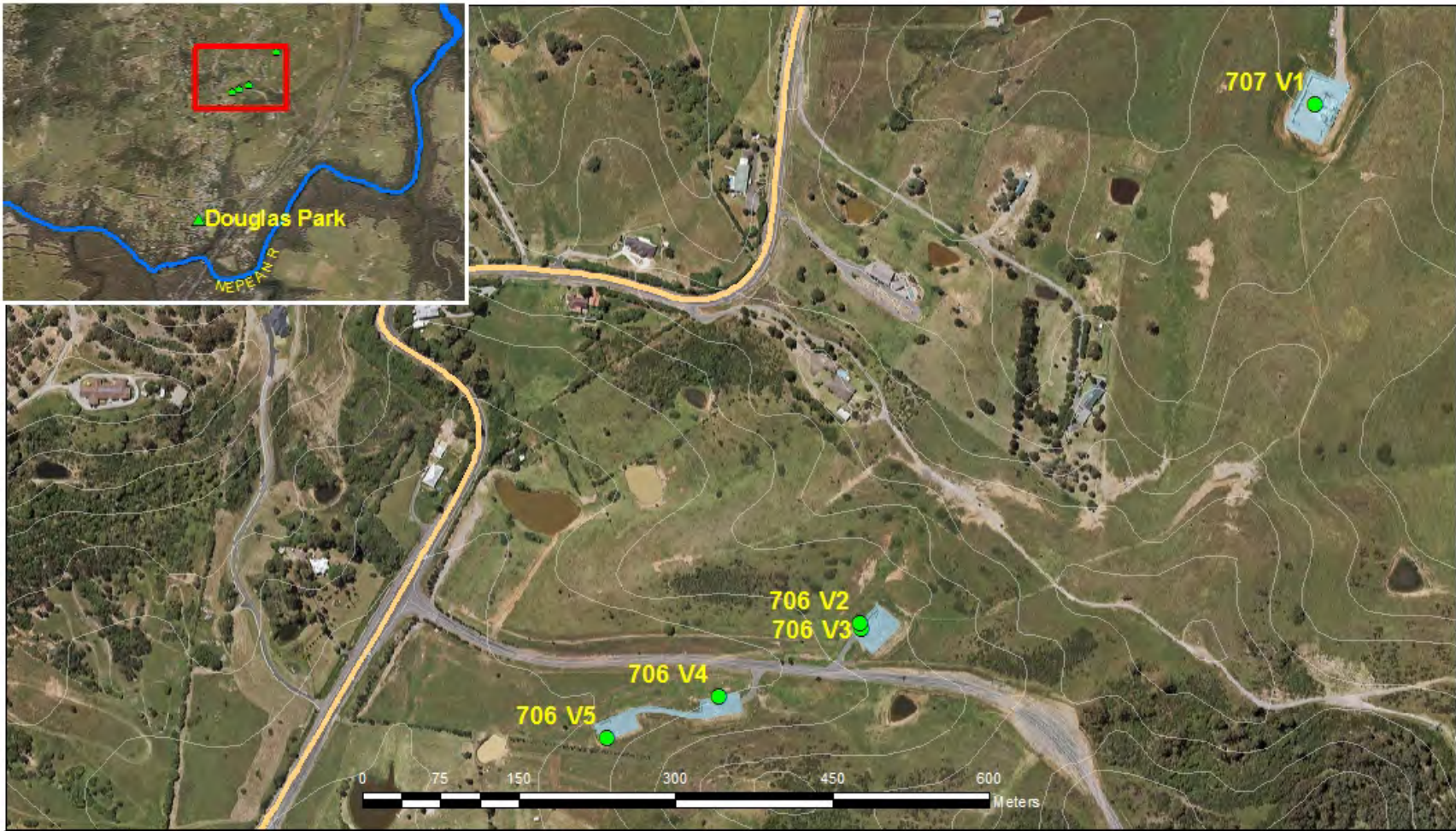
**Land Preparation Plan  
West Cliff Emplacement**

*Date: Sept, 2017  
Author: D Gregory*

**Version 1**  
Horizontal Datum  
MGA - Zone 56

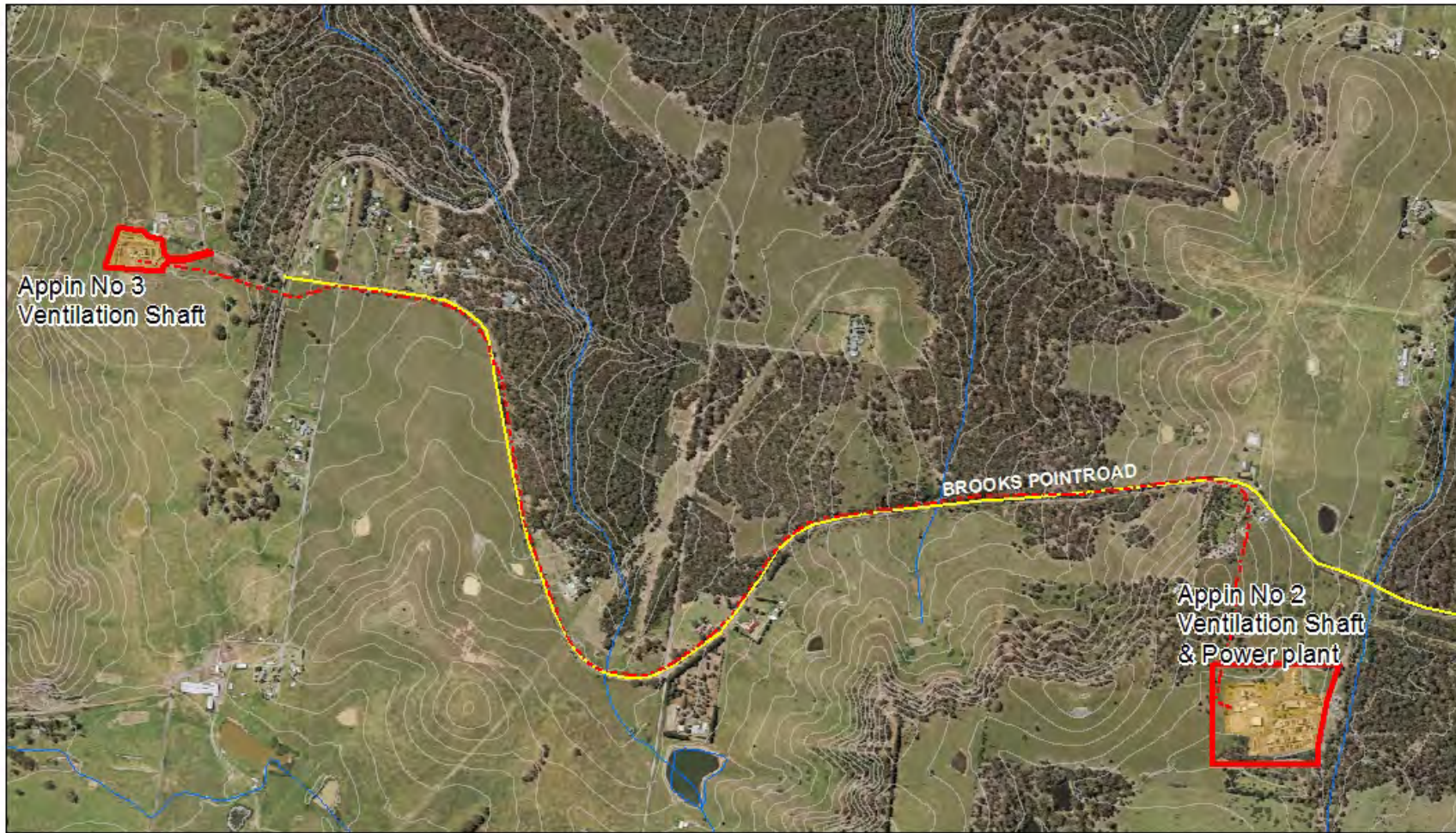
**PLAN 12 – APPIN MINE SAFETY GAS DRAINAGE REHABILITATION**





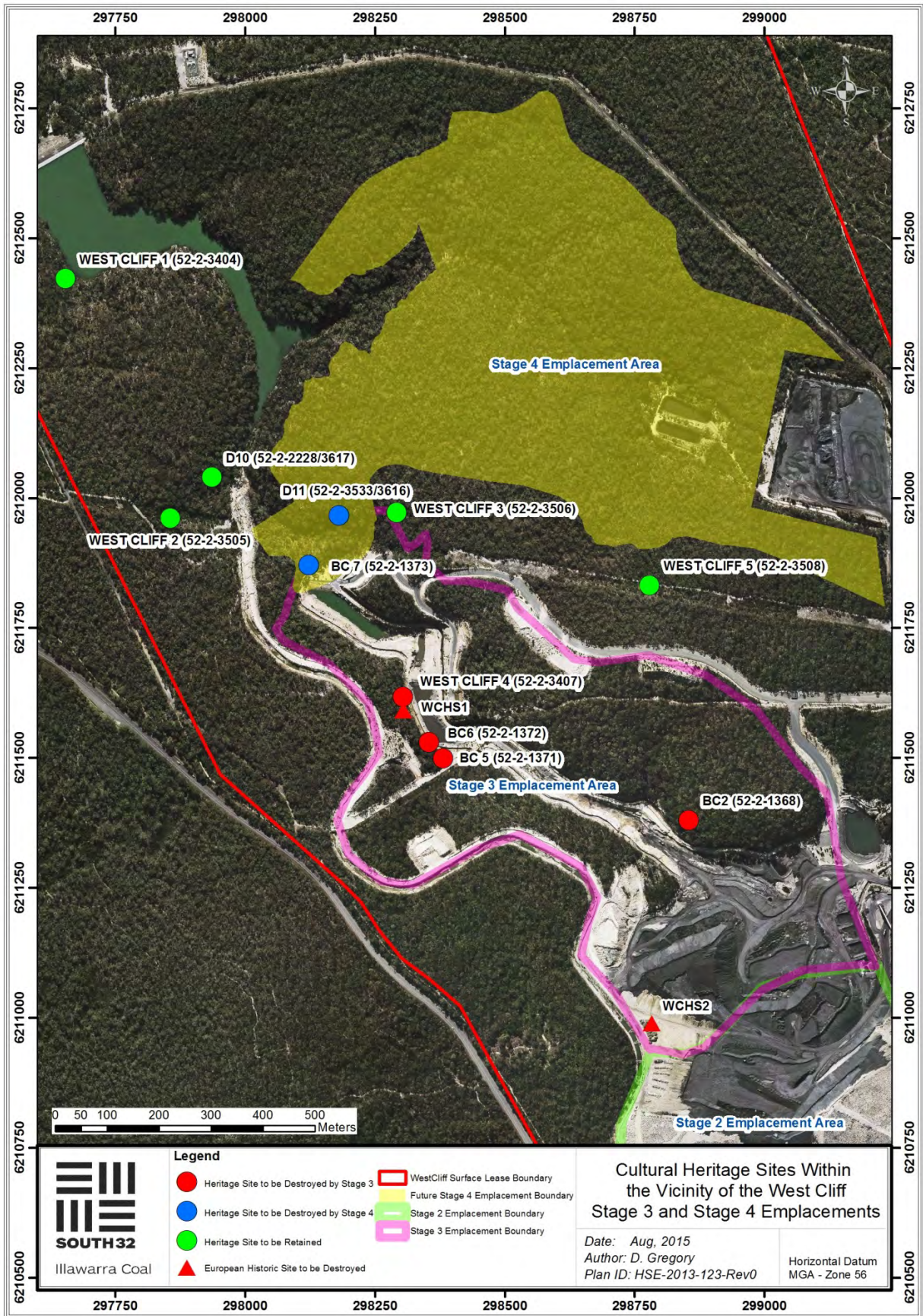
 <p><b>SOUTH32</b> Ilzwarra Coal</p>	<p><b>Legend</b></p> <ul style="list-style-type: none"> <li><span style="color: green;">●</span> Gas Drainage Well</li> <li><span style="border-bottom: 2px solid yellow; width: 20px; display: inline-block;"></span> Menangle Road</li> <li><span style="background-color: lightblue; width: 20px; height: 10px; display: inline-block;"></span> Gas Well Pads Undergoing Rehabilitation</li> <li><span style="border-bottom: 1px solid gray; width: 20px; display: inline-block;"></span> 10m Contours</li> </ul>	<p>BSO Annual Review Rehabilitated Appin Gas Well Sites</p>		
		<p>Date: August, 2017 Author: A. Parro</p>	<p>Version 1 Horizontal Datum MGA - Zone 56</p>	

**PLAN 13 – APPIN EAST GAS DRAINAGE PLANT AND PIPELINE UPGRADE**

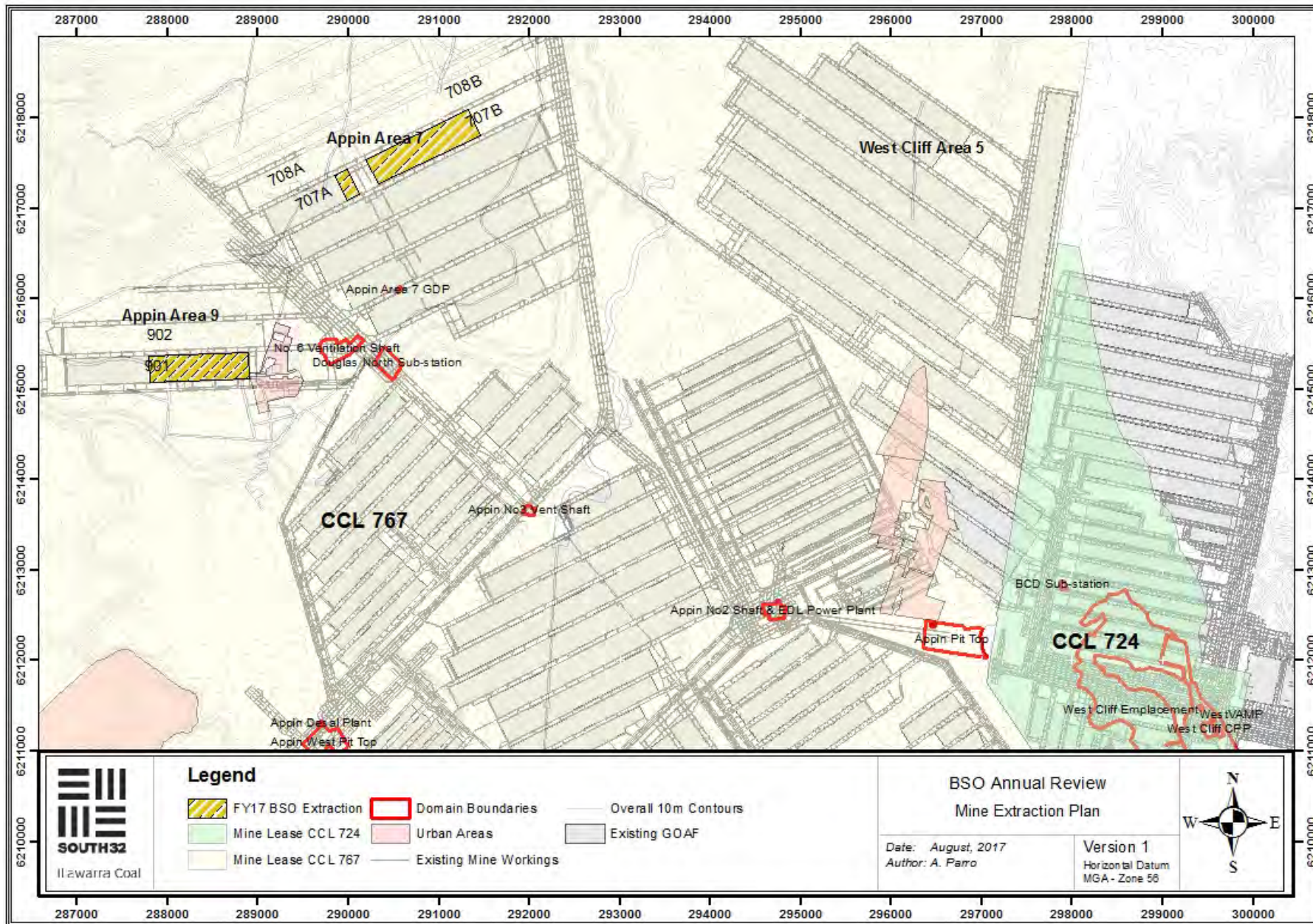


 <p>SOUTH32 Ilzwarra Coal</p>	<p><b>Legend</b></p> <ul style="list-style-type: none"> <li><span style="color: yellow;">—</span> Brooks Point Road</li> <li><span style="color: red; border-bottom: 1px dashed red;">—</span> Appin East Gas Drainage Pipeline</li> <li><span style="color: blue;">—</span> Creeklines</li> <li><span style="border: 1px solid red; display: inline-block; width: 15px; height: 10px; vertical-align: middle;"></span> Domain Boundaries</li> <li><span style="color: gray;">—</span> 5m Contours</li> </ul>	<p>BSO Annual Review Appin East Gas Drainage Plant Upgrade</p>		
		<p>Date: 20 September, 2017 Author: A. Parro</p>	<p>Version 1 Horizontal Datum MGA - Zone 56</p>	

