

Dendrobium Mine Development

Conditions of Approval Independent Environmental Audit

South 32 — Illawarra Coal

21 May 2017

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Dendrobium Mine Development

Conditions of Approval Independent Environmental Audit

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Date:	21 May 2018

South32 – Illawarra Coal

May 2018

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EXECUTIVE SUMMARY

Environmental Resources Management Australia Pty Ltd (ERM) was commissioned to perform an independent environmental audit (IEA) of the Dendrobium Mine Development (DMD) located in Mount Kembla, NSW on behalf of South 32 – Illawarra Coal. The primary purpose of the audit was to satisfy the Department of Planning and Environment (DPE) Ministers’ Conditions of Approval (MCoA) the DMD development approval 60-30-2001 (Modification 7) April 2015, which requires the commissioning of an independent audit every 3 years, unless the Director General directs otherwise. The most recent audit was completed November 2014.

The audit included a review of:

- *Conditions of consent of Develop Approval - DA 60-03-2001 (Modification 7 issued April 2017);*
- *Environmental Protection Licence - EPL No. 3241;*
- *Subsidence Management Plan Approval (Are 3B, 2013);*
- *Consolidated Coal Lease 768;*
- *Mining Leases 1510 & 1566; and*
- *Implementation of Management Plans developed as part of the Ministers Conditions of Approval.*


Overall, compliance was achieved with the audit documents that were reviewed. A qualitative risk assessment was also completed on the findings, consistent with AS/NZS 4360:2004 Risk management and HB 436:2004 Risk Management Guidelines Companion to AS/NZS 4360:2004 and as described in the Department of Planning & Environment publication “Independent Audit Guidelines” issued October 2015. The number of non-compliances with the statutory conditions is summarised in Table below:

Summary of Audit Findings

Number of Conditions	Non compliances	Administrative Non - compliances	Observations
<i>Statutory Instruments</i>			
204	8	2	15
High (0), Medium (7), Low (1)			

An action response table has been developed by DMD addressing all audit findings and will be submitted separately to this report.

Independent Environmental Audit Certification Form

Independent Environmental Audit Certification Form	
Development Name	Dendrobium Mine Development
Development Consent No.	<i>Development Application (DA) 60-30-2001 (Modification 7) April 2015</i>
Description of Development	<p>Illawarra Coal operates an underground mine at Dendrobium produce high quality metallurgical coal used for steelmaking. As a by-product, small amounts of coal are supplied for energy production.</p> <p>Coal is processed at the Dendrobium plant, before being transported by road and rail to Port Kembla in Wollongong for shipping around Australia and internationally. Port Kembla Coal Terminal is also managed as part of the development.</p>
Development Address	Dendrobium mine Pit Top - Cordeaux Road, Mt Kembla; Kemira Valley Coal Loading Facility - Stones Road, Mt Kembla; Kemira Valley Rail Line; Ventilation Shafts 1, 2 and 3; Mining Areas - Subsidence management; Dendrobium Coal Preparation Plant - Bluescope Steelworks, Port Kembla; and West Cliff Emplacement Area Stage 3
Operator	South 32 - Illawarra Coal
Operator Address	Enterprise 1 Building, Level 3 Squires Way North Wollongong, NSW, 2526, Australia
Independent Audit	
Title of Audit	Dendrobium Mine Development Conditions of Approval Independent Environmental Audit
<p><i>I certify that I have undertaken the independent audit and prepared the contents of the attached independent audit report and to the best of my knowledge:</i></p> <ul style="list-style-type: none"> • <i>The audit has been undertaken in accordance with relevant approval condition(s) and in accordance with the auditing standard AS/NZS ISO 19011:2014 and Post Approval Guidelines - Independent Audits</i> • <i>The findings of the audit are reported truthfully, accurately and completely;</i> • <i>I have exercised due diligence and professional judgement in conducting the audit;</i> • <i>I have acted professionally, in an unbiased manner and did not allow undue influence to limit or over-ride objectivity in conducting the audit;</i> • <i>I am not related to any owner or operator of the development as an employer, business partner, employee, sharing a common employer, having a contractual arrangement outside the audit, spouse, partner, sibling, parent, or child;</i> • <i>I do not have any pecuniary interest in the audited development, including where there is a reasonable likelihood or expectation of financial gain or loss to me or to a person to whom I am closely related (i.e. immediate family);</i> • <i>Neither I nor my employer have provided consultancy services for the audited development that were subject to this audit except as otherwise declared to the lead regulator prior to the audit; and</i> • <i>I have not accepted, nor intend to accept any inducement, commission, gift or any other benefit (apart from fair payment) from any owner or operator of the development, their employees or any interested party. I have not knowingly allowed, nor intend to allow my colleagues to do so.</i> <p><i>Note.</i></p> <p><i>a) The Independent Audit 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.</i></p> <p><i>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).</i></p>	
Signature	
Name of Lead / Principal Auditor	William Weir
Address	Level 4, 201 Leichhardt St, Spring Hill QLD 4004
Email Address	William.weir@erm.com
Auditor Certification (if relevant)	N/A
Date 21 May 2018	

INTRODUCTION

Environmental Resources Management Australia Pty Ltd (ERM) was commissioned to perform an independent environmental audit (IEA) of the Dendrobium Mine Development (DMD) located in Mount Kembla, NSW on behalf of South 32 – Illawarra Coal. The primary purpose of the audit was to satisfy the Department of Planning and Environment (DPE) Ministers' Conditions of Approval (MCoA) the DMD development approval 60-30-2001 (Modification 7) April 2015 and EPBC approval 2001/214 dated 20 December 2001. The MCoA requires the completion of an independent audit by 31 December 2011, and every 3 years thereafter from the date of the approval, unless the Director General directs otherwise. The most recent audit was completed November 2014. The audit period assessed in this IEA is 1 November 2014 through 14 September 2017. The audit must:

- (a) be conducted by suitably qualified, experienced and independent team of experts whose appointment has been endorsed by the Secretary;
- (b) include consultation with the relevant agencies;
- (c) assess the environmental performance of the development and assess whether it is complying with the relevant requirements in this approval and any relevant EPL or mining lease (including any strategy, plan or program required under these approvals);
- (d) review the adequacy of strategies, plans or programs required under these approvals; and, if appropriate,
- (e) recommend measures or actions to improve the environmental performance of the development, and/or any strategy, plan or program required under these approvals.

Within 6 weeks of the completing of this audit, or as otherwise agreed by the Secretary, the Applicant shall submit a copy of the audit report to the Secretary, together with its response to any recommendations contained in the audit report.

1.1

AUDIT TEAM

The audit has been conducted by the following team of suitably qualified and experienced persons that have been approved by DoPE:

- William Weir (ERM Lead Auditor);
- Oliver Moore (ERM Support Auditor);
- Matthew Flower (Biodiversity and Rehabilitation Specialist and EPBC auditor); and

- Steve Ditton (DgS - Mine Subsidence Specialist).

The audit team also was supported with review of specific technical aspects by:

- Nathan Lynch (ERM Acoustics Engineer);
- Iain Cowen (ERM Air Quality Scientist); and
- Joanne Woodhouse (ERM Heritage Consultant).

1.2 *MINE HISTORY & APPROVALS*

Illawarra Coal, an underground mining operation, comprises Dendrobium Mine and Cordeaux Colliery. Mining operations are located in New South Wales, in the Southern Coalfields, and date back over 80 years. Mt Kembla village, located within 500 m of the Pit Top site, has historical links with the mine.

Cordeaux Colliery, located approximately 20 km north-west of Wollongong, commenced production in 1980, merged with Corrimal Colliery in 1986 and ceased operations in 2001. Thereafter, the site was placed under “care and maintenance” and remains the responsibility of South32 (previously BHP Billiton Illawarra Coal). Cordeaux Colliery was not considered in the scope of this IEA.

Dendrobium Mine, located approximately 8 km west of the city of Wollongong, comprises key infrastructure; Dendrobium Pit Top, Kemira Valley Coal Loading Facility (KVCLF), Kemira Valley Rail Line, Ventilation Shafts 1, 2 & 3, and Dendrobium Coal Preparation Plant (DCPP).

Production commenced at Dendrobium in 2005, using longwall methods. Hard coking coal is produced from materials sourced from the Wongawilli Seam. There are five approved underground mining areas (1, 2, 3A, 3B and 3C). Longwall mining is currently being conducted at Area 3B.

Illawarra Coal is 100 per cent owned and Dendrobium Mine is operated by South32.

1.2.1 *Approvals*

Dendrobium Underground Coal Mine was granted approval by the NSW Government in November 2001 through to 21 December 2023, with construction commencing in 2002.

EPBC approval (2001/214) was granted in December 2001 to extract Wongawilli Seam Coal from nearby the existing Eloura Mine and associated works. The approval is effective until 1 January 2032. The approval allows 5.2 million tonnes ROM coal per annum until the end of 2030, transported by rail only from the surface facilities, within adhering to specified noise criteria.

SMP approvals for Longwalls 6-8 and 19 were issued in 2010, and approvals for Longwalls 9 to 13 in 2013, supported by the Mining Operations Plan Area 3A & 3B. A Subsidence Management Plan for area 3B was approved in 2013. As the seams are exhausted new areas of underground mining are developed to exploit the seams. The latest proposal is to extend the underground mining areas to access more of the coal seam, and supporting surface development. This will involve Longwall mining in additional areas (5 & 6).

Dendrobium Mine is covered by EPL No. 3241.

The Illawarra operations include one Consolidated Coal Lease (CCL) and two Mining Leases (ML):

- CCL 768 associated with Cordeaux Colliery covering an area of 18,560 hectares.
- ML 1510 and ML 1566 associated with the Dendrobium Mine covering a combined area of 49.295 hectares.

1.3 OVERVIEW OF OPERATIONS

Dendrobium Mine operations are located within Mining Leases 1510 & 1566, with the development consent initially granted to BHP BIC. Dendrobium Mine is currently owned and operated by Dendrobium Coal Pty Ltd., a subsidiary of South32.

The approval allows for the production of up to 5.2 million tonnes per annum, which is primarily coking coal. The coal is extracted from the No. 3 underground seam (Wongawilli Seam) and is extracted by longwall methods.

The mine consists of the following sites;

1.3.1 *Dendrobium Mine Pit Top*

The Dendrobium Pit Top is made up of the following facilities and infrastructure;

- Administration buildings;
- Workshop, machinery and equipment storage areas;
- The Dendrobium tunnel (providing access to underground works);
- Sedimentation ponds (A & B);
- A water treatment facility.

1.3.2 *Kemira Valley Coal Loading Facility*

The Kemira Valley Coal Loading Facility (KVCLF) receives coal from the underground operations via a conveyor system that travels to the surface through the Kemira Valley Tunnel. The coal then travels through a coal sizer and into a rill tower before being deposited onto a stockpile. Coal is loaded from the stockpile on to trains via an enclosed chute.

1.3.3 *Kemira Valley Rail Line*

Once loaded on to trains, the ROM coal is transported to the Dendrobium Coal Preparation Plant (DCPP) via private rail line. The rail line must adhere to operational restrictions to minimise impacts to the surrounding environment. This includes operating within prescribed noise limits and timeframes (train movements only occurring between 6am-11pm).

1.3.4 *Ventilation Shafts 1, 2 and 3*

Ventilation Shaft 1 currently operates only as an air intake for the underground workings. Ventilation Shafts 2 and 3 were constructed at a later date and are now the two operational shafts that provide ventilation to the Area 3 underground workings.

1.3.5 *Mining Areas*

There are currently four mining areas that comprise the approved mine plan; Areas 1, 2, 3A and 3B. Longwall mining is currently occurring at Area 3B, with extraction from Longwall 13 commencing in March 2017. Each mining area has an approved Extraction Plan/Subsidence Management Plan, fulfilling the requirements of the development consent (DA-60-03-2001).

As part of a Brownfields exploration program, twenty three exploration boreholes were drilled in FY17 in Dendrobium Areas. Two seismic lines were acquired in FY17 to monitor subsurface geological features.

1.3.6 *Dendrobium Coal Preparation Plant*

The DCPP, Located within the Port Kembla Steelworks, is where the ROM coal is processed. The coal is washed prior to undergoing the coke making process. The coal wash is then placed at the West Cliff Colliery Emplacement Area.

1.3.7 *West Cliff Emplacement Area Stage 3*

Stage 3, the current stage, has an estimated capacity of 33.5 million tonnes for coal wash emplacement. Stage 4 has been approved and will hold an additional 59.4 million tonnes of coal wash when the stage 3 emplacement capacity has been reached. In order to limit the volume of coal wash ending up at the Emplacement Area, where possible, the coal wash is used elsewhere on-site i.e in engineered fill. Emplacement Areas 1 and 2 have undergone rehabilitation works, and are being monitored quarterly to determine the rehabilitation success.

1.4 *AUDIT OBJECTIVES*

The primary objectives of the audit included:

- Assessment of the environmental performance of the site, and its effects on the surrounding environment and sensitive receivers;

- Assessment of whether the site is complying with the requirements in the CoA, EPBC Approval, EPL 3241 and any other relevant consents/approvals (including any assessment, plan or program required under these consents/approvals);
- Review of the adequacy of any approved strategy, plan, or program required under the abovementioned consents/approvals; and
- Recommendation of measures or actions to improve the environmental performance of BSO, and/or any strategy/plan/program required under these consents/approvals.

1.5

AUDIT SCOPE

This second Independent Environmental Audit (IEA) will be completed in accordance with Condition 6, Schedule 8 of DA 08/0150 and ERM's Terms of Reference.

- The IEA under DA 60-03-2001 will cover the period 1 November 2014 to 14 September 2017 (date of final day in field).
- The audit is to be completed in accordance with DP&E's Guidelines for Independent Audits;
- The audit to also be completed in accordance with AS/NZS ISO 19011:2003: Guidelines for quality and/or environmental management systems auditing;
- Review of compliance against the documentation identified in the MCoA (as it relates to the current activities of both the North Development Approval and the South Project Approval) which will include:
 - Document review of compliance against the MCoA, and any other relevant consents/approvals;
 - Site inspection to assess compliance against field implementation of active MCoA;
 - Review of supporting plans developed as part of the MCoA and assessment of their adequacy towards effective environmental performance;
- Review of monitoring results and trends with comparison of monitoring results against regulatory limits and MCoA limits (where applicable);
- Confirmation if any additional monitoring required for identified trends;
- Community complaints with review completed for any trends and identifying the source of an established trend;

- Review of any regulatory actions including any letters, penalty notices and prosecutions; and
- Review of previous Independent Environment Report (issued 2014) audit report to verify close-out of actions.
- Consultation with the relevant agencies such as Department of Planning and Environment (DP&E), NSW Environment Protection Agency (EPA), NSW Department of Industry (Division of Resource and Energy (DRE)), Department of Primary Industry (DPI) Wollondilly Shire Council (WSC) and Campbelltown City Council;
- Draft report with results of compliance assessment to be issued for comment to BSO; and
- Final report issued for submission to the DP&E.

The concurrent EPBC audit will be completed in accordance with EPBC Approval 2010/5350, condition 18. The EPBC audit period will cover the period 27 November 2013 to 3 February 2017 (date of final day in field).

- Field observations will be recorded as at time of the audit in the week starting 30 January 2017; and
- The EPBC audit will be carried out in accordance with DoEE's Independent Audit and Audit Report Guidelines for controlled actions which have been approved under Chapter 4 of the Environmental Protection and Biodiversity Conservation Act 1999.

1.6

AUDIT CRITERIA

The audit covered the following specifications and standards, with a particular focus on activities associated with the current stages of operation. The documents relevant to this audit included:

- Conditions of consent of Develop Approval - DA 60-03-2001 (Modification 7 issued April 2017);
- Environmental Protection Licence - EPL No. 3241;
- Consolidated Coal Lease 768;
- Mining Leases 1510 & 1566; and
- Subsidence Management Plan (SMP) Approval (Area 3B, 2013);
- Management Plans - the commitments in the management plans developed as part of the Development and Project Approvals have been implemented including:

- Aboriginal Heritage Management Plan (AHMP);
- Air Quality Management Plan (AQMP);
- Bushfire Management Plan (BMP);
- Environmental Management System (EMS)
- Greenhouse Gas and Energy Efficiency Management Plan (GGEEMP);
- Landscape Management Plan (LMP);
- Lighting Management Plan;
- Noise Management Plan (NMP);
- Pollution Incident Response Management Plan (PIRMP);
- Subsidence Management Plan / Extraction Plan (SMP);
- Traffic Management Plan (TMP);
- Waste Management Plan; and
- Water Management Plan (WMP).

Plus supporting management plans for Area 3B Longwalls 11, 12 & 13 monitoring program;

- Asset Protection Plan;
- Groundwater Management Plan
- Swamp Research and Rehabilitation Plan (SRRP);
- Swamp Impact, Monitoring, Management and Contingency Plan (SWMMCP); and
- Watercourse Impact, Monitoring, Management and Contingency Plan (WIMMCP).

1.7 *LIMITATIONS OF THIS REPORT*

This disclaimer, together with any limitations specified in the report, applies to this report and its use.

This report was prepared in accordance with the contracted scope of services for the specific purpose stated and subject to the applicable cost, time and other constraints. In preparing this report, ERM relied on:

- a) client/third party information which was not verified by ERM except to the extent required by the scope of services, and ERM do not accept responsibility for omissions or inaccuracies in the client/third party information; and
- b) information taken at or under the particular times and conditions specified, and ERM do not accept responsibility for any subsequent changes.

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The audit comprised a site inspection, interviews with key personnel and review of records and other related documentation over the period 1 November 2014 to 14 September 2017. The audit process included the following primary components:

- Terms of Reference developed which included:
 - Audit scope and objectives;
 - Date and location of audit;
 - Members of audit team;
 - List of people to be interviewed; and
 - List of reference documents and audit criteria.
- The Lead Auditor worked with the South32 Environmental Coordinator to confirm details of the Terms of Reference, site inspection logistics and request for documentation required prior to the site inspection component of the audit;
- An opening meeting was held on 12 September 2017 at South32 offices in North Wollongong to confirm the audit objectives and scope for the site inspection. Attendees included:
 - William Weir (ERM Lead Auditor);
 - Oliver Moore (ERM Support Auditor);
 - Matthew Flower (Biodiversity Specialist);
 - Steve Ditton (Mine Subsidence Specialist);
 - Peter McMillan (South32, Environmental Superintendent);
 - Joanne Page (South32, Environment Manager)
 - Gary Brassington (South32, Principal Mining Approvals);
 - Sam Knight (South32, Process Engineer);
 - Ben Davis (South32, Environmental Advisor);
 - Richard Walsh (South32, Exploration);

- Amber Cleary (South32, Corporate Affairs); and
- Bryony Anderson (South32, General Manager);
- Site inspections were undertaken between 12 September and 14 September 2017;
- Any identified gaps/issues were documented and followed up with site personnel and additional information was requested as required;
- A closeout meeting was held on 14 September 2017 to discuss initial findings and recommendations. Attendees included the same participants as the opening meeting;
- Preparation of a draft audit report (this report);
- Response to comments developed by DMD; and
- Preparation of a final audit report.

2.2

AGENCY AND COMMUNITY CONSULTATION

As part of this audit, ERM and DMB consulted with the following agencies and stakeholders:

- Department of Planning and Environment (DP&E);
- NSW Environment Protection Agency (EPA);
- Department of the Environment and Energy (DoEE);
- NSW Department of Industry (Division of Resource and Energy (DRE));
- Department of Primary Industry (DPI);
- WaterNSW; and
- Wollongong City Council (WSC).

In each case an email was sent to representatives of each agency requesting feedback on those issues considered most relevant by their department at the time of the audit. All responses were considered in conducting the audit.

2.2.1

Summary of Consultation

The Terms of Reference were provided to the DP&E, DoEE, DRE, DPI and WSC on 28 August 2017, prior to the site inspection to obtain feedback and draw attention to any key issues, within the agreed scope of the audit.

DP&E responded confirming the audit team and Terms of Reference met the requirements of the IEA.

At the time of reporting responses had been received from the DRE, DP&E, WaterNSW, WSC and the EPA, summarised as follows:

DP&E (Resources & Geosciences)

One of the key focus areas from a Division of Resources and Geoscience, Environmental Sustainability Unit perspective would be related to subsidence impacts, including compliance with relevant development approval and mining lease conditions and with Subsidence Management Plan / Extraction Plan requirements and commitments.

Water NSW

WaterNSW expressed concerns about impacts of the Dendrobium Mine over the audit period to surface water volumes, ecological systems and to a lesser extent, groundwater level reductions and surface water quality reductions.

A detailed summary of specific concerns was provided by WaterNSW (in letter to ERM dated 11 September 2017), which in turn has been passed on to DMD for consideration.

WaterNSW provided one recommendation for consideration applicable to DMD mining activities during the audit period, as follows:

- undertake additional analysis to confirm estimates of leakage from Lake Codeaux, Lake Avon and Wongawilli Creek.

Other matters raised in the WaterNSW response were considered during the review against applicable approval and licence conditions, and in consideration of the adequacy of approval strategies, plans and programs as discussed in this report. Specific discussion is provided with regard to subsidence aspects in the specialist's report (refer *Annex B*).

WSC

WSC requested that the independent environmental audit assess the environmental performance of the Dendrobium mine operations particularly with respect to the following issues:

- 1) Mine operations impact upon creeks and upland swamps within the subject area, including subsidence related impacts.
- 2) Mine operations impact upon any loss of water quality and / or loss of water flows to the Sydney drinking water catchment.
- 3) Noise impacts from pit top activities and rail noise impacts upon the surrounding residential neighbourhood of Mount Kembla and Cordeuax Heights in particular.

- 4) Air quality impacts / emissions from the Dendrobium pit top and transport of coal via rail upon the surrounding catchment.
- 5) Road traffic / transport related issues upon key roads and intersections in Mount Kembla, Cordeaux Heights and Figtree.

EPA

- 1) Compliance with EPL conditions that are replicated in the consent.
- 2) Compliance with Noise Impact Assessment Criteria Schedule 4 Conditions 1 and 2.
- 3) Compliance with Rail Haulage Impact Assessment Criteria Schedule 4 Conditions 3 -7. Note requirements of EIP1 added to EPL on 2 November 2015, and community complaints described below.
- 4) Compliance with Air Quality Impact Assessment Criteria Schedule 4 Condition 9.
- 5) Compliance with Rail Transport of Coal Schedule 4 Condition 23.
- 6) Compliance with Schedule 5 West Cliff Coal Wash Emplacement conditions 3-9, noting the relevant EIPs and PRPs on EPL 2504.
- 7) Compliance with Schedule 2 Condition 1 and condition 12 as they relate specifically to hydrocarbons stored in the catchment lands, note attached response from South32 DOC17/339227-01.
- 8) Compliance with 8 Schedule Condition 11 and 12 Access to information, in particular as it relates to monitoring data required under EPL 3241 being placed on a webpage where it is publicly available.

No response had been obtained from DPI and CCC by the time that this report was completed.

The Community Consultation Committee for DMD meets regularly and had last met in August 2017, at the time of the audit.