**PLAN 14 – WEST CLIFF EMBLACEMENT CULTURAL HERITAGE SITES**

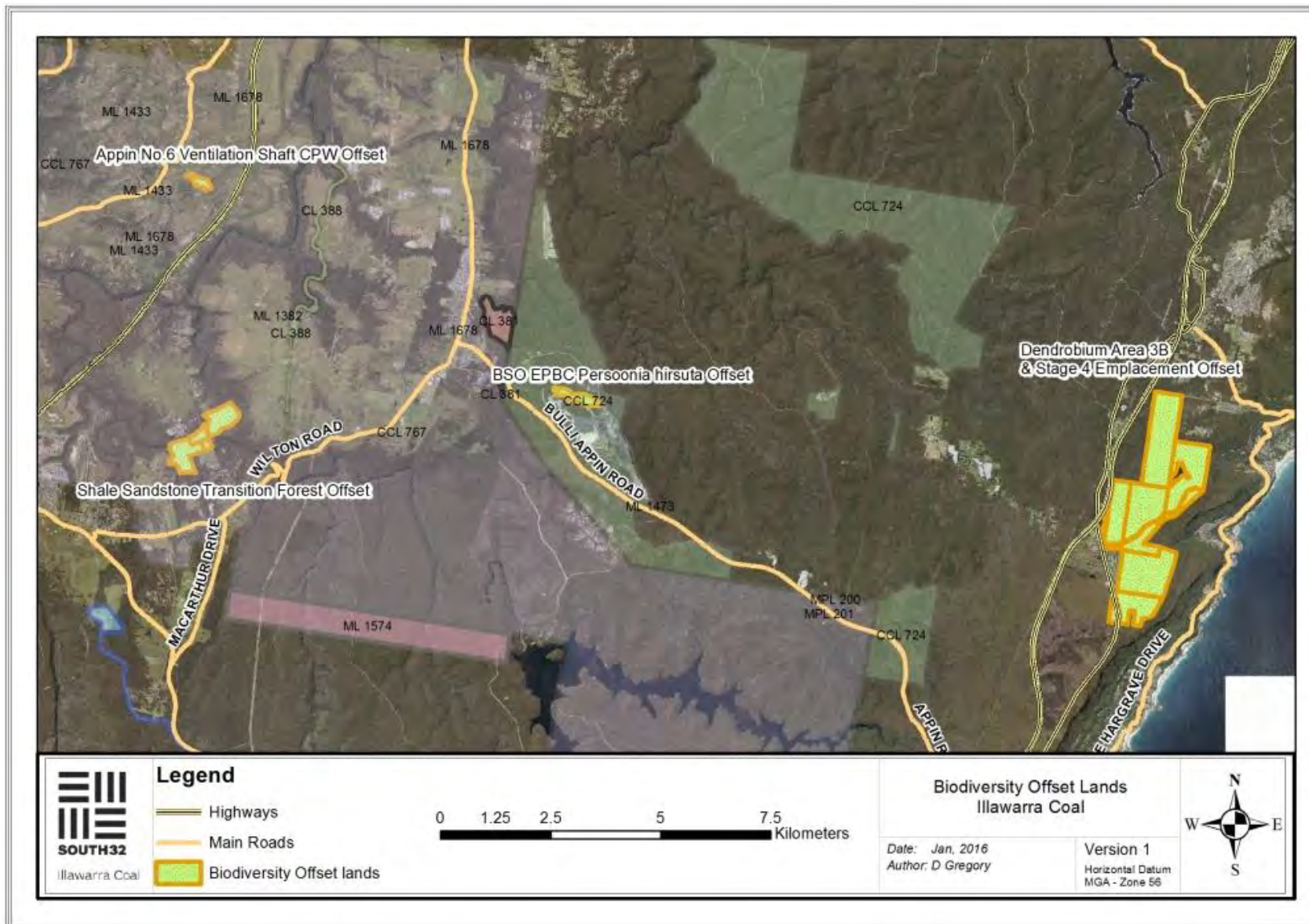


**PLAN 15 – MINE EXTRACTION PLAN**



**PLAN 16 – BIODIVERSITY OFFSET LOCATIONS**





# **APPENDICES**

## **APPENDIX A: ANNUAL REHABILITATION REPORT**

# MONITORING REPORT - EMPLACEMENT REHABILITATION YEAR 6

Illawarra Coal, June 2017



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# INTRODUCTION

## REQUIREMENT FOR MONITORING

### Stage 3 Consent

The development consent for the Stage 3 Emplacement at West Cliff Colliery Emplacement required Illawarra Coal (IC) to implement a formal monitoring program for all past, present and future emplacement rehabilitation activity on the site. The Stage 3 consent was replaced by the Bulli Seam Operations (BSO) Part 3A and EPBC Act approvals in 2011.

### BSO Part 3A and EPBC Act Approvals

IC received Project Approval for current and proposed operations within the BSO for the next 30 years from the:

- NSW Department of Planning and Environment (DOPE) under the *Environmental Planning and Assessment Act 1979* in December 2011; and
- Department of the Environment (DOTE) under the *Environment Protection and Biodiversity Conservation Act 1999* in May 2012.

Both contain conditions relating to the emplacement operations as summarised below:

**Table 1: Condition requirements of the EPBC and Part 3a approvals relating to emplacement rehabilitation**

BSO Project Approval Condition 17	EPBC Project Approval Clause 6:
<p>The Proponent shall prepare and implement a West Cliff Emplacement Area Management Plan for the project to the satisfaction of the Director-General. This plan must be prepared in consultation with OEH and be submitted to the Director-General for approval by the end of June 2013. This plan must include:</p> <p>a) detailed design plans which include options for reducing, avoiding and/or managing impacts on Aboriginal heritage sites in and adjacent to the south-western fringe of the proposed Stage 4 footprint (including sites: 52-2-2228/3617, 52-2-1373, 52-2-3533/3613 and 52-2-3506</p> <p>(b) management strategies to ensure no impacts to Aboriginal heritage site 52-2-3505 other than negligible impacts, including consideration of potential staged development of the emplacement and/or buffer areas;</p> <p>(c) management strategies for the protection and conservation of <i>Persoonia hirsuta</i>;</p> <p>(d) management strategies for the protection and conservation of the Broad-headed Snake and the Southern Brown Bandicoot;</p> <p>(e) a comprehensive groundwater monitoring program for the Brennans Creek valley, including the area of the emplacement;</p> <p>(f) provide for progressive rehabilitation of the emplacement area, including through:</p> <ul style="list-style-type: none"> <li>- maximising opportunities for natural regeneration;</li> <li>- maximising retention of suitable habitat species;</li> <li>- appropriate weed and pest control strategies; and</li> <li>- planting only endemic species in habitat mixes appropriate for soil, slope and aspect.</li> </ul>	<p>The person taking the action must provide a Coal Wash Emplacement Staging and Rehabilitation Plan (the Staging Plan) for the stage 4 coal wash emplacement area to the Minister for approval. Clearing of vegetation for stage 4 coal wash area must not occur until the Staging Plan has been approved by the Minister. The Staging Plan must include, but not be limited to:</p> <p>Measures to limit the clearing of native vegetation to no more than 60 hectares;</p> <p>Provision for the progressive staging of coal wash emplacement to ensure at all times a minimum 100 m wide habitat corridor is maintained linking the <i>Persoonia hirsuta</i> core population with habitat adjacent to the Stage 4 coal wash emplacement area;</p> <p>Measures to ensure that, if the corridor is to include land previously used as emplacement areas (either in whole or part), native re-vegetation is established to the extent that it facilitates the movement of pollination vectors for <i>Persoonia hirsuta</i>;</p> <p>Staging of emplacement from east to west;</p> <p>Provision for progressive rehabilitation of the emplacement area, including through:</p> <p>Staged clearing of native vegetation within the stage 4 coal wash emplacement area;</p> <p>Maximising opportunities for natural regeneration, including through salvage, storage and re-use of site top soil and maximising the retention time of suitable habitat species within the stage 4 coal wash emplacement area adjacent to active emplacement areas to assist re-colonisation of native species to rehabilitated areas;</p> <p>Key performance objectives for site rehabilitation, including indicative timelines, performance measures, management actions and responsibilities and accountabilities;</p> <p>Planting only endemic species in habitat mixes appropriate for the local surrounding environment, soil, slope and aspect, in accordance with relevant published guidelines; and</p> <p>Appropriate weed and pest control strategies.</p> <p>Monitoring and rehabilitation actions including but not limited to, measures to assess the success of management actions, natural regeneration and revegetation. The reporting of monitoring results must be submitted to the department within 30 days of every 12 month anniversary of the implementation date of the Staging Plan; and</p> <p>Unless otherwise agreed to in writing by the Minister, the Staging Plan must be implemented and remain implemented for a minimum period of 10 years at which point a revised plan taking into account the monitoring referred to above must be</p>

<b>BSO Project Approval Condition 17</b>	<b>EPBC Project Approval Clause 6:</b>
	submitted to and approved by the Minister.

### Emplacement Management Plan

The BSO Emplacement Area Management Plan was approved on 25<sup>th</sup> July 2014 by DOPE.

The rehabilitation monitoring commitments outlined in this plan are as follows:

**Table 2: Monitoring requirements from the Coal Wash Emplacement Area Management Plan**

Type	Who	Frequency	Aspects monitoring	Output
Quarterly Inspection	Site Environmental Representative	Quarterly	Photographic records at pre-determined sites located within the rehabilitated area of the emplacement.	Report (internal) and photographic database. Results summarised in the BSO AEMR.
Annual Inspection	Qualified ecologists or suitably trained site environmental representative	Annual	Fixed photo points throughout the emplacement. Quadrat monitoring in rehabilitation and surrounding areas Random meander transects (every two years) in rehabilitated areas Materials Characterisation (as required)	Report (internal) Outcomes from monitoring summarised in the BSO AEMR Report appended to the BSO AEMR.

### PURPOSE OF THIS REPORT

The purpose of this report is to provide the results of the spring 2016 survey for the emplacement rehabilitation works.

# SURVEY DESIGN

## AIM

To measure, over time, the success of the rehabilitation of the Emplacement Area, particularly the regeneration of natural vegetation and placement of specific habitat features including rocks and logs.

This will be achieved through monitoring of biometric attributes, fixed photo points and threatened plant meander surveys as well as measuring the presence/absence of fauna within the various rehabilitation sites of varying age.

## KEY PERFORMANCE CRITERIA

The monitoring program is designed to monitor the success of the following criteria:

1. Adequate regeneration of translocated communities: Exposed Sandstone Scribbly Gum Woodland (ESSW) and Sandstone Gully Peppermint Forest (SGPF). Regeneration to reflect the composition and structure of the two communities.
  - i. Biometric attributes within local benchmarks
  - ii. no more than 20 percent weed cover in translocated compartments;
2. The degree to which fauna (native) use the rehabilitated emplacement including constructed habitats and nest boxes.

## METHODS

### Biometric Vegetation Assessment

This assessment utilises the BioBanking Assessment Methodology as outlined in the *BioBanking Assessment Methodology and Credit Calculator Operational Manual* (OEH 2014). This methodology is used as it is a ready-made vegetation condition assessment, incorporating parameters (known as 'site attributes') that reflect changes in condition over time against benchmarks. Furthermore, the methodology allows for the calculation of local benchmark data, thereby providing a more accurate picture of the condition of the suitable vegetation types locally. In summary, the system is a vegetation condition assessment predicated on the basis of a comparison of site attributes against benchmarks for those attributes within the relevant vegetation types. Local benchmark data can be collected to reflect local conditions.

Vegetation plots (50 x 20 metres) were established within each of the monitoring zones and data for the following site attributes was collected:

- Native Plant Species Richness;
- Native Overstorey Cover;
- Native Midstorey Cover;
- Native Groundcover (Grasses);
- Native Groundcover (Shrubs);
- Native Groundcover (Other);

- Exotic Plant Cover;
- Total Length of Fallen Logs.

### *Control Sites*

Six locations were chosen as control sites (Plan A: Monitoring plot locations). Monitoring the controls sites will:

- Allow the measurement of the success of soil translocation within the Emplacement through the comparison of a range of site condition attributes with local benchmark conditions;
- Provide long term data regarding the condition of local vegetation types and the targets for rehabilitation; and
- Account for any stochastic variability within the local ecosystems (e.g., bushfire, climate, etc.) and allow for the consideration of such variability in relation to the outcomes on the site.

The six locations chosen as control sites were stratified evenly (three of each) between the two locally dominant vegetation types; ESSW and SGPF.

### *Monitoring Sites*

Stratification of the monitoring sites, within the Emplacement, occurred according to their treatment histories, age and the respective areas they occupied in hectares. Accordingly, 11 monitoring sites were chosen across three different treatment types in 2011. This has been expanded to 15 plots across four separate treatments in 2014 (Plan A: Monitoring plot locations & Plan B: Emplacement Plot Locations And Rehabilitation Progress). Monitoring sites are listed in Table 3: Monitoring site locations

**Table 3: Monitoring site locations**

Site	Easting	Northing	Emplacement Stage
a1-228	299842	6210193	1
a1-230	299758	6210171	
a1-232	299857	6210092	
a2a-237	299578	6210253	2a
a2a-239	299649	6210350	
a2a-240	299509	6210386	
a2b-241	299515	6210493	2b
a2b-242	299322	6210565	
a2b-243	299136	6210510	
a2b-244	299093	6210408	
a2b-245	299388	6210627	
a2c-042	299259	6210803	2c
a2c-043	299223	6210746	
a2d-001	298798	6210768	2d
a2d-002	298848	6210678	

### *Local Benchmarks*

Local benchmark data was collected at six control sites. The BioBanking Local Benchmark Calculator is then used to calculate the benchmark levels and the range of values for each of the collected attributes. The control sites were nominated on the basis of Revised Biometric

Vegetation Types (RBVTs as defined by OEH in the Biometric Vegetation Types Database) as either the Red Bloodwood – Scribbly-Gum Heathy Woodland RBVT or the Sydney peppermint – Smooth-Barked Apple – Red Bloodwood Shrubby Open Forest RBVT of the Sydney Metropolitan Catchment Management Authority (CMA). It was considered that the Emplacement was likely to regenerate to a state that was an artificial combination of both of these RBVTs and therefore no attempt has been made to stratify the survey on the basis of these types.

Table 4 below shows the local benchmark values for each of the biometric attributes utilising data from the control sites collected in 2010, 2012 and 2014. Data from these years was used as the Local Benchmark. The data was entered into the Local Benchmark Calculator. The calculator only allows entry of up to 20 plots and, as 30 control sites exist (five years of six plots), only data from three years could be used (i.e., 18 plots). An average of the data from these two monitoring season was utilised in this report.

**Table 4: Local benchmarks**

Attribute	Benchmarks (2014)	
	Lower	Upper
Native Plant Species	-	>= 49
Native Overstorey Cover	5.0	22.3
Native Midstorey Cover	1.2	21.2
Native Ground Cover (Grasses)	0.0	39.0
Native Ground Cover (Shrubs)	14.8	72.0
Native Ground Cover (Other)	13.4	62.6
Number of Trees with Hollows*	-	>= 2
Total Length of Fallen Logs	-	>= 26

\* Included here for completeness only. As discussed above, trees with hollows are unlikely to develop within the life of the project.

### Photo Point Vegetation Monitoring

Permanent photographic points have been established at each of the biometric vegetation plots.

### Threatened Plant Random Meander

A random meander for threatened plants (Cropper 1993) is conducted through the Emplacement. This method is the most appropriate and accurate for the purposes of the monitoring survey. Two people, approximately 10 metres apart, traverse the Emplacement. Targeted species included those known to exist locally (some within the West Cliff Colliery surface lease-area) and include; *Acacia bynoeana*, *Epacris purpurascens* var. *purpurascens*, *Grevillea parviflora* ssp. *parviflora*, *Melaleuca deanei*, *Persoonia hirsuta*, *Persoonia nutans* and *Pultenaea aristata*.

### Fauna Using Camera Traps

Camera traps are becoming the preferred survey method over traditional cage traps or hair tubes as they are more efficient and less labor intensive, and non-invasive. The method is well documented for monitoring small to medium sized mammals. Some useful resources are Eyre et al (2012) and Meek et al. (2012).

Camera traps will be deployed to the rehabilitating areas, using a passive survey approach (i.e. non baited). The sites will target specific habitat features i.e. logs, log hollows and rock crevasses/overhangs to determine occupation – As a general rule, minimum 1 trap per rehabilitation compartment. Refer to Plan C: Camera Trap Locations 2016/17.

Camera will be Infra-red type. Cameras should be placed to aim the lens at the core body zone of the animal. The camera should be placed approx. 20-30cm above the ground and distance from the feature should be no more than 2-3m (Meek *et al.* 2012).

A measurement of scale should be placed in the background (30cm ruler, steel pole or other aid).



The recommended minimum deployment time is 12 nights (Meek et al. 2012 and Paull et al. 2011).

### Timing

Biometric assessments are required annually, starting at 1 year after translocation.

Surveys at control sites only required once every three years and the benchmarks as presented in this report remain so for the ensuing three year period.

Photo point monitoring is required annually and done in conjunction with the above.

Meanders for threatened plants are undertaken every three years.

Fauna monitoring using camera traps is required annually, starting 5 years after translocation or as deemed appropriate depending on the maturity of the revegetation.

Criteria can be measured most easily in spring by noting flowering, seed production, seedling growth and establishment.

## 2016 RESULTS AND DISCUSSION

### BIOMETRIC VEGETATION ASSESSMENT

#### Native Plant Species Richness

The local benchmark for Native Plant Species Richness is  $\geq 49$  species per plot.