2.3

CLASSIFICATION OF AUDIT FINDINGS

Findings resulting from an assessment of audit evidence were divided into six categories as follows:

- **Compliant (C):** the intent and all elements of the audit criteria requirements have been complied with within the scope of the audit.
- **Not Verified (NV):** insufficient verifiable evidence to demonstrate that the intent and all elements of the audit criteria have been complied with within the scope of the audit.
- **Non-compliant (NC):** Failure to meet the audit requirements, failure to achieve the field performance outcomes identified in documentation, or ineffective environmental management of the activity.

- **Administrative Non-compliance (ANC):** technical conformance with audit requirements that would not impact on performance and is considered minor in nature (e.g. report submitted but not on the due date, failed monitor or late monitoring session). This would not apply to performance-related aspects (e.g. exceedance of a noise limit) or where a requirement had not been met at all (e.g. noise management plan not prepared and submitted for approval).
- **Observation (O):** Observations are recorded where the audit identified issues of concern which do not strictly relate to the scope of the audit or assessment of compliance.
- **Not Triggered (NT)** – A regulatory approval requirement has an activation or timing trigger that had not been met at the time of the audit inspection, and therefore a determination of compliance could not be made.
- **Note:** A statement or fact, where no assessment of compliance is required.

A qualitative risk assessment was also completed on the findings, consistent with AS/NZS 4360:2004 Risk management and HB 436:2004 Risk Management Guidelines Companion to AS/NZS 4360:2004 and as described in the DP&E publication “Independent Audit Guidelines” issued October 2015.

The overall level of risk was estimated by combining the likelihood of harm occurring with the estimated level of harm associated with each finding. Risk levels have been assigned as follows:

- **High:** Non-compliance with potential for significant environmental consequences, regardless of the likelihood of occurrence;
- **Medium:** Non-compliance with:
 - potential for serious environmental consequences, but is unlikely to occur; or
 - potential for moderate environmental consequences, but is likely to occur;
- **Low:** Non-compliance with:
 - potential for moderate environmental consequences, but is unlikely to occur; or
 - potential for low environmental consequences, but is likely to occur
- **Administrative non-compliance:** Only to be applied where the non-compliance does not result in any risk of environmental harm (e.g. submitting a report to government later than required under approval conditions).

3 *AUDIT FINDINGS*

3.1 *PREVIOUS AUDIT FOLLOW - UP*

An audit was completed and reported on 28 November 2014 with site inspection completed September 2014. The 2014 audit was the fourth Independent Environmental Audit for DMD. The 2014 audit report did not include compliance tables addressing each specific consent and licence condition, rather providing a high level overview of compliance status for environmental matters. A summary of the previous non-compliances and/or recommendations and their status is summarised below in *Table 3.1*.

Table 3.1 Previous Audit Findings: Summary of Actions

Environmental Aspect	Finding	DMD Response To Audit Finding
Subsidence Impacts	<p>(i) It is noted however that the observed subsidence exceedance above the starting end of LW9 has not been addressed adequately, and further review of the possible reasons for the increased subsidence magnitude should be reviewed by MSEC and an independent expert if necessary. It is considered however, that the issue could be resolved during the next audit period;</p> <p>(ii) whether sub-surface cracking impacts on shallow groundwater levels and increased recession rates beneath the swamps will represent more than a 'minor' environmental consequence in terms of a vegetation or erosion response (the two key parameters defining swamp impacts);</p> <p>(iii) whether the mine will be in breach of its consent conditions in regards to (ii)</p> <p>(iv) It is recommended that environmental monitoring sites for groundwater below swamps be installed as early as possible and impact explanations be provided to consider limitations of available base line readings.</p> <p>(v) the request by some stakeholders for raw monitoring data for all impacted areas of the mine is yet to be resolved. In the interests of transparency, it would probably be a beneficial exercise to present all raw, on-going monitoring data for previously mined areas to stakeholders if requested.</p>	Refer to Section 4.5 of the Subsidence Impact Management Compliance Assessment report (provided in Annex B of this report).
Noise	While minor exceedances of the noise impact assessment criteria have been recorded at non-mine related receptors during the audit period, the operation is for the most part compliant.	Ongoing management
Blasting and Vibration	No blasting undertaken during audit period.	NA
Air Quality	Some minor exceedances of dust deposition and PM10 recorded – no further action deemed necessary.	Ongoing management
Meteorological Monitoring	Compliant	Ongoing management

Environmental Aspect	Finding	DMD Response To Audit Finding
Water Management	Some exceedances of discharge water quality criteria were not considered to be non-conformance.	Ongoing management
Landscape Management	Minor spills and one more substantial spill of soluble oil during the audit period, which were reported to be cleaned up with no environmental impacts. Dendrobium should re-visit the 2011/2012 AEMR information request in relation to Bushfire Management and respond more expansively in the next AEMR.	Ongoing management
Transport	<i>Dendrobium maintains full records of coal transport (evidence sighted). While these are not reported in the AEMRs as required by the Consent Approval, the Auditor does not consider this non-compliance to have any adverse significance. The Auditor suggests that Dendrobium seek a revision to this condition at some appropriate time in the near future from DoPE reflecting that full data sets be maintained at the premises instead of reporting them in the AEMRs.</i>	Schedule 4, Condition 24 currently requires: <i>The Applicant shall record the:</i> <i>(a) date and time of each train movement on the Kemira Valley rail line; and</i> <i>(b) amount of coal transported from the KVCLF each year and include a comprehensive summary and discussion of the results of this monitoring in each AEMR.</i>
Visual	Compliant	NA
Waste	Compliant	NA
Greenhouse Gas and Energy Efficiency	Compliant	NA
Access to Information	<i>BHPB to take actions to address some noted deficiencies in the material available on their website.</i>	The South32 DMD website was found to contain relevant and up to date information at the time of the September 2017 audit.
Schedule 8	<i>The Dendrobium actions under the Schedule 8 conditions comply</i>	NA

3.2

COMPLAINTS SUMMARY

Complaints received over the auditing period include:

FY2015: During the annual reporting period, 78 complaints were received relating to Rail Related Complaints (73), noise (2), dust (1) and traffic (2).

FY2016: During the annual reporting period, 44 complaints were received relating to Rail Related Complaints (38), noise (2), dust (2), traffic (1) and damage (2).

FY2017: During the annual reporting period 26 complaints were received relating to noise (8), Rail Related Complaints (10), Dust (2), Worker Behaviour (3), Traffic (1) Other (2).

FY2018 (to 14 September 2017): Between 1 July and 14 September 3 complaints were received relating to Rail Related Complaints (2) and Noise (1).

There has been a notable reduction in the number of complaints received over the audit period. This is likely to be a direct result of implementation of noise management strategies and ongoing community consultation in relation to Rail Movements.

All complaints received are recorded in an internal event recording system and process is in place to ensure the complaint is followed up with the complainant and where necessary the regulatory authority. Complaints and the resolution are reported on the South32 website each month in the Community Complaints Report and are summarised in the AEMR/AR.

3.3

ENVIRONMENTAL INFRINGEMENTS AND REGULATORY NOTICES

In response to rail noise community complaints, the EPA added an Environmental Improvement Program to EPL 3241 on 2 November 2015 (DOC15/393665).

The EPA advised of the following community complaints and industry self-reports over the audit period.

Incident Number	Date	Issue
I16547-2014	November 2014	Train/Machinery Noise
I09703-2015	July 2015	Train Noise
I09826-2015	July 2015	Train Noise
I13125-2015	Sept 2015	Train loading
I14622-2015	Nov 2015	Water Pollution
I06671-2016	May 2016	Dust
I08641-2016	June 2016	Noise mine and trains
I09992-2016	July 2016	Drilling Mud spill
I05371-2017	April 2017	Transformer Oil Spill – Corrimal Shaft

The EPA advised that:

- In March 2017 the EPA received representations from the local Member of Parliament on behalf of one of his constituents. The concerns related to 'pollution limits permitted under legislation'. A response was provided to the Minister in June 2017.
- Drilling Mud incident was reported in 15 July 2016. DPI is the Appropriate Regulatory Authority for this incident.
- South32 reported an incident I05371-2017 when transformer oil discharged from an unused transformer at Corrimal #3 shaft. Following this incident, South32 were requested to provide information on their electrical assets in the catchments (DOC17/339227-01), including Dendrobium assets.

3.4 ENVIRONMENTAL MONITORING PERFORMANCE

3.4.1 Noise and Blasting

The approved 2014 Noise Management Plan and associated Noise Monitoring Program meets the requirements of Schedule 4, Condition 7 of the DA and was prepared in consultation with the EPA.

The following exceedances of applicable noise criteria were recorded during the audit period:

FY15:

Four exceedances of the LAeq, 15 minute noise criteria during this period at R39a (two during the day and two during the evening). The source of the exceedances were due to rail movements within KVCLF (train idling) and vehicles working on the stockpile. Small exceedance recorded within KVCLF under idle condition for tonality (3.15kHz frequency), while overall noise (LAeq and Leq) were below criteria.

FY16:

There were two exceedances of the LAeq, 15 minute noise criteria during the reporting period at R39a, however the mine noise level remained below the dominant noise (insects, birds and bats). This again related to small exceedance recorded for under idle condition for tonality (3.15kHz frequency), while overall noise (LAeq and Leq) were below criteria.

It is apparent that rail noise is contributing to the recorded exceedances of the amenity criteria at R39a. It is noted that rail activity has its own established noise criteria. In other instances exceedance related mine site activity are impacted by other surrounding dominant noise source (i.e. birds, bats insects).

No recorded exceedance of noise criteria were recorded in FY17 or FY18 up to the time of the audit.

No surface blasting was undertaken during the audit period.

3.4.2

Air

The approved 2014 Air Quality Management Plan and associated Air Quality Monitoring Program meets the requirements of Schedule 4, Condition 13 of the DA and was prepared in consultation with the EPA.

The following exceedances of applicable noise criteria were recorded during the audit period:

FY16:

One exceedance for PM10 was recorded at Point 21 (HVAS) which was attributed to bushfire conditions at that time.

No other exceedance were reported for dust deposition or HVAS sampling during the audit period.

3.4.3

Water Management

The approved 2014 Water Management Plan and associated Monitoring Programs meet the requirements of Schedule 4, Condition 10 of the DA and was prepared in consultation with the EPA.

Surface Water

Exceedance at EPL 3241 - Point 5, FY16 AER, oil and grease result over EPL 100 percentile limit. 23 July 2015 - oil and grease of 12mg/L reported through annual return to the EPL and also via the 14 day monitoring report. DMD reported as an unknown source of high reading, no further action required.

FY15/FY16: Reported that only negligible reductions observed.

FY17: Flow and catchment yield modelling assessment indicates that the headwater catchments at sites within DC13, Donald Castle Creek and WC21 have been affected by under-mining. Effects are not clearly observed in downstream catchments of both Donald Castle Creek and Wongawilli Creek.

The FY17 AR reports a discernible loss of flows along the watercourse LA4, which is a tributary of Lake Avon. The previously determined TARPs have not been triggered, however flow behaviour during Longwall 12 was reported as anomalous, including the occurrence of cease-to-flow conditions, indicative of a mining effect.

Level 2 DO levels recorded after consecutive triggers at LA4 during Longwall 12.

Inspection of the Dendrobium Pit Top Site identified instances where oil cans / waste oil cans were not being stored in bunded areas. Surface staining was observed in numerous locations on the concrete apron, noting the significant amount of cracking of the apron providing a potential pathway for contamination of underlying soils.

Groundwater

Groundwater results of monitoring are reported in End of Panel Reports and Annual Environmental Monitoring Reports/Annual Reviews.

The site reports it is not seeing more than 0.5ML/day of modern water make in the mine, hence TARP not triggered. Monthly reports on water quality sampling are prepared for the NSW Dam Safety Committee.

Level 2 TARP Dissolved oxygen (DO) levels recorded after consecutive triggers at LA4 during LW12.

3.4.4

Subsidence

The following is provided as summary of recommendation from the review of the specialists Subsidence Impact Management Compliance Assessment:

The performance of the approved Area 3B Swamp, Watercourse and Water Storage TARPs have been subject to a high level of scrutiny by Stakeholders concerned that they are not providing an appropriate response or Corrective Management Actions (CMA) to the observed impacts. The IEA has made a number of observations with regard to the approved management plans and approved TARPs. These observations do not infer that DMD has not been operating in accordance with the approved plans and TARPs. Rather the auditor's observations and suggested actions/recommendations are aimed at addressing concerns raised by Stakeholders and the auditor in relation to the approved plans and TARPs. DMD should confirm they can continue to meet the environmental protection objectives and intent of relevant approval conditions using these approved methods and strategies.

It is therefore strongly suggested that the mine resolve these concerns by firstly adopting any alternative approach in consultation with WaterNSW (refer letter to ERM dated 11/9/18). This will (i) allow productive discussions and resolution of the approved TARPs in question; and (ii) to determine objectively whether the SRRP and/or CMAs or Offsets proposed in impacted areas to-date are appropriate responses to the impacted swamps, watercourses, biodiversity and catchment yield losses. It is understood that the above review may have significant implications regarding the proposed mine plan approvals sought in the remainder of Area 3C.

It is considered the previous assessment of reducing the longwall width should be reviewed again for LW16 to 19 under the appropriate performance measure context of achieving a multiple sub-critical mining layout to reduce mining impacts if required. It is noted that the mining height has already been decreased from 4.6 m to 3.9 m as advised by the DP&E's independent subsidence expert for the LW3B SMP Approval for LW14 & 15. The expert was of the opinion that reducing the mining width by >40% (i.e. from 305 m to 180 m) would be necessary to significantly reduce the environmental impacts to key surface features and that this would not be economically feasible. It is noted by

the auditors however, that this conclusion could be at odds with the Performance Measures for the Special Areas (i.e. the risks to catchment yield and Avon dams storage capacity may be found to be significant after the approved longwalls are extracted).

During the document review, it became apparent that that current status of proposed CMAs and SRRP for the Swamps was not clearly described. It would therefore help if a section providing the status of subsidence impact CMAs (complete or proposed) could be tabulated. A remediation and CMA works register on the website would also assist future auditors.

Refer to Annex B – Subsidence Impact Management Compliance Assessment (full report). Refer to *Annex B – Subsidence Impact Management Compliance Assessment (full report)*.

3.4.5 *Landscape Management and Rehabilitation*

Landscape monitoring and rehabilitation and summary of rehabilitation is reported in the Annual Reviews. Rehabilitation has occurred at two locations preceding this audit period. Monitoring those rehabilitation areas has been undertaken, with completion in one area preceding the audit period. The second area relates to an unplanned event and was responded to as the *Dendrobium Tunnel Sinkhole Rehabilitation Project*. It was noted that the Landscape Management Plan does not outline a process for dealing with such events. However, this is adequately addressed in the draft Mine Closure Plan (under development).

3.4.6 *Traffic Management*

DMD operates under an approved Traffic Management Plan (2014). Some isolated complaints were received in relation to personnel behaviour and the Driver's Code of Conduct during the audit period. The auditor understands that these were investigated and dealt with in accordance with the TMP enforcement processes.

3.5 *COMPLIANCE WITH REGULATORY INSTRUMENTS*

A compliance check of the MCoA, EPL, MLs and water access licence conditions has been completed. Non-compliances and observations for each component are summarised in *Table 3.2*.

A full review and audit findings for each component are under the following Annexures:

- *Annex A.1 - MCoA DA 60-03-2001*
- *Annex A.2 - EPL_3241*
- *Annex A.3 - SMP Approval Compliance Table (Area 3B 2013)*

- *Annex A.4* – Statement of Commitments
- *Annex A.5* – Consolidated Mining Lease ML1510, ML1566 CCL768
- *Annex B* – Subsidence Impact Management Compliance Assessment

As discussed in *Section 2.2*, a qualitative risk assessment was also completed on the findings as follows:

- Non-compliance assessed as ‘high’ have been colour coded red;
- Non-compliance assessed as ‘moderate’ have been colour coded orange;
- Non-compliance assessed as ‘low’ have been colour coded yellow; and
- Administrative non-compliances have been colour coded blue.

Table 3.2 Summary of Audit Findings

Item No	Assessment Requirement	Comment	Audit Classification	Response/Action
Sch.2, C1	The Applicant shall implement all reasonable and feasible measures to prevent and/or minimise any harm to the environment that may result from the construction, operation, or rehabilitation of the development.	<p>Some exceedances of monitoring criteria for noise and water quality have been reported during the audit period, but are not considered by the auditor to be as a result of any systematic inadequacy of measures or effort.</p> <p>Stakeholders are claiming Area 3B longwalls may causing significant biodiversity impact to swamps, creeks and catchment yield losses from Special Areas due to inadequacy of the approved TARPs. The suitability of offsets secured by the mine is also being questioned.</p> <p>Refer <i>Subsidence Impact Management Compliance Assessment</i> in <i>Annex B</i> for more detail.</p>	O	<p>Review of Environmental TARPs in full consultation with WaterNSW and DP&E.</p> <p>CMA - Layout for LW13 - 19 may need to be reviewed after TARP review if necessary.</p>
Sch.2, C9	The Applicant shall ensure that monitoring programs, management plans and the Environmental Management Strategy, as in existence at the date of modification of consent in November 2008, continue to be implemented (to the satisfaction of the Secretary) until replaced by monitoring programs and management plans approved in accordance with the conditions of this consent.	Monitoring programs, management plans and the Environmental Management Strategy were reviewed following the 2014 IEA and updated as required and continue to be implemented as further discussed against relevant conditions of this approval. However, some areas for review have been suggested in relation to the adequacy of monitoring programs and management plans have been raised by the auditor particularly in relation to Subsidence Management.	O	Refer to ANCs and observations provided against several conditions below.

Item No	Assessment Requirement	Comment	Audit Classification	Response/Action
Sch.3, C3	The Applicant shall ensure the development does not result in reduction (other than negligible reduction) in the quality or quantity of surface water or groundwater inflows to Lake Cordeaux or Lake Avon or surface water inflow to the Cordeaux River at its confluence with Wongawilli Creek, to the satisfaction of the Secretary.	<p>FY17: Flow and catchment yield modelling assessment indicates that the headwater catchments at sites within DC13, Donald Castle Creek and WC21 have been affected by under-mining. Effects are not clearly observed in downstream catchments of both Donald Castle Creek and Wongawilli Creek.</p> <p>The FY17 AR reports a discernible loss of flows along the watercourse LA4, which is a tributary of Lake Avon. The previously determined TARPs have not been triggered, however flow behaviour during Longwall 12 was anomalous, including the occurrence of cease-to-flow conditions, indicative of a mining effect.</p>	O	<p>Review level of impacts to receiving watercourses from impacts to headwater catchments and any need for corrective actions.</p> <p>CMA - review of modelled groundwater leakage losses from Avon & Cordeaux Dams (refer to WaterNSW letter dated 11/9/17) based on time lag analysis between underground water make and rainfall + GW chemistry/age & source analysis to resolve this.</p> <p>CMA - Layout for LW13 & 19 may need be reviewed after TARP review if necessary.</p>

Item No	Assessment Requirement	Comment	Audit Classification	Response/Action
Sch.3, C4	<p>Prior to carrying out any underground mining operations that could cause subsidence in either Area 3A, Area 3B or Area 3C, the Applicant shall prepare a Watercourse Impact Monitoring, Management and Contingency Plan to the satisfaction of the Secretary. Each such Plan must:</p> <p>(a) demonstrate how the subsidence impact limits in conditions 1 - 3 are to be met;</p> <p>(b) include a monitoring program and reporting mechanisms to enable close and ongoing review by the Department and DRE DPI of the subsidence effects and impacts (individual and cumulative) on Wongawilli Creek, Sandy Creek and Sandy Creek Waterfall;</p> <p>(c) include a general monitoring and reporting program addressing surface water levels, water flows, water quality, surface slope and gradient, erodibility, aquatic flora and fauna (including Macquarie Perch, any other threatened aquatic species and their habitats) and ecosystem function;</p> <p>(d) include a management plan for avoiding, minimising, mitigating and remediating impacts on watercourses, which includes a tabular contingency plan (based on the Trigger Action Response Plan structure) focusing on measures for remediating both predicted and unpredicted impacts;</p> <p>(e) address third and higher order streams individually but address first and second order streams collectively;</p> <p>(f) be prepared in consultation with OEH DECC, SCA and DRE DPI;</p> <p>(g) incorporate means of updating the plan based on experience gained as mining progresses;</p>	<p>The current approved WIMMCP addresses the requirements of this condition and is applicable to the mining activities undertaken during the reporting period for Longwalls 11 - 13.</p> <p>The results of the Watercourse Impact Monitoring program are reported in detail in the End of Panel Reports and summarised in the Annual Environmental Monitoring Report.</p> <p>The Audit team observed examples of subsidence monitoring locations in the field.</p> <p>The Auditor is satisfied that DMD is implementing the approved WIMMCP.</p> <p>Several Corrective Management Actions (CMAs) were triggered during the current audit period by the Dendrobium WIMMCP and TARP which required back filling of surface cracks across fire trails and review of surface water groundwater impacts associated with rock bar cracking, flow path diversion and water quality and storage loss impacts to Avon reservoir and its feeder tributaries.</p> <p>Overall, the approved SMP/SIMMCP/WIMMCPs do not appear to be performing reasonably well in regard to the predicted subsidence and management of impacts. The auditor notes that although the proposed Swamp Research and Rehabilitation Plan (SRRP) and on-going monitoring of impacted features is occurring, it would appear that the approved Swamp and Watercourse TARPS are likely too aggressive to allow a reasonable assessment of actual impacts that allow appropriate responses to occur in a timely manner.</p>	O	<p>CMA - Consider revision of SIMMCP and WIMMCP TARPs with reference to WaterNSW requests (letter to ERM dated 11/09/17) and review against Performance Measures (PM) for Swamps, Watercourses & Water Storages.</p> <p>CMA - Layout for LW13 & 19 may need to be reviewed after TARP review if necessary.</p>

Item No	Assessment Requirement	Comment	Audit Classification	Response/Action
	<p>(h) be approved prior to the carrying out of any underground mining operations that could cause subsidence impacts on watercourses in the relevant Area; and</p> <p>(i) be implemented to the satisfaction of the Secretary.</p>	<p>Refer <i>Subsidence Impact Management Compliance Assessment</i> in <i>Annex B</i> for more detail.</p>		
Sch.3, C6	<p>Prior to carrying out any underground mining operations that could cause subsidence in either Area 3A, Area 3B or Area 3C, the Applicant shall prepare a Swamp Impact Monitoring, Management and Contingency Plan to the satisfaction of the Secretary. Each such Plan must:</p> <p>(a) demonstrate how the subsidence impact limits in condition 5 are to be met;</p> <p>(b) include a monitoring program and reporting mechanisms to enable close and ongoing review by the Department and DRE DPI of the subsidence effects and impacts (individual and cumulative) of each Area 3A longwall on Swamp 15a;</p> <p>(c) include a general monitoring and reporting program addressing surface water levels, near- surface groundwater levels, water quality, surface slope and gradient, erodibility, flora and ecosystem function;</p> <p>(d) include a management plan for avoiding, minimising, mitigating and remediating impacts on swamps, which includes a tabular contingency plan (based on the Trigger Action Response Plan structure) focusing on measures for remediating both predicted and unpredicted impacts;</p> <p>(e) address headwater and valley infill swamps separately and address each swamp individually;</p>	<p>Refer to Watercourse Impact Management - Condition 4 Subsidence <i>Impact Management Compliance Assessment</i> in <i>Annex B</i>.</p>	O	<p>Refer to Watercourse Impact Management - Condition 4 Recommendations above.</p>

Item No	Assessment Requirement	Comment	Audit Classification	Response/Action
	<p>(f) be prepared in consultation with OEH DECC, SCA and DRE DPI;</p> <p>(g) incorporate means of updating the plan based on experience gained as mining progresses;</p> <p>(h) be approved prior to the carrying out of any underground mining operations that could cause subsidence impacts on swamps in the relevant Area; and</p> <p>(i) be implemented to the satisfaction of the Secretary.</p>			
Sch.3, C8	<p>The SMPs prepared under condition 7 for Areas 3B and 3C must:</p> <p>(a) include a mine plan for the relevant Area;</p> <p>(b) include a detailed subsidence impact assessment, clearly setting out all predicted subsidence effects, subsidence impacts and environmental consequences;</p> <p>(c) include a minimum of 2 years of baseline data, collected at appropriate frequency and scale, for all significant natural features;</p> <p>(d) identify and assess the significance of all natural features located within 600 m of the edge of secondary extraction;</p> <p>(e) distinguish between, clearly describe and adequately quantify all subsidence effects, subsidence impacts and environmental consequences;</p> <p>(f) propose limits on subsidence impacts and environmental consequences to be applied within the relevant Area;</p>	<p>As discussed in the main body of this IEA report, WaterNSW provided some very detailed and specific feedback to the audit process with regard to aspects of SMP and adequacy of TARPs. These were provided to South32 for consideration and considered further in review of relevant compliance conditions.</p>	O	<p>Consider WaterNSW feedback and preparation of a response. Make any necessary changes to current and future SMP and TARPs where deemed appropriate.</p>

Item No	Assessment Requirement	Comment	Audit Classification	Response/Action
	<p>(g) be otherwise prepared in accordance with any guidelines for SMPs developed by the Department and/or DPI DRE;</p> <p>(h) be approved prior to the carrying out of any underground mining operations that could cause subsidence in the relevant Area; and</p> <p>(i) be implemented to the satisfaction of the Secretary and the DRE Director-General of DPI.</p>			
Sch.3, C10	The Applicant shall include a comprehensive summary, analysis and discussion of the results of monitoring of subsidence effects, subsidence impacts and environmental consequences in each AEMR.	During the document review, it became apparent that that current status of proposed CMAs and SSRP for the Swamps was not clearly described in the AEMR/AR.	O	<p>Include a section in the AEMR/AR providing the status of subsidence impact CMAs (complete or proposed), noting this could be tabulated.</p> <p>A remediation and CMA works register on the website would also assist future auditors.</p>
Sch.4, C1	The Applicant shall ensure that the noise generated at the surface facilities does not exceed the noise impact assessment criteria in Table 1 at any residence on privately-owned land, or on more than 25% of any privately-owned land. The applicable criteria for any residence not listed in Table 1 shall be the criteria applying at the nearest listed residence.	<p>FY15:</p> <p>Four exceedances of the LAeq, 15 minute noise criteria during this period at R39a (two during the day and two during the evening). The source of the exceedances were due to rail movements within KVCLF (train idling) and vehicles working on the stockpile.</p> <p>FY16:</p> <p>There were two exceedances of the LAeq, 15 minute noise criteria during the reporting period at R39a, however the mine noise level remained below the dominant noise (insects, birds and bats).</p>	NC	Continue to implement all reasonable and feasible noise mitigation measures with a view to ongoing improvement.

Item No	Assessment Requirement	Comment	Audit Classification	Response/Action
Sch.4, C12	<p>The Applicant shall ensure all surface water discharges from the surface facilities:</p> <p>(a) meet the relevant ANZECC water quality objectives for the protection of aquatic ecosystems and water quality of existing receiving waters; and</p> <p>(b) comply with the discharge limits (both volume and quality) set for the development in any EPL.</p>	<p>An Oil & Grease exceedance of EPL Water Quality Criteria was appropriately reported during the audit period. The source of the recorded levels was not able to be identified.</p>	NC	<p>No further action required.</p>
Sch.4, C13	<p>The Applicant shall prepare and implement a Water Management Plan for the surface facilities to the satisfaction of the Secretary. This plan must:</p> <p>(a) be submitted to the Secretary for approval by 30 April 2009;</p> <p>(b) be prepared in consultation with EPA DECC, SCA and NOW DWE by suitably qualified expert/s whose appointment/s have been approved by the Secretary; and</p> <p>(c) include a:</p> <p>Site Water Balance; Erosion and Sediment Control Plan; Surface Water Monitoring Program; and Surface and Ground Water Response Plan.</p>	<p>Inspection of the Dendrobium Pit Top Site identified instances where oil cans / waste oil cans were not being stored in bunded areas. Surface staining was observed in numerous locations on the concrete apron, noting the significant amount of cracking of the apron providing a potential pathway for contamination of underlying soils.</p>	NC	<p>Ensure all oils and chemicals are appropriately stored in contained and covered areas in accordance with the WMP.</p>
Sch.4, C14	<p>The Site Water Balance must:</p> <p>(a) include details of:</p> <p>sources and security of water supply;</p> <p>water use on site;</p> <p>water intercepted by mining operations;</p> <p>water management on site;</p> <p>off-site water transfers and water stored or disposed of underground; reporting procedures; and</p> <p>(b) describe measures to minimise water use by the development.</p>	<p>WaterNSW provided some very detailed and specific feedback to the audit process with regard to the site water balance and associated modelling. This feedback was provided to South32 for consideration.</p>	O	<p>Consider the WaterNSW feedback and preparation of a response. Make any necessary changes to current and future site water balance modelling if deemed necessary.</p>

Item No	Assessment Requirement	Comment	Audit Classification	Response/Action
Sch.4, C15	<p>The Erosion and Sediment Control Plan must:</p> <p>(a) be consistent with the requirements of the Managing Urban Stormwater: Soils and Construction Manual (Landcom 2004, or its latest version);</p> <p>(b) identify activities that could cause soil erosion and generate sediment;</p> <p>(c) describe measures to minimise soil erosion and the potential for transport of sediment to downstream waters;</p> <p>(d) describe the location, function, and capacity of erosion and sediment control structures; and</p> <p>(e) describe what measures would be implemented to monitor and maintain the structures over time.</p>	<p>The Erosion and Sediment Control Plan (ESCP) is generally consistent with Landcom 2004, and meets the other requirements of this condition.</p> <p>The ESCP contained in the WMP does not specifically reference or direct requirements for ERSED controls to be in in accordance with Landcom, 2004.</p>	O	<p>Ensure any updated ESCP specifically directs that controls are to be designed in accordance with the requirements of Landcom, 2004, or its latest version.</p>
Sch.4, C17	<p>The Surface and Ground Water Response Plan must describe what measures and/or procedures would be implemented to:</p> <p>(a) respond to any exceedances of the surface water, stream health, and groundwater assessment criteria; and</p> <p>(b) mitigate and/or offset any adverse impacts on groundwater dependent ecosystems, aquatic ecosystems or riparian vegetation.</p>	<p>Trigger Action Response Plans (TARP) updated in Watercourse Impact Monitoring management and Contingency Plan (May 2015); Swamp Remediation and Research Program for Area 3A and 3B still pending approval. The SRRP was updated in August 2016 based on DP&E feedback (dated 29-June 16) and further discussion.</p>	O	<p>Confirm status of SRRP Approval.</p>

Item No	Assessment Requirement	Comment	Audit Classification	Response/Action
<i>Environmental Protection Licence 3241</i>				
L2.1	For each monitoring/discharge point or utilisation area specified in the table\ below (by a point number), the concentration of a pollutant discharged at that point, or applied to that area, must not exceed the concentration limits specified for that pollutant in the table.	Exceedance at Point 5, FY16 AER, oil and grease result over EPL 100 percentile limit. 23 July 2015 - oil and grease of 12mg/L reported through annual return to the EPL and also via the 14 day monitoring report. DRM reported as an unknown source of high reading, no further action required.	NC	No further action required
L2.4	Water and/or Land Concentration Limits [Table]	Exceedance reported at Point 5, FY16 AER as discussed at L2.1 above.	NC	No further action required
O1.1	Licensed activities must be carried out in a competent manner. This includes: a) the processing, handling, movement and storage of materials and substances used to carry out the activity; and b) the treatment, storage, processing, reprocessing, transport and disposal of waste generated by the activity.	The auditor observed an area for improvement in relation to housekeeping and storage of waste hydrocarbons at the Dendrobium Mine Pit Top yard and laydown. One example included a skip with oil drums not provided with secondary containment and observed staining in this area. Other oil cans were also seen discarded in an uncontrolled manner. Monitoring reports reviewed reference the relevant conditions.	NC	The auditor observed an area for improvement in relation to housekeeping and storage of waste hydrocarbons at the Dendrobium Mine Pit Top yard and laydown. One example included a skip with oil drums not provided with secondary containment and observed staining in this area. Other oil cans were also seen discarded in an uncontrolled manner.
O4.1	All liquid and non-liquid wastes resulting from activities and processes at the Dendrobium Coal Mine must be assessed, classified and managed in accordance with the EPA's Environmental Guidelines: Assessment, Classification and Management of Liquid and Non-Liquid Wastes (2008), or any other EPA document superseding this guideline.	Refer finding and recommendation for improvement at condition O1.1.	NC	As above

Item No	Assessment Requirement	Comment	Audit Classification	Response/Action
M2.1	For each monitoring/discharge point or utilisation area specified below (by a point number), the licensee must monitor (by sampling and obtaining results by analysis) the concentration of each pollutant specified in Column 1. The licensee must use the sampling method, units of measure, and sample at the frequency, specified in the other columns: [Table]	Non-compliance in AR FY16, monthly sampling of point 6 and point 18 required 12 sampling events, but only 11 samples collected for the year. Missed one monthly sample at each point due to faulty equipment.	NC	No further action required, noting the mine self-reported this as an NC.
M6.1	For each discharge point or utilisation area specified below, the licensee must monitor: a) the volume of liquids discharged to water or applied to the area; b) the mass of solids applied to the area; c) the mass of pollutants emitted to the air; at the frequency and using the method and units of measure, specified below. [Table]	Continuous monitoring of the volume of liquids discharged was undertaken throughout the audit period. The only exception was during some periods of flow monitoring equipment failure.	ANC	No further action is required.

SMP Approval Compliance Table (Area 3B 2013)

C6	The Applicant shall prepare and implement a Biodiversity Offset Strategy to the satisfaction of the Director- General. Initially, the Strategy must compensate for the impacts of Longwalls 9 to 13 on upland swamps and must: (e) propose a process whereby the actual impacts of the development on upland swamps are regularly reviewed (at least every 2 years) against predicted impacts and reported on to all affected agencies, including detailed consideration of the: <ul style="list-style-type: none"> • predictions in the SMP; • performance measures in Table 1; 	No reporting is evident that describes how the remedial actions (CMAs) from the TARP in the previous year are being measured and are the actions succeeding in mitigating the impacts predicted (refer FY16 AR stating that monitoring indicated TARP actions were required, but no mention in AR FY17 of how those actions performed).	O	Consider reporting on the performance of CMA in the Annual Reviews.
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Item No	Assessment Requirement	Comment	Audit Classification	Response/Action
	<ul style="list-style-type: none"> monitoring results; application, success and predicted success of measures to mitigate or remediate subsidence impacts 			
C9	<p>The Applicant shall ensure that the development does not cause any exceedance of the performance measures in Table 1, to the satisfaction of the Director-General.</p> <p>Table 1: Subsidence Impact Performance Measures</p>	<p>Letter from DP&E to South32 Illawarra Coal (ref: 16/08860; dated: 16/12/2016) states that the DP&E considers the Strategic Biodiversity Offset document fulfils the requirements of this condition and Condition 6 above.</p> <p>Review of detailed monitoring results has focussed on the End of Panel Reports for Longwalls 11 and 12.</p> <p>Letter from WaterNSW to ERM (11/9/17) notes previous correspondence to DP&E that several Performance Measures for Swamps, Watercourses and Water Storage losses have probably been exceeded in Area 3B regardless of TARP triggers indicated in End of Panel Reports and Annual Reviews. Conclusions based on independent expert reviews of available data.</p> <p>Reported impacts summarised below:</p> <p><i>Swamps</i></p> <p>Dendrobium Area 3B Longwall 12 End of Panel Report (May 2017) (South32) states that terrestrial ecology monitoring is undertaken at swamps 1, 15B, 15A, 1A, 1B and 5. It reports on page 35 that swamps 1A and 5 have observed a decline of a vegetation community type greater than the comparative data, which the report states is a Level 2 TARP observation. These impacts are reported similarly in the preceding Longwall 11 End of Panel report (page 33) and LW12 where Non-executive Level 3 TARP triggered for Swamps 1a,3,5,10.</p> <p>(Eco-system impact indicator only and not a breach of any Performance Measure). It is noted however,</p>	O	<p>CMA - review and where necessary consider any necessary revision of SIMMCP and WIMMCP TARPs with reference to WaterNSW requests (letter to ERM dated 11/09/17) and review against PM for Swamps, Watercourses & Water Storages.</p> <p>CMA - Layout for LW13 & 19 may need to be reviewed pending above plan reviews</p>

Item No	Assessment Requirement	Comment	Audit Classification	Response/Action
		<p>that the approved TARP values allow four consecutive monitoring periods (i.e. years after mining) of decline in swamp size & biodiversity against control swamps before the impact is considered to be > Minor.</p> <p><i>Watercourses</i></p> <p>Surface water quality was reported as meeting the approved TARP values for both Donalds Castle and Wongawilli Creeks (End of Panel Report-Longwall 12, page 43) (level 2 and level 1 TARP respectively).</p> <p>End of Panel Reports for longwalls 11 and 12 also report no surface impacts to Donalds Castle or Wongawilli Creeks.</p> <p>Sections of Donalds Castle Creek tributaries and WC21 have dried out since undermining. Claiming no impact on downstream creek therefore debatable and require CMA on whether the current approved TARP values adequate for Performance Measure (PM) exceedance assessment.</p> <p><i>Water storages</i></p> <p>The End of Panel Report-Longwall 12, page 44) discusses sub catchment approved TARP levels being met however no whole-of-creek magnitude TARP values being reached (when considering the 'overall catchment' of Donalds Castle and Wongawilli Creeks). It also states that flows into the Avon Reservoir are below significant levels (page 33).</p> <p>Estimates of storage losses being negligible in light of independent expert review of groundwater flows to the mine require modelling and impacts to be reviewed. Shallow VWP are considered to be not recording surface water table levels correctly and require verification around Dams.</p>		

Item No	Assessment Requirement	Comment	Audit Classification	Response/Action
C10	<p><i>Rehabilitation</i></p> <p>If the Applicant does not meet the performance measures in Table 1, then following consultation with OEH, SCA and DRE, the Director-General may issue the Applicant with a direction in writing to undertake actions or measures to mitigate or remediate subsidence impacts and/or associated environmental consequences. The Applicant must implement the direction in accordance with its terms and requirements, in consultation with the Director-General and affected agencies.</p>	<p>Two instances of Impact Performance Measure exceedances are identified in the audit against condition 9 (above) in relation to Swamp 5 and Surface water quality for both Donalds Castle and Wongawilli Creeks. However, in interview the Environment Superintendent it was identified there to have not been any exceedances of the performance criteria. Hence, it is the auditors understanding that these exceedances have not been acted upon.</p>	O	As above
C15	<p>The Applicant shall prepare and implement a Swamp Rehabilitation Research Program to the satisfaction of the Director-General. This program must:</p> <p>(a) be prepared in consultation with OEH, SCA and ORE;</p> <p>(b) be submitted by 31 October 2013 to the Director-General for approval;</p> <p>(c) investigate methods to rehabilitate swamps subject to subsidence impacts and environmental consequences within Areas 3A and 3B, with the aim of restoring groundwater levels and groundwater recharge response behaviour to pre-mining levels;</p> <p>(d) 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;</p> <p>(e) provide for the expenditure of at least \$3.5 million over this period; and</p> <p>(f) include a schedule for subsequent trials, development of work plans and ongoing reporting.</p>	<p>The Manager Approvals indicated that the DP&E have not yet approved the Swamp Rehabilitation Research Program - Dendrobium Area 3B (August 2016) (SRRP).</p> <p>a) section 3 of the SRRP describes consultation with NSW Government agencies.</p> <p>b) page 2 and section 3 state that a draft report was submitted to DP&E, WaterNSW, OEH and T&I.</p> <p>c) the SRRP contains description of such research activities (section 5).</p> <p>d) SRRP sections 5.8-5.11.</p> <p>e) Dollar (\$) values are quoted as per campaign or per day however a sum total is not expressed.</p> <p>f) section 5.8 only contains a statement referencing that subsequent trials may be required with no schedule outlined.</p>	ANC	<p>Consideration should be given to identifying what is actual expenditure in keeping with the assumed intent of this condition.</p> <p>Establish and document a schedule for subsequent trials, development of work plans and ongoing reporting.</p>

Item No	Assessment Requirement	Comment	Audit Classification	Response/Action
<i>Statement of Commitments</i>				
SOC3	<p>Subsidence Impact - Avoidance, Mitigation and Rehabilitation</p> <p>If the monitoring program identifies impacts to natural features that exceed those predicted, the following contingent measures will be implemented.</p>	<p>Refer to Annex A3 SMP Compliance conditions above re; Swamp impacts and water quality, and Annex B Subsidence Impact Management Compliance Assessment.</p>	O	Refer SMP Condition 9 above.
SOC4	<p>Swamp Contingency Plan</p> <p>Prior to the commencement of mining within Dendrobium Area 3A, 3B and 3C, Illawarra Coal will prepare a swamp remediation contingency plan for all swamps within each area.</p>	<p>Swamp Research and Rehabilitation Plan (SRRP) first submitted to the DPE in May 2013 for regulatory approval, however not yet approved. The SRRP was updated in August 2016 based on DP&E feedback (dated 29-June 16) and further discussion.</p>	O	Confirm status of SRRP Approval.

3.6

REVIEW OF MANAGEMENT PLANS IMPLEMENTATION

A check against commitments made in the management plans developed as part of the statutory instruments for the site was completed. Conformances and observations for each commitment in the plans are summarised in *Table 3.3*.

Table 3.3 Summary of Plan Implementation Review Findings

Assessment Requirement	Comment	Audit Classification
The Applicant shall prepare and implement an Environmental Management Strategy for the development to the satisfaction of the Secretary.	The updated Strategy dated October 2017 was prepared to satisfy the requirements of Condition 1, Schedule 6.	C
Prior to carrying out any underground mining operations that could cause subsidence in either Area 3A, 3B or 3C, the Applicant shall prepare a Subsidence Management Plan (SMP) to the satisfaction of the Secretary and the DRE.	The current Dendrobium Area 3B – Subsidence Management Plan was prepared in consultation with appropriate regulatory authorities, inclusive of the required components and well implemented in the operation of the mine.	C
Water Management Plan, which has been prepared in consultation with EPA, Water NSW and DWE, which provides for the management of the potential impacts and/or environmental consequences of the proposed second workings on watercourses and aquifers, including: <ul style="list-style-type: none"> • Site Water Balance; Erosion and Sediment Control Plan; Surface Water Monitoring Program; and Surface and Ground Water Response Plan. 	The current Water Management Plan was originally prepared in consultation with appropriate regulatory authorities. The updated WMP adequately addresses the requirements of the conditions of approval and appears to be well implemented. The auditor was advised that the updated plan was being prepared such as to integrate current operational activities and water management plans associated with the standalone Subsidence Management Plans. The date for submission of this plan falls outside the scope of this audit.	C
The Erosion and Sediment Control Plan must: (a) be consistent with the requirements of the Managing Urban Stormwater: Soils and Construction Manual (Landcom 2004, or its latest version);	The Erosion and Sediment Control Plan is generally consistent with Landcom 2004, and meets the other requirements of this condition. The ESCP contained in the WMP however does not specifically reference or direct requirements for ERSED controls to be in accordance with Landcom, 2004.	O
Prior to carrying out any underground mining operations that could cause subsidence in either Area 3A, 3B or 3C, the Applicant shall prepare a Subsidence Management Plan (SMP) to the satisfaction of the Secretary and the DRE.	The SMP covering area 3B was approved by DRE in February 2013 prior to undertaking mining in Longwalls 10-13. The SMP generally addresses the requirements of the conditions of approval including those detailing requirement for Aboriginal Heritage Plan and Groundwater Monitoring program. An observation was made on the basis of detailed feedback on technical aspects from WaterNSW that will require review and consideration by DMD.	O
Prior to carrying out any underground mining operations that could cause subsidence in either Area 3A, Area 3B or Area 3C, the Applicant shall prepare a Swamp Impact Monitoring, Management and Contingency Plan to the satisfaction of the Secretary.	The SIMMCP and TARP was updated in 2015. The current approved SIMMCP and TARP meets the requirements of this condition, and appears to be well implemented.	C

Assessment Requirement	Comment	Audit Classification
<p>The Applicant shall prepare and implement a Biodiversity Offset Strategy to the satisfaction of the Director- General. Initially, the Strategy must compensate for the impacts of Longwalls 9 to 13 on upland swamps.</p>	<p>Illawarra Coal – Strategic Biodiversity Offset was prepared in consultation with appropriate regulatory authorities. The Strategy was deemed by DP&E to adequately address the conditions of approval. Recommendation were made against Schedule 3, Condition 6 of the Are 3B SMP approval in relation to identification of suitable offsets, and ongoing reporting of Corrective Management Actions (CMA) in Annual Reviews (Refer Annex A).</p>	ANC
<p>The Applicant shall prepare and implement a Noise Monitoring Program for the development to the satisfaction of the Secretary.</p>	<p>The current updated Noise Management Plan (2014) contains the Noise Monitoring Program which was prepared in consultation with appropriate regulatory authorities, and appears to be well implemented.</p>	C
<p>The Applicant shall prepare and implement an Air Quality Monitoring Program for the surface facilities (excepting those surface facilities within the mining area) to the satisfaction of the Secretary.</p>	<p>The current updated Air Quality Management Plan (2014) contains the Air Quality Monitoring Program which was prepared in consultation with appropriate regulatory authorities, and appears to be well implemented.</p>	C
<p>The Applicant shall prepare and implement a Landscape Management Plan for the surface facilities to the satisfaction of the Secretary and the DRE.</p>	<p>The current updated Landscape management Plan (2014) was prepared in consultation with appropriate regulatory authorities, and appears to be generally well implemented. Some gaps were however identified with the Rehabilitation Management Plan as discussed against review of Schedule 4, Condition 20 of the DA (Refer Annex A).</p>	ANC
<p>The Applicant shall prepare and implement a Bushfire Management Plan for the site, with particular reference to the mining area, in consultation with SCA and to the satisfaction of the Rural Fire Service.</p>	<p>The Bushfire Management Plan was prepared in consultation with the Rural Fire Service and Sydney Catchment Authority, and appears to be well implemented.</p>	C
<p>Within 4 months of the completion of each longwall panel, or as otherwise permitted by the Secretary, the Applicant shall:</p> <p>(a) prepare an end-of-panel report:</p> <p>reporting all subsidence effects (both individual and cumulative) for the panel and comparing subsidence effects with predictions;</p> <p>describing in detail all subsidence impacts (both individual and cumulative) for the panel; discussing the environmental consequences for watercourses, swamps, water yield, water</p>	<p>End of Panel Reports were prepared for Longwall 10, 11 and 12. The reports have been prepared in accordance with the requirements of this condition and within the stipulated timeframe.</p>	C

Assessment Requirement	Comment	Audit Classification
<p>quality, aquatic ecology, terrestrial ecology, groundwater, cliffs and steep slopes; and comparing subsidence impacts and environmental consequences with predictions;</p> <p>The Applicant shall:</p> <ul style="list-style-type: none"> (a) monitor the amount of waste generated by the development; (b) investigate ways to reuse, recycle, or minimise this waste; (c) implement reasonable and feasible measures to minimise this waste; and (d) report on waste management and minimisation in the AEMR to the satisfaction of the Secretary. 	<p>While not a specific requirement of the approval condition DMD operates in accordance with its Waste Management Plan (2012). The plan covers the requirements of this condition and appears to be well implemented across the operation.</p>	C
<p>The Applicant shall:</p> <ul style="list-style-type: none"> (a) ensure that all external lighting associated with the surface facilities complies with Australian Standard AS4282 (INT) 1995 - Control of Obtrusive Effects of Outdoor Lighting; (b) take all practicable measures to mitigate off-site lighting impacts from the surface facilities; (c) ensure that light emitted from headlights of locomotives operating on the Kemira Valley rail line are screened from residences; and (d) report on the effectiveness of lighting emission controls in the AEMR to the satisfaction of the Secretary. 	<p>While not a specific requirement of the approval condition DMD operates in accordance with its Lighting Management Plan (2012). The plan adequately covers the requirements of this condition and appears to be well implemented across the operation.</p>	C
<p>Protection of the Environment Operations (General) Amendment (Pollution Incident Response Management Plans) Regulation 2012 (EPL 3241 and approval conditions addressing Pollution).</p>	<p>DMD operates in accordance with its Pollution Incident Response Plan (2014). The plan adequately covers the requirements of relevant conditions, along with the Regulation and appears to be well implemented.</p>	

CONCLUSION

An audit of MCoA and license conditions has been completed as well as a check against commitments made in the management plans developed as part of MCoA conditions for the site.