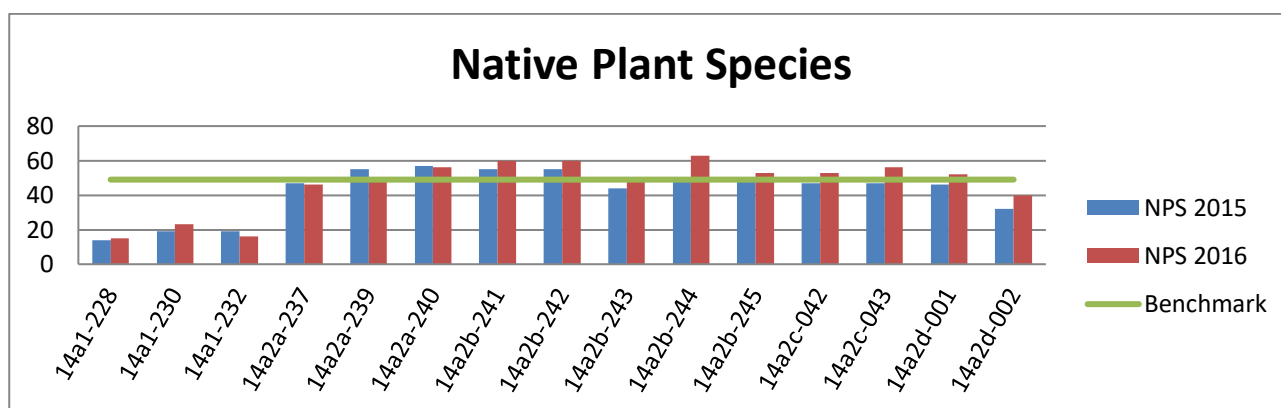


Figure 1 Number of native plant species at the monitoring plots for rehabilitation areas 1, 2a, 2b, 2c and 2d for 2016.

The plots in Area 1 had low species richness in comparison to benchmark; however this was also the case in previous years (2011 to 2015) and is a stable result. This is due to the differing nature of the methodology used in comparison to stage 2 i.e. Stage 1 has shallower topsoil and planted with tube stock (Predominantly Acacia's and Eucalypts).

The plots in Area 2a had an average of 50 species per plot which is a decrease from the previous year's average of 53 species. Rehabilitation in this area commenced in 2007 and it is expected that species richness will approach benchmark as certain species thrive and out compete others.

The plots in Area 2b had an average of 50 species per plot which is the same as the previous year. The average remains above benchmark.

The newly treated areas of 2c and 2d (last five years) are mostly above benchmark levels, which is an increase from previous years. It is expected that these species richness figures will increase further at these locations as the treatments establish.

The high native species richness present in Area 2 may be a reflection of the immaturity of the translocation areas, in that it shows that no particular species has had time to establish dominance and out-compete other species. It is expected that these sites in Area 2 will see a decline in species diversity over time and approach benchmark levels as certain species thrive and out compete others for resources and space (Niche 2014).

### Native Overstorey Cover

Local benchmark for Native Overstorey Cover is 5.0 – 22.3 percent foliage cover.

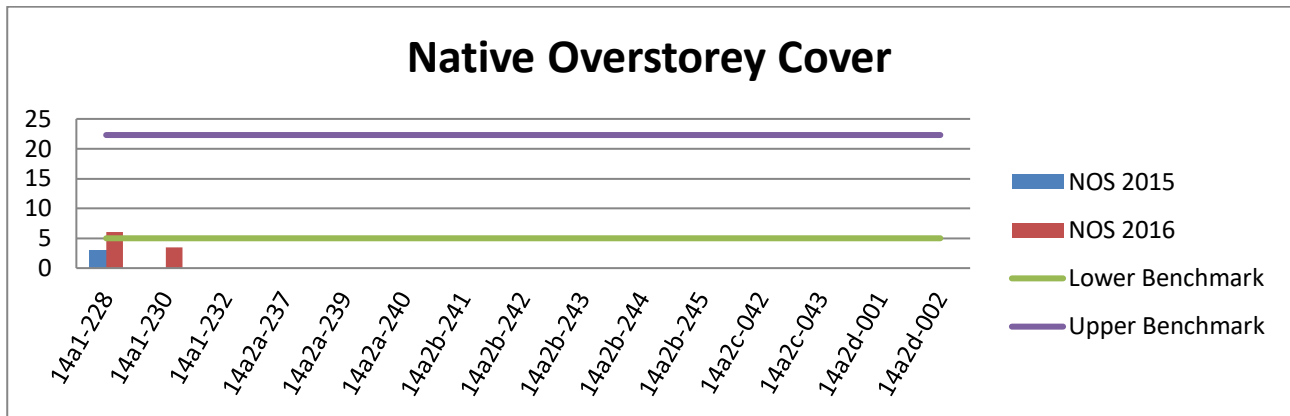


Figure 2 Native overstorey cover collected at the monitoring plots for rehabilitation areas 1, 2a, 2b, 2c and 2d for 2016.

The areas subject to rehabilitation in 2a-d are too immature to have recorded native overstorey as cover, despite all dominant overstorey species being recorded within the monitoring plots. All canopy species within the plots were present only as shrubs or sub-shrubs and were considered a component of the midstorey or groundcover (shrubs < 1 metre). As a consequence, none of the sites in Area 2 are within the benchmark range for Native Overstorey Cover. As the translocation areas establish and mature it is expected that Native Overstorey Cover will increase and approach benchmark levels.

### Native Midstorey Cover

The local benchmark for Native Midstorey Cover is 1.2 – 21.2 percent foliage cover.

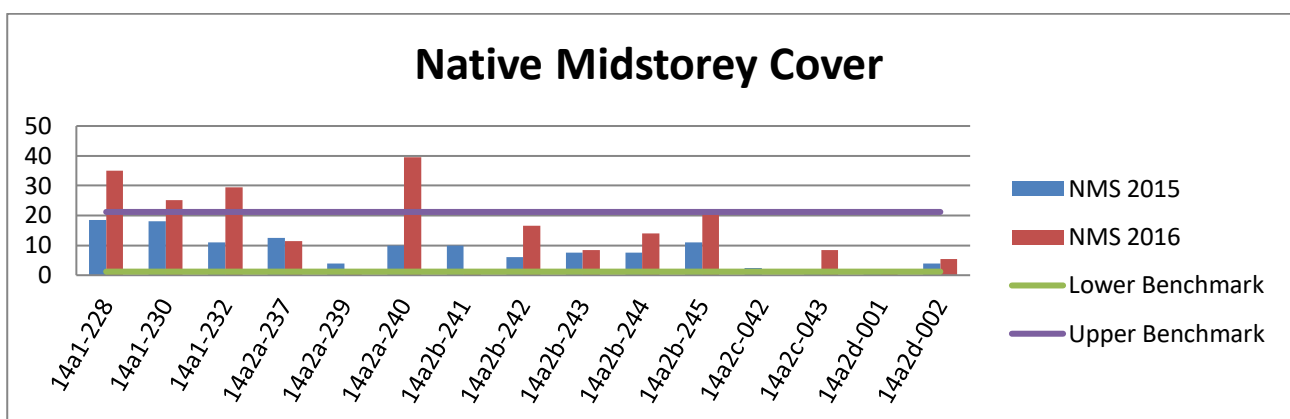


Figure 3 Native Midstorey Cover collected at the monitoring plots for rehabilitation areas 1, 2a, 2b, 2c and 2d for 2016.

The majority of treatment areas demonstrated within or above benchmark values for native midstorey cover. There have been some clear increases in both Area 1 and Area 2. The increases can be explained by maturity of some species whose natural life form is now above one metre (i.e., shrubs that were less than one metre in previous years are now large shrubs or small trees over

one metre). It is likely that mid-storey cover in a2c and a2d further in coming years as the rehabilitation areas mature.

### Native Ground Cover (Shrubs)

The local benchmark for Native Groundcover (Shrubs), i.e., woody plants < 1 metre: 14.8 – 72.0 per cent.

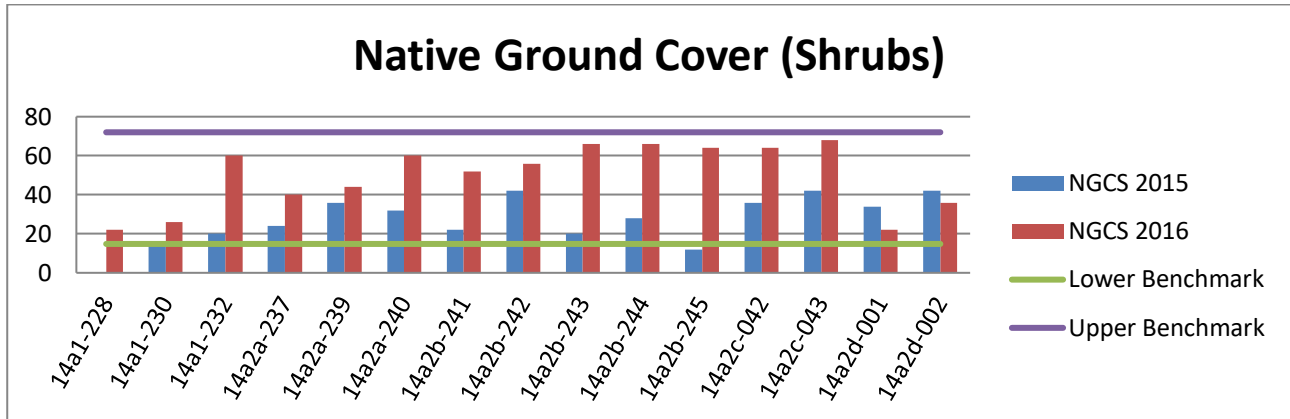


Figure 4 Native ground cover – Shrubs at the monitoring plots for rehabilitation areas 1, 2a, 2b, 2c and 2d for 2016.

All plots are clearly within the benchmark range for the attribute. The low ground cover in A1 may be as a result of the fact that the bulk of the species within this treatment are either canopy or small trees and the shrub layer has become mid-storey (i.e., greater than one metre) over time.

### Native Ground Cover (Grasses)

The local benchmark for Native Groundcover (Grasses) is 0.0 – 39.0 per cent. Grass cover is naturally very low in the control sites, as Sydney Coastal Dry Sclerophyll Forests, hence the low and broad benchmark range for the attribute.

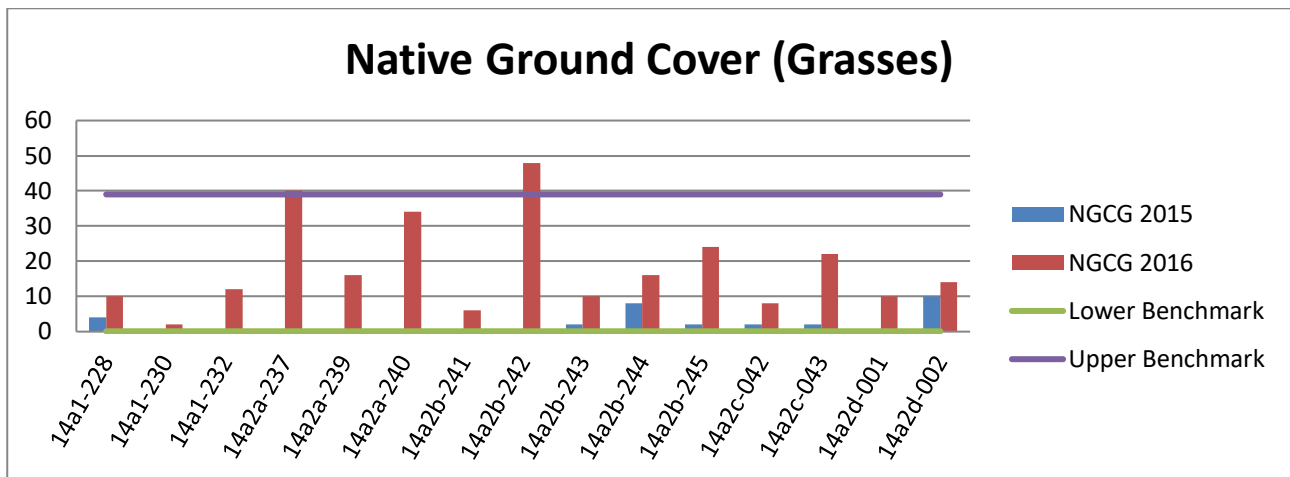


Figure 5 Native ground cover – Grasses at the monitoring plots for rehabilitation areas 1, 2a, 2b, 2c and 2d for 2016.

Given that zero (0) is the lower benchmark for Native Groundcover (Grasses), all treatments are within benchmark for this attribute. This is entirely reasonable given that the translocated soils are from Sydney Coastal Dry Sclerophyll Forests which are naturally higher in cover for herbs and forbs than grass cover. Grass cover also requires an open environment and since most of the treatments have resulted in a relatively dense mid-storey and shrub layer, native grass is difficult to establish. Percent cover of native grasses is not necessarily indicative of ecosystem health in

Sydney Coastal Dry Sclerophyll Forests and the attribute is within benchmark in all treatment areas. In saying this, large increases in native grass cover are shown in almost all of the areas. This may be a result of the high rainfall experienced during the year.

**Native Ground cover (Other)**

The local benchmark for Native Groundcover (Other), i.e., herbs and forbs other than grasses is 13.4 – 62.6 per cent.

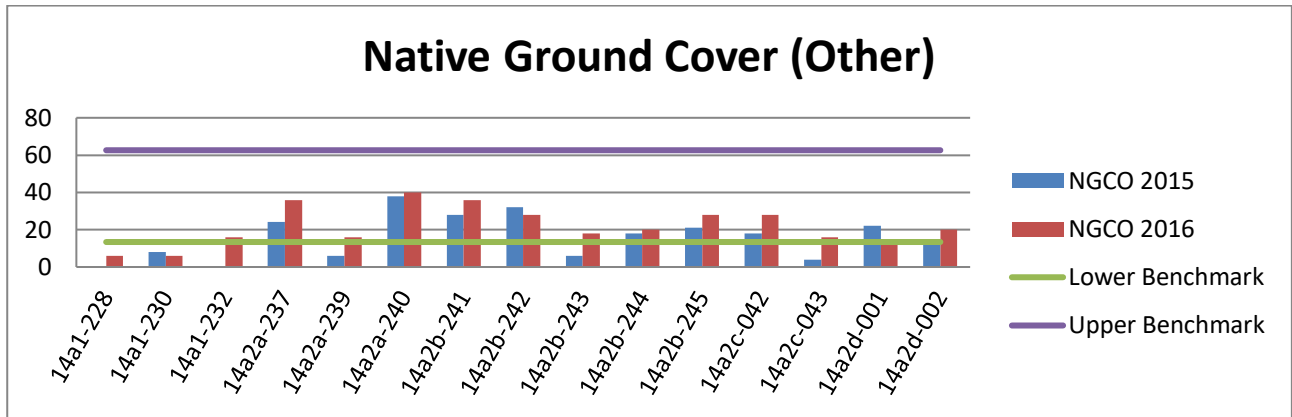


Figure 6: Native ground cover – Other at the monitoring plots for rehabilitation areas 1, 2a, 2b, 2c and 2d for 2016.

Area 1 continues to experience low levels in Native Groundcover (Other), which along with low native grass cover appears symptomatic of the treatment history and the subsequent density of the shrub and mid-storey layers. All other Areas are at or within benchmark for Native Groundcover (Other).

**Exotic Plant Cover**

There is no local benchmark for exotic plant cover. Whilst it is assumed that there would 0 – 5% exotic plant cover within the control plots, a target of <20% has been chosen for all rehabilitation areas.

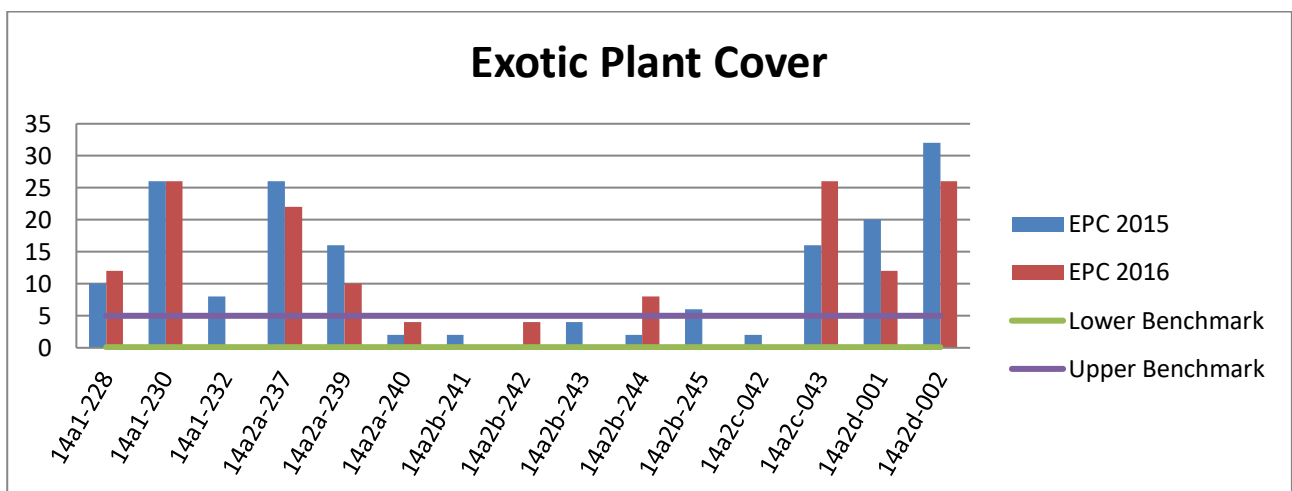


Figure 7 exotic plant cover at the monitoring plots for rehabilitation areas 1, 2a, 2b, 2c and 2d for 2016.

The majority of sites fall below the target of 20% exotic plant cover with the exception of one plot in A1a, A2a, A2c and A2d. The dominant weeds in these areas include *Eragrostis curvula* (African lovegrass), *Andropogon virginicus* (whisky grass), *Conyza bonariensis* (Fleabane), and *Hypochaeris radicata*. *Pennisetum clandestinum* (Kikuyu), *Cortaderia selloana* (Pampas grass)

and *Cynodon dactylon* (common couch) are all exotic perennial grasses that have dominated localised patches within the Emplacement and also require management.

### Length of Fallen logs

The local benchmark for Length of Fallen Logs is  $\geq 26$  metres within the 20 x 50 metre plot.