Overall, conformance was achieved with the audit documents that were reviewed. The number of non-conformances with the statutory conditions is summarised in *Table 4.1* below:

Table 4.1 *Summary of Audit Findings*

Number of Conditions	Non compliance	Administrative Non - compliance	Observations
<i>Statutory Instruments</i>			
204	8	2	6
	High (7), Medium (7), Low (1)		

An action response table has been developed by DMD addressing all audit findings and will be submitted separately to this report.

Annex A

Detailed Audit Compliance Table

Table A.1:

Compliance with Ministers Conditions of
Approval - DA 60-03-2001 (Modification 7
issued April 2017)

Table A.1: Compliance with Ministers Conditions of Approval DA 60-03-2001 (Modification 7 issued April 2017)

No	Assessment Requirement	Reference/ Evidence	Comments	Compliance Status	Recommendations
SCHEDULE 2 – ADMINISTRATIVE CONDITIONS					
Obligation to Minimise Harm to the Environment					
1.	The Applicant shall implement all reasonable and feasible measures to prevent and/or minimise any harm to the environment that may result from the construction, operation, or rehabilitation of the development.	AEMR FY15, AR FY16, FY17 EMS (ID: ENMP0039) Original doc dated Feb 2005 and has been updated three times (Apr 2009, Mar 2012, Oct 2017) Interview with Environmental Superintendent This IEA	EMS defines strategies to monitor, review and manage impacts to maintain compliant operations in accordance with DC (Mod 7) & ISO14001. Non-compliance events are avoided if possible and incidents recorded. Impact management strategies/plans audited annually to improve performance. AEMR/AR informs regulators & stakeholders of the outcomes for each year of operations. Some exceedances of monitoring criteria for noise and water quality have been reported during the audit period, but are not considered by the auditor to be as a result of any systematic inadequacy of measures or effort. Stakeholders are claiming Area 3B longwalls may causing significant biodiversity impact to swamps, creeks and catchment yield losses from Special Areas due to inadequacy of the approved TARPs. The suitability of offsets secured by the mine is also being questioned. Refer <i>Subsidence Impact Management Compliance Assessment</i> in Annex B for more detail.	O	Consider a review of Environmental TARPs in full consultation with WaterNSW and DP&E. CMA - Layout for LW13 - 19 may need to be reviewed after TARP review if necessary.
Terms of Approval					
2.	The Applicant shall carry out the development generally in accordance with the: (a) Development Application (DA 60-03-2001), EIS and associated submissions to the Dendrobium Underground Coal Mine Project Commission of Inquiry, and in particular its: Primary Submission (the Dendrobium Project, dated 30 July 2001); Submission in Reply (the Dendrobium Project, undated); and Environmental Effects of Subsidence Associated with the Dendrobium Project, prepared by National Environmental Consulting Services and dated August 2001; (b) Modification Application dated 12 February 2002 and supporting information dated 27 January 2002; (c) Modification Application and supporting information dated 24 May 2002 and additional supporting information dated 14 June 2002;	Note	Noted	Note	

No	Assessment Requirement	Reference/ Evidence	Comments	Compliance Status	Recommendations
	(d) Modification Application and Statement of Environmental Effects for the Dendrobium Coal Sizer, prepared by Olsen Environmental Consulting and dated March 2005; (e) Application for Further Approval of West Cliff Emplacement Area Stage 3, Vol 2 (including Appendices), prepared by Cardno Forbes Rigby and dated July 2007, associated Response to Submissions dated 1 November 2007 and associated Statement of Commitments dated 28 November 2007 (see Appendix 3); (f) Modification Application – Modification of Area 3 Footprint and Review of Conditions of Consent dated 27 November 2007, EA and associated Statement of Commitments (see Appendix 4); (g) EA (MOD 7); and (h) conditions of this consent.				
3.	If there is any inconsistency between the above documents, the most recent document shall prevail to the extent of the inconsistency. However, the conditions of this consent shall prevail to the extent of any inconsistency.	Note	Noted	Note	
4.	The Applicant shall comply with any reasonable and feasible requirement/s of the Secretary arising from the Department's assessment of: (a) any reports, plans, programs, strategies or correspondence that are submitted in accordance with the conditions of this consent; and (b) the implementation of any actions or measures contained in these reports, plans, programs, strategies or correspondence.	Note	Noted	Note	
LIMITS ON APPROVAL					
Mining Operations					
<i>Note: Under this consent, the Applicant is required to rehabilitate the site to the satisfaction of the Secretary and DRE. Consequently this consent will continue to apply in all other respects other than the right to conduct mining operations until the site has been rehabilitated to a satisfactory standard.</i>					
5.	Mining operations may take place in the mining area until 31 December 2030.	Note	Noted	Note	
Coal Extraction and Production					
6.	The Applicant shall not extract more than 5.2 million tonnes of ROM coal a year from the mining area.	AEMR FY15, AR FY16, FY17	Extraction limits not exceeded during the audit period.	C	
7.	The Applicant shall only transport coal from the surface facilities by rail.	AEMR FY15, AR FY16, FY17	Trains only used for transport of coal to Port Kemble. Coal washings are transported by truck to Stage 3 of the West Cliff emplacement areal. Some coal wash is also transported for beneficial reuse. This is managed under the Bulli Seam Operations approval.	C	
Staged Submission of Management Plans/Monitoring Programs					
8.	With the approval of the Secretary, the Applicant may submit any management plan or monitoring program required by this consent on a progressive basis.	Note	Noted		

No	Assessment Requirement	Reference/ Evidence	Comments	Compliance Status	Recommendations
9.	The Applicant shall ensure that monitoring programs, management plans and the Environmental Management Strategy, as in existence at the date of modification of consent in November 2008, continue to be implemented (to the satisfaction of the Secretary) until replaced by monitoring programs and management plans approved in accordance with the conditions of this consent.	Interview – Environmental Superintendent EMS (ID: ENMP0039) Original doc dated Feb 2005 and has been updated three times (Apr 2009, Mar 2012, Oct 2017) Environmental Management Plans – as required by conditions of this approval.	Monitoring programs, management plans and the Environmental Management Strategy were reviewed following the 2014 IEA and updated as required and continue to be implemented as further discussed against relevant conditions of this approval. However, some areas for review have been suggested in relation to the adequacy of monitoring programs and management plans have been raised by the auditor particularly in relation to Subsidence Management.	O	Refer to ANCs and observations provided against several conditions below.
Structural Adequacy					
10.	The Applicant shall ensure that all new buildings and structures, and any alterations or additions to existing buildings and structures, are constructed in accordance with the relevant requirements of the BCA.	AEMR FY15, AR FY16, FY17 Interview – Environmental Superintendent	FY15: Bulk storage cover on the portal road constructed, completed August 2014 constructed in accordance with BCA requirements. FY16: Minor construction i.e installation of timber railings, surfacing works, removal of old fencing and installation of a new gate FY17: No major construction reported No demolition works were reportedly undertaken during the audit period.	C	
<p>Notes:</p> <p>Under Part 4A of the EP&A Act, the Applicant is required to obtain construction and occupation certificates for the proposed building works.</p> <p>Part 8 of the EP&A Regulation sets out the requirements for the certification of the development.</p>					
Demolition					
11.	The Applicant shall ensure that all demolition work is carried out in accordance with Australian Standard AS 2601-2001: The Demolition of Structures, or its latest version.	Interview – Environmental Superintendent	The Auditor was advised that no demolition works were undertaken during the audit period.	NT	
Operation of Plant and Equipment					
12.	The Applicant shall ensure that all plant and equipment used on site is: (a) maintained in a proper and efficient condition; and (b) operated in a proper and efficient manner.	(SAP) - Work Planning and Scheduling system and outputs. Interview – Maintenance Superintendent Interview - Business Process and Data Lead	Review of the maintenance work planning and scheduling process, and information management system on-screen with the Maintenance Superintendent. This included tracing a sample of maintenance activities on screen for water pumps. A sample of calibration record sheets for water sampling equipment were also sighted by the Auditor. During the site inspection no observations were made of unmaintained or inappropriately operated equipment.	C	

No	Assessment Requirement	Reference/ Evidence	Comments	Compliance Status	Recommendations
Community Enhancement					
13.	<p>The Applicant shall contribute \$0.03 per tonne of saleable coal production each financial year to fund the provision of significant present and future benefits to local communities directly affected by the development. These funds shall be:</p> <p>(a) administered and expended in accordance with procedures which are to the satisfaction of WCC and the Secretary;</p> <p>(b) provided by 30 September each year over the life of the consent;</p> <p>(c) based on saleable coal production in the previous financial year; and</p> <p>(d) indexed in accordance with the CPI, with April 2005 used as the commencement date for indexation calculations.</p>	<p>AEMR FY15, AR FY16, FY17</p> <p>CPI Calculation Spreadsheet (xls)</p>	<p>Three cents per saleable tonne of coal from the Dendrobium Operations (adjusted for CPI) contributed. For FY17 rate is calculated and reported at just over 4 cents/tonne.</p> <p>The auditor sighted several examples of community improvement projects in the Mount Kemble area.</p>	C	
Costs of Management Measures					
14.	<p>The Applicant shall be responsible for the costs of all management measures (including measures to minimise, mitigate, offset or remediate impacts of the development which are not recoverable by a third party through the Mine Subsidence Compensation Act 1961 or the Mining Act 1991) including but not limited to remediation of natural features, rehabilitation of ecological systems, the provision of supplementary waters and monitoring of the effectiveness of the works, as determined by the Secretary.</p>	Note	Noted	Note	

No	Assessment Requirement	Reference/ Evidence	Comments	Compliance Status	Recommendations
Strategic Biodiversity Offsets					
15.	<p>If the Applicant is required to provide a biodiversity offset pursuant to this consent (including any biodiversity offset that is required under the conditions of a subordinate approval issued in accordance with this consent), the Secretary, in consultation with OEH, may accept in satisfaction of the requirement for the biodiversity offset, the provision of land that has conservation values which exceed the conservation values required to meet the relevant offsetting requirement.</p> <p>If the Secretary accepts such an offset under this condition, the Secretary shall issue a written statement to the Applicant advising:</p> <ul style="list-style-type: none"> (a) the details of the proposed offset land; (b) the offset requirements that are being met; (c) the conservation values that have been relied upon to meet the offsetting requirements; and (d) that in the opinion of the Secretary: <ul style="list-style-type: none"> (i) the land has offsetting values in addition to those that have been relied upon to meet the offsetting requirement in condition 15(b); or (ii) if the land has been subject to a previous statement from the Secretary under this condition, confirmation that the land continues to have conservation values in addition to those that have been relied upon to meet the previous offsetting requirement, or that there are no further conservation values available in respect of the land. <p>If the Secretary has issued a statement under this condition, the Applicant can rely on that statement and the residual conservation values that the land subject to the statement may hold, to meet further offsetting requirement(s) that may be required under this consent or the project approval for the Bulli Seam Operations Project (08_0150).</p> <p>The Secretary's statement under this condition can be relied on a number of times in respect of the same land until all of the conservation values of the land the subject of the Secretary's statement have been relied upon to meet offsetting requirements under this consent or the approval for the Bulli Seam Operations Project (08_0150).</p> <p>The Applicant shall make suitable arrangements to provide appropriate long-term security for the biodiversity offset area(s) accepted under this condition, within 2 years of the date of the Secretary's statement in respect of that land, unless otherwise agreed with the Secretary.</p>	<p>Illawarra Coal – Strategic Biodiversity Offset (South32, March 2016)</p> <p>Letter DP&E to South32 Illawarra Coal (ref: 16/08860; dated: 16/12/2016)</p>	<p>Strategic Biodiversity Offset (South32 March 2016) identifies proposal put forth by DMD to provide an offset in the form of a 598 ha site north of the project at Maddens Plains near Helensburgh.</p> <p>Satisfaction of the Secretary of DP&E and the OEH (consulted by DP&E) is evident in the letter: Letter DP&E to South32 Illawarra Coal (ref: 16/08860; dated: 16/12/2016), which states that both agencies support the Strategic Biodiversity Offset (SBO). The letter states that the Secretary considers the SBO document fulfils the requirements of this condition.</p> <p>It is noted that WaterNSW do not support the Offset (letter to ERM dated 11/9/17).</p> <p>The Secretary of DP&E letter regarding the offset confirms the approval condition requirements as:</p> <ul style="list-style-type: none"> a) states the land as the Maddens Plains Offset Site. b) & c) states the offset requirements being met (for Dendrobium) as the upland swamps (including a cross reference to the SBO). d) <ul style="list-style-type: none"> i) states additional offsetting values such as permanent land security and habitat linkage enhancement and security. ii) not applicable. <p>Use of the offset area for SBO is noted.</p> <p>Regarding land security, the SBO (South32, March 2016) and the letter of DP&E acceptance states that the intention is to transfer the land to the National Parks and Wildlife (NPWS) estate. Verification from NSW Land Registry Services confirms the ownership of Maddens Plains Lands has been transferred to the Minister Administering the National Parks and Wildlife.</p>	C	

SCHEDULE 3 – SPECIFIC ENVIRONMENTAL CONDITIONS – UNDERGROUND MINING

SUBSIDENCE

WATERCOURSE IMPACT MANAGEMENT

Note: These conditions should be read in conjunction with the Statement of Commitments.

1.	<p>The Applicant shall ensure that, as a result of the development:</p> <p>(a) no rock fall occurs at Sandy Creek Waterfall or from its overhang;</p> <p>(b) the structural integrity of the waterfall, its overhang and its pool are not impacted;</p> <p>(c) cracking in Sandy Creek within 30 m of the waterfall is of negligible environmental and hydrological consequence; and</p> <p>(d) negligible diversion of water occurs from the lip of the waterfall to the satisfaction of the Secretary.</p>	<p>Interview – Environmental Superintendent</p>	<p>The audit team inspected Sandy Creek and the Sandy Creek Waterfall. No obvious impacts to the waterfall were observed at the time of the audit. The Auditors were advised that the waterfall is regularly inspected as part of routine subsidence monitoring, both from above and below the waterfall. The latter requires access by boat.</p> <p>No surface cracking was observed within 30m of Sandy Creek at the time of the audit.</p>	C	
2.	<p>The Applicant shall ensure that underground mining operations do not cause subsidence impacts at Sandy Creek and Wongawilli Creek other than “minor impacts” (such as minor fracturing, gas release, iron staining and minor impacts on water flows, water levels and water quality) to the satisfaction of the Secretary.</p>	<p>AEMR FY15, AR FY16, FY17</p> <p>Dendrobium Area 3B Longwall 10 End of Panel Report, May 2015</p> <p>Dendrobium Area 3B Longwall 11 End of Panel Report, 25 May 2016</p> <p>Dendrobium Area 3B Longwall 12 End of Panel Report, May 2015</p>	<p>Wongawilli Creek in Area 3B. Sandy Creek is in Area 3A and not included or reported on in AEMR/AR for Area 3B if > 2 years ago & no impacts observed. Valley closure movements across Wongawilli Creek within predictions and no reported impacts.</p> <p>The audit team inspected Wongawilli and Sandy Creeks and noted their condition to be consistent with that reported.</p>	C	

Note: In this condition, “minor impacts” are those defined as minor triggers in Table 23.2 of the draft SMP submitted by the Applicant for Dendrobium Area 3A.

3.	<p>The Applicant shall ensure the development does not result in reduction (other than negligible reduction) in the quality or quantity of surface water or groundwater inflows to Lake Cordeaux or Lake Avon or surface water inflow to the Cordeaux River at its confluence with Wongawilli Creek, to the satisfaction of the Secretary.</p>	<p>AEMR FY15, AR FY16, FY17</p> <p>Dendrobium Area 3B Longwall 10 End of Panel Report, May 2015</p> <p>Dendrobium Area 3B Longwall 11 End of Panel Report, 25 May 2016</p> <p>Dendrobium Area 3B Longwall 12 End of Panel Report, May 2015</p> <p>Interview – Environmental Superintendent</p>	<p>FY15/FY16: Reported that only negligible reductions observed.</p> <p>FY17: Flow and catchment yield modelling assessment indicates that the headwater catchments at sites within DC13, Donald Castle Creek and WC21 have been affected by under-mining. Effects are not clearly observed in downstream catchments of both Donald Castle Creek and Wongawilli Creek.</p> <p>The FY17 AR reports a discernible loss of flows along the watercourse LA4, which is a tributary of Lake Avon. The previously determined TARP have not been triggered, however flow behaviour during Longwall 12 was anomalous, including the occurrence of cease-to-flow conditions, indicative of a mining effect.</p>	O	<p>Review level of impacts to receiving watercourses from impacts to headwater catchments and any need for corrective actions.</p> <p>CMA - review of modelled groundwater leakage losses from Avon & Cordeaux Dams (refer to WaterNSW letter dated 11/9/17) based on time lag analysis between underground water make and rainfall + GW chemistry/age & source analysis to resolve this.</p> <p>CMA - Layout for LW13 & 19 may need be reviewed after TARP review if necessary.</p>
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			<p>The site reports it is not seeing more than 0.5ML/day of modern water make in the mine, hence the approved TARP is not triggered. Monthly report on water quality sampling is prepared for the NSW Dam Safety Committee.</p> <p>Level 2 DO levels recorded after consecutive triggers at LA4 during LW12.</p>		
4.	<p>Prior to carrying out any underground mining operations that could cause subsidence in either Area 3A, Area 3B or Area 3C, the Applicant shall prepare a Watercourse Impact Monitoring, Management and Contingency Plan to the satisfaction of the Secretary. Each such Plan must:</p> <p>(a) demonstrate how the subsidence impact limits in conditions 1 - 3 are to be met;</p> <p>(b) include a monitoring program and reporting mechanisms to enable close and ongoing review by the Department and DRE DPI of the subsidence effects and impacts (individual and cumulative) on Wongawilli Creek, Sandy Creek and Sandy Creek Waterfall;</p> <p>(c) include a general monitoring and reporting program addressing surface water levels, water flows, water quality, surface slope and gradient, erodibility, aquatic flora and fauna (including Macquarie Perch, any other threatened aquatic species and their habitats) and ecosystem function;</p> <p>(d) include a management plan for avoiding, minimising, mitigating and remediating impacts on watercourses, which includes a tabular contingency plan (based on the Trigger Action Response Plan structure) focusing on measures for remediating both predicted and unpredicted impacts;</p> <p>(e) address third and higher order streams individually but address first and second order streams collectively;</p> <p>(f) be prepared in consultation with OEH DECC, SCA and DRE DPI;</p> <p>(g) incorporate means of updating the plan based on experience gained as mining progresses;</p> <p>(h) be approved prior to the carrying out of any underground mining operations that could cause subsidence impacts on watercourses in the relevant Area; and</p> <p>(i) be implemented to the satisfaction of the Secretary.</p>	<p>Watercourse Impact Monitoring, Management and Contingency Plan – Dendrobium Colliery Area 3B (WIMMCP - May, 2015)</p> <p>AEMR, FY15 AR FY16, FY17</p> <p>Dendrobium Area 3B Longwall 10 End of Panel Report, May 2015</p> <p>Dendrobium Area 3B Longwall 11 End of Panel Report, 25 May 2016</p> <p>Dendrobium Area 3B Longwall 12 End of Panel Report, May 2015</p> <p>Interview – Environmental Superintendent</p>	<p>The current approved WIMMCP addresses the requirements of this condition and is applicable to the mining activities undertaken during the reporting period for Longwalls 11 - 13.</p> <p>The results of the Watercourse Impact Monitoring program are reported in detail in the End of Panel Reports and summarised in the Annual Environmental Monitoring Report.</p> <p>The Audit team observed examples of subsidence monitoring locations in the field.</p> <p>The Auditor is satisfied that DMD is implementing the approved WIMMCP.</p> <p>Several Corrective Management Actions (CMAs) were triggered during the current audit period by the Dendrobium WIMMCP and TARP which required back filling of surface cracks across fire trails and review of surface water groundwater impacts associated with rock bar cracking, flow path diversion and water quality and storage loss impacts to Avon reservoir and its feeder tributaries.</p> <p>Overall, the approved SMP/SIMMCP/WIMMCPs do not appear to be performing reasonably well in regard to the predicted subsidence and management of impacts. The auditor notes that although the proposed Swamp Research and Rehabilitation Plan (SRRP) and on-going monitoring of impacted features is occurring, it would appear that the approved Swamp and Watercourse TARPS are likely too aggressive to allow a reasonable assessment of actual impacts</p>	O	<p>CMA – Consider revision of SIMMCP and WIMMCP TARPs with reference to WaterNSW requests (letter to ERM dated 11/09/17) and review against Performance Measures (PM) for Swamps, Watercourses & Water Storages.</p> <p>CMA - Layout for LW13 & 19 may need to be reviewed after TARP review if necessary.</p>

			that allow appropriate responses to occur in a timely manner. Refer <i>Subsidence Impact Management Compliance Assessment in Annex B</i> for more detail.		
<p>Notes: Should review by the Department of reports by the Applicant under paragraph (b) indicate that subsidence impacts have exceeded or threaten to limits imposed in conditions 1-3, then under condition 4 of Schedule 2 the Secretary may instruct the Applicant to implement reasonable and feasible requirements, which may include to cease mining within the operative longwall, shorten the length of that longwall or shorten the length and/or width of future longwalls. Requirements under paragraphs (a) and (b) in respect of Sandy Creek and Sandy Creek Waterfall relate only to the Watercourse Impact Monitoring, Management and Contingency Plan for Area 3A.</p>					
Swamp Impact Management					
5.	The Applicant shall ensure that subsidence does not cause erosion of the surface or changes in ecosystem functionality of Swamp 15a and that the structural integrity of its controlling rockbar is maintained or restored, to the satisfaction of the Secretary.	Interview – Environmental Superintendent	Swamp 15a is not considered applicable to assessments in Area 3B.	NT	
6.	<p>Prior to carrying out any underground mining operations that could cause subsidence in either Area 3A, Area 3B or Area 3C, the Applicant shall prepare a Swamp Impact Monitoring, Management and Contingency Plan to the satisfaction of the Secretary. Each such Plan must:</p> <p>(a) demonstrate how the subsidence impact limits in condition 5 are to be met;</p> <p>(b) include a monitoring program and reporting mechanisms to enable close and ongoing review by the Department and DRE DPI of the subsidence effects and impacts (individual and cumulative) of each Area 3A longwall on Swamp 15a;</p> <p>(c) include a general monitoring and reporting program addressing surface water levels, near- surface groundwater levels, water quality, surface slope and gradient, erodibility, flora and ecosystem function;</p> <p>(d) include a management plan for avoiding, minimising, mitigating and remediating impacts on swamps, which includes a tabular contingency plan (based on the Trigger Action Response Plan structure) focusing on measures for remediating both predicted and unpredicted impacts;</p> <p>(e) address headwater and valley infill swamps separately and address each swamp individually;</p> <p>(f) be prepared in consultation with OEH DECC, SCA and DRE DPI;</p> <p>(g) incorporate means of updating the plan based on experience gained as mining progresses;</p> <p>(h) be approved prior to the carrying out of any underground mining operations that could cause subsidence impacts on swamps in the relevant Area; and</p> <p>(i) be implemented to the satisfaction of the Secretary.</p>	<p>AEMR FY15 AR FY16, FY17</p> <p>Swamp Impact, Monitoring, Management and Contingency Plan – Dendrobium Area 3B (SIMMCP) 2012</p> <p>Swamp Impact, Monitoring, Management and Contingency Plan – Dendrobium Area 3B (SIMMCP) October 2015</p> <p>Area 3B End of Panel Reports</p>	<p>Refer above regarding Swamp 15a.</p> <p>The SIMMCP was prepared prior to mining in Area 3B.</p> <p>The SIMMCP and TARP was updated in 2015. The current approved SIMMCP and approved TARP address this condition.</p> <p>Subsidence impacts to swamps are reported in Annual Reviews and End of Panel Reports for provision to the Secretary.</p> <p>The approved SIMMCP and associated TARP has been implemented during the audit period.</p> <p>Refer to Watercourse Impact Management - Condition 4 Subsidence Impact Management Compliance Assessment in Annex B.</p>	O	Refer to Watercourse Impact Management - Condition 4 Recommendations above.
<p>Notes: Should review by the Department of reports by the Applicant under paragraph (b) indicate that subsidence impacts have exceeded or threaten to exceed limits imposed in condition 5, then under condition 4 of Schedule 2 the Secretary may instruct the Applicant to implement reasonable and feasible requirements, which may include to cease mining within the operative longwall, shorten the length of that longwall or shorten the length and/or width of future longwalls. Requirements under paragraphs (a) and (b) relate only to the Swamp Impact Monitoring, Management and Contingency Plan for Area 3A.</p>					

Subsidence Management Plans					
7.	<p>Prior to carrying out any underground mining operations that could cause subsidence in either Area 3A, 3B or 3C, the Applicant shall prepare a Subsidence Management Plan (SMP) to the satisfaction of the Secretary and the DRE. Each such SMP must:</p> <p>(a) integrate ongoing management of Areas 1 and 2;</p> <p>(b) integrate the Watercourse and Swamp Impact Monitoring, Management and Contingency Plans required under conditions 4 and 6; (c) include monitoring of subsidence effects;</p> <p>(d) include a SCA Assets Protection Plan;</p> <p>(e) include monitoring, management, and contingency plans for all other significant natural features and all significant man made features which may be impacted by subsidence, including:</p> <p>landscape (including cliffs and steep slopes);</p> <p>groundwater (see condition 13);</p> <p>terrestrial flora and fauna and ecology (including all threatened species assessed as being likely to be significantly affected by the development and their habitats);</p> <p>Aboriginal and other cultural heritage (see condition 12); and electrical, communications and other infrastructure;</p> <p>(f) be prepared in consultation with OEHD, DECC, SCA and DRE DPI;</p> <p>(g) be approved prior to the carrying out of any underground mining operations that could cause subsidence in the relevant Area; and</p> <p>(h) be implemented to the satisfaction of the Secretary and the DRE Director-General of DPI.</p>	<p>Dendrobium Area 3B – Subsidence Management Plan, PDM-001-9.6.1D Rev B</p> <p>Dendrobium Area 3B SMP_ Notice of Approval, February 2013</p> <p>AEMR FY15 AR FY16, FY17 (Draft)</p> <p>Dendrobium Area 3B Longwall 10 End of Panel Report, May 2015</p> <p>Dendrobium Area 3B Longwall 11 End of Panel Report, 25 May 2016</p> <p>Dendrobium Area 3B Longwall 12 End of Panel Report, May 2015</p>	<p>The SMP covering area 3B was approved by DRE in February 2013 prior to undertaking mining in Longwalls 10-13. The SMP generally addresses the requirements of this condition.</p> <p>Subsidence impacts are reported in Annual Reviews and End of Panel Reports for provision to the Secretary.</p> <p>Area 3C has not yet been mined.</p> <p>Approval granted for LW13 and 14 using same mining geometry is noted by the Auditor.</p>	C	
<p>Notes:</p> <p>The SCA Assets Protection Plan required under this condition must also be prepared and implemented to the satisfaction of the SCA.</p> <p>The contingency plans required under paragraph (e) must address remediation (as appropriate) and be based on a TARP structure.</p>					
8.	<p>The SMPs prepared under condition 7 for Areas 3B and 3C must:</p> <p>(a) include a mine plan for the relevant Area;</p> <p>(b) include a detailed subsidence impact assessment, clearly setting out all predicted subsidence effects, subsidence impacts and environmental consequences;</p> <p>(c) include a minimum of 2 years of baseline data, collected at appropriate frequency and scale, for all significant natural features;</p> <p>(d) identify and assess the significance of all natural features located within 600 m of the edge of secondary extraction;</p> <p>(e) distinguish between, clearly describe and adequately quantify all subsidence effects, subsidence impacts and environmental consequences;</p> <p>(f) propose limits on subsidence impacts and environmental consequences to be applied within the relevant Area;</p> <p>(g) be otherwise prepared in accordance with any guidelines for SMPs developed by the Department and/or DPI-DRE;</p> <p>(h) be approved prior to the carrying out of any underground mining operations that could cause subsidence in the relevant Area; and</p> <p>(i) be implemented to the satisfaction of the Secretary and the DRE Director-General of DPI.</p>	<p>Dendrobium Area 3B – Subsidence Management Plan, PDM-001-9.6.1D Rev B</p>	<p>The SMP addresses all aspects of this condition.</p> <p>Area 3C is not yet being mined.</p> <p>As discussed in the main body of this IEA report, WaterNSW provided some very detailed and specific feedback to the audit process with regard to aspects of SMP and adequacy of TARPs. These were provided to South32 for consideration and considered further in review of relevant compliance conditions.</p>	O	<p>Consider WaterNSW feedback and preparation of a response. Make any necessary changes to current and future SMP and TARPs where deemed appropriate.</p>
<p>Note: In approving an SMP, the Secretary may impose conditions containing subsidence impact limits (similar to conditions 1- 3 & 5), subsidence management mechanisms (similar to conditions 4 & 6) or other conditions.</p>					
<p>End of Panel Reporting</p>					

9.	<p>Within 4 months of the completion of each longwall panel, or as otherwise permitted by the Secretary, the Applicant shall:</p> <p>(a) prepare an end-of-panel report: reporting all subsidence effects (both individual and cumulative) for the panel and comparing subsidence effects with predictions; describing in detail all subsidence impacts (both individual and cumulative) for the panel; discussing the environmental consequences for watercourses, swamps, water yield, water quality, aquatic ecology, terrestrial ecology, groundwater, cliffs and steep slopes; and comparing subsidence impacts and environmental consequences with predictions; and</p> <p>(b) submit the report to the Department, DRE DPI, SCA, OEH DECC, NOW DWE and any other relevant agency to the satisfaction of the Secretary.</p>	<p>Dendrobium Area 3B Longwall 10 End of Panel Report, May 2015</p> <p>Dendrobium Area 3B Longwall 11 End of Panel Report, 25 May 2016</p> <p>Dendrobium Area 3B Longwall 12 End of Panel Report, May 2015</p>	<p>End of Panel Reports were prepared for Longwall 10, 11 and 12. The reports have been prepared in accordance with the requirements of this condition and within the stipulated timeframe.</p> <p>LW13 still being mined during audit period.</p>	C	
10.	<p>The Applicant shall include a comprehensive summary, analysis and discussion of the results of monitoring of subsidence effects, subsidence impacts and environmental consequences in each AEMR.</p>	<p>AEMR FY15, AR FY16, FY17</p>	<p>The AEMR and AR reports address the requirements of this condition.</p> <p>The summary of impacts provided is consistent with the above referenced End of Panel Reports completed during the audit period (i.e. for Longwalls 10, 11 and 12).</p> <p>During the document review, it became apparent that that current status of proposed CMAs and SSRP for the Swamps was not clearly described in the AEMR/AR.</p>	O	<p>Consider including a section in the AEMR/AR providing the status of subsidence impact CMAs (complete or proposed), noting this could be tabulated.</p> <p>A remediation and CMA works register on the website would also assist future auditors.</p>
Subsidence Expert Assessments					
11.	<p>The Applicant shall pay the reasonable costs of the Department in engaging independent experts to advise it when it assesses SMPs prepared under condition 7 for Areas 3B and 3C.</p>	<p>Note</p>	<p>Noted</p>	<p>Note</p>	
ABORIGINAL HERITAGE					
12.	<p>The SMPs prepared under condition 7 must include an Aboriginal Heritage Plan, which must include a:</p> <p>(a) description of known Aboriginal heritage sites;</p> <p>(b) protocol for the ongoing consultation and involvement of the Aboriginal community in the conservation and management of Aboriginal heritage;</p> <p>(c) description of the measures that would be implemented to protect Aboriginal sites generally, including measures that would be implemented to secure, analyse and record sites at risk of subsidence;</p> <p>(d) description of the measures that would be implemented to protect Aboriginal site 52-2-1646, including:</p> <p>a full recording and assessment of the site's rock art;</p> <p>a more detailed subsidence assessment for the site;</p> <p>measures which seek to avoid any significant impact on the site and any necessary contingency plans to protect the site against collapse or substantial impact on its rock art; and</p> <p>(e) description of the measures that would be implemented if any new Aboriginal objects or skeletal remains are discovered during the development.</p>	<p>Dendrobium Area 3B – Subsidence Management Plan, PDM-001-9.6.1D Rev B</p> <p>Biosis (2006c) Dendrobium Coal Mine, Subsidence Monitoring Program Cultural Heritage.</p> <p>Biosis (2007c). Dendrobium Coal Mine – Area 3A: Cultural Heritage Management Program (Subsidence).</p> <p>Biosis (2012) Dendrobium Area 3B Heritage Impact Assessment Report prepared for BHPBIC.</p>	<p>The SMP for Area 3B includes summary of the Cultural Heritage and Management based on the requirements of the following Biosis (2006c), Biosis (2007c) and Biosis (2012).</p> <p>The SMP provides monitoring, trigger and response requirements for Aboriginal site 52-2-1646, but does not outline specific measure to protect the site. However, general management measures for heritage sites are described and are considered adequate. Biosis (2007c) reports that the risk of impact to the site is considered very low.</p> <p>The SMP adequately addresses the requirements of this condition.</p>	C	
GROUNDWATER MONITORING PROGRAM					
13.	<p>The SMPs prepared under condition 7 must include a Groundwater Monitoring Program, which must include:</p>	<p>AEMR FY15, AR FY16, FY17</p>	<p>The SMP provides a summary of Groundwater Monitoring and</p>	O	<p>CMA - Installation of Screened Piezometers to verify water table depth below ground in Area 3B and</p>

	<p>(a) proposals to develop a detailed regional and local groundwater model, with special reference to flows to and from nearby water storages;</p> <p>(b) detailed baseline data to benchmark the natural variation in groundwater levels, yield and quality;</p> <p>(c) groundwater impact assessment criteria;</p> <p>(d) a program to monitor the impact of the development on: groundwater levels, yield and quality (particularly any potential loss of flow to, or flow from, SCA water storages); coal seam aquifers and overlying aquifers; and groundwater springs and seeps; and</p> <p>(e) consideration of the requirements of the latest version (or subsequent replacement) of SCA's The Design of a Hydrological and Hydrogeological Monitoring Program to Access the Impacts of Longwall Mining in SCA Catchment.</p>	<p>Dendrobium Area 3B – Subsidence Management Plan - Volume 2 (SMP), PDM-001- 9.6.1D Rev B</p> <p>Dendrobium Area 3B Longwall 10 End of Panel Report, May 2015</p> <p>Dendrobium Area 3B Longwall 11 End of Panel Report, 25 May 2016</p> <p>Dendrobium Area 3B Longwall 12 End of Panel Report, May 2015</p>	<p>Management derived from various plans and assessment reports.</p> <p>The SMP adequately addresses the requirements of this condition.</p> <p>Groundwater results of monitoring are reported in End of Panel Reports and Annual Environmental Monitoring Reports/Annual Reviews.</p> <p>WaterNSW (letter to ERM dated have identified shallow VWP failures (false positives) across Area 1-3. Screened standpipe piezometers are recommended to verify water table depth below ground (upper aquifer levels).</p>		<p>probably other areas. Consultation with WaterNSW required to develop a practical scope.</p>
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ENVIRONMENTAL OFFSETS

14.	<p>The Applicant shall provide suitable offsets for loss of water quality or loss of water flows to SCA storages, clearing and other ground disturbance (including cliff falls) caused by its mining operations and/or surface activities within the mining area, unless otherwise addressed by the conditions of this consent, to the satisfaction of the Secretary. These offsets must:</p> <p>(a) be submitted to the Secretary for approval by 30 April 2009;</p> <p>(b) be prepared in consultation with SCA;</p> <p>(c) provide measures that result in a beneficial effect on water quality, water quantity, aquatic ecosystems and/or ecological integrity of SCA's special areas or water catchments.</p>	<p>Previous IEA (KADENZ 2014)</p> <p>Interview – Environment Superintendent</p>	<p>Previous IEA states this condition was met through an area of offset transferred from IC to NPWS in the Illawarra Escarpment State Conservation Area.</p> <p>Condition predates this audit.</p> <p>Notwithstanding, no reported water losses or quality reductions have occurred such as to trigger required offsets.</p>	NA	
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SCHEDULE 4 – SPECIFIC ENVIRONMENTAL CONDITIONS – SURFACE FACILITIES

Noise

Noise Impact Assessment Criteria

1.	<p>The Applicant shall ensure that the noise generated at the surface facilities does not exceed the noise impact assessment criteria in Table 1 at any residence on privately-owned land, or on more than 25% of any privately-owned land. The applicable criteria for any residence not listed in Table 1 shall be the criteria applying at the nearest listed residence.</p> <p><i>Table 1: Noise impact assessment criteria dB(A)</i></p> <table border="1"> <thead> <tr> <th>Day</th> <th>Evening</th> <th>Night</th> <th colspan="2">Residence</th> </tr> <tr> <th>LAeq(15 min)</th> <th>LAeq(15 min)</th> <th>LAeq(15 min)</th> <th>LA1(1 min)</th> <th>(as shown in the Noise Monitoring Program)</th> </tr> </thead> <tbody> <tr> <td>42</td> <td>42</td> <td>38</td> <td>48</td> <td>R2</td> </tr> <tr> <td>41</td> <td>41</td> <td>40</td> <td>50</td> <td>R22</td> </tr> <tr> <td>40</td> <td>40</td> <td>39</td> <td>49</td> <td>R1</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td>R9</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td>R15a</td> </tr> <tr> <td>40</td> <td>40</td> <td>37</td> <td>47</td> <td>R3a</td> </tr> </tbody> </table>	Day	Evening	Night	Residence		LAeq(15 min)	LAeq(15 min)	LAeq(15 min)	LA1(1 min)	(as shown in the Noise Monitoring Program)	42	42	38	48	R2	41	41	40	50	R22	40	40	39	49	R1					R9					R15a	40	40	37	47	R3a	<p>AEMR FY15 AR FY16, FY17</p> <p>2014 Noise Management Plan</p> <p>Interview – Environmental Superintendent</p>	<p>FY15: Four exceedances of the LAeq, 15 minute noise criteria during this period at R39a (two during the day and two during the evening). The source of the exceedances were due to rail movements within KVCLF (train idling) and vehicles working on the stockpile.</p> <p>FY16: There were two exceedances of the LAeq, 15 minute noise criteria during the reporting period at R39a, however the mine noise level remained below the dominant noise (insects, birds and bats).</p> <p>FY17: No exceedances recorded at time of audit.</p> <p>It is apparent that rail noise is contributing to the recorded exceedances of the amenity criteria at R39a. It is noted that</p>	NC	<p>Continue to implement all reasonable and feasible noise mitigation measures with a view to ongoing improvement.</p>
Day	Evening	Night	Residence																																										
LAeq(15 min)	LAeq(15 min)	LAeq(15 min)	LA1(1 min)	(as shown in the Noise Monitoring Program)																																									
42	42	38	48	R2																																									
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				R9																																									
				R15a																																									
40	40	37	47	R3a																																									

				R5a	37	35	35	45	R39a	Notes: To determine compliance with the LAeq(15 minute) limit, noise from the development is to be measured at the most affected point within the residential boundary, or at the most affected point within 30 metres of a dwelling (rural situations) where the dwelling is more than 30 metres from the boundary. Where it can be demonstrated that direct measurement of noise from the development is impractical, DECC may accept alternative means of determining compliance (see Chapter 11 of the NSW Industrial Noise Policy). The modification factors in Section 4 of the NSW Industrial Noise Policy shall also be applied to the measured noise levels where applicable. To determine compliance with the L A1(1 minute) limit, noise from the development is to be measured at 1 metre from the dwelling façade. Where it can be demonstrated that direct measurement of noise from the development is impractical, DECC may accept alternative means of determining compliance (see Chapter 11 of the NSW Industrial Noise Policy). The noise emission limits identified in the above table apply under meteorological conditions of: - wind speeds of up to 3 m/s at 10 metres above ground level ; or - up to 3oC/100 m temperature inversion strength for all receivers, plus a 2 m/s source-to-receiver component drainage flow wind at 10 metres above ground level for those receivers where applicable. These limits do not apply if the Applicant has an agreement with the relevant owner/s of these residences to generate higher noise levels, and the Applicant has advised the Department and EPA DECC in writing of the terms of this agreement.	rail activities has its own established noise criteria. In other instances exceedance related mine site activity are impacted by other surrounding dominant noise source (i.e. birds, bats insects).		
			R6a&b										
			R39a										

Land Acquisition Criteria

2.	<p>If the noise generated at the surface facilities exceeds the relevant criteria in Table 2 at any residence on privately-owned land or on more than 25% of any privately-owned land, the Applicant shall, upon receiving a written request for acquisition from the landowner, acquire the land in accordance with the procedures in conditions 8 - 10 of schedule 4. The applicable criteria for any residence not listed in Table 2 shall be the criteria applying at the nearest listed residence.</p> <p>Table 2: Noise acquisition criteria dB(A)</p> <table border="1"> <thead> <tr> <th>Day</th> <th>Evening</th> <th>Night</th> <th>Residence</th> </tr> <tr> <th>LAeq(15 min)</th> <th>LAeq(15 min)</th> <th>LAeq(15 min)</th> <th>(as shown in the Noise Monitoring Program)</th> </tr> </thead> <tbody> <tr> <td>47</td> <td>47</td> <td>43</td> <td>R2</td> </tr> <tr> <td>46</td> <td>46</td> <td>45</td> <td>R22</td> </tr> <tr> <td>45</td> <td>45</td> <td>44</td> <td>R1</td> </tr> <tr> <td></td> <td></td> <td></td> <td>R9</td> </tr> <tr> <td></td> <td></td> <td></td> <td>R15a</td> </tr> <tr> <td>45</td> <td>45</td> <td>42</td> <td>R3a</td> </tr> <tr> <td></td> <td></td> <td></td> <td>R5a</td> </tr> <tr> <td></td> <td></td> <td></td> <td>R6a&b</td> </tr> <tr> <td>42</td> <td>40</td> <td>40</td> <td>R39a</td> </tr> </tbody> </table> <p>Note: Noise generated by the development is to be measured in accordance with the notes to Table 1.</p>	Day	Evening	Night	Residence	LAeq(15 min)	LAeq(15 min)	LAeq(15 min)	(as shown in the Noise Monitoring Program)	47	47	43	R2	46	46	45	R22	45	45	44	R1				R9				R15a	45	45	42	R3a				R5a				R6a&b	42	40	40	R39a	Interview Superintendent - Environmental	No requests for acquisition made during audit period.	NT	
Day	Evening	Night	Residence																																														
LAeq(15 min)	LAeq(15 min)	LAeq(15 min)	(as shown in the Noise Monitoring Program)																																														
47	47	43	R2																																														
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			R9																																														
			R15a																																														
45	45	42	R3a																																														
			R5a																																														
			R6a&b																																														
42	40	40	R39a																																														