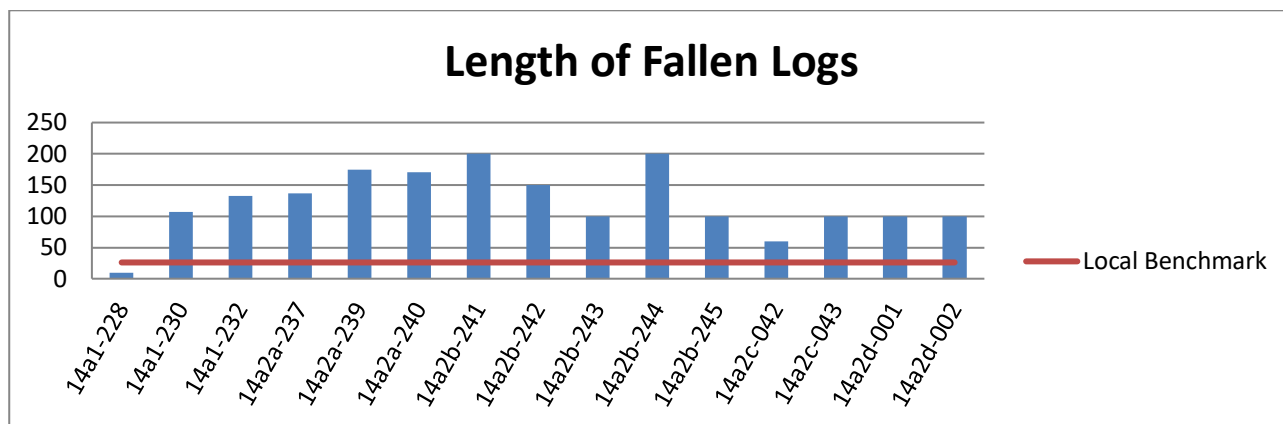


Figure 8 length of fallen logs within all plots (data obtained in 2015).

All plots and areas have substantial log length, well above the benchmark levels. This was due to the targeted movement of this material along with the soil translocation. These figures are not expected to change dramatically over time, however the graph above serves to demonstrate that an adequate amount of logs have been moved with the translocation. Given the limitations on the amount of logs available to the Emplacement as a resource, the current on-site strategy for log placement has been substantially reduced and will still meet benchmark levels.

### Biobanking Scores

Biobanking scores are calculated every 3 years. The last calculation was undertaken in 2014.

At the time Six BioBanking scenarios were run through the BioBanking Credit Calculator (2014 on-line version) using the data collected from the monitoring sites from 2011 and 2014. These scenarios were comprised of one scenario for each of the treatment areas assuming that the sites would regenerate to either the Red Bloodwood – Scribbly-Gum Heathy Woodland BVT (ME014) or the Sydney peppermint – Smooth-Barked Apple – Red Bloodwood Shrubby Open Forest BVT (ME029). The scenarios were run only as an indication of the ecosystem credits generated by the current management regime. Species credits were not included in the calculations. The ecosystem credits generated are used here only as an index and are not for the purposes of creating a BioBank Site.

Ecosystem credit calculations for each of the three main treatment areas, for which BioMetric attribute data exists in both 2011 and 2014 are shown in Table 5. Due to the limitations of the BCC, the scenarios presented in Table 3 assume that the treatment areas will regenerate to either ME014 (Bloodwood – Scribbly) or ME029 (Peppermint – Apple). Table 5 shows that an increase in ecosystem credits has occurred within each of the treatment areas, thus indicating stable if not improved condition overall. The only exception to this overall improvement is Area 2b assuming regeneration to ME014 (Bloodwood – Scribbly), which decreases from 77 to 68 credits. As an increase in ecosystem credits is shown for Area 2b assuming regeneration to ME029 (Peppermint – Apple), from 63 to 66 credits, the formerly mentioned decrease is likely a result of differences in benchmarks between ME014 (Bloodwood – Scribbly) and ME029 (Peppermint – Apple). The decrease will be monitored in future BCC scenarios – The next calculation will be in 2017.

**Table 5 Results of biobanking credit calculations for 2011 and 2014 (From Niche 2015)**

BVT Code	BVT	Treatment area	Area (ha)	Ecosystem Credits - 2011	Ecosystem Credits - 2014
ME014	Red Bloodwood – Scribbly-Gum Heathy Woodland	Area 1	9	26	46
		Area 2a	7	25	33
		Area 2b	12	77	68
ME029	Sydney peppermint – Smooth-Barked Apple – Red Bloodwood Shrubby Open Forest	Area 1	9	15	16
		Area 2a	7	25	33
		Area 2b	12	63	66

## PHOTO-POINT MONITORING

Photo-point monitoring, illustrating the changes in vegetation cover at each of the monitoring sites at 2011 (previous monitoring report) and 2014, is provided in Appendix 1. In general, all treatment areas have a good cover of native vegetation as a response to translocation and/or direct-seeding.

## THREATENED PLANT RANDOM MEANDER

Threatened plant meanders are undertaken every 3 years. The last meander was completed in 2014. At the time, *Pultenaea aristata* (12 individuals) and *Persoonia hirsuta* (one individual) were detected within the Emplacement during the surveys conducted in spring 2014. This is in addition to individuals recorded during the previous four monitoring events from 2010 to 2013. *Pultenaea aristata* is listed as vulnerable on the TSC and EPBC Acts, while *Persoonia hirsuta* is listed as endangered on both Acts. *Pultenaea aristata* has continued to have success in re-establishing to maturity within the Emplacement (refer to previous monitoring reports). The single mature individual of *Persoonia hirsuta* recorded in 2014 was located in Emplacement treatment area A2a, has reached maturity (flowering and fruiting) and has a stout stem with healthy foliage cover. This plant indicates that the species can germinate and survive to maturity in translocated soils. This is significant for the species locally, particularly given the focus of the BHPBIC recovery work being conducted by the University of Wollongong and the Royal Botanic Gardens (Mt Annan).

Threatened plant occurrences within the Emplacement will be regularly monitored by IC environmental staff.

## FAUNA

Camera traps were deployed across five sites in the mature rehabilitation areas (2640 camera hours) between May and June 2017. Cameras were placed to target specific habitat features (Figure 9 and Table 6).

**Table 6: Camera Trap Locations**

Site Name	Feature	Location
Site 1	Log Hollow	Stage 1 Rehabilitation E299740, N6210188
Site 2	Rock Shelter	Stage 2 Rehabilitation E299631, N6210209
Site 3	Fallen log	Stage 2 Rehabilitation E299254, N6210337
Site 4	Pond	Stage 2 Rehabilitation E299594, N6210337
Site 5	Animal Path	Stage 2 Rehabilitation E299142, N6210530



**Figure 9: Example of a camera site (Camera Trap site 1, emplacement Stage 1).**

The survey detected 12 native species; 8 of which were mammals, 3 birds and 1 reptile. This included one possible sighting of an Eastern Pigmy Possum which is listed as Vulnerable on the TSC Act (Stage 2 rehab, Site 5). The results are summarised in Table 7 below.

**Table 7: Fauna records from the camera trap survey**

		Site 1	Site 2	Site 3	Site 4	Site 5
		No. of events	No. of events	No. of events	No. of events	No. of events
Mammals	Brown Rat <i>Rattus norvegicus</i>	1				
	Brown Antichinus <i>Antichinus Stuartii</i>		2		5	3
	Bush Rat <i>Rattus fuscipes</i>		3		2	
	Cat <i>Felix catus</i>		1			
	Common Wallaroo <i>Macropus Robusta</i>	2				
	Eastern Pigmy Possum <i>Cercartetus nanus</i> <sup>1</sup>				1	
	Echidna <i>Tachyglossus aculeatus</i>					1
	European Fox <i>Vulpes vulpes</i>		1			
	Rabbit <i>Oryctolagus cuniculus</i>					1
	Ringtail Possum <i>Pseudocheirus peregrinus</i>		3		1	
	Sugar Glider <i>Petaurus breviceps</i>		1			
	Swamp Wallaby <i>Wallabia bicolor</i>	1	2		2	7
Birds	Common bronzewing <i>Phaps chalcoptera</i>					1
	Eastern Yellow Robin <i>Eopsaltria australis</i>	1	1			1
	Eastern Whipbird <i>Psophodes olivaceus</i>		1			
Reptiles	Eastern Water Dragon <i>Intellagama lesueurii</i>			3		
	Trap Nights	24	24	24	19	19
	Camera Hours	576	576	576	456	456

<sup>1</sup> Poor quality photo - most likely Eastern Pigmy Possum

## CONCLUSION

This report provides a description of the methodologies used and the outcomes achieved from the sixth season of monitoring the rehabilitation success in Stages 1 and 2 of the Emplacement. For the most part, the rehabilitation areas were within or above the local benchmarks for most of the biometric attributes. Treatment area 1 remains in the poorest condition and fails to meet the benchmarks for most attributes.

Weed incursion remains the key threat to the rehabilitation of the Emplacement. *Eragrostis curvula* (African Lovegrass) was observed as one of the dominant weeds throughout the monitoring program. It is likely to spread and out-crowd native plants if not treated. Weed management will be a major focus for 2017.

Two threatened plant species, *Pultenaea aristata* and *Persoonia hirsuta*, were detected within the Emplacement during the 2014 survey and both species remain. The *Persoonia hirsuta* individual is considered a significant observation and will contribute to the understanding of the species' capacity for regeneration within the rehabilitation areas.

The habitat features within the rehabilitation are clearly being occupied by native mammals. As the rehabilitation matures, it is expected that native fauna abundance will increase further.

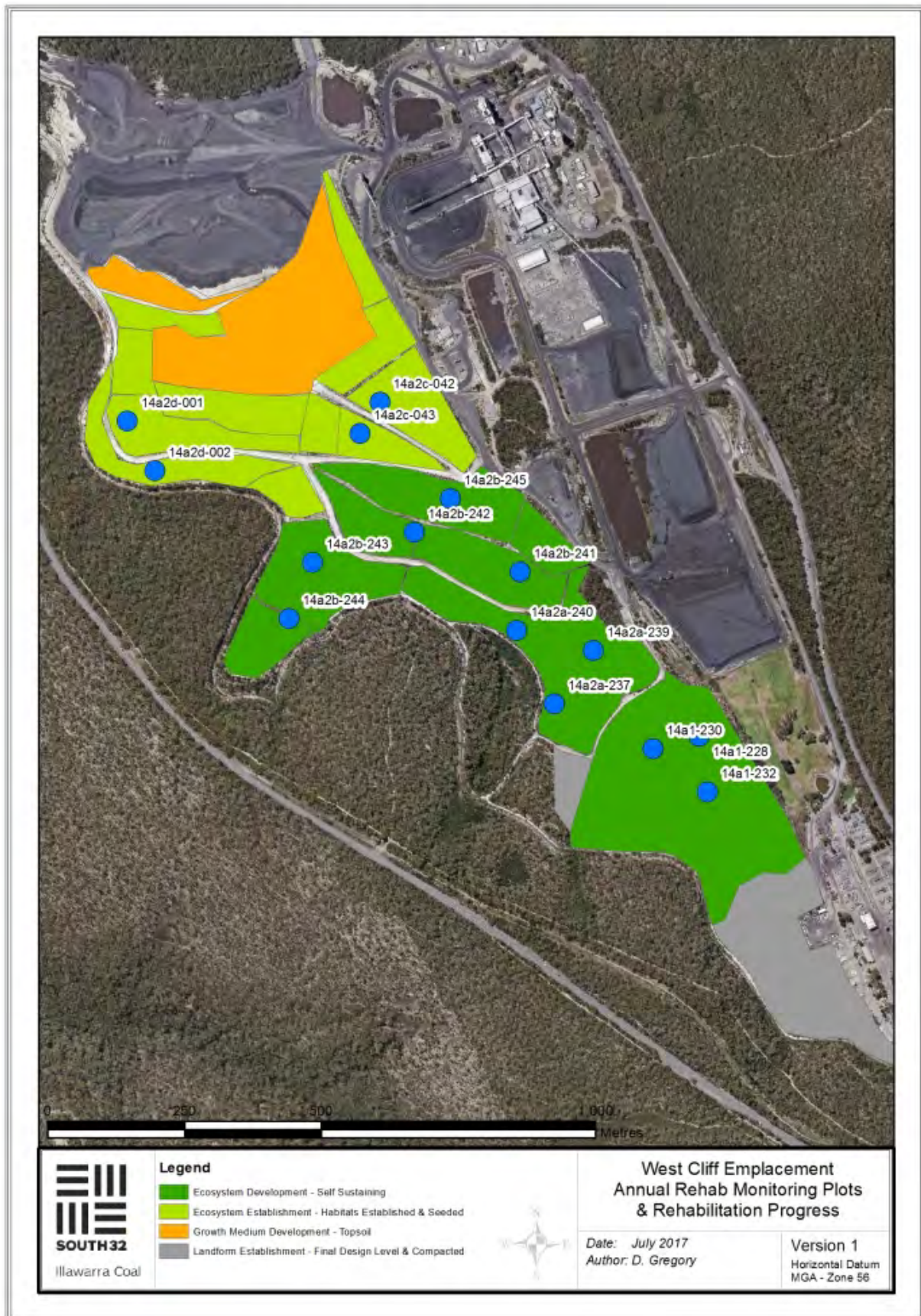


# PLANS

## PLAN A: MONITORING PLOT LOCATIONS



**PLAN B: EMPLACEMENT PLOT LOCATIONS AND REHABILITATION PROGRESS**



# PLAN C: CAMERA TRAP LOCATIONS 2016/17



# APPENDIX 1: PHOTO POINT MONITORING



Plate 1: Site A1\_228 (left 2010, right 2016)



Plate 2: Site A1\_230 (left 2010, right 2016)



Plate 3: Site A1-232 (left 2011, right 2016)



Plate 4: A2a\_237 (left 2010, right 2016)



Plate 5: Site A2a\_239 (left 2010, right 2016)



Plate 6: Site A2a\_240 (left 2010, right 2016)



Plate 7: Site A2b\_244 (left 2010, right 2016)



Plate 8: Site A2b\_241 (left 2010, right 2016)



Plate 9: Site A2b\_242 (left 2010, right 2016)



Plate 10: Site A2b\_243 (left 2010, right 2016)



Plate 11: Site A2b\_245 (left 2010, right 2016)



Plate 12: Site A2c-042 (left 2012, right 2016)



Plate 13: A2c-043 (left 2012, right 2016)



Plate 14: A2d-001 (left 2015, Right 2016)



Plate 15: A2d-002 (left 2015, right 2016)

**APPENDIX B: 2016/17 EPA ANNUAL RETURN**



# Annual Return

ENDEAVOUR COAL PTY LIMITED



## ANNUAL RETURN

LICENCE NO	2504
LICENCE HOLDER	ENDEAVOUR COAL PTY LIMITED
REPORTING PERIOD	01-Feb-2016 to 31-Jan-2017

If your licence has been transferred, suspended, surrendered or revoked by the EPA during this reporting period, cross out the dates above and specify the new dates to which this Annual Return relates below:

REVISED REPORTING PERIOD \_\_\_\_/\_\_\_\_/\_\_\_\_ to \_\_\_\_/\_\_\_\_/\_\_\_\_

(Note: the revised reporting period also needs to be entered in Section H)

**THIS ANNUAL RETURN MUST BE RECEIVED BY THE EPA BEFORE 02-Apr-2017**

Your Annual Return must be completed, including certification in Section H, and submitted to the EPA no later than 60 Days after the end of the reporting period for your licence.

Failure to submit this Annual Return within 60 days after the reporting period ends may result in:

- the issue of a Penalty Notice for \$1500 (individuals) or \$3000 (corporations);
- OR
- prosecution.

Please send your completed Annual Return by **Registered Post** to:

**Regulatory and Compliance Support Unit  
Environment Protection Authority  
PO Box A290  
SYDNEY SOUTH NSW 1232**

It is an offence to supply any information in this form to the EPA that is false or misleading in a material respect, or to certify a statement that is false or misleading in a material respect.

**THERE IS A MAXIMUM PENALTY OF \$250,000 FOR A CORPORATION OR \$120,000 FOR AN INDIVIDUAL.**

Details provided in this Annual Return will be available on the EPA's Public Register in accordance with section 308 of the *Protection of the Environment Operations Act 1997*.

# Annual Return

ENDEAVOUR COAL PTY LIMITED



Use the checklist below to ensure that you have completed your Annual Return correctly.

(✓ the boxes)

CHECKLIST		
<input checked="" type="checkbox"/>	Section A:	All licence details are correct
<input checked="" type="checkbox"/>	Section B1:	You have entered the correct number in the complaints table
<input checked="" type="checkbox"/>	Section B2 – B3:	If there are tables, you have provided the required details
<input checked="" type="checkbox"/>	Section C:	You have answered question 1, and 2 if applicable
<input checked="" type="checkbox"/>	Section D:	If applicable, you have completed all load calculation worksheets
<input checked="" type="checkbox"/>	Section E:	You have answered question 1, 2, 3, 4, 5 and 6 if applicable
<input checked="" type="checkbox"/>	Section F:	You have answered question 1, 2 and 3 if applicable
<input checked="" type="checkbox"/>	Section G:	You have answered question 1 and question 2, 3 and 4 or question 5 through to 11 if applicable
<input checked="" type="checkbox"/>	Section H:	The Annual Return has been signed by appropriate person(s) and, if applicable, the revised reporting period entered
<input checked="" type="checkbox"/>	Make a copy of the completed Annual Return and keep it with your licence records	

Please send your completed Annual Return by **Registered Post** to:

**Regulatory and Compliance Support Unit  
Environment Protection Authority  
PO Box A290  
SYDNEY SOUTH NSW 1232**

## A Statement of Compliance - Licence Details

**ALL licence holders must check that the licence details in Section A are correct**

**If there are changes to any of these details you must advise the EPA and apply as soon as possible for a variation to your licence or for a licence transfer.**

Licence variation and transfer application forms are available on the EPA website at: <http://www.epa.nsw.gov.au/licensing>, or from regional offices of the EPA, or by contacting us on telephone 02 9995 5700.