Rail Haulage Impact Assessment Criteria

3.	<p>The Applicant shall ensure that noise generated by locomotives using the Kemira Valley rail line does not exceed the rail noise impact assessment criteria in Table 3.</p> <p><i>Table 3: Rail noise impact assessment criteria</i></p> <table border="1"> <thead> <tr> <th>Operating Condition</th> <th>Measurement Conditions</th> <th>Criteria LA1(I min)</th> </tr> </thead> <tbody> <tr> <td>Locomotive at idle, with compressor radiator fans and air conditioning operating at maximum load</td> <td>Stationary 15 metre contour</td> <td>70 dB(A)</td> </tr> <tr> <td>All other throttle settings under self-load, with compressor radiator fans and air conditioning operating at maximum load</td> <td>Stationary 15 metre contour</td> <td>87 dB(A) 95 dB(Lin)</td> </tr> <tr> <td>All service conditions</td> <td>Up to 50 kilometres per hour, 15 metres from centreline of rail track</td> <td>87 dB(A) 95 dB(Lin) Must be non-tonal Linear noise levels must not exceed A-weighted noise levels by more than 15 dB</td> </tr> </tbody> </table> <p><i>Note: All measured noise levels must be assessed for tonality in accordance with the NSW Industrial Noise Policy, unless otherwise specified</i></p>	Operating Condition	Measurement Conditions	Criteria LA1(I min)	Locomotive at idle, with compressor radiator fans and air conditioning operating at maximum load	Stationary 15 metre contour	70 dB(A)	All other throttle settings under self-load, with compressor radiator fans and air conditioning operating at maximum load	Stationary 15 metre contour	87 dB(A) 95 dB(Lin)	All service conditions	Up to 50 kilometres per hour, 15 metres from centreline of rail track	87 dB(A) 95 dB(Lin) Must be non-tonal Linear noise levels must not exceed A-weighted noise levels by more than 15 dB	<p>AEMR FY15 AR FY16, FY17</p> <p>Dendrobium Mine – Rail Haulage Noise Compliance Monitoring - June 2915 (Wilkinson Murray)</p> <p>Dendrobium Mine – Rail Haulage Operations Noise Monitoring Report (May 2016)</p> <p>2014 Noise Management Plan</p> <p>Interview – Environmental Superintendent</p>	<p>FY15: Small exceedance recorded under idle condition for tonality (3.15kHz frequency). Overall noise (LAeq and Leq) were below criteria.</p> <p>FY16: Small exceedance recorded for under idle condition for tonality (3.15kHz frequency). Overall noise (LAeq and Leq) were below criteria.</p> <p>FY17: Results fell within assessment criteria</p> <p>No recorded exceedance of noise criteria in FY18 up to the time of the audit.</p>	C	
Operating Condition	Measurement Conditions	Criteria LA1(I min)															
Locomotive at idle, with compressor radiator fans and air conditioning operating at maximum load	Stationary 15 metre contour	70 dB(A)															
All other throttle settings under self-load, with compressor radiator fans and air conditioning operating at maximum load	Stationary 15 metre contour	87 dB(A) 95 dB(Lin)															
All service conditions	Up to 50 kilometres per hour, 15 metres from centreline of rail track	87 dB(A) 95 dB(Lin) Must be non-tonal Linear noise levels must not exceed A-weighted noise levels by more than 15 dB															
Continuous Improvement																	
4.	<p>The Applicant shall:</p> <p>(a) continue to investigate ways to reduce the noise generated by the development (including off-site road noise, noise and vibration impacts from the operation of the Kemira Valley rail line and maximum noise levels which may result in sleep disturbance);</p> <p>(b) continue to implement all reasonable and feasible best practice noise mitigation measures; and</p> <p>(c) report on these investigations and the implementation and effectiveness of these measures in the AEMR, to the satisfaction of the Secretary.</p>	<p>AEMR FY15 AR FY16, FY17</p>	<p>Additional monitoring was undertaken during FY15 reporting period using real-time and handheld noise monitoring units to identify feasible noise reduction initiatives. It was proposed that Underground Load Haul Dump Vehicles are to be changed to a quieter model at the end of the FY14 reporting period.</p> <p>FY16/FY17: Environmental improvement program - Rail noise investigation EIP1 initiative conducted during reporting period.</p>	C													

5.	The Applicant shall use its best endeavors to minimise wheel squeal, brake squeal and locomotive wheel slippage arising from rail haulage on the Kemira Valley rail line.	AEMR FY15 AR FY16, FY17 Interviews – Environmental Superintendent, Stockpile Operator, Locomotive Operator	The maximum rail speed limit increased to accommodate the optimum speed range for reduced wheel and brake squeal at focal point in Mount Kembla residential area. Brake shoes have been given a conforming fit to reduce vibration subsequently resulting in reduced noise output. The auditors observed a passing loaded train at a focal point in the Mount Kembla residential area to gain an appreciation of noise outputs. The majority of noise complaints received during the audit period have been in relation to rail noise output in the Kembla residential area. DMD has undertaken numerous initiatives to address noise issues and shown to be responsive to community concerns. There has been a notable reduction in complaints over the audit period.	C	
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Additional Noise Mitigation Measures

6.	Upon receiving a written request from the owner of any residence where subsequent noise monitoring shows the noise generated by the development is 3 dB(A) greater than the noise impact assessment criteria in Table 1 (except where a negotiated noise agreement is in place) the Applicant shall implement reasonable and feasible noise mitigation measures (such as double glazing, insulation and/or air conditioning) at any residence on the land in consultation with the landowner. If within 3 months of receiving this request from the landowner, the Applicant 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 Secretary for resolution.	Interview Superintendent Environmental	The Auditor was advised that no such requests have been made during the audit period.	NT	
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Monitoring

7.	The Applicant shall prepare and implement a Noise Monitoring Program for the development to the satisfaction of the Secretary. This program must: (a) be submitted to the Secretary for approval by 30 April 2009; (b) be prepared in consultation with EPA DECC; (c) provide for quarterly attended noise monitoring and real-time noise monitoring (where appropriate) to monitor the performance of the development, especially in residential areas close to the surface facilities; and (d) include a noise monitoring protocol for evaluating compliance with the noise impact and land acquisition criteria in this consent.	AEMR FY15 AR FY16, FY17 Noise Monitoring Plan (2014) Dendrobium Coal Mine (DA 60-03-2001) Management Plans (DPE Ref 10/13245-4), 25 August 2014.	The Noise Management Plan details noise monitoring program prepared and implemented. Monitoring results reported in AEMR/AR. The approved 2014 Noise Management Plan meets the requirements of this condition. Noise monitoring locations were identified and sighted (where possible) by the Audit Team during the site inspection.	C	
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Note: This program must expressly monitor the modifying factors referred to in the NSW Industrial Noise Policy (such as intermittency, tonality and low frequency)

BLASTING AND VIBRATION

8.	The Applicant is not permitted to undertake blasting operations at the surface facilities except with the prior written approval of EPA DECC and subject to any conditions which EPA DECC may impose.	Interview – Environmental Superintended AEMR FY15 AR FY16, FY17	No surface blasting was undertaken during the audit period.	NT	
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AIR QUALITY

Impact Assessment Criteria

9.	<p>The Applicant shall ensure that dust generated by the development does not cause additional exceedances of the criteria listed in Tables 4 to 6 at any residence on privately-owned land, or on more than 25 percent of any privately-owned land.</p> <p><i>Table 4: Long term impact assessment criteria for particulate matter</i></p> <table border="1"> <thead> <tr> <th>Pollutant</th> <th>Averaging period</th> <th>Criterion</th> </tr> </thead> <tbody> <tr> <td>Total suspended particulate (TSP) matter</td> <td>Annual</td> <td>90 µg/m³</td> </tr> <tr> <td>Particulate matter < 10 µm (PM₁₀)</td> <td>Annual</td> <td>30 µg/m³</td> </tr> </tbody> </table> <p><i>Table 5: Short term impact assessment criteria for particulate matter</i></p> <table border="1"> <thead> <tr> <th>Pollutant</th> <th>Averaging period</th> <th>Criterion</th> </tr> </thead> <tbody> <tr> <td>Particulate matter < 10 µm (PM₁₀)</td> <td>24 hour</td> <td>50 µg/m³</td> </tr> </tbody> </table> <p><i>Table 6: Long term impact assessment criteria for deposited dust</i></p> <table border="1"> <thead> <tr> <th>Pollutant</th> <th>Averaging period</th> <th>Maximum increase in deposited dust level</th> <th>Maximum total deposited dust level</th> </tr> </thead> <tbody> <tr> <td>Deposited dust</td> <td>Annual</td> <td>2g/m²/month</td> <td>4g/m²/month</td> </tr> </tbody> </table> <p><i>Note: Deposited dust is assessed as insoluble solids as defined by Standards Australia, 1991, AS/NZS 3580.10.1-2003: Methods for Sampling and Analysis of Ambient Air - Determination of Particulates - Deposited Matter - Gravimetric Method.</i></p>	Pollutant	Averaging period	Criterion	Total suspended particulate (TSP) matter	Annual	90 µg/m ³	Particulate matter < 10 µm (PM ₁₀)	Annual	30 µg/m ³	Pollutant	Averaging period	Criterion	Particulate matter < 10 µm (PM ₁₀)	24 hour	50 µg/m ³	Pollutant	Averaging period	Maximum increase in deposited dust level	Maximum total deposited dust level	Deposited dust	Annual	2g/m ² /month	4g/m ² /month	AEMR FY15 AR FY16, FY17	<p>FY16: One exceedance for PM10 was recorded at Point 21 (HVAS) which was attributed to bushfire conditions at that time.</p> <p>No other exceedance were reported for dust deposition or HVAS sampling during the audit period.</p>	C	
Pollutant	Averaging period	Criterion																										
Total suspended particulate (TSP) matter	Annual	90 µg/m ³																										
Particulate matter < 10 µm (PM ₁₀)	Annual	30 µg/m ³																										
Pollutant	Averaging period	Criterion																										
Particulate matter < 10 µm (PM ₁₀)	24 hour	50 µg/m ³																										
Pollutant	Averaging period	Maximum increase in deposited dust level	Maximum total deposited dust level																									
Deposited dust	Annual	2g/m ² /month	4g/m ² /month																									

Monitoring

10.	<p>The Applicant shall prepare and implement an Air Quality Monitoring Program for the surface facilities (excepting those surface facilities within the mining area) to the satisfaction of the Secretary. This program must:</p> <p>(a) be submitted to the Secretary for approval by 30 April 2009;</p> <p>(a) be prepared in consultation with EPA DECC;</p> <p>(b) use a combination of high volume samplers and dust deposition gauges to monitor the performance of the development; and</p> <p>(c) include an air quality monitoring protocol for evaluating compliance with the air quality impact assessment criteria in this consent.</p>	<p>AEMR FY14, FY15 AR FY16/FY17 (Draft) Air Quality Management Plan, 2014</p> <p>Dendrobium Coal Mine (DA 60-03-2001) Management Plans (DPE Ref 10/13245-4), 25 August 2014.</p>	<p>Air Quality Monitoring program in place and results reported in AEMR/AR</p> <p>Approved 2014 AQMP meets the requirements of this condition and was adequately implemented during the audit period.</p>	C	
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METEOROLOGICAL MONITORING					
11.	During the development, the Applicant shall ensure that it has a suitable meteorological station in the vicinity of the site that is generally in accordance with the requirements in the guideline Approved Methods for Sampling of Air Pollutants in New South Wales.	AEMR FY15 AR FY16, FY17	Meteorological Station located on top of Rill Tower at Kamira Valley Load Out Facility, one at the Pit Top and at Vent Shafts 2 & 3. The Auditor sighted real-time meteorological data on-screen.	C	
WATER MANAGEMENT					
Discharges					
12.	The Applicant shall ensure all surface water discharges from the surface facilities: (a) meet the relevant ANZECC water quality objectives for the protection of aquatic ecosystems and water quality of existing receiving waters; and (b) comply with the discharge limits (both volume and quality) set for the development in any EPL.	AEMR FY15 AR FY16, FY17	An Oil & Grease exceedance of EPL Water Quality Criteria was appropriately reported during the audit period. The source of the recorded levels was not able to be identified.	NC	No further action required.
Water Management Plan					
13.	The Applicant shall prepare and implement a Water Management Plan for the surface facilities to the satisfaction of the Secretary. This plan must: (a) be submitted to the Secretary for approval by 30 April 2009; (b) be prepared in consultation with EPA DECC, SCA and NOW DWE by suitably qualified expert/s whose appointment/s have been approved by the Secretary; and (c) include a: Site Water Balance; Erosion and Sediment Control Plan; Surface Water Monitoring Program; and Surface and Ground Water Response Plan.	AEMR FY15 AR FY16, FY17 Water Management Plan, 2014 Dendrobium Coal Mine (DA 60-03-2001) Management Plans (DPE Ref 10/13245-4), 25 August 2014.	The Water Management Plan was updated in 2014 and adequately meets the requirement of this condition. Inspection of the Dendrobium Pit Top Site identified instances where oil cans / waste oil cans were not being stored in bunded areas. Surface staining was observed in numerous locations on the concrete apron, noting the significant amount of cracking of the apron providing a potential pathway for contamination of underlying soils.	NC	Ensure all oils and chemicals are appropriately stored in contained and covered areas in accordance with the WMP.
Site Water Balance					
14.	The Site Water Balance must: (a) include details of: sources and security of water supply; water use on site; water intercepted by mining operations; water management on site; off-site water transfers and water stored or disposed of underground; reporting procedures; and (b) describe measures to minimise water use by the development.	2014 Water Management Plan Dendrobium Water Balance TARP Review AEMR FY15 AR FY16, FY17 Interview – Specialist Environment, Environmental Superintendent, Principal Approvals	The approved Water Management Plan outlines the elements of the site water balance that address the requirements of this condition. The site water usage, groundwater water take and surface water storage is assessed in accordance with the approved Groundwater anagement Plan and this information is reported in the Annual Environmental Management Reports. During the audit period DMD operated under the Dendrobium Water Balance TARP Review. Mine water usage, water flows and volumes are tracked and regularly scrutinised and reported on, with monthly reporting provided to relevant regulatory stakeholders. A summary of the mine water balance is	O	Consider the WaterNSW feedback and preparation of a response. Make any necessary changes to current and future site water balance modelling if deemed necessary.

			<p>provided in the Annual Environmental Management Reports.</p> <p>WaterNSW provided some very detailed and specific feedback to the audit process with regard to the site water balance and associated modelling. This feedback was provided to South32 for consideration.</p>		
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Erosion and Sediment Control					
15.	<p>The Erosion and Sediment Control Plan must:</p> <p>(a) be consistent with the requirements of the Managing Urban Stormwater: Soils and Construction Manual (Landcom 2004, or its latest version);</p> <p>(b) identify activities that could cause soil erosion and generate sediment;</p> <p>(c) describe measures to minimise soil erosion and the potential for transport of sediment to downstream waters;</p> <p>(d) describe the location, function, and capacity of erosion and sediment control structures; and</p> <p>(e) describe what measures would be implemented to monitor and maintain the structures over time.</p>	2014 Water Management Plan	<p>The Erosion and Sediment Control Plan (ESCP) is generally consistent with Landcom 2004, and meets the other requirements of this condition.</p> <p>During construction projects, site specific ESCPs are prepared. The recently Dendrobium Fan Site 2 & 3 was inspected which required construction of a sediment basin and other controls designed in accordance with Landcom 2004.</p> <p>The auditor inspected a number of other sites where ERSED controls were in place.</p> <p>The ESCP contained in the WMP does not specifically reference or direct requirements for ERSED controls to be in in accordance with Landcom, 2004.</p>	O	Ensure any updated ESCP specifically directs that controls are to be designed in accordance with the requirements of Landcom, 2004, or its latest version.
Surface Water Monitoring Program					
16.	<p>The Surface Water Monitoring Plan must include:</p> <p>(a) baseline data on surface water flows and quality in streams and other waterbodies that have been or could be affected by the surface facilities;</p> <p>(b) surface water quality and stream health assessment criteria, including trigger levels for investigating any potentially adverse surface water impacts;</p> <p>(c) a program to monitor the impact of the surface facilities on surface water flows and quality, stream health and channel stability; and</p> <p>(d) procedures for reporting the results of this monitoring.</p>	2014 Water Management Plan	<p>The Surface Water Monitoring Plan (SWMP) is outlined in the approved 2014 WMP. The SWMP refers to the baseline assessments undertaken to support the Environmental Assessments to support SMP approvals. The SWMP adequately addressed the requirements of this condition.</p>	C	
Surface and Ground Water Response Plan					
17.	<p>The Surface and Ground Water Response Plan must describe what measures and/or procedures would be implemented to:</p> <p>(a) respond to any exceedances of the surface water, stream health, and groundwater assessment criteria; and</p> <p>(b) mitigate and/or offset any adverse impacts on groundwater dependent ecosystems, aquatic ecosystems or riparian vegetation.</p>	<p>2014 Water Management Plan</p> <p>Dendrobium Water Balance TARP Review</p>	<p>The Surface and Groundwater Response Plan is outlined in the approved 2014 Water Management Plan. The Groundwater Response Plan directs to the groundwater monitoring program/s covered by the approved SMPs, including the Dendrobium Water Balance TARP Review and reporting.</p> <p>Trigger Action Response Plans (TARP) updated in Watercourse Impact Monitoring management and Contingency Plan (May 2015); Swamp Remediation and Research Program for Area 3A and 3B still pending approval. The SRRP was updated in August 2016 based on DP&E feedback (dated 29-June 16) and further discussion.</p>	O	Confirm status of SRRP Approval.
LANDSCAPE MANAGEMENT					
Rehabilitation					

18.	<p>The Applicant shall rehabilitate the surface facilities sites to the satisfaction of DRE DPI. For rehabilitation works within the Metropolitan Special Area, the Applicant shall also ensure that these works are carried out to the satisfaction of SCA.</p>	<p>Interview – Environment Supervisor</p> <p>Dendrobium Mine Landscape Management Plan (BHP Billiton 2014) (the LMP)</p> <p>AEMR FY14 AEMR FY15 AR FY16, FY17</p> <p>Mine Operations Plan FY16-FY22</p>	<p>No surface facilities have been removed requiring rehabilitation in the audit period.</p> <p>Rehabilitation has occurred at two locations preceding this audit period:</p> <ol style="list-style-type: none"> 1) No. 2 & 3 ventilation shaft site (an area referred to as the fan site) in 2008. 2) The Dendrobium Tunnel following an unplanned land surface failure in October 2013 (the ‘Dendrobium Tunnel Sinkhole Rehabilitation Project’). <p>Monitoring those rehabilitation areas has been undertaken and has identified:</p> <ol style="list-style-type: none"> 1) monitoring of that area was required for three years after rehabilitation. The cessation of that monitoring predates this audit period. 2) the initial rehabilitation response predates this audit, however it is noted that the LMP rehabilitation sections do not outline a process for response to such unplanned events. Therefore there are no requirements against which to consider the rehabilitation of such an event. There is no requirement stated in any plan to rehabilitate or revegetate such unplanned failure areas to any standard, nor to monitor the success of any response for any length of time. This has been identified as an observation and opportunity for improvement. <p>The response was discussed in the AR FY15 as ‘planting occurred’ at the site and discussed characteristics of the revegetation including that the agreed final land use is native bushland (p74). The AR FY15 commits that future ARs will monitor and report on the success of the revegetation (p75), however this is not mentioned in subsequent ARs FY16 or FY17. The Environment Supervisor confirmed the ‘Dendrobium Tunnel Sinkhole Rehabilitation Project’ occurred outside the Metropolitan Special Area, therefore the SCA did not need to approve activities or plans. Rehabilitation is now completed and the site is now self-sustaining and no longer requiring monitoring as is reported in the Mine Operations Plan FY16-FY22.</p>	O	<p>LMP rehabilitation sections could be improved with a section guiding responses to unplanned land surface failures, including the initial rehabilitation actions, general guidelines for proposed eventual outcomes and processes following to confirm the rehabilitation success over time.</p>
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			Land rehabilitation for exploration drilling pads and tracks are considered under the approval requirements for exploration (separate Reviews of Environmental Factors (REFs) for WaterNSW (formerly Sydney Catchment Authority (SCA)). Notwithstanding that, field observation of those recently rehabilitated areas above Area 3B identified natural vegetation recolonisation, timber and woody debris spread across pad and no visible erosion.		
Landscape Management Plan					
19.	The Applicant shall prepare and implement a Landscape Management Plan for the surface facilities to the satisfaction of the Secretary and the DRE. This plan must: (a) be submitted for approval by 30 April 2009; (b) be prepared by suitably qualified expert/s whose appointment/s have been endorsed by the Secretary; (c) be prepared in consultation with OEH DECC and SCA; and (d) include a: Rehabilitation Management Plan; and Mine Closure Plan.	Dendrobium Mine Landscape Management Plan (BHP Billiton 2014) (the LMP) Department of Trade and Investment (DTI) (Resources and Energy) Letter to BHP Billiton Illawarra Coal (20 May 2014) (ref: OUT14/14335) AEMR FY15 AR FY16, FY17	DTI Letter to BHPB IC (20 May 2014) confirms Secretary acceptance of the content of the Dendrobium Mine Landscape Management Plan. Landscape monitoring and rehabilitation and summary of rehabilitation is reported in the Annual Reviews. The LMP was reviewed and the following found: a) date predates this audit period. b) Qualifications of the LMP expert person and their approval status by the Secretary is not stated and therefore can't be verified, however it is noted that the plan is accepted by the Secretary (DTI Letter to BHPB IC (20 May 2014)). c) Review History (p2) states that consultation was undertaken with the NSW Government Agencies: Department of Industry and Investment, Sydney Catchment Authority and the Department of Environment, Climate Change and Water. d) includes a rehabilitation management plan (section 5) and a mine closure plan (section 6).	C	
<i>Note: The Mine Closure Plan may be submitted at a date agreed by the Secretary, provided that this date is at least 2 years prior to the planned cessation of mining at the site.</i>					
Rehabilitation Management Plan					
20.	The Rehabilitation Management Plan must include: (a) the rehabilitation objectives for the surface facilities sites; (b) a general description of the short, medium and long term measures that would be implemented to rehabilitate these sites; (c) performance and completion criteria for the rehabilitation of these sites; (d) a description of how the performance of the rehabilitation works would be monitored over time to achieve the stated objectives and against the relevant performance and completion criteria;	Dendrobium Mine Landscape Management Plan (BHP Billiton 2014) (the LMP). Dendrobium Mine and Cordeaux Colliery: Closure Plan (South32 January 2017) [internal working draft report]	The rehabilitation management plan is contained as element 5 of the LMP. This element 5 is split into five surface facilities areas. a) although not stated specifically under any 'objectives' subheading each of the five surface facilities sections contains statements amounting to objectives under	C	

	<p>(e) any measures necessary to ensure that abandoned mine workings do not impact on stored waters or dams; and</p> <p>(f) details of who is responsible for monitoring, reviewing and implementing the plan.</p>		<p>subsections described as 'long term rehabilitation measures'. Objects are clearly stated in the draft Closure Plan.</p> <p>b) subheadings for the short, medium and long term rehabilitation measures are present for each of the five surface facilities areas, however all contain statement that as the facilities are required for ongoing operation there are no such measures.</p> <p>c) similar to b) above, headings are presented for performance measures and some measures are suggested however also states that none have been agreed upon as the sites are operational and there is no foreseen rehabilitation required.</p> <p>d) monitoring requirements are stated.</p> <p>e) No specific reference to water management post mining in the LMP, but this is detailed in the draft Closure Plan. Reference is made that all contaminated material will be removed from the site.</p> <p>f) contained in section 3.</p> <p>The plan does not include any detail of rehabilitation of unplanned land surface failures (refer condition 18 above), however this is considered in the draft Closure Plan.</p>		
Mine Closure Plan					
21.	<p>The Mine Closure Plan must:</p> <p>(a) be prepared in consultation with the affected councils and CCC;</p> <p>(b) define the objectives and criteria for mine closure;</p> <p>(c) investigate options for the future use of the surface facilities sites;</p> <p>(d) include the proposed management and use of any heritage-listed buildings;</p> <p>(e) investigate ways to minimise the adverse socio-economic effects associated with mine closure, including reduction in local and regional employment;</p> <p>(f) describe the measures that would be implemented to minimise or manage the on-going environmental effects of the development; and</p> <p>(g) describe how the performance of these measures would be monitored over time.</p>	<p>Dendrobium Mine and Cordeaux Colliery: Closure Plan (South32 January 2017) [internal working draft report]</p>	<p>A Mine Closure Plan exists as an internal working document which was provided for audit purposes. The closure plan covers Dendrobium operations comprising surface footprints. Regarding compliance:</p> <p>(a) section 4.2 details consultation which includes Wollongong City Council and the CCC.</p> <p>(b) objectives contained in section 5.2 and 5.3, closure criteria in section 5.4 and are "high level" with more detailed criteria to be developed over time.</p> <p>(c) not contained in detail. Section 8.7 states that future use of surface facilities are being considered and will be developed as the draft document is progressed.</p> <p>(d) section 6.11 describes baseline knowledge. Section 8.7.2 states that heritage considerations will be developed over time.</p>	C	As above