If you are applying to vary or transfer your licence you must still complete this Annual Return.

### A1 Licence Holder

Licence Number	2504
Licence Holder	ENDEAVOUR COAL PTY LIMITED
Trading Name (if applicable)	
ABN	38 099 830 476

### A2 Premises to which Licence Applies (if applicable)

Common Name (if any)	3. WEST CLIFF AND NORTH CLIFF COLLIERIES
Premises	WEDDERBURN ROAD APPIN NSW 2560
Common Name (if any)	1. APPIN COLLIERY
Premises	OFF APPIN ROAD APPIN NSW 2560
Common Name (if any)	2. APPIN WEST COLLIERY
Premises	DOUGLAS PARK DRIVE DOUGLAS PARK NSW 2569

### A3 Activities to which Licence Applies

Mining for coal  
Waste disposal (application to land)  
Coal works

### A4 Other Activities (if applicable)

Electricity generation  
Resource Recovery

## A5 Fee-Based Activity Classifications

**Note** that the fee based activity classification is used to calculate the administrative fee.

Fee-based activity	Activity scale	Unit of measure
Mining for coal	> 5,000,000.00	T annual production capacity
Waste disposal by application to land		capacity
Coal works	> 5,000,000.00	T annual handing capacity

## A6 Assessable Pollutants (Not Applicable)

## B Monitoring and Complaints Summary

### B1 Number of Pollution Complaints

Number of complaints recorded by the licensee during the reporting period.  If no complaints were received enter nil in the attached box, otherwise complete the table below.		10
Pollution Complaint Category	Number of Complaints	
Air	3	
Water	1	
Noise	2	
Waste	0	
Other	4	

### B2 Concentration Monitoring Summary

For each monitoring point identified in your licence complete all the details for each pollutant listed in the tables provided below.

If concentration monitoring is **not** required by your licence, **no tables** will appear below.

**Note** that this does not exclude the need to conduct appropriate concentration monitoring of assessable pollutants as required by load-based licensing (if applicable).

#### Monitoring Point 4

Discharge Quality Monitoring. Volume Monitoring. - West Cliff and North Cliff Collieries., Sampling tap in settling chamber of STP.

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Biochemical oxygen demand	milligrams per litre	12	13	<2	5	20

Oil and Grease	milligrams per litre	12	13	<5	<5	10
pH	pH	12	13	7.4	7.7	8.2

## Discharge & Monitoring Point 10

### Discharge to waters

#### Discharge quality monitoring

Volume monitoring - West Cliff and North Cliff Collieries., Piped Discharge outlet labelled "Point 10" on map titled "Bulli Seam Operations Point 10 Discharge Water EPL Variation" dated 12 January 2015( Doc No:HSE-2015-140-Rev0). Flowmeter location is denoted as "FM10" on the map.

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Alkalinity (as calcium carbonate)	milligrams per litre	12	12	125	588	860
Aluminium (dissolved)	milligrams per litre	12	12	90	388	640
Arsenic (dissolved)	micrograms per litre	12	12	3	6	8
Bicarbonate	milligrams per litre	12	12	419	617	854
Cadmium (dissolved)	micrograms per litre	12	12	<0.1	<0.1	<0.2
Chemical oxygen demand	milligrams per litre	12	12	10	15	46
Cobalt (dissolved)	micrograms per litre	12	12	2	2	3
Conductivity	microsiemens per centimetre	12	12	1340	1823	2150
Copper (dissolved)	micrograms per litre	12	11	2	4	8
Lead (dissolved)	micrograms per litre	12	12	1	2	4

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ENDEAVOUR COAL PTY LIMITED



Manganese (dissolved)	micrograms per litre	12	11	5	8	11
Nickel (dissolved)	micrograms per litre	12	12	59	86	110
Nitrogen (ammonia)	micrograms per litre	12	12	30	69	220
Nitrogen (total)	micrograms per litre	12	12	90	724	1500
Oil and Grease	milligrams per litre	12	12	<5	<5	<5
Oxidised nitrogen	micrograms per litre	12	12	60	305	740
pH	pH	12	12	8.1	8.7	9.2
Total dissolved solids	milligrams per litre	12	12	778	1045	1250
Total suspended solids	milligrams per litre	12	12	<5	6	13
Turbidity	nephelometric turbidity units	continuous	continuous	0.51	8.31	57.97
Zinc (dissolved)	micrograms per litre	12	12	11	27	71

## Monitoring Point 11

Ambient water quality monitoring- West Cliff and North Cliff Collieries., Georges River located approximately 50 metres upstream of the confluence with Brennans Creek labelled "LDP11" on map titled "West Cliff and North Cliff Mine" dated May 2010.

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Conductivity	microsiemens per centimetre	29	28	62	347	1860
pH	pH	29	28	6.8	7.3	9.0

Total suspended solids	milligrams per litre	11	11	<5	6	12
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## Monitoring Point 12

Ambient water quality monitoring - West Cliff and North Cliff Collieries., Georges River located approximately 50 metres downstream of the confluence with Brennans Creek labelled "LDP12" on map titled "West Cliff and North Cliff Mine" dated May 2010.

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Conductivity	microsiemens per centimetre	30	29	199	1534	2550
pH	pH	30	29	7.5	8.6	9.3
Total suspended solids	milligrams per litre	12	12	<5	6	12

## Monitoring Point 14

Dust Monitoring - Appin Colliery, Dust Gauge "AE-DD14" is located to the SE of the coal stockpile on the property boundary.

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Ash	grams per square metre per month	12	12	0.3	0.7	1.2
Combustible solids	grams per square metre per month	12	12	0.3	1.1	2.3
Insoluble solids	grams per square metre per month	12	12	0.6	1.8	3.5

## Monitoring Point 15

Dust Monitoring - Appin Colliery, Dust Gauge "AE-DD15" is located to the east of the coal stockpile near the sediment pond



Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Ash	grams per square metre per month	12	12	0.4	0.6	0.8
Combustible solids	grams per square metre per month	12	12	0.5	0.8	1.1
Insoluble solids	grams per square metre per month	12	12	0.9	1.4	1.8

## Monitoring Point 16

Dust Monitoring - Appin Colliery, Dust Gauge "AE-DD16" is located on the north property boundary near the Sydney Water tank.

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Ash	grams per square metre per month	12	12	0.2	0.4	0.6
Combustible solids	grams per square metre per month	12	12	0.3	0.5	0.7
Insoluble solids	grams per square metre per month	12	12	0.5	0.9	1.3

## Monitoring Point 17

Dust Monitoring - Appin Colliery, Dust Gauge "AE-DD17" is located at the NE corner of the property boundary near the truck exit/entry point.

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Ash	grams per square metre per month	12	12	0.5	1.0	1.9
Combustible solids	grams per square metre per month	12	12	0.8	1.3	2.0

# Annual Return

ENDEAVOUR COAL PTY LIMITED



Insoluble solids	grams per square metre per month	12	12	1.4	2.3	3.9
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## Discharge & Monitoring Point 18

Discharge to waters.

Discharge quality and volume monitoring

(Stormwater Discharge) - Appin East Colliery, Underflow from the filter lagoon discharging through a v-notch weir labelled "LDP18" on map titled "Appin East Pit Top" dated May 2010.

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Oil and Grease	milligrams per litre	0	0	---	---	---
pH	pH	0	0	---	---	---
Total suspended solids	milligrams per litre	0	0	---	---	---

## Discharge & Monitoring Point 19

Discharge to waters. Discharge quality and volume monitoring.

(Surface Water Discharge) - Appin East Colliery, Dyna Sand Filter outlet at location labelled "LDP19" on map titled "Appin East Pit Top" dated May 2010.

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Oil and Grease	milligrams per litre	7	7	<5	<5	<5
pH	pH	7	7	6.7	7.0	7.8
Total suspended solids	milligrams per litre	7	7	<5	6	9

## Discharge & Monitoring Point 20

Discharge to land.

Discharge quality and volume monitoring.

(Spray Irrigation Discharge) - Appin East Colliery., Envirocycle Irrigation Area as indicated by highlighted area labelled "LDP20" on map titled "Appin East Pit Top" dated May 2010.

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Biochemical oxygen demand	milligrams per litre	12	12	2	10	21
Oil and Grease	milligrams per litre	12	12	<5	<5	<5
pH	pH	12	12	6.5	7.1	8.1

## Discharge & Monitoring Point 22

Discharge to utilisation area.

Water quality monitoring

Volume Monitoring. - Appin West Colliery, The 100mm poly pipe from the secondary stabilisation lagoon of the sewage treatment plant labelled "LDP22 Sample Location" on Plan A07-1240 "Appin West Effluent Irrigation Area" dated 30.08.11. The application area is labelled LDP22 "Irrigation Area"

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Biochemical oxygen demand	milligrams per litre	12	12	9	17	33
Oil and Grease	milligrams per litre	12	12	<5	6	9
pH	pH	12	12	6.6	7.0	7.5

## Discharge & Monitoring Point 23

Discharge to waters.

Water quality monitoring.

Discharge volume monitoring. - Appin West Colliery, Piped discharge outlet for stormwater labeled "LDP23" on map titled "Appin West Pit Top" dated May 2010.

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Oil and Grease	milligrams per litre	12	13	<5	5	6

pH	pH	12	13	6.6	7.4	8.8
Total suspended solids	milligrams per litre	12	13	5	10	24

## Discharge & Monitoring Point 24

Discharge to waters.

Water quality monitoring. Discharge volume monitoring - Appin West Colliery, Piped discharge outlet for minewater labelled "LDP24" on map titled "Appin West Pit Top" dated May 2010.

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Conductivity	microsiemens per centimetre	12	12	158	770	1160
Oil and Grease	milligrams per litre	12	12	<5	<5	<5
pH	pH	12	12	6.4	7.1	8.4
Total suspended solids	milligrams per litre	12	12	5	6	10

## Monitoring Point 26

Dust Monitoring - Appin Colliery, Dust Gauge "AE-DD18" is located at the SW corner of the coal stockpile next to the loading bin

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Ash	grams per square metre per month	12	12	1.2	1.7	2.5
Combustible solids	grams per square metre per month	12	12	1.2	2.9	5.1
Insoluble solids	grams per square metre per month	12	12	2.4	4.6	7.6

## Monitoring Point 27

PM10 Monitoring - Appin Colliery, Photometer "AE-PF1" is located at the NE corner of the property boundary near the truck entry/exit point.

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of sample	Highest sample value
PM10	micrograms per cubic metre	continuous	continuous	4.9	10.3	38.7

## Monitoring Point 28

PM10 Monitoring - Appin Colliery, Photometer "AE-PF3" is located at the NW corner of the property boundary.

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of sample	Highest sample value
PM10	micrograms per cubic metre	continuous	continuous	4.6	7.5	41.2

## Monitoring Point 29

Dust Monitoring - Appin West Colliery, Dust Gauge "AW-DD1" is located at the pit top between the mine access road, employee car park and EDL power plant.

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Ash	grams per square metre per month	12	12	0.4	0.9	2.5
Combustible solids	grams per square metre per month	12	12	0.2	0.5	0.9
Insoluble solids	grams per square metre per month	12	12	0.6	1.4	3.1

## Monitoring Point 30

Dust Monitoring - Appin West Colliery, Dust Gauge "AW-DD2" is located at the junction of the mine access road and Douglas Park Drive.

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Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Ash	grams per square metre per month	12	11	0.2	0.4	0.7
Combustible solids	grams per square metre per month	12	11	0.1	0.4	0.7
Insoluble solids	grams per square metre per month	12	11	0.5	0.8	1.4

## Monitoring Point 31

Dust Monitoring - West Cliff Colliery, Dust Gauge "W-DD1" is located at the junction of Wedderburn Rd and Appin Rd.

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Ash	grams per square metre per month	12	12	0.3	0.9	1.6
Combustible solids	grams per square metre per month	12	12	0.5	1.1	2.0
Insoluble solids	grams per square metre per month	12	12	0.8	2.0	3.6

## Monitoring Point 32

Dust Monitoring - West Cliff Colliery, Dust Gauge "W-DD3" is located at the pit top south site.

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Ash	grams per square metre per month	12	12	0.5	1.4	2.8
Combustible solids	grams per square metre per month	12	12	0.3	1.0	1.7

# Annual Return

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Insoluble solids	grams per square metre per month	12	12	0.4	2.2	4.5
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## Monitoring Point 33

Dust Monitoring - West Cliff Colliery, Dust Gauge "AW-DD8" is located at Brennan Creek dam.

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Ash	grams per square metre per month	12	12	0.1	0.3	0.6
Combustible solids	grams per square metre per month	12	12	0.1	0.2	0.5
Insoluble solids	grams per square metre per month	12	12	0.2	0.6	0.9

## Monitoring Point 34

Dust Monitoring - West Cliff Colliery, Dust Gauge "W-DD10" is located on Wedderburn Road next to the product stockpiles.

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Ash	grams per square metre per month	12	12	4.0	12.4	32.1
Combustible solids	grams per square metre per month	12	12	4.0	8.2	15.1
Insoluble solids	grams per square metre per month	12	12	8.0	20.6	47.2

## Monitoring Point 35

PM10 Monitoring - West Cliff Colliery, Photometer "W-PF1" is located at the junction of Appin Road and Wedderburn Road.

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of sample	Highest sample value
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# Annual Return

ENDEAVOUR COAL PTY LIMITED



PM10	micrograms per cubic metre	continuous	continuous	11.2	16.1	46.0
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## Discharge & Monitoring Point 36

Discharge to waters. Discharge quality monitoring - Douglas Park Vent Shaft No.6, Piped discharge outlet from primary sedimentation dam as described in the Vent Shaft No.6 Water Management Plan.

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Electrical conductivity	microsiemens per centimetre	2	2	741	875.5	1010
pH	pH	2	2	6.9	7.2	7.9
Total suspended solids	milligrams per litre	2	2	8	11.7	15.4

## B3 Volume or Mass Monitoring Summary

For each monitoring point identified in your licence complete the details of the volume or mass monitoring indicated in the tables provided below.

If volume or mass monitoring is not required by your licence, **no tables** will appear below.

**Note** that this does not exclude the need to conduct appropriate concentration monitoring of assessable pollutants as required by load-based licensing (if applicable).

### Monitoring Point 4

Discharge Quality Monitoring. Volume Monitoring. - West Cliff and North Cliff Collieries.

Unit of measure	Frequency	No. of measurements made	Lowest result	Mean result	High result
kilolitres per day	Continuous	continuous	0	17	629



## Discharge & Monitoring Point 10

Discharge to waters  
 Discharge quality monitoring  
 Volume monitoring - West Cliff and North Cliff Collieries.

Unit of measure	Frequency	No. of measurements made	Lowest result	Mean result	High result
kilolitres per day	Continuous	continuous	0	224	924

## Monitoring Point 13

Volume monitoring - West Cliff and North Cliff Collieries.

Unit of measure	Frequency	No. of measurements made	Lowest result	Mean result	High result
kilolitres per day	Continuous	continuous	0	1887	4755

## Discharge & Monitoring Point 18

Discharge to waters.  
 Discharge quality and volume monitoring  
 (Stormwater Discharge) - Appin East Colliery

Unit of measure	Frequency	No. of measurements made	Lowest result	Mean result	High result
kilolitres per day	Continuous during discharge	continuous	0	0	0

## Discharge & Monitoring Point 19

Discharge to waters. Discharge quality and volume monitoring.  
 (Surface Water Discharge) - Appin East Colliery

Unit of measure	Frequency	No. of measurements made	Lowest result	Mean result	High result

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ENDEAVOUR COAL PTY LIMITED



kilolitres per day	Continuous during discharge	continuous	0	100	1993
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## Discharge & Monitoring Point 20

Discharge to land.  
Discharge quality and volume monitoring.  
(Spray Irrigation Discharge) - Appin East Colliery.

Unit of measure	Frequency	No. of measurements made	Lowest result	Mean result	High result
kilolitres per day	Continuous during discharge	No longer required	---	---	---

## Discharge & Monitoring Point 22

Discharge to utilisation area.  
Water quality monitoring  
Volume Monitoring. - Appin West Colliery

Unit of measure	Frequency	No. of measurements made	Lowest result	Mean result	High result
kilolitres per day	Continuous	continuous	0	23	74

## Discharge & Monitoring Point 24

Discharge to waters.  
Water quality monitoring. Discharge volume monitoring - Appin West Colliery

Unit of measure	Frequency	No. of measurements made	Lowest result	Mean result	High result
kilolitres per day	Continuous	continuous	0	257	2462

## C Statement of Compliance - Licence Conditions

### C1 Compliance with Licence Conditions

( the boxes)

1 Were all conditions of the licence complied with (including monitoring and reporting requirements)?

Yes  No

( a box)

2 If you answered 'No' to question 1, please supply the following details for each non-compliance in the format, or similar format, provided on the following page.

Please use a separate page for each licence condition that has not been complied with.

a) What was the specific licence condition that was not complied with?

b) What were the particulars of the non-compliance?

c) What were the date(s) when the non-compliance occurred, if applicable?

d) If relevant, what was the precise location where the non-compliance occurred?

Attach a map or diagram to the Statement to show the precise location.

e) What were the registration numbers of any vehicles or the chassis number of any mobile plant involved in the non-compliance?

f) What was the cause of the non-compliance?

g) What action has been, or will be, taken to mitigate any adverse effects of the non-compliance?

h) What action has been, or will be, taken to prevent a recurrence of the non-compliance?

3. How many pages have you attached?

Each attached page must be initialled by the person(s) who signs Section G of this Annual Return

6

## C2 Details of Non-Compliance with Licence

Licence condition number not complied with
M2.3
Summary of particulars of the non-compliance
December 2016 Point 10 sample missing Copper and Manganese.
If required, further details on particulars of non-compliance
N/A
Date(s) when the non-compliance occurred, if applicable
December 2016
If relevant, precise location where the non-compliance occurred (attach a map or diagram)
Piped discharge from Brennans Creek Dam
If applicable, registration numbers of any vehicles or the chassis number of any mobile plant involved in the non-compliance
N/A
Cause of non-compliance
Error in Chain of Custody documentation resulted in incorrect analyte suite being used by ALS (lab). An administrative change (error) was made to the full analytical suite by the Laboratory which removed copper and manganese without advising Illawarra Coal.
Action taken or that will be taken to mitigate any adverse effects of the non-compliance
No adverse effects associated with the non-compliance. Copper and manganese were unlikely to be over the licence limit as no results were above the limits during the reporting period and discharge is fed from a large body of water (Brennans Creek dam).
Action taken or that will be taken to prevent a recurrence of the non-compliance
Sampling suites have now been corrected and the following January 2017 sample included Copper and Manganese

*MBR*  
*MKT*

# Annual Return

ENDEAVOUR COAL PTY LIMITED



## C2 Details of Non-Compliance with Licence

Licence condition number not complied with
M2.3
Summary of particulars of the non-compliance
Point 10 conductivity was above percentile limits for four days during reporting period.
If required, further details on particulars of non-compliance
N/A
Date(s) when the non-compliance occurred, if applicable
December 2016 - January 2017
If relevant, precise location where the non-compliance occurred (attach a map or diagram)
Piped discharge from Brennans Creek Dam
If applicable, registration numbers of any vehicles or the chassis number of any mobile plant involved in the non-compliance
N/A
Cause of non-compliance
There were intermittent reliability issues with the fresh water supply line (i.e. electrical trips to pump) that is used to reduce the electrical conductivity of the discharge. This resulted in the electrical conductivity limit being exceeded.
Action taken or that will be taken to mitigate any adverse effects of the non-compliance
Work conducted to improve the reliability and improve the automation of the system.
Action taken or that will be taken to prevent a recurrence of the non-compliance
Continuing to refine automation and reduce reliance on manual intervention.

A handwritten signature in black ink, appearing to be 'M. B. O.', located in the lower right quadrant of the page.

## C2 Details of Non-Compliance with Licence

Licence condition number not complied with
M2.3
Summary of particulars of the non-compliance
Pt 11 and Pt 12 19/12/16 monitoring was undertaken, however data sheet was misplaced resulting in conductivity and pH not being reported.
If required, further details on particulars of non-compliance
N/A
Date(s) when the non-compliance occurred, if applicable
19/12/16
If relevant, precise location where the non-compliance occurred (attach a map or diagram)
Georges River
If applicable, registration numbers of any vehicles or the chassis number of any mobile plant involved in the non-compliance
N/A
Cause of non-compliance
Human error.
Action taken or that will be taken to mitigate any adverse effects of the non-compliance
N/A
Action taken or that will be taken to prevent a recurrence of the non-compliance
Licence has since been altered and it is no longer a requirement that conductivity and pH be sampled via in-situ methods, they are now included in the monthly grab sample.



Handwritten signature, possibly 'MKT'.

# Annual Return

ENDEAVOUR COAL PTY LIMITED



## C2 Details of Non-Compliance with Licence

Licence condition number not complied with
L2.4
Summary of particulars of the non-compliance
pH results for Point 23 returned result higher than EPL 100 Percentile limit.
If required, further details on particulars of non-compliance
EPL 100 Percentile limit for pH is between 6.5 and 8.5. October lab result for Point 23 was 8.8, and field sheet in-situ recording was 8.69.
Date(s) when the non-compliance occurred, if applicable
12/10/16
If relevant, precise location where the non-compliance occurred (attach a map or diagram)
Appin West Stormwater release
If applicable, registration numbers of any vehicles or the chassis number of any mobile plant involved in the non-compliance
N/A
Cause of non-compliance
Cause of high pH was unable to be determined. Resample had a pH of 7.4 as reported.
Action taken or that will be taken to mitigate any adverse effects of the non-compliance
N/A
Action taken or that will be taken to prevent a recurrence of the non-compliance
N/A

A handwritten signature in black ink, appearing to be 'MBO'.

# Annual Return

ENDEAVOUR COAL PTY LIMITED



## C2 Details of Non-Compliance with Licence

Licence condition number not complied with
L2.4
Summary of particulars of the non-compliance
October 2016 Pt 24 pH result returned below EPL 100 Percentile limit.
If required, further details on particulars of non-compliance
EPL 100 Percentile limit is between 6.5 and 8.5, result returned from lab sample was 6.1, and field sheet recorded result of 6.4. Both readings were below the EPL limit.
Date(s) when the non-compliance occurred, if applicable
12/10/16
If relevant, precise location where the non-compliance occurred (attach a map or diagram)
Appin West piped discharge of treated minewater
If applicable, registration numbers of any vehicles or the chassis number of any mobile plant involved in the non-compliance
N/A
Cause of non-compliance
<p>Low pH caused by operational issue with water treatment plant:</p> <ul style="list-style-type: none"> <li>- Environment discharge was diverted (forced) to accommodate sampling personnel without the blending being turned on.</li> <li>- The time from the diversion to sampling would have been short and did not allow the pH to be adjusted by the causing dosing pump.</li> </ul> <p>The low pH was unlikely to cause any adverse effects as discharge was on for a very short period during sampling and then switched back off. All other results from real-time monitoring at the Water Treatment Plant were within the licence limits.</p>
Action taken or that will be taken to mitigate any adverse effects of the non-compliance
Discharge was turned off.
Action taken or that will be taken to prevent a recurrence of the non-compliance
<ul style="list-style-type: none"> <li>- The operator will take parallel samples with the environment personnel and validate results with our pH and conductivity meters. (Environment team member shall continue on site testing independently and communicate results to the operator prior to leaving site).</li> <li>- The operator shall not force environment unless the blending system is in Auto.</li> <li>- The tolerance of the pH dosing has been tightened for a quicker response from the pH controller.</li> </ul>

*Handwritten signatures: VBR and MKT*



# Annual Return

ENDEAVOUR COAL PTY LIMITED



## C2 Details of Non-Compliance with Licence

Licence condition number not complied with
M2.2
Summary of particulars of the non-compliance
Pt 30 (AW-DD2) unable to be sampled for November 2016 due to damaged dust deposition gauge
If required, further details on particulars of non-compliance
Dust deposition gauge (DDG) found damaged when sample being collected.
Date(s) when the non-compliance occurred, if applicable
November 2016
If relevant, precise location where the non-compliance occurred (attach a map or diagram)
Appin West property boundary at mine entrance point off Douglas Park Drive.
If applicable, registration numbers of any vehicles or the chassis number of any mobile plant involved in the non-compliance
N/A
Cause of non-compliance
DDG damaged by unknown source.
Action taken or that will be taken to mitigate any adverse effects of the non-compliance
N/A
Action taken or that will be taken to prevent a recurrence of the non-compliance
N/A

*ANBR*  
*MP*

## D Statement of Compliance - Load-Based Fee

### Calculation Worksheets

If you are not required to monitor assessable pollutants by your licence, no worksheets will appear below. Please go to Section E.

If assessable pollutants have been identified on your licence (see licence condition L2), complete the following worksheets for each assessable pollutant to determine your load-based fee for the licence fee period to which this Annual Return relates.

Loads of assessable pollutants must be calculated using any of the methods provided in the EPA's Load Calculation Protocol for the relevant activity. A Load Calculation Protocol would have been sent to you with your licence. If you require additional copies you can download the Protocol from the EPA's website or you can contact us on telephone 02 9995 5700.

You are required to keep all records used to calculate licence fees for four years after the licence fee was paid or became payable, whichever is the later date.

#### **PENALTIES APPLY FOR SUPPLYING FALSE OR MISLEADING INFORMATION**

**D1 - D8 (Not Applicable)**

## E Statement of Compliance - Requirement to Prepare Pollution Incident Response Management Plan (PIRMP) Under Section 153A of the POEO Act 1997

1 Have you prepared a PIRMP as required under s153A of the Protection of the Environment Operations Act 1997?

(✓ a box)

Yes

No

If you answered 'Yes' to question 1, please tick the appropriate box to indicate the following:

2 Is the PIRMP available at the premises?

(✓ a box)

Yes

No

3 Is the PIRMP available in a prominent position on a publicly accessible web site?

(✓ a box)

Yes

No

If the PIRMP is available on a publicly accessible web site please indicate clearly below the address of the web site where the PIRMP can be accessed:

Web site Address

4 Has the PIRMP been tested in the last 12 months?

(✓ a box)

Yes

No

If you answered 'Yes' to question 4 please indicate clearly below the date that the PIRMP was last tested:

The PIRMP was last tested on

5 Has the PIRMP been updated?

(✓ a box)

Yes

No

If you answered 'Yes' to question 5 please indicate clearly below the date that the PIRMP was last updated:

The PIRMP was last updated on

6 How many times has the PIRMP been activated in this reporting period?

If the PIRMP has been activated, please indicate clearly below the date/s when the PIRMP was activated:

The PIRMP was activated on

The EPA's guidelines for preparation of pollution incident response management plans are available at

<http://www.epa.nsw.gov.au/legislation/20120227egpreppirmp.htm>

## F Statement of Compliance - Requirement to Publish Pollution Monitoring Data Under Section 66(6) of the POEO Act 1997

1 Are there any conditions attached to your licence that require pollution monitoring to be undertaken?

(✓ a box)

Yes

No

If you answered 'Yes' to question 1, please tick the appropriate box to indicate the following:

2 Do you operate a web site?

(✓ a box)

Yes

No

3 Is the pollution monitoring data published on your web site in accordance with the EPA's written requirements for publishing pollution monitoring data?

(✓ a box)

Yes

No

If you publish pollution monitoring data on a web site please indicate clearly below the address of the web site where the pollution monitoring data can be accessed:

Web site address

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

The EPA's written requirements for publishing pollution monitoring data are available at

<http://www.epa.nsw.gov.au/legislation/20120263reqpubpmdata.htm>

**Note** - if you do not maintain a web site, you must provide a copy of any monitoring data that relates to pollution, to any person requests a copy of the data at no charge to the person requesting the data.

## G Statement of Compliance - Environmental Management Systems and Practices

1 Do you have an environmental management system (EMS) certified to ISO 14001 or any other demonstrated equivalent system<sup>1</sup>? (see note below on demonstrated equivalent)

(✓ a box)

Yes

No

If your answer to question 1 is 'No', please proceed to question 5. If your answer to question 1 is 'Yes', please proceed to question 2.

2 When was the last check of the EMS<sup>2</sup> completed (see note below on check of EMS)?

9/12/2016

3 Were there any non-conformances related to environmental issues identified in the last check of the EMS?

(✓ a box)

Yes

No

4 If there were non-conformances identified, were these non-conformances rectified?

(✓ a box)

Yes

No

If you answered 'No' to question 1, please answer questions 5 - 11. If you answered 'Yes' to question 1 please proceed to section H. Questions 5-11 relate to any documented environmental practices, procedures and systems in place. Refer to <http://www.epa.nsw.gov.au/licensing/EMCP.htm> for guidance on how to complete questions 5 to 11. If unsure of the answer, tick No.

5 Have you conducted an assessment of your activities and operations to identify the aspects that have a potential to cause environmental impacts and implemented operational controls to address these aspects?

(✓ a box)

Yes

No

6 Have you established and implemented an operational maintenance program, including preventative maintenance?

(✓ a box)

Yes

No

7 Do you keep records of regular inspections and maintenance of plant and equipment?

(✓ a box)

Yes

No

8 Do you conduct regular site audits to assess compliance with environmental legal requirements and assess conformance to the requirements of any documented environmental practices, procedures and systems in place?

(✓ a box)

Yes

No

9 Are the audits of documented environmental practices, procedures and systems undertaken by a third party?

(✓ a box)

Yes

No

10 Have you established and implemented an environmental improvement or management plan?

(✓ a box)

Yes

No

11 Do you train staff in environmental issues that may arise from your activities and operations and keep records of this?

(✓ a box)

Yes

No

<sup>1</sup> Demonstrated equivalent refers to an environmental management system that the EPA considers is equivalent to the accountability, procedures, documentation and record keeping requirements of an ISO 14001 system. For further information go to:

<http://www.epa.nsw.gov.au/resources/licensing/150402-environmental-management-systems-guidelines.pdf>

<sup>2</sup> Undertaking a 'check of an EMS' refers to the ISO 14001 requirements that an organisation demonstrates conformity to the requirements of its EMS and to the standard, these checks require third-party certification that requirements have been met.

# Annual Return

ENDEAVOUR COAL PTY LIMITED



## H Signature and Certification

This Annual Return may only be signed by a person(s) with legal authority to sign it as set out in the categories below. **Please tick (✓) the box** next to the category that describes how this Annual Return is being signed.

If you are uncertain about who is entitled to sign or which category to tick, please contact us on telephone 02 9995 5700.

If the licence holder is:	the Annual Return must be signed and certified by one of the following:
an individual	<input type="checkbox"/> the individual licence holder, or <input type="checkbox"/> a person acting on behalf of the individual licence holder in accordance with a power of attorney for the individual. A copy of the power of attorney must be submitted with the Annual Return.
a company	<input checked="" type="checkbox"/> by two directors, or <input type="checkbox"/> by a director and a company secretary, or <input type="checkbox"/> if a proprietary company that has a sole director who is also the sole company secretary - by that director, or <input type="checkbox"/> by a person delegated to sign a copy of the Annual Return on the company's behalf in accordance with the Corporations Act 2001. Delegation of authority must be submitted with the Annual Return, or. <input type="checkbox"/> by affixing the common seal, in accordance with the Corporations Act 2001
a public authority other than a Council	<input type="checkbox"/> by the Chief Executive Officer of the public authority, or <input type="checkbox"/> by a person delegated to sign on the public authority's behalf in accordance with its legislation.
a local Council	<input type="checkbox"/> by the General Manager in accordance with s377 of the Local Government Act 1993, or <input type="checkbox"/> by affixing the seal of the Council in a manner authorised under the Local Government Act 1993.

**It is an offence to supply any information in this form that is false or misleading in a material respect, or to certify a statement that is false or misleading in a material respect. There is a maximum penalty of \$250,000 for a corporation or \$120,000 for an individual.**

I/We

- declare that the information in the Monitoring and Complaints Summary in section B of this Annual Return is correct and not false or misleading in a material respect, and
- certify that the information in the Statement of Compliance in sections A, C, D, E, F and G and any pages attached to Section C is correct and not false or misleading in a material respect.

If your licence has been transferred, suspended, surrendered or revoked by the EPA during this reporting period, cross out the dates below and specify the new dates to which this Annual Return relates below:

**For the reporting period** 01-Feb-2016 to 31-Jan-2017 or \_\_\_/\_\_\_/\_\_\_ to \_\_\_/\_\_\_/\_\_\_

SIGNATURE: <u>Michael Rix</u>	SIGNATURE: <u>[Signature]</u>
NAME: <u>Michael Rix</u> (printed)	NAME: <u>MICHAEL THOMAS</u> (printed)
POSITION: <u>Director</u>	POSITION: <u>DIRECTOR</u>
DATE: <u>22, 03, 2017</u>	DATE: <u>24, 03, 2017</u>

SEAL (if signing under seal)

**PLEASE ENSURE THAT ALL APPROPRIATE BOXES HAVE BEEN COMPLETED AND THAT THE CHECKLIST ON PAGE 2 OF THE ANNUAL RETURN HAS BEEN COMPLETED**

**APPENDIX C: BSO COMMUNITY COMPLAINTS REPORT FY17**

# COMPLAINTS REPORT

June 2017

BULLI SEAM OPERATIONS





### Bulli Seam Operations - Community Complaints Report

Operation/Project	Month	Date	Nature of Complaint	Actions / Follow Up
Appin Projects	Jun-17	9/06/2017	Resident called regarding the condition of the road repair work. The resident was concerned that the rain had made everything muddy and this was very slippery and was unsafe. The resident also advised people she knew had damaged their tyres as a result of the road.	The complaint was reported to the Project Manager who advised the road would be dressed with road base to cover the muddy areas. The complainant since has been happy with the road condition.
Appin Projects	Jun-17	14/06/2017	Resident called regarding the condition of the road repair work associated with the pipeline project. The resident advised on Thursday 8th June at 4:30pm they drove through the section of road with the traffic lights and moved over onto the muddy section and slipped of the road and hit a pot hole. The resident claimed this damaged the rim and it was required to be repaired.	The complaint was reported to the project manager, and since the incident the road has been dressed with road base to cover the muddy sections. The complainant has been advised that we would not reimburse for the rim and we are concentrating on making improvements to the road. He was happy with this.
Appin Projects	Jun-17	14/06/2017	Resident called the Community Call Line on 14 June regarding the condition of the road repair work associated with the Appin Pipeline Project. The complainant noted the condition of the road had potentially caused the damage to one of her rear tyres (pertaining to the condition of the road on 8 June). No formal request for reimbursement was made.	The complaint was immediately reported to the project manager for further investigation. As part of the investigation, Illawarra Coal's community team responded to the call to obtain further details regarding the condition of the road and damage to the residents tyre. In consultation with the landholder and the Project, immediate action was taken to improve the condition of the road including laying and grading road base to cover muddy sections of the road (from a former rainfall event). The resident, after inspecting the