			<p>(e) not fully detailed. Section 6.10 describes socio-economic knowledge of the site. Sections 8.5 & 8.6 states that detailed socio-economic planning is being progressed.</p> <p>(f) section 10 describes ongoing management and maintenance and describes that detailed planning is in progress.</p> <p>(g) section 10.2 states that monitoring will occur but to be developed in future closure planning.</p>		
Bushfire Management Plan					
22.	The Applicant shall prepare and implement a Bushfire Management Plan for the site, with particular reference to the mining area, in consultation with SCA and to the satisfaction of the Rural Fire Service.	<p>Illawarra Coal: Environmental Management System – Dendrobium Mine: Bush Fire Management Plan (BHP Billiton 2012)</p> <p>Interview – Environment Superintendent</p>	<p>The plan contains a review history (p2) stating that it was prepared in consultation with the Rural Fire Service and Sydney Catchment Authority.</p> <p>Asset protection clearing has occurred in the audit period around Ventilation Shaft No. 2&3 and was observed in the field during the audit site visit.</p> <p>The ARs from the audit period contain reporting of bushfire management actions:</p> <ul style="list-style-type: none"> - AEMRR FY15 p49 - AR FY16 section 6.13 - AR FY17 section 6.13 <p>These include maintaining asset protection zones and maintaining fire trails consistent with the plan.</p> <p>In interview, the Environment Supervisor stated that the RFS satisfaction is implicit in that South32/BHPB-IC have not received any infringement notices.</p>	C	
TRANSPORT					
Rail Transport of Coal					
23.	The Applicant shall ensure that trains do not travel on the Kemira Valley rail line: (a) between 12 midnight and 6 am, until 29 April 2010; and (b) between 11 pm and 6 am, from 30 April 2010 unless written approval is obtained from EPA DECC for emergency use of the rail line.	2014 Noise Management Plan	<p>Appropriate curfew times are addresses in the 2014 Noise Management Plan.</p> <p>The auditor discussed operational times with the train load out operators. They were aware of the requisite operational times and the necessary cut-off times for trains leaving Port Kembla to ensure compliance with curfew.</p> <p>No breaches of curfew were reported during the audit period.</p>	C	

24.	The Applicant shall record the: (a) date and time of each train movement on the Kemira Valley rail line; and (b) amount of coal transported from the KVCLF each year and include a comprehensive summary and discussion of the results of this monitoring in each AEMR.	AEMR FY15 AR FY16, 17 Sample of Pacific Nation – Train Running Report – Illawarra Coal (Daily Flight Sheets)	Date and time records of each train movement are recorded in Daily Flight Sheets. FY15: 2,603 trains loaded 4,329,219 tonnes of ROM coal transported FY16: 2,689 trains loaded 4,444,961 tonnes of ROM coal transported FY17: 2,836 trains loaded 4,733,241 tonnes of ROM coal transported	C	
Road Transport					
25.	The Applicant shall prepare and implement a Traffic Management Plan for the development to the satisfaction of the Secretary. This plan must: (a) be submitted to the Secretary for approval by 30 April 2009; (b) be prepared in consultation with the WCC, Mt Kembla Primary School and the CCC; (c) include traffic control measures for truck movements through residential areas, including Stones Road and its intersection with Cordeaux Road; (d) provide that mine shift changeover times and deliveries by heavy vehicle to the pit top facilities and KVCLF do not conflict with pick-up and drop-off times for Mt Kembla Primary School students; (e) provide heavy vehicle speed limits; (f) include a Driver's Code of Conduct to be applied to the Applicant's employees and contractors working at the development and measures for the enforcement of this code; and (g) include procedures for regular monitoring of compliance with this plan.	2014 Traffic Management Plan Interview – Environmental Superintendent, Pit Top and KVLF operations personnel.	The approved 2014 Traffic Management Plan adequately addresses the requirements of this condition. Mine shift changeover times and delivery times were confirmed to be understood in effect at the pit top facilities and KVCLF in accordance with the Traffic Management Plan. Some isolated complaints were received in relation to personnel behaviour during the audit period. The auditor was advised that these were investigated and dealt with in accordance with the TMP.	O	Ensure ongoing promotion and enforcement of the Driver's Code of Conduct to the workforce.
Road Maintenance					
26.	The Applicant shall enter into an agreement with SCA, to the satisfaction of the Secretary, to share the reasonable costs of maintenance of all access roads, bridges and creek crossings located on land controlled by SCA and used by the Applicant.	2014 Traffic Management Plan	The TMP addresses requirements to share reasonable costs.	C	
27.	The Applicant shall establish an agreement with WCC to share the reasonable costs of maintenance of Stones Road for the life of the development. Prior to decommissioning of the mine, Stones Road must be inspected, to the satisfaction of WCC, and the road restored by the Applicant to a standard not less than its condition prior to the development's approval. If roadworks are not carried out by the Applicant within one month of being informed by WCC that these works are required under the maintenance agreement, WCC shall be entitled to carry out such maintenance work at the Applicant's cost. Any dispute over implementation of this condition is to be referred to the Secretary for resolution.	2014 IEA	The TMP addresses requirements to maintain Stones Road in accordance with this condition. Agreement with WCC was verified in the previous IEA.	C	
VISUAL					
Visual Amenity					
28.	The Applicant shall minimise the visual impacts of the surface facilities to the satisfaction of the Secretary.	AEMR FY15 AR FY16, 17	Refer below	C	
Lighting Emissions					
29.	The Applicant shall:	AEMR FY15 AR FY16, 17	Visual amenity and stray light impacts are addressed in the AEMR / AR. Stray light	C	

	<p>(a) ensure that all external lighting associated with the surface facilities complies with Australian Standard AS4282 (INT) 1995 – Control of Obtrusive Effects of Outdoor Lighting;</p> <p>(b) take all practicable measures to mitigate off-site lighting impacts from the surface facilities;</p> <p>(c) ensure that light emitted from headlights of locomotives operating on the Kemira Valley rail line are screened from residences; and</p> <p>(d) report on the effectiveness of lighting emission controls in the AEMR to the satisfaction of the Secretary.</p>		<p>is monitored quarterly. Night time noise monitoring is also used as an opportunity to identify any stray light.</p> <p>Visual amenity and lighting is reported to not have been raised as a community issue during the audit period.</p> <p>No complaints have been received in relation to lighting emissions.</p>		
WASTE					
30.	<p>The Applicant shall:</p> <p>(a) monitor the amount of waste generated by the development;</p> <p>(b) investigate ways to reuse, recycle, or minimise this waste;</p> <p>(c) implement reasonable and feasible measures to minimise this waste; and</p> <p>(d) report on waste management and minimisation in the AEMR to the satisfaction of the Secretary.</p>	<p>AEMR FY15 AR FY16, 17</p> <p>Big Picture – Waste and Recycling Report – Illawarra Coal Monthly Report for June 2017 (Cleanaway), including Waste Transport Certificates.</p>	<p>The site actively undertakes waste segregation into general waste, recyclables/reusable and regulated waste streams. Such waste materials are removed from site by licenced operators. The auditor sighted a sample of waste tracking documents (Cleanaway).</p> <p>Appropriately signed and/or colour coded waste storage bins and receptacles were observed at site.</p> <p>The Mine reports on the performance of its waste management strategies in the AEMR / AR.</p> <p>The site undertook trial and is now approved for beneficial reuse of coal washings in road base and engineered fill.</p>	C	
SCHEDULE 5 – SPECIFIC ENVIRONMENTAL CONDITIONS – OTHER SITE COMPONENTS					
COAL WASHERY					
Hot Gas Exhaust Stack Discharges					
1.	<p>The Applicant shall:</p> <p>(a) ensure that the concentration of pollutants discharged from the coal dryer hot gas exhaust complies with discharge limits set for the development in any EPL;</p> <p>(b) regularly monitor the concentration of pollutants discharged from the coal dryer hot gas exhaust;</p> <p>and</p> <p>(c) report on waste management and minimisation in the AEMR to the satisfaction of the Secretary.</p>	<p>Interview – Environmental Superintendent</p>	<p>The coal dryer was not fully commissioned and has never been in service.</p>	NT	
Fuel Source					
2.	<p>The Applicant shall ensure the coal drying plant only uses blast furnace offgas or natural gas as fuel for the drier.</p>	<p>Interview – Environmental Superintendent</p>	<p>See above</p>	NA	
WEST CLIFF COAL WASH EMPLACEMENT - addressed in the Bulli Seam Operation Annual Environmental Management Report					
Coal Washery Reject					

3.	The Applicant shall: (a) monitor the amount of coal washery reject emplaced in the West Cliff Coal Wash Emplacement; (b) investigate ways to reduce emplacement of coal washery reject at West Cliff, including beneficial use or improved disposal options; and (c) report on these matters in the West Cliff AEMR to the satisfaction of the Secretary.	Interview - Environment Superintendent	The Environment Superintendent confirmed this condition is no longer considered relevant to the Dendrobium operation and is now part of the Bulli Seam Operation approval.	NA	
Pollution Reduction Program					
4.	The Applicant shall develop with EPA DECC a new Pollution Reduction Program (PRP) to be incorporated into the West Cliff Colliery's EPL. Subject to the satisfaction of the EPA DECC , the PRP shall: (a) include investigation, trial and implementation of appropriate strategies, technologies or works to achieve agreed water quality discharge criteria for licensed discharges from the West Cliff Colliery site with particular reference to salinity; and (b) cover a period of not less than five years.	Interview - Environment Superintendent	As above	NA	
Water Quality Monitoring Program					
5.	The Applicant shall review its water quality monitoring program for the West Cliff Mine in consultation with DECC and NOW DWE and to the satisfaction of the Secretary.	Interview - Environment Superintendent	As above	NA	
Brennans Creek Diversion Bypass Rehabilitation Plan					
6.	The Applicant shall, by 30 June 2009, develop a Brennans Creek Diversion Bypass Rehabilitation Plan in consultation with OEH DECC , NOW DWE and DRE and to the satisfaction of the Secretary.	Interview - Environment Superintendent	As above	NA	
General Management of the Emplacement					
7.	Subject to condition 2 of schedule 2 and conditions 3- 6 above, the Applicant shall monitor and manage the West Cliff Coal Wash Emplacement as part of the Environmental Management Plan for the West Cliff Mine. Monitoring and management of the Emplacement shall be reported within the West Cliff AEMR, rather than the AEMR for this development.	Interview - Environment Superintendent	As above	NA	
8.	All references in this consent (including conditions 3 – 7 of this schedule and Appendix 3) that have direct application to the West Cliff Coal Wash Emplacement shall cease to have force and effect subsequent to the grant of any project approval under Part 3A of the Environmental Planning & Assessment Act 1979 which includes the West Cliff Colliery and the West Cliff Coal Wash Emplacement Area.	Interview - Environment Superintendent	As above	NA	
SCHEDULE 6 – SPECIFIC ENVIRONMENTAL CONDITIONS – EXTENDED SITE					
GREENHOUSE GASES & ENERGY EFFICIENCY					
1.	The Applicant shall prepare and implement a Greenhouse and Energy Efficiency Plan for the development. This plan must: (a) be prepared in consultation with EPA DECC and generally in accordance with the Guidelines for Energy Savings Action Plans (DEUS 2005, or its latest version); (b) be submitted to the Secretary by 30 April 2009 for approval; (c) include a program to monitor greenhouse gas emissions and energy use generated by the development; (d) include a framework for investigating and implementing measures to reduce greenhouse gas emissions and energy use at the development; (e) include a research program to inform the continuous improvement of the greenhouse gas minimisation measures at the development;	2013 Greenhouse and Energy Efficiency Plan AEMR FY15, AR FY16, FY17	The approved Greenhouse and Energy Efficiency Plan was prepared in consultation with the EPA in 2009 and has been updated in 2013. The Plan adequately addresses the requirements of this condition. The greenhouse gas emissions and mitigation measures for ventilation shafts are reported in the Annual Reviews.	C	

	(f) describe how the performance of these measures would be monitored over time; and (g) report on the development's greenhouse gas emissions and minimisation measures in the AEMR to the satisfaction of the Secretary.				
<i>Note: The Applicant may consider the Dendrobium Mine's greenhouse gas minimisation measures within its overall greenhouse gas minimisation measures across its Southern Coalfield mines and related operations.</i>					
2.	The Applicant shall implement all reasonable and feasible measures to minimise the greenhouse gas emissions from the development to the satisfaction of the Secretary.	As above	As above	NV	As above
SCHEDULE 7 - ADDITIONAL PROCEDURES FOR AIR QUALITY AND NOISE MANAGEMENT					
NOTIFICATION OF LANDOWNERS					
1.	If the results of monitoring required in Schedule 4 identify that the impacts generated by the development are greater than the relevant impact assessment criteria in Schedule 4, except where this is predicted in the documents listed in Condition 2 of Schedule 2 or where a negotiated agreement has been entered into in relation to that impact, then the Applicant shall notify the Secretary and the affected landowners and/or existing or future tenants (including tenants of mine-owned properties) accordingly, and provide quarterly monitoring results to each of these parties until the results show that the development is complying with the criteria in Schedule 4.	Interview - Environment Supervisor	The auditor was advised no agreements have been entered into.	NT	
INDEPENDENT REVIEW					
2.	If a landowner considers the development to be exceeding the impact assessment criteria in schedule 4, except where this is predicted in the EA, then he/she may ask the Secretary in writing for an independent review of the impacts of the development on his/her land. If the Secretary is satisfied that an independent review is warranted, the Applicant shall within 2 months of the Secretary's decision: (a) consult with the landowner to determine his/her concerns; (b) commission a suitably qualified, experienced and independent person, whose appointment has been approved by the Secretary, to conduct monitoring on the land, to: determine whether the development is complying with the relevant impact assessment criteria in schedule 4; and identify the source(s) and scale of any impact on the land, and the development's contribution to this impact; and (c) give the Secretary and landowner a copy of the independent review.	Interview - Environment Supervisor	The Auditor was advised that no requests for independent review made during the audit period.	NT	
3.	If the independent review determines that the development is complying with the relevant impact assessment criteria in schedule 4, then the Applicant may discontinue the independent review with the approval of the Secretary. If the landowner disputes the results of the independent review then either the Applicant or the landowner may refer the matter to the Secretary for resolution.	Interview - Environment Supervisor	As above	NT	
4.	If the independent review determines that the development is not complying with the relevant impact assessment criteria in Schedule 4, and that the development is primarily responsible for this non-compliance, then the Applicant shall: (a) take all reasonable and feasible measures, in consultation with the landowner, to ensure that the development complies with the relevant criteria and conduct further monitoring to determine whether these measures ensure compliance; or (b) secure a written agreement with the landowner to allow exceedances of the relevant criteria; or (c) offer to acquire all or part of the landowner's land in accordance with the procedures in conditions 6-8 below to the satisfaction of the Secretary.	Interview - Environment Supervisor	As above	NT	

5.	<p>If further monitoring under condition 4(a) determines that the development is complying with the relevant impact assessment criteria, then the Applicant may discontinue the independent review with the approval of the Secretary.</p> <p>If further monitoring under condition 4(a) determines that measures implemented under that condition have not achieved compliance with the impact assessment criteria in schedule 4, and the Applicant cannot secure a written agreement with the landowner under condition 4(b) to allow these exceedances, then the Applicant shall, upon receiving a written request from the landowner, acquire all or part of the landowner's land in accordance with the procedures in conditions 6-8 below.</p>	Interview - Environment Supervisor	As above	NT	
LAND ACQUISITION					
6.	<p>Within 3 months of receiving a written request from a landowner with acquisition rights, the Applicant shall make a binding written offer to the landowner based on:</p> <p>(a) the current market value of the landowner's interest in the property at the date of this written request, as if the property was unaffected by the development the subject of the development application, having regard to the:</p> <ul style="list-style-type: none"> - existing and permissible use of the land, in accordance with the applicable planning instruments at the date of the written request; and - presence of improvements on the property and/or any approved building or structure which has been physically commenced at the date of the landowner's written request, and is due to be completed subsequent to that date, but excluding any improvements that have resulted from the implementation of the 'additional noise mitigation measures' in condition 6 of schedule 4; <p>(b) the reasonable costs associated with:</p> <ul style="list-style-type: none"> - relocating within the local government areas of the affected Councils, or to any other local government area determined by the Secretary; - obtaining legal advice and expert advice for determining the acquisition price of the land, and the terms upon which it is required; and <p>(c) reasonable compensation for any disturbance caused by the land acquisition process.</p> <p>If, within 28 days of the Applicant making this offer, the Applicant and landowner cannot agree on the acquisition price of the land and/or the terms upon which the land is to be acquired, then either party may refer the matter to the Secretary for resolution.</p> <p>Upon receiving such a referral, the Secretary shall request the President of the NSW Division of the Australian Property Institute (the API) to appoint a qualified independent valuer to:</p> <ul style="list-style-type: none"> - consider submissions from both parties; - establish a fair market valuation for the land and determine reasonable costs and compensation for the acquisition, in accordance with paragraphs (a)-(c) above and any guidance or guidelines that the Secretary may prepare relating to this condition; and propose any appropriate fair and reasonable terms of acquisition. <p>The appointed valuer is to provide a full report and explanation of their valuation, determinations and proposed terms of acquisition to the Secretary, the Applicant and the landowner. The Secretary shall consider the report and decide whether the valuation, determinations and any proposed terms of acquisition are fair and reasonable and advise the parties accordingly.</p> <p>Within 14 days of receiving the Secretary's decision that the independent valuer's report is fair and reasonable, the Applicant shall make a written offer to purchase the</p>	Interview - Environment Supervisor	No requests for land acquisition during the audit period.	NT	

	land at a price and according to terms not less than set out in the independent valuer's report. If the Secretary is of the opinion that the valuation and/or determination is not fair and/or reasonable, they shall give notice to the parties that a further independent valuation and determination will be undertaken in accordance with this condition and duly request a further appointment by the API. If the landowner refuses to accept within 6 months a written offer duly made by the Applicant under this condition, then the Applicant's obligations to acquire the land shall cease, unless otherwise agreed by the Secretary.				
7.	The Applicant shall bear the full costs of any independent valuer's valuation, determination and report.	As above	As above	NT	
8.	If the Applicant and landowner agree that only part of the land shall be acquired, then the Applicant shall pay all reasonable costs associated with obtaining Council approval for any plan of subdivision (where permissible), and registration of the plan at the Office of the Registrar-General.	As above	As above	NT	
SCHEDULE 8 - ENVIRONMENTAL MANAGEMENT, MONITORING, AUDITING AND REPORTING					
ENVIRONMENTAL MANAGEMENT STRATEGY					
1.	The Applicant shall prepare and implement an Environmental Management Strategy for the development to the satisfaction of the Secretary. This strategy must be submitted to the Secretary for approval by 30 April 2009, and: (a) provide the strategic framework for environmental management of the development; (b) identify the statutory requirements that apply to the development; (c) describe in general how the environmental performance of the development would be monitored and managed for the: - mining area; - surface facilities; - other site components; and extended site; (d) describe the procedures that would be implemented to: - keep the local community and relevant agencies informed about the operation and environmental performance of the development; - receive, handle, respond to, and record complaints; - resolve any disputes that may arise during the course of the development; - respond to any non-compliance; manage cumulative impacts; and respond to emergencies; and (e) describe the role, responsibility, authority and accountability of all key personnel involved in the environmental management of the development.	EMS (ID: ENMP0039) Original doc dated Feb 2005 and has been updated three times (Apr 2009, Mar 2012, Oct 2017)	The approved EMS adequately addresses the requirements of this condition and is being implemented by DMD.	C	
ENVIRONMENTAL MONITORING PROGRAM					
2.	The Applicant shall prepare and implement Environmental Monitoring Programs for the: (a) mining area; and (b) surface facilities to the satisfaction of the Secretary. These programs must consolidate the various monitoring requirements in Schedules 3-6 of this consent into single documents, include plans showing the monitoring sites and be submitted to the Secretary by 30 April 2009.	South32 website	The Environmental Monitoring Programs are provided in the aspect specific management plans that are available on the South32 website.	C	
REPORTING					
Incident Reporting					

3.	Within 24 hours of detecting the occurrence of an incident that causes (or may cause) material harm to the environment, the Applicant shall notify the Department and other relevant agencies of the incident.	Interview - Environment Superintendent	No requirement for notification during the audit period.	NT	
4.	Within 21 days of notifying the Department and other relevant agencies of such an incident, the Applicant shall provide the Department and these agencies with a written report that: (a) describes the date, time, and nature of the incident; (b) identifies the cause (or likely cause) of the incident; (c) describes what action has been taken to date; and (d) describes the proposed measures to address the incident.		As above	NT	
Annual Reporting					
5.	By the end of September each year, and for at least 3 years following the cessation of mining at the development, the Applicant shall submit an AEMR to the Secretary, CCC and all relevant agencies. This report must relate to the previous financial year and: (a) identify the standards and performance measures that apply to the development; (b) describe the works carried out in the previous financial year; (c) describe the works that would be carried out in the current financial year; (d) include a summary of the complaints received during the past year, and compare this to the complaints received in previous years; (e) include a summary of the monitoring results for the development during the past year; (f) include an analysis of these monitoring results against the relevant: impact assessment criteria/limits; monitoring results from previous years; and predictions in the EIS, EA or other documents listed in condition 2 of schedule 4; (g) identify and discuss all exceedances of consent and licence conditions and other applicable standards and performance measures; (h) identify any trends in the monitoring results over the life of the development; (i) identify any non-compliance during the previous year; and (j) describe what actions were, or are being, taken to ensure compliance.	AEMR FY15 AR FY16, FY17	AEMR (or Annual Report) submitted/available for reporting period FY15, FY16 and FY17. The reports adequately address the requirements of this condition.	C	
INDEPENDENT ENVIRONMENTAL AUDIT					
6.	By 31 December 2011, and every 3 years thereafter, unless the Secretary directs otherwise, the Applicant shall commission and pay the full cost of an Independent Environmental Audit of the development. This audit must: (a) be conducted by suitably qualified, experienced and independent team of experts whose appointment has been endorsed by the Secretary; (b) include consultation with the relevant agencies; (c) assess the environmental performance of the development and assess whether it is complying with the relevant requirements in this approval and any relevant EPL or mining lease (including any strategy, plan or program required under these approvals); (d) review the adequacy of strategies, plans or programs required under these approvals; and, if appropriate, (e) recommend measures or actions to improve the environmental performance of the development, and/or any strategy, plan or program required under these approvals.	2014 IEA 2011 IEA	Independent Audits have been conducted as required by this condition.	C	
<i>Note: This audit team must be led by a suitably qualified auditor and include experts in the fields of a) mine subsidence impacts and remediation and b) stream hydrology and water quality.</i>					
7.	Within 6 weeks of the completing of this audit, or as otherwise agreed by the Secretary, the Applicant shall submit a copy of the audit report to the Secretary, together with its response to any recommendations contained in the audit report.	As above	Response and Action Plans prepared and submitted for previous two audits.	C	