Operation/Project	Month	Date	Nature of Complaint	Actions / Follow Up
Appin West	Jun-17	14/06/2017	Resident called the community call line regarding the ongoing issue of excessive noise from the Appin West Gas Drainage plant. The Complaint advised that the flares seem to be causing the issues.	The Complaint was referred to the project team who advised that the flares were running at the time of the complaint. Noise walls are to be extended over the next two weeks. The complainant was advised we will monitor it. The complainant advised it was ok the next day. We continue to work with the complainant on ensuring we can overcome this issue.
Appin West	Jun-17	24/06/2017	Received an email and a call via the community call line from a resident who has advised that the noise from the flares at the Appin West Gas Drainage Plant is very noisy.	Contacted the site regarding the noise and spoke to the site supervisor. This is an ongoing issue and we are looking at what improvements can be made. The noise wall extension will occur over the next week. I have been in regular contact with the complainant to advise of the work we are doing and continue to do. The complainant understands we are trying to work on the issue.
Appin West	May-17	5/05/2017	Resident complaint about noise from the Appin West Gas Drainage Plant. The noise was loud at the time of the call and resident believed Illawarra Coal was moving too slow on resolving the issue.  Further call made 6.5.2017 when the noise was audible in the home at 5.40am.	Noise monitoring from the last 2 complaints showed noise to be within legal requirements however investigations are continuing. Supervisor Energy and Surface Gas took a field visit to determine the noise - air compressor. This is being investigated further. Handheld monitoring will be conducted as planned 9/5 at 6pm during which the air compressors will be turned on and off. A static monitor will be in the field by the end of the week

Operation/Project	Month	Date	Nature of Complaint	Actions / Follow Up
Appin Projects	May-17	8/05/2017	Resident complaint regarding condition of section of Brooks Point Road where works are underway as part of the Appin Pipeline Project.	The complaint was immediately reported to the Project Manager and the area of the road (identified) was repaired within one hour by adding and compacting additional road base. The resident also suggested additional signage of 'share the road' be displayed along the road - this was also actioned within one day. The resident was satisfied with these outcomes.
Appin West	May-17	19/05/2017	Resident complaint about noise from the Appin West Gas Drainage Plant. The noise was audible at 2.30am.	Noise logger data from a property 660m away was reviewed and noise determined to be within regulatory requirements. Ongoing investigations with a noise concern from a nearby resident have resulted in identification of a noisy compressor at the plant. Investigations are underway to fix the issue and install appropriate noise attenuation to appease the resident. This compressor was on at the time of this complaint and has since been tagged out and will remain non-operational until the end of the following week.
Appin West	May-17	19/05/2017	Resident complaint about continuing noise from the Appin West Gas Drainage Plant. It was quiet Monday - Tuesday before becoming loud on Wednesday. The noise is loud and constant.	Advised the investigation is continuing and reiterated the noise logger at the property is assisting to determine the main source of the noise. Issue raised to HSE Lead as a priority.
Appin Projects	May-17	19/05/2017	Resident complaint regarding condition of section of Brooks Point Road where works are underway as part of the Appin Pipeline Project.	The complaint was immediately reported to the Project Manager and the area of the road (identified) was repaired within the hour by adding and compacting additional road base. The resident was satisfied with these outcomes and the quick response from the Project team.

Operation/Project	Month	Date	Nature of Complaint	Actions / Follow Up
Appin West	May-17	23/05/2017	Resident complaint and noise from the flares at the Appin West Gas Drainage Plant.	Ongoing investigation completed and noise was determined to be within regulations. Compressor in question was off during the time of the complaint. While no action is necessary a noise wall will be installed at the flares and compressors and noise attenuation of compressor 4 progressed.
Appin Projects	May-17	24/05/2017	Resident complaint regarding Appin Pipeline Project and associated traffic impacts which prevented them from getting through the area (due to narrow width of road).	The complaint was immediately reported to the Project Manager and the narrow section of road was widened to ensure the resident's truck could safely pass through the area. The Project Manager and Community Specialist also visited the resident to discuss updates regarding the project and any impacts the traffic works may be having on his business.
Appin Projects	May-17	29/05/2017	Resident complaint regarding Appin Pipeline Project and associated road repair work being undertaken which resulted in a resident's personal blue metal stockpile being mistakenly removed and used with the project's road upgrade.	The complaint was reported to the Project Manager and the blue metal material replaced within one day. The Manager apologised for the misunderstanding. The resident was satisfied with the outcome.
Appin West Mine	April 2017	30/04/2017	Resident complained about noise from the flare site still being loud. Requested static noise monitor at the property.	Investigations are continuing. Handheld monitoring to be conducted in an evening. A static monitor will be placed in the field when available.
Processing & Logistics	April 2017	25/04/2017	A rock or piece of coal hit driver's windscreen when driving on Appin Road from a coal truck driving in the opposite direction.	Reported to Processing and Logistics to investigate incident, which showed a coal truck was in the area at the time of incident.

Operation/Project	Month	Date	Nature of Complaint	Actions / Follow Up
Appin West Mine	April 2017	20/04/2017	Resident complained about increase in noise from the flare site over the last month	Two flares were operating and initial investigations resulted in the fire rate being lowered. Subsequent investigations resulted in a change to the pumps being used which did somewhat reduce noise levels. Investigations are continuing with noise monitoring planned at the next pump outage.
	March 2017		No complaints made for the month	
	February 2017		No complaints made for the month	
	January 2017		No complaints made for the month	
Appin Mine Ventilation shaft number 3	December 2016	21/12/2016	Resident complained about dust being emitted from ventilation shaft number 3 during a testing period	The matter was rectified by notifying the site, discussing with the landholder, subsequently the dust had stopped.
Appin Mine Ventilation shaft number 6	December 2016	27/12/2016	Resident complained about dust being emitted from ventilation shaft number 6 during planned works	Event reported and investigated. Real time dust monitoring results were reviewed and discussed with the landowner. Relevant government agencies were notified of the concern.
Appin Mine Ventilation shaft number 6	December 2016	29/12/2016	Resident complaint about the presence of stonedust at the property emitted from ventilation shaft number 6 during planned works 27/12/2016	Event reported and investigated

Operation/Project	Month	Date	Nature of Complaint	Actions / Follow Up
West cliff Area 5	November 2016	9/11/2016	Resident complained about regular water deliveries were being delivered late and he ran out of water	Arranged water deliveries to be conducted the same time each week and confirmed this with the landholder.
Appin Area 7 – Rail mitigation	November 2016	14/11/2016	Resident complained about gate being left open during the rail mitigation project.	This incident was discussed with the contractor and a review of the procedures occurred to ensure this problem would not reoccur.
Appin Mine Ventilation shaft number 6	November 2016	17/11/2016	Resident complained about noise being emitted from the ventilation shaft during improvement works.	A noise inspection occurred during the night and the noise was in audible at the time of the inspection. Resident was advised to call back if problem reoccurs.
Appin Mine	October 2016	5/10/2016	Resident complained about works being conducted on property, which are not in accordance with an access agreement	Works stopped immediately until an access agreement is sort
Appin Mine	October 2016	20/10/2016	Resident complained about a smell coming from the number 6 ventilation shaft.	Investigated the event and could not identify the smell from the ventilation shaft
	September 2016		No complaints made for the month	
	August 2016		No complaints made for the month	
	July 2016		No complaints made for the month	

Operation/Project	Month	Date	Nature of Complaint	Actions / Follow Up
	June 2016		No complaints made for the month	
	May 2016		No complaints made for the month	
	April 2016		No complaints made for the month	
Appin Area 9 Projects - RP&D	March 2016	16/03/2016	Noise complaint from 707 Bulgo site	Event reported to Project Manager. The noise source ceased immediately following complaint.
Appin Area 9 Projects - RP&D	March 2016	18/03/2016	Resident complained about gates being left open on property	Event reported to Project Manager for investigation. Mitigation controls have been put in place to avoid a reoccurrence of this incident.
	February 2016		No complaints received	
Appin Area 9 Projects - RP&D	January 2016	13/01/2016	Resident complained about damage to personal property	Event reported and investigated and corrected by Project Manager.
Appin Area 9 Projects - RP&D	January 2016	19/01/2016	Resident complained about damage to personal property	Event reported and investigated and corrected by Project Manager.

Operation/Project	Month	Date	Nature of Complaint	Actions / Follow Up
Ventilation Shaft 6 - Projects	December 2015	1/12/2015	Complaint of dust emission at Vent Shaft 6.	Incident reported to Project Manager. Dust source investigated and actions implemented.
707 Bulgo	December 2015	2/12/2015	Noise complaint from 707 Bulgo	Noise reported to Project Manager and rectified on site.
Ventilation Shaft 6 - Projects	December 2015	4/12/2015	Light complaint from Vent Shaft site	Event reported and light source identified and work ceased immediately following the complaint.
Appin Area 9 Projects	December 2015	16/12/2015	Noise complaint from generator as part of Appin Area 9 rail works	Event reported and investigated. Work using generator ceased.
Appin Area 9 Projects	December 2015	16/12/2015	Noise complaint from generator as part of Appin Area 9 rail works	Event reported and investigated. Work using generator ceased.



**APPENDIX D: BSO EPBC APPROVAL 2010/5350 COMPLIANCE REPORT**



## Bulli Seam Operations Annual Compliance Report – August 2017 (EPBC 2010/5350)

**Date of submission:** 10 August 2017

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Abbreviations:

DOE – Federal Department of the Environment (Now DOTEE)

DOTEE – Federal Department of the Environment & Energy

DOPE – NSW Department of Planning and the Environment

OEH – NSW Office of Environment and Heritage

CCL – Consolidated Coal Lease

UOW – University of Wollongong

EPBC – Environment Protection and Biodiversity Conservation

ACARP – Australian Coal Association Research Program

In accordance with condition 14 of the EPBC approval (2010/5350) within three months of every 12 month anniversary of the commencement of the action, the person taking the action must publish a report on their website addressing compliance with each of the conditions of this approval, including implementation of any management plans as specified in the conditions. Documentary evidence providing proof of the date of publication and non-compliance with any of the conditions of this approval must be provided to the department at the same time as the compliance report is published.

Condition	Condition Summary	Status	Compliant Y/N
1	<u>Persoonia Hirsuta</u> Provide proposed <i>Persoonia hirsuta</i> offset area for approval.	Proposed offset area submitted to DOE in the <i>Persoonia hirsuta</i> Offset Management Plan. Application submitted on 26 Nov 2013 to amend CCL724 via a s238 Condition under the Mining Act 1992 to legally secure a <i>Persoonia</i> Offset Area at West Cliff Mine as required by our Bulli Seam Operations EPBC Approval (2010/5350). The Minister for Resources and Energy amended CCL 724 on 23 March 2014.	Yes



Condition	Condition Summary	Status	Compliant Y/N
2	<p><u>Persoonia Hirsuta</u></p> <p>Develop a management plan for the <i>Persoonia hirsuta</i> offset area.</p>	<p>Persoonia management plan was submitted to DOE prior to the 31<sup>st</sup> December 2012 and approved on 22 November 2013 (ref 2013/10882). Plan has since been reviewed and was approved in April 2016. Plan is available on our website. <a href="http://www.south32.net/getmedia/3d05a2ab-2694-4d0a-af4e-dc194ce6ef24/South32Web">http://www.south32.net/getmedia/3d05a2ab-2694-4d0a-af4e-dc194ce6ef24/South32Web</a>.</p> <p>Persoonia hirsuta Condition Reports submitted as required in 2013, 2014, 2015 (submitted late) and 2016.</p>	<p>Yes - 2015</p> <p>Persoonia Condition Report submitted late.</p>
3	<p><u>Persoonia Hirsuta</u></p> <p>Engage a suitably qualified expert to undertake targeted research to inform conservation activities. Make research publicly available.</p>	<p>University of Wollongong have been engaged to conduct research. The ‘targeted’ research consists of a series of honours projects and research undertaken by Mt Annan Royal Botanic Gardens.</p> <p>The following UOW projects have been completed to date:</p> <ol style="list-style-type: none"> <li>1. Honours project #1 titled <i>The Demography and Habitat Characteristics of the Endangered Persoonia hirsuta</i> (completed 2013)</li> <li>2. Honours project #2 titled <i>Conservation genetics of the rare and endangered plant, Persoonia hirsuta (proteaceae)</i> (completed 2015)</li> <li>3. Honours Project #3 (Continuation of #2) titled <i>Can the seed bank act as a reservoir of genetic diversity? A Conservation genetic study of Persoonia hirsuta</i> (Completed 2016).</li> </ol> <p>UOW will publish the outcomes from this work. We expect the final paper/s to be available late 2017.</p> <p>In addition, Mt Annan Royal Botanic Gardens (RBG) are undertaking trial propagation using cuttings collected from the West Cliff and other populations. The aim is to develop a population of stock plants at the nursery, which will be used to collect seed for germination trials and translocation. This project is ongoing; progress has been slow due to the overall success rate for this species</p>	<p>Yes</p>



Condition	Condition Summary	Status	Compliant Y/N
		<p>being very low.</p> <p>Mt Annan RBG (in collaboration with Illawarra Coal and Centennial Coal) has been granted ACARP funding to conduct research on seed germination biology and alternative ex situ storage of <i>Persoonia</i> germplasm for restoration. This project will address two main questions: 1) how to effectively propagate <i>Persoonia</i> species (both rare and common) for mine rehabilitation work; and, 2) what are the most appropriate ex situ conservation options to ensure restoration success. The project commenced February 2015 and completed in March 2017. This project was granted further funding in 2016 and will be extended for two years (conclude 2019) to include high interest native plants in mine site restoration programs and propagation, translocation and re-introduction of plants for the establishment of offset populations.</p> <p>IC requested an extension to the research report deadline to 15 May 2019. The extension was granted on 15<sup>th</sup> May 2017.</p>	
4	<p><u>Shale/Sandstone Transition Forest</u></p> <p>Conduct an ecological survey that demonstrates quality and extent of proposed offset area.</p> <p>Setup mechanism to protect the shale/sandstone transition forest offset in perpetuity.</p>	<p>In 2012, IC provided an offset management plan as well as ecological survey information to comply with these conditions. The plan was approved by the Department of the Environment (DOTE) in June 2013. In 2014, IC requested an extension to the deadline to have the offset secured in perpetuity. DOTE granted an additional 18 months, making the deadline March 2016.</p> <p>In October 2015, IC made an application to NSW Office of Environment &amp; Heritage (OEH) to have the SSTF offset secured via a BioBanking Agreement under Part 7A Division 2 of the <i>Threatened Species Conservation Act 1995</i>. The BioBanking Agreement was finalised and executed on 1st February 2017.</p>	Yes
5	<p><u>Shale/Sandstone Transition Forest</u></p> <p>Develop a management plan for shale/sandstone</p>	<p>Management plan submitted and approved on 7<sup>th</sup> June 2013. The revised Plan was updated and approved on 2<sup>nd</sup> September 2014. The 2014 version is</p>	Yes



Condition	Condition Summary	Status	Compliant Y/N
	transition forest.	available on our website. <a href="http://www.south32.net/what-we-do/places-we-work/illawarra-metallurgical-coal/documents">http://www.south32.net/what-we-do/places-we-work/illawarra-metallurgical-coal/documents</a>  The Management Plan will be updated in 2017 and re-submitted to the Department to reflect the new offset mechanism (BioBanking).  The 2016 SSTF monitoring was conducted in November 2016 and the monitoring report submitted to DOEE on 23 March 2017.	
6	<u>Coal Wash Emplacement Staging and Rehabilitation Plan</u>  Develop a Coal Wash Emplacement Staging and Rehabilitation Plan for stage 4 coal wash emplacement area.	The West Cliff Coal Wash Emplacement Area Management Plan (available on our website) incorporates the requirements of both the EPBC Act approval and NSW EP&A Act. Whilst the Plan is currently approved by the Minister administering the EP&A Act, it has not yet been approved under the EPBC Act given that Stage 4 emplacement operations are at least 10 years away.	Yes
7	<u>Southern Brown Bandicoot and Broad Headed Snake Management Plan or Plans</u>  Develop a Southern Brown Bandicoot and Broad Headed Snake conservation management plan or plans.	Draft Plans completed and submitted to DOE on the 15 <sup>th</sup> May 2013.  Plans revised following comments from DOE and OEH. Final Plans re-submitted to DOE and OEH on 29 April 2014. Plans approved on the 28 May 2014. Plans are available on our website. <a href="http://www.south32.net/what-we-do/places-we-work/illawarra-metallurgical-coal/documents">http://www.south32.net/what-we-do/places-we-work/illawarra-metallurgical-coal/documents</a>  Both Plans have been updated and are currently under review by DOTEE.	Yes
8	<u>Surface and Ground Water Quality Monitoring and Adaptive Management Plan</u>  Develop a Surface and Ground Water Quality Monitoring and Adaptive Management Plan for species listed in the EPBC Act.	Original Plan submitted on the 30 <sup>th</sup> September 2012 to DOE. Plan was approved on 3 July 2014. <a href="http://www.south32.net/what-we-do/places-we-work/illawarra-metallurgical-coal/documents">http://www.south32.net/what-we-do/places-we-work/illawarra-metallurgical-coal/documents</a>  The Plan was revised and submitted to DOTEE on 29 <sup>th</sup> June 2017; however, the new Plan has not yet been approved.	Yes
9	<u>Mine Closure Environmental Management Plan</u>  Develop a mine closure plan 3 years prior to closure for	Current mining plan is for next 30 years, therefore plan not required.	Yes



Condition	Condition Summary	Status	Compliant Y/N
	EPBC Act listed species.		
10	<u>Mine Closure Environmental Management Plan</u> Management for EPBC listed bats through the decommissioning of mining equipment.	Plan not yet submitted. To be submitted in the mine closure plan.	Yes
11	<u>Shapefiles</u> Provide offset area shapefiles to the DOE.	Shapefiles provided on 26 November 2013.	Yes
12	<u>Notification of Actual Date of Commencement</u> Notification date of commencement to be supplied to DSEWPaC.	Letter sent to DOE 31 May 2012.	Yes
13	<u>Publication Requirements</u> publish all management plans, reports, strategies or agreements with DSEWPaC	Undertaken as required. See website. <a href="http://www.south32.net/what-we-do/places-we-work/illawarra-metallurgical-coal/documents">http://www.south32.net/what-we-do/places-we-work/illawarra-metallurgical-coal/documents</a>	Yes
14	<u>Compliance Report</u> Publish a report on website addressing compliance with each of the conditions of this approval.	This compliance report meets this condition. The 2013, 14, 15 and 16 reports were submitted and are available on our website. The 2013 compliance report was submitted five days after the due date required by the condition. This was found to be non-compliant due to late submission of the compliance report. All other reports have been submitted on time.	Yes – See comments regarding the 2013 report.
15	<u>Accurate Records Must be Maintained</u> Maintain accurate records substantiating all activities associated with or relevant to the conditions of approval.	Documents are maintained in the Illawarra Coal controlled document registers.	Yes
16	<u>Minister's Approval of the Modification to a Management Plan, Report, Strategy or Agreement</u> Apply to the minister for approval to modify management	Undertaken as required.	Yes



Condition	Condition Summary	Status	Compliant Y/N
	plans, reports, strategies or agreements.		
17	<u>Minister's Modification to a Management Plan, Report, Strategy or Agreement</u> Comply with the minister's request to modify management plans, reports, strategies or agreements.	No requests received from the minister.	Yes
18	<u>Independent Auditor</u> Commission and pay the full cost for independent environmental auditor of the project.	Independent Environmental Audit was conducted by ERM. The Audit commenced January and completed February 2017; the report was provided to Illawarra Coal on 22 <sup>nd</sup> March 2017. A copy of the report was provided to DOTEE on 22 March 2017 to satisfy Condition 18 (g). EPBC condition (2) was found to be administratively non-compliant as one of the Annual Personia condition-monitoring reports was submitted late (2015 report). EPBC condition (14) was previously found to be non-compliant in the 2013 Independent Environmental Audit due to late submission of the 2013 compliance report (5 days late). This most recent report t is available on the South32 website. <a href="https://www.south32.net/what-we-do/places-we-work/illawarra-metallurgical-coal/documents">https://www.south32.net/what-we-do/places-we-work/illawarra-metallurgical-coal/documents</a>	Yes
19	<u>Unsatisfactory Commencement of Action</u> If work has not commenced within 5 years of approval, written approval needs to be obtained from the minister.	Work commenced 15 <sup>th</sup> May 2012 as per date of commencement letter sent to Department of the Environment.	Yes

## APPENDIX E: BSO CONSENT COMPLIANCE REPORT AND SUMMARY OF NON-COMPLIANCES

Schedule 2 Administrative Conditions		
Condition	Condition Summary	Status
	<p><u>Obligation to Minimise Harm to the Environment</u> Prevent and/or minimise any harm to the environment.</p>	Management Plans developed and implemented to minimise harm to the environment.
	<p><u>Terms of Approval</u> Carry out projects in accordance with the EA, Statement of Commitments, PPR and conditions of this approval.</p>	Management Plans and monitoring developed to meet EA, Statement of Commitments, PPR and conditions of this approval.
	<p><u>Terms of Approval</u> 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.</p>	Not triggered during the Reporting Period.
	<p><u>Terms of Approval</u> 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.</p>	Requirements from Director General included in the Management Plans.
	<p><u>Limits on Approval – Mining Operations</u> Carry out mining operations on the site until 31 December 2041.</p>	Not triggered during the Reporting Period.
	<p><u>Limits on Approval – Coal Extraction and Production</u> 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.</p>	FY17- ROM Coal- BSO extracted 3.99MT of 'Run of Mine' FY17 – Product Coal transported – 5.73MT
	<p><u>Limits on Approval – Hours of Operation</u> Undertake mining operations 24 hours a day, 7 days a week.</p>	Mining operations are in accordance with hours of operation.
	<p><u>Surrender of Consents and Approval</u> Surrender all existing development consents and project approvals for mining operations relied on by the Proponent for the site (other than this approval)</p>	Letters sent on 29 July 2014 to DoPE and 1 Aug 2014 to WSC advising that Illawarra Coal Holdings Pty Ltd surrenders all existing development consents and project approvals for mining (including Wollondilly Shire Council approvals for: Shaft



in accordance with Sections 75YA and 104A of the EP&A Act. 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.

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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.

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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.

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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.

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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.

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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**

<b>Condition</b>	<b>Condition Summary</b>	<b>Status/Other Documents</b>
1.	Subsidence – Performance Measures – Natural and Heritage Features, etc. Ensure that the project does not cause any exceedances.	For all observed impacts, the appropriate TARP's were applied, actions implemented and key stakeholders notified as required by the approved Subsidence Management Plan and Extraction Plan. See Section 6.15 of this AR for summary of the predicted vs observed impacts.
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.	For all observed impacts, the appropriate TARP's were applied, actions implemented and key stakeholders notified as required by the approved Subsidence Management Plan and Extraction Plan. See Section 6.15 of this AR for summary of the predicted vs observed impacts.
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.	For all observed impacts, the appropriate TARP's were applied, actions implemented and key stakeholders notified as required by the approved Subsidence Management Plan and Extraction Plan. See Section 6.15 of this AR for summary of the predicted vs observed impacts.
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. <a href="http://www.south32.net/our-operations/australia/illawarra-coal/regulatory-document">http://www.south32.net/our-operations/australia/illawarra-coal/regulatory-document</a>
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 <a href="http://www.south32.net/our-operations/australia/illawarra-coal/regulatory-document">http://www.south32.net/our-operations/australia/illawarra-coal/regulatory-document</a>
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 <a href="http://www.south32.net/our-operations/australia/illawarra-coal/regulatory-document">http://www.south32.net/our-operations/australia/illawarra-coal/regulatory-document</a>
8.	Payment of Reasonable Costs	Condition not triggered during Reporting Period.

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.

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).	See section 6.15 of this AEMR for information on the BSO Environmental Research Program.
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.	As above.

#### Schedule 4 – Specific Environmental Conditions – General

Condition	Condition Summary	Status/Other Documents
1.	<u>Noise – Noise Impact Assessment Criteria</u> 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.	<u>Noise – Noise Impact Assessment Criteria</u> 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.	<u>Noise Mitigation</u> Implement noise mitigation measures upon receiving written request from identified residents.	Noise barrier wall erected at Appin West Gas Drainage Plant after community complaint. Noise levels were within compliance.
4.	<u>Operating Conditions</u> 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 <a href="http://www.south32.net/our-operations/australia/illawarra-coal/regulatory-document">http://www.south32.net/our-operations/australia/illawarra-coal/regulatory-document</a>
5.	<u>Noise Management Plan</u> Prepare and implement a Noise Management Plan.	Plan submitted and approved. <a href="http://www.south32.net/our-operations/australia/illawarra-coal/regulatory-document">http://www.south32.net/our-operations/australia/illawarra-coal/regulatory-document</a>

6.	<p><u>Road Traffic Noise Mitigation</u></p> <p>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 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.</p>	Condition not triggered during Reporting Period.
7.	<p><u>Air Quality &amp; Greenhouse Gas – Odour</u></p> <p>Ensure that no offensive odours are emitted from the site.</p>	Condition not triggered during Reporting Period. One complaint received for odour during the reporting period it was transient in nature.
8.	<p><u>Greenhouse Gas Emissions</u></p> <p>Implement all reasonable and feasible measures to minimise the release of greenhouse gas emissions from the site.</p>	Link to Air Quality and GHG Mgmt. Plan <a href="http://www.south32.net/our-operations/australia/illawarra-coal/regulatory-document">http://www.south32.net/our-operations/australia/illawarra-coal/regulatory-document</a>
9.	<p><u>Air Quality Criteria</u></p> <p>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.</p>	Link to Air Quality and GHG Mgmt. Plan <a href="http://www.south32.net/our-operations/australia/illawarra-coal/regulatory-document">http://www.south32.net/our-operations/australia/illawarra-coal/regulatory-document</a>
10.	<p><u>Air Quality Acquisition Criteria</u></p> <p>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.</p>	Condition not triggered during Reporting Period.
11.	<p><u>Operating Conditions</u></p> <p>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.</p>	Link to Air Quality and GHG Mgmt. Plan <a href="http://www.south32.net/our-operations/australia/illawarra-coal/regulatory-document">http://www.south32.net/our-operations/australia/illawarra-coal/regulatory-document</a>
12.	<p><u>Air Quality &amp; Greenhouse Gas Management Plan</u></p> <p>Prepare and implement a detailed Air Quality &amp; Greenhouse Gas Management Plan.</p>	Link to Air Quality and GHG Mgmt. Plan <a href="http://www.bhpbilliton.com/home/society/regulatory/Documents/_coal/illawarra/bulliseam/131113_coal_illawarra_bulliseam_AirQualityandGreenhouseGasManagementPlanV2.pdf">http://www.bhpbilliton.com/home/society/regulatory/Documents/_coal/illawarra/bulliseam/131113_coal_illawarra_bulliseam_AirQualityandGreenhouseGasManagementPlanV2.pdf</a>
13.	<p><u>Meteorological Monitoring</u></p>	Weather station installed at West cliff Mine, Appin Mine and No. 6 Shaft.

Ensure that there is a suitable meteorological station operating in the vicinity of the site.

14.	<p><u>Compensatory Water Supply</u> Provide a compensatory water supply to any owner of privately-owned land whose water supply is adversely impacted (other than an impact that is negligible) as a result of the project.</p>	Water supplied as per the management plan.
15.	<p><u>Surface Water Discharge</u> 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.</p>	<p>Surface water discharge monitored in accordance with the EPL. <a href="http://www.south32.net/our-operations/australia/illawarra-coal/regulatory-document">http://www.south32.net/our-operations/australia/illawarra-coal/regulatory-document</a></p>
16.	<p><u>Surface Water Management Plan</u> Prepare and implement a Surface Water Management Plan.</p>	<p>Plan submitted and approved. Link to Surface Water Mgmt. Plan <a href="http://www.south32.net/our-operations/australia/illawarra-coal/regulatory-document">http://www.south32.net/our-operations/australia/illawarra-coal/regulatory-document</a></p>
17.	<p><u>West Cliff Coal Wash Emplacement Area – West Cliff Coal Wash Emplacement Area Management Plan</u> Prepare and implement a West Cliff Coal Wash Emplacement Area Management Plan.</p>	<p>Plan submitted, and approved by the DoPE. <a href="http://www.south32.net/our-operations/australia/illawarra-coal/regulatory-document">http://www.south32.net/our-operations/australia/illawarra-coal/regulatory-document</a></p>
18.	<p><u>West Cliff Coal Wash Emplacement Area Biodiversity Offset Strategy</u> Provide a suitable biodiversity offset strategy to compensate for the impacts of Stage 4 of the West Cliff Coal Wash Emplacement Area.</p>	<p>Throughout the period from 2013-2016, Illawarra Coal undertook numerous meetings and held discussions with senior officers of the Department of Environment and Planning, Office of Environment and Heritage, relevant Ministerial Offices and Water NSW in relation to the suitability of the proposed offsets. In March 2016, the final Strategic Biodiversity Offset was submitted to the Department of Planning and Environment for approval. The final Strategy was endorsed by OEH.</p>
19.	<p><u>West Cliff Coal Wash Emplacement Area Biodiversity Offset Strategy</u> Provide appropriate long-term security for the offset areas by 31 December 2012.</p>	As above.
20.	<p><u>Underground Coal Wash Emplacement Trial</u> Prepare and undertake an Underground Coal Wash Emplacement Trial.</p>	<p>Illawarra Coal submitted a revised Underground Coal Wash Emplacement Trial to the Department October 2013. The revised</p>

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

Illawarra Coal's focus on diverting material from surface emplacement via alternative beneficial uses continues.

Following discussions with the Department, further commitments have been included in the Plan to report on the research annually in the AEMR during the deferred period.

21.	<p><u>Project Surface Infrastructure Management – Gas Drainage Management Plan</u> Prepare and implement a Gas Drainage Management Plan.</p>	<p>Plans submitted and approved. <a href="http://www.epa.nsw.gov.au/prpoeoapp/ViewP/OEOLicence.aspx?DOCID=33589&amp;SYSUID=1&amp;LICID=2504">http://www.epa.nsw.gov.au/prpoeoapp/ViewP/OEOLicence.aspx?DOCID=33589&amp;SYSUID=1&amp;LICID=2504</a></p>
22.	<p><u>Service Boreholes Management Plan</u> Prepare and implement a Service Boreholes Management Plan.</p>	<p>Link to Borehole Mgmt. Plan <a href="http://www.south32.net/our-operations/australia/illawarra-coal/regulatory-document">http://www.south32.net/our-operations/australia/illawarra-coal/regulatory-document</a></p>
23.	<p><u>Personal Emergency Device (PED) Communication Management Plan</u> Prepare and implement a PED Communications Management Plan.</p>	<p>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.</p>
24.	<p><u>Heritage – Heritage Management Plan</u> Prepare and implement a Heritage Management Plan.</p>	<p>Plan submitted and approved. Link to Heritage Mgmt. Plan <a href="http://www.south32.net/our-operations/australia/illawarra-coal/regulatory-document">http://www.south32.net/our-operations/australia/illawarra-coal/regulatory-document</a></p>
25.	<p><u>Transport – Monitoring of Coal Transport</u> 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.</p>	<p>Documents are maintained in the Illawarra Coal document registers. Records are on our website: <a href="http://www.south32.net/our-operations/australia/illawarra-coal/regulatory-document">http://www.south32.net/our-operations/australia/illawarra-coal/regulatory-document</a></p>
26.	<p><u>Traffic Management Plan</u> Prepare and implement a Traffic Management Plan.</p>	<p>Plan was developed and submitted to the Director General on 21/12/2013. Plan was formally approved July 2015. .</p>
27.	<p><u>Visual – Visual Amenity and Lighting</u></p>	<p>Lighting setup in accordance with consent conditions.</p>

Minimise the visual impacts, and particularly the off-site lighting impacts, of the main infrastructure area and associated ancillary surface works.

28.	<u>Waste</u> 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.	<u>Waste</u> Prepare and implement a Waste Management Plan.	Link to Waste Mgmt. Plan <a href="http://www.south32.net/our-operations/australia/illawarra-coal/regulatory-document">http://www.south32.net/our-operations/australia/illawarra-coal/regulatory-document</a>
30.	<u>Bushfire Management</u> 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.	<u>Rehabilitation – Rehabilitation Objectives</u> Rehabilitate the site to describe satisfactory level.	Rehabilitation conducted in accordance with rehabilitation management plan.
32.	<u>Progressive Rehabilitation</u> Carry out the rehabilitation of the site progressively.	Rehabilitation conducted in accordance with rehabilitation management plan.
33.	<u>Rehabilitation Management Plan</u> Prepare and implement a Rehabilitation Management Plan.	Plan submitted and approved in 2012. Link to Mining Operations Plan/RMP <a href="http://www.south32.net/our-operations/australia/illawarra-coal/regulatory-document">http://www.south32.net/our-operations/australia/illawarra-coal/regulatory-document</a>

#### 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.	Condition not triggered during Reporting Period.

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.

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.	<u>Environmental Management Strategy</u> Prepare and implement an Environmental Management Strategy for the project.	Strategy submitted and approved. Link to Environmental Management Strategy. <a href="http://www.south32.net/our-operations/australia/illawarra-coal/regulatory-document">http://www.south32.net/our-operations/australia/illawarra-coal/regulatory-document</a>
2.	<u>Management Plan Requirements</u> 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.	<u>Adaptive Management</u> Assess and manage project-related risks.	Condition not triggered during Reporting Period.
4.	<u>Annual Review</u> Review the environmental performance of the projects.	As discussed in this review
5.	<u>Revision of Strategies, Plans and Programs</u> 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.
6.	<u>Community Consultative Committee</u> Establish and operate a new Community Consultative Committee (CCC) which must be operated in general accordance with the <i>Guidelines for Establishing and</i>	Community Consultative Committee is operational in accordance with the Guidelines for Establishing and Operating Community Consultative Committees for Mining Projects.



*Operating Community Consultative Committees for Mining Projects* (Department of Planning, 2007, or its latest version), and be operating by 30 September 2012.

	<u>Reporting – Incident Reporting</u>	
7.	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.
	<u>Regular Reporting</u>	Link to BSO 14 Day EPL Reporting and BSO Project Approval monitoring requirements.
8.	Regularly report on the environmental performance on the website.	<a href="http://www.south32.net/our-operations/australia/illawarra-coal/regulatory-document">http://www.south32.net/our-operations/australia/illawarra-coal/regulatory-document</a>
	<u>Independent Environmental Audit</u>	Environmental Resources Management Australia Pty Ltd (ERM) was engaged by IC to carry out an Independent Environmental Audit of the BSO.
9.	Commission and pay the full cost for independent environmental auditor of the project.	The audit commenced January 2017 and was completed in February 2017. The review identified 10 medium level non-conformances, 5 administrative non-conformances and 5 observations. 8 of the 10 non- conformances related to exceedances of water discharge concentration limits; the other 2 reported non-conformances related to project noise exceedances The BSO operations were recertified with ISO14001 environmental certification following an external audit in December 2016.
	<u>Independent Environmental Audit</u>	As above.
10.	Within 6 weeks of the completion of this audit provide a copy of the audit report.	
	<u>Access to Information</u>	All approved plans, strategies and monitoring results are on the south32 Regulatory Webpage.
11.	From 30 June 2012, make copies of specified documents publically available on the website and keep them up to date.	<a href="http://www.south32.net/our-operations/australia/illawarra-coal/regulatory-document">http://www.south32.net/our-operations/australia/illawarra-coal/regulatory-document</a>

## **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.