8.	Within 3 months of submitting the audit report to the Secretary, the Applicant shall review, and if necessary revise the strategies/plans/programs required under this consent to the satisfaction of the Secretary.	Management Plans as required by this approval.	Management Plans were updated in 2014 with a summary of what updates were required out of the 2014 IEA.	C	
COMMUNITY CONSULTATIVE COMMITTEE					
9.	The Applicant shall maintain a Community Consultative Committee (CCC) for the development to the satisfaction of the Secretary. This CCC must be operated in general accordance with the Guidelines for Establishing and Operating Community Consultative Committees for Mining Projects (Department of Planning, 2007, or its latest version) to the satisfaction of the Secretary.	AEMR FY15, AR FY16, FY17 Interview – Environmental Superintendent	The Dendrobium Community Enhancement Program (DCEP) was developed in 2002 to facilitate funding for community projects.	C	
<i>Note: The CCC is an advisory committee. The Department and other relevant agencies are responsible for ensuring that the Applicant complies with this consent. In accordance with the Guideline, the Committee should comprise an independent chair and appropriate representation from the Applicant, affected councils, recognised environmental groups and the general community in Mt Kembla and the area of the development.</i>					
10.	If required by the CCC, the Applicant shall establish and maintain a trust fund, or other funding arrangement that may be agreed between the Applicant and the CCC. This fund shall be: (a) managed by the Chair of the CCC to facilitate the functioning of the CCC; (b) used only if required for the engagement of consultants to interpret technical information and the like; (c) provided with \$8,000 per annum (indexed according to the CPI) by the Applicant for the duration of mining operations and other activities under the consent, or as otherwise directed by the Secretary; (d) managed so that any monies unspent during each year are returned to the Applicant; (e) managed so that the Chair of the CCC causes a record of the finances of the fund to be kept and provided to the Applicant and the Secretary at the end of each year the fund is used.	Interview - Environment Supervisor IEA 2014	Since inception, Illawarra Coal has contributed over \$1.4 million to the fund.	C	
ACCESS TO INFORMATION					
11.	Within 3 months of the approval of any strategy/plan/ program required under this consent (or any subsequent revision of these strategies/plans/ programs), or the completion of the audits or AEMRs required under this consent, the Applicant shall: (a) provide a copy of the relevant document/s to the relevant agencies and CCC; and (b) put a copy of the relevant document/s on its website.	South32 Website	Dendrobium mine relevant strategies/plans/programs are publically available on website. The Environmental Monitoring Programs as required by Schedule 8, Condition 2 are provided in the aspect specific management plans.	C	
12.	From 30 April 2009, and thereafter during the development, the Applicant shall: (a) provide a copy of this consent as may be modified from time to time on its website; (b) provide a comprehensive, running summary of monitoring results required under this consent on its website; and (c) update these results on a regular basis (at least every three months).	Website	The South32 website contains the requisite information required by this condition.	C	

Table A.2:

Compliance with EPL_3241

Table A.2 POEO EPL_3241 Compliance Table

No	Assessment Requirement	Reference/ Evidence	Comments	Compliance Status	Recommendations									
1 Administrative Conditions														
A1. What the licence authorises and regulates														
A1.1	<p>This licence authorises the carrying out of the scheduled activities listed below at the premises specified in A2. The activities are listed according to their scheduled activity classification, fee-based activity classification and the scale of the operation.</p> <p>Unless otherwise further restricted by a condition of this licence, the scale at which the activity is carried out must not exceed the maximum scale specified in this condition</p> <table border="1"> <thead> <tr> <th>Scheduled Activity</th> <th>Fee Based Activity</th> <th>Scale</th> </tr> </thead> <tbody> <tr> <td>Coal Works</td> <td>Coal works</td> <td>> 2000000 - 5000000 T handled</td> </tr> <tr> <td>Mining for coal</td> <td>Mining for coal</td> <td>> 3500000 - 5000000 T produced</td> </tr> </tbody> </table>	Scheduled Activity	Fee Based Activity	Scale	Coal Works	Coal works	> 2000000 - 5000000 T handled	Mining for coal	Mining for coal	> 3500000 - 5000000 T produced	Annual Environmental Management Report (AEMR) FY15, Annual Review (AR) FY16, FY17	<p>Reporting states that works do not exceed the maximum scale specified.</p> <p>Handled: FY14: 3.84 million tonnes FY15: 4.39 million tonnes FY16: 4.42 million tonnes FY17: 4.57 million tonnes</p> <p>Produced: FY14: 3.00 million tonnes FY15: 3.26 million tonnes FY16: 3.26 million tonnes FY17: 3.36 million tonnes</p>	C	
Scheduled Activity	Fee Based Activity	Scale												
Coal Works	Coal works	> 2000000 - 5000000 T handled												
Mining for coal	Mining for coal	> 3500000 - 5000000 T produced												
A1.3	Not applicable													
A2. Premises or plant to which the licence applies														
A2.1	<p>The licence applies to the following premises:</p> <ul style="list-style-type: none"> - DENDROBIUM MINE, CORDEAUX ROAD, MOUNT KEMBLA, NSW, 2526 <p>SEE PREMISES DETAILS LISTED BELOW (MAP RECEIVED 12/12/01)</p>	Note	Noted	C										

No	Assessment Requirement	Reference/ Evidence	Comments	Compliance Status	Recommendations																																																																																																									
A2.2	<p>Premises details:</p> <table border="1"> <thead> <tr> <th colspan="3">Dendrobium Mine Pit Top Facilities (Ex Nebo Mine Pit Top)</th> </tr> </thead> <tbody> <tr><td>1</td><td>Pt Portion 4</td><td>DP 751278</td></tr> <tr><td>2</td><td>Pt Portion 160</td><td>DP 606150</td></tr> <tr><td>3</td><td>Pt Portion 161</td><td>DP 751278</td></tr> <tr><td>4</td><td>Pt Portion 74</td><td>DP 751278</td></tr> <tr> <th colspan="3">Above Ground Coal Conveyor Portal to Kemira Valley Coal Loading</th> </tr> <tr><td>5</td><td>Pt Portion 152</td><td>DP 751278</td></tr> <tr><td>6</td><td>Portion 136</td><td>DP 751278</td></tr> <tr><td>7</td><td>Portion 137</td><td>DP 751278</td></tr> <tr> <th colspan="3">Kemira Valley Coal Loading Facilities</th> </tr> <tr><td>8</td><td>Portion 114</td><td>DP 751278</td></tr> <tr><td>9</td><td>Portion 115</td><td>DP 751278</td></tr> <tr><td>10</td><td>Portion 116</td><td>DP 751278</td></tr> <tr><td>11</td><td>Lot 102</td><td data-bbox="700 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Lease 768 as set out in Plan D referred to in that Lease and a copy of which is held by DECCW; and</p> <p>(b) for which all necessary consents or approvals for mining for coal have been obtained (including any consent or approval required under the Environmental Planning and Assessment Act 1979).</p>	Dendrobium Mine Pit Top Facilities (Ex Nebo Mine Pit Top)			1	Pt Portion 4	DP 751278	2	Pt Portion 160	DP 606150	3	Pt Portion 161	DP 751278	4	Pt Portion 74	DP 751278	Above Ground Coal Conveyor Portal to Kemira Valley Coal Loading			5	Pt Portion 152	DP 751278	6	Portion 136	DP 751278	7	Portion 137	DP 751278	Kemira Valley Coal Loading Facilities			8	Portion 114	DP 751278	9	Portion 115	DP 751278	10	Portion 116	DP 751278	11	Lot 102	DP 602229	No 1 Vent Shaft			12	Portion 169	DP 751278	O'Briens Drift (top of escarpment facilities)			13	Portion 109	DP 751278 (ML 20)	Windy Gully Lagoon Site			14	Pt Portion 172	DP 751278	Allan's Creek Pipeline			15	Lot 1	DP606431	Kemira Valley Rail Line			16	Lot 1	DP157009		Lot 1	DP156521		Lot 102	DP602229		Lot1	DP203034		Lot 2	DP280744		Lot 6	DP867936		Lot 3	DP203034		Lot 2	DP208440		Lot 70	DP432516		Lot 4	DP203034	Number 2 and 3 Shaft Sites			17	Lot 1	DP 830607			Noted	
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A3. Information supplied to the EPA																																																																																																														

No	Assessment Requirement	Reference/ Evidence	Comments	Compliance Status	Recommendations
A3.1	Works and activities must be carried out in accordance with the proposal contained in the licence application, except as expressly provided by a condition of this licence. In this condition the reference to "the licence application" includes a reference to: a) the applications for any licences (including former pollution control approvals) which this licence replaces under the Protection of the Environment Operations (Savings and Transitional) Regulation 1998; and b) the licence information form provided by the licensee to the EPA to assist the EPA in connection with the issuing of this licence.	Note	Noted	C	

2. Discharges to Air and Water and Applications to Land

P1. Location of monitoring/discharge points and areas

P1.1	<p>The following points referred to in the table below are identified in this licence for the purposes of monitoring and/or the setting of limits for the emission of pollutants to the air from the point.</p> <p>Air</p> <table border="1"> <thead> <tr> <th>EPA ID No.</th> <th>Type of monitoring point</th> <th>Type of Discharge point</th> <th>Location description</th> </tr> </thead> <tbody> <tr> <td>6</td> <td>Dust Monitoring</td> <td>-</td> <td>Dust gauge located at Figtree Farm, O'Briens Road Figtree, labelled as "Point 6" in the map titled "Figure 1 - Air Quality Monitoring Sites" submitted to the EPA on 15/9/09.</td> </tr> <tr> <td>9</td> <td>Dust Monitoring</td> <td>-</td> <td>Dust gauge located at Mt Kembla Primary School labelled as "Point 9" in the map titled "Figure 1 - Air Quality Monitoring Sites" submitted to the EPA on 15/9/09.</td> </tr> <tr> <td>13</td> <td>Dust Monitoring</td> <td>-</td> <td>Dust gauge located at Dendrobium Colliery Surface, labelled as "Point 13" in the map titled "Figure 1 - Air Quality Monitoring Sites" submitted to the EPA on 15/9/09.</td> </tr> <tr> <td>17</td> <td>Dust Monitoring</td> <td>-</td> <td>Dust gauge located at 206 Cordeaux Road, Mt Kembla, labelled as "Point 17" in the map titled "Figure 1 - Air Quality Monitoring Sites" submitted to the EPA on 15/9/09.</td> </tr> <tr> <td>18</td> <td>Dust Monitoring</td> <td>-</td> <td>Dust gauge located at Kemira Valley Coal Loading Facility at the bins, labelled as "Point 18" in the map titled "Figure 1 - Air Quality Monitoring Sites"</td> </tr> </tbody> </table>	EPA ID No.	Type of monitoring point	Type of Discharge point	Location description	6	Dust Monitoring	-	Dust gauge located at Figtree Farm, O'Briens Road Figtree, labelled as "Point 6" in the map titled "Figure 1 - Air Quality Monitoring Sites" submitted to the EPA on 15/9/09.	9	Dust Monitoring	-	Dust gauge located at Mt Kembla Primary School labelled as "Point 9" in the map titled "Figure 1 - Air Quality Monitoring Sites" submitted to the EPA on 15/9/09.	13	Dust Monitoring	-	Dust gauge located at Dendrobium Colliery Surface, labelled as "Point 13" in the map titled "Figure 1 - Air Quality Monitoring Sites" submitted to the EPA on 15/9/09.	17	Dust Monitoring	-	Dust gauge located at 206 Cordeaux Road, Mt Kembla, labelled as "Point 17" in the map titled "Figure 1 - Air Quality Monitoring Sites" submitted to the EPA on 15/9/09.	18	Dust Monitoring	-	Dust gauge located at Kemira Valley Coal Loading Facility at the bins, labelled as "Point 18" in the map titled "Figure 1 - Air Quality Monitoring Sites"	<p>AEMR FY15 AR FY16, FY17</p> <p>Site Observation</p>	<p>Monitoring is conducted in-line with requirements and reported annually (AEMR/AER).</p> <p>The Auditor sighted during site visit EPA ID No. 18 and ID No. 13, as well as high-volume sampler at ID No. 20. These were clearly identified by the auditor.</p>	C	
EPA ID No.	Type of monitoring point	Type of Discharge point	Location description																										
6	Dust Monitoring	-	Dust gauge located at Figtree Farm, O'Briens Road Figtree, labelled as "Point 6" in the map titled "Figure 1 - Air Quality Monitoring Sites" submitted to the EPA on 15/9/09.																										
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No	Assessment Requirement				Reference/ Evidence	Comments	Compliance Status	Recommendations
				submitted to the EPA on 15/9/09.				
	20	Ambient Air Monitoring	-	Hi-Vol sampler located at Kemira Valley Coal Loading Facility labelled as "Point 20" in the map titled "Figure 1 - Air Quality Monitoring Sites" submitted to the EPA on 15/9/09.				
	21	Ambient Air Monitoring	-	Hi-Vol sampler located at Dendrobium Surface, labelled as "Point 21" in the map titled "Figure 1 - Air Quality Monitoring Sites" submitted to the EPA on 15/9/09.				
P1.2	The following points referred to in the table are identified in this licence for the purposes of the monitoring and/or the setting of limits for discharges of pollutants to water from the point.				Note	Noted	Note	
P1.3	The following utilisation areas referred to in the table below are identified in this licence for the purposes of the monitoring and/or the setting of limits for any application of solids or liquids to the utilisation area.				Note	Noted	Note	
	Water and Land				AEMR FY15 AR FY16, FY17	All monitoring and discharge points are recorded in the Annual Review Reports, along with the requisite data.	C	
	EPA I.D. No.	Type of Monitoring Point	Type of Discharge Point	Location Description	Site Observations	Auditor sighted during site visit EPA ID No. 5, ID No.22, ID No. 18, ID No. 13 and ID No. 23. These were clearly identified by the auditor.		
	5		Stormwater and minewater discharge from Dendrobium mine. Brine discharge from Appin West mine. Discharge quality monitoring.	Pipeline discharging to Allan's Creek labelled as "Discharge Point" on map titled "Dendrobium Mine Water Disposal Pipeline" dated 8 November 2002.				
	22		Wet weather discharge	Spillway overflow from Dendrobium Mine pit top sedimentation dam to American Creek as shown on plan titled "location of spillway and Proposed Licence Discharge Point", BHPBilliton, 24 November 2011. EPA file reference number LIC06/280-12				
	23		Wet weather discharge	Spillway overflow from Kemira Valley Coal Loading Facility sedimentation dam to Brandy and Water Creek shown on plan "Location of spillway and proposed Licence Discharge Point", BHPBilliton, 24 November				

No	Assessment Requirement					Reference/ Evidence	Comments	Compliance Status	Recommendations
				2011. EPA file reference number LIC06/280-12.					
	24	Volume monitoring		Pipeline dewatering underground water storage area.					
	25	Volume monitoring		Pipeline discharge for Kemira Valley sedimentation ponds.					
3. Limit Conditions									
L1. Pollution of Waters									
L1.1	Except as may be expressly provided in any other condition of this licence, the licensee must comply with section 120 of the Protection of the Environment Operations Act 1997.					AEMR FY15 AR FY16, FY17 14 Day Monitoring Report	No non-compliance was reported for FY15 or FY17. Water quality non-compliance events for FY16 were reported to NSW Department of Water and NSW EPA during audit period and corrective actions undertaken where necessary. None of these were considered to result in a breach of Section 120 of the Protection of the Environment Operations Act 1997.	C	
L2. Concentration limits									
L2.1	For each monitoring/discharge point or utilisation area specified in the table below (by a point number), the concentration of a pollutant discharged at that point, or applied to that area, must not exceed the concentration limits specified for that pollutant in the table.					AEMR FY15 AR FY16, FY17 14 Day Monitoring Report	No exceedance of concentration limits were reported FY15 or FY17. Exceedance at Point 5, FY16 AER, oil and grease result over EPL 100 percentile limit. 23 July 2015 – oil and grease of 12mg/L reported through annual return to the EPL and also via the 14 day monitoring report. DRM reported as an unknown source of high reading, no further action required.	NC	No further action required.
L2.2	Where a pH quality limit is specified in the table, the specified percentage of samples must be within the specified ranges.					Note	Noted	Note	
L2.3	To avoid any doubt, this condition does not authorise the pollution of waters by any pollutant other than those specified in the table. Note: discharges from Point 5 can exceed the concentration limit for TSS in the table above during the release of stormwater from the Kemira Valley Sediment Ponds caused by rainfall totaling more than 60mm in the preceding 5 days.					Note	Noted	Note	
L2.4	Water and/or Land Concentration Limits POINT 5					AEMR FY15 AR FY16, FY17 Interview Environmental Superintendent	No exceedances of land concentration limits were reported in FY15 or FY17 reports. – Exceedance reported at Point 5, FY16 AER as discussed at L2.1 above. No exceedances reported in FY18 up to the time of the site audit.	NC	
	Pollutant	Units of Measure	50 percentile concentration limit	90 percentile concentration limit	3DGM concentration limit	100 percentile concentration limit			
	Arsenic	milligrams per litre				1.3			
	Copper	milligrams per litre				0.080			

No	Assessment Requirement	Reference/ Evidence	Comments	Compliance Status	Recommendations															
	<table border="1"> <tr> <td>Nickel</td> <td>milligrams per litre</td> <td>5</td> </tr> <tr> <td>Oil and Grease</td> <td>milligrams per litre</td> <td>10</td> </tr> <tr> <td>pH</td> <td>pH</td> <td>6.5-9.0</td> </tr> <tr> <td>Zinc</td> <td>milligrams per litre</td> <td>0.4</td> </tr> <tr> <td>Total suspended solids</td> <td>milligrams per litre</td> <td>30</td> </tr> </table> <p>Note: discharges from Point 5 can exceed the concentration limit for TSS in the table above during release of stormwater from the Kemira Valley Sediment Ponds caused by rainfall totalling more than 60mm in the preceding 5 days.</p>	Nickel	milligrams per litre	5	Oil and Grease	milligrams per litre	10	pH	pH	6.5-9.0	Zinc	milligrams per litre	0.4	Total suspended solids	milligrams per litre	30				
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Zinc	milligrams per litre	0.4																		
Total suspended solids	milligrams per litre	30																		
4. Operating Conditions																				
O.1 Activities must be carried out in a competent manner																				
O1.1	Licensed activities must be carried out in a competent manner. This includes: a) the processing, handling, movement and storage of materials and substances used to carry out the activity; and b) the treatment, storage, processing, reprocessing, transport and disposal of waste generated by the activity.	Interview Environmental Supervisor Site observations	- The auditor observed an area for improvement in relation to housekeeping and storage of waste hydrocarbons at the Dendrobium Mine Pit Top yard and laydown. One example included a skip with oil drums not provided with secondary containment and observed staining in this area. Other oil cans were also seen discarded in an uncontrolled manner.	NC	It is recommended that all chemicals are stored in appropriately banded and covered area to minimise the potential for release to the environment.															
O2. Maintenance of plant and equipment																				
O2.1	All plant and equipment installed at the premises or used in connection with the licensed activity: a) must be maintained in a proper and efficient condition; and b) must be operated in a proper and efficient manner.	Information solution (SAP) - Work Planning and Scheduling system and outputs. Interview – Maintenance Superintendent	Review of the maintenance work planning and scheduling process, and information management system on-screen with the Maintenance Superintendent. This included tracing a sample of maintenance activities on screen for water pumps. A sample of calibration record sheets for water sampling equipment were also sighted by the Auditor. During the site inspection no observations were made of unmaintained or inappropriately operated equipment.	C																
O3. Dust																				
O3.1	The premises must be maintained in a condition which minimises or prevents the emission of dust from the premises.	AEMR FY15 AR FY16, FY17 Site Observation	Automatic and manual dust controls are in place. Dust cart was observed by the Auditor on rotation at Dendrobium Mine Pit Top Facilities and Kemira Valley Coal Loading. Automatic water suppression on conveyors, loading units and portal road at Dendrobium Mine Pit Top. The Auditor did not observe any significant dust generation during the site inspections.	C																
O4. Waste																				
O4.1	All liquid and non-liquid wastes resulting from activities and processes at the Dendrobium Coal Mine must be assessed, classified and managed in accordance with the EPA's Environmental Guidelines: Assessment,	AEMR FY15 AR FY16, FY17	Waste is recycled or disposed of off-site, and where applicable it is analysed for	NC	Refer O1.1															

No	Assessment Requirement	Reference/ Evidence	Comments	Compliance Status	Recommendations
	Classification and Management of Liquid and Non-Liquid Wastes (2008), or any other EPA document superseding this guideline.	Waste Management Plan, 2012	recycling/re-use with the aim to minimise total waste volume. All waste for offsite disposal is handled by licenced waste management company (Cleanaway). On-site waste is generally stored in accordance with the Waste Management Plan dated 21 March 2012. Refer finding and recommendation for improvement at condition O1.1.		
O5. Bunding					
O5.1	All above ground tanks containing material that is likely to cause environmental harm must be bunded or have an alternative spill containment system in-place.	AEMR FY15 AR FY16, FY17 Site Observation Interview Environmental Supervisor	The auditor was advised that hydrocarbon bunded areas are checked weekly and maintained at a sufficient capacity. Portable bunds and spill kits also available for use in the event of a requirement for temporary storage.	C	
5. Monitoring and Recording Conditions					
M1. Monitoring records					
M1.1	The results of any monitoring required to be conducted by this licence or a load calculation protocol must be recorded and retained as set out in this condition.	Note	Noted	Note	
M1.2	All records required to be kept by this licence must be: a) in a legible form, or in a form that can readily be reduced to a legible form; b) kept for at least 4 years after the monitoring or event to which they relate took place; and c) produced in a legible form to any authorised officer of the EPA who asks to see them.	AEMR FY15 AR FY16, FY17 Review of sample documents and site database.	Annual returns are submitted to the EPA. The auditor sighted and reviewed legible documents and data observed to date back to the start of operations (2005).	C	
M1.3	The following records must be kept in respect of any samples required to be collected for the purposes of this licence: a) the date(s) on which the sample was taken; b) the time(s) at which the sample was collected; c) the point at which the sample was taken; and d) the name of the person who collected the sample.	AEMR FY15 AR FY16, FY17 14 Day Monitoring Report Sample of Chain of Custody records from 2015, 2016 and 2017	As above. The Auditor sighted a sample of reports for groundwater and surface water monitoring and sample collection during the reporting period that complied with the requirements of this condition. This included a sample of Chain of Custody records.	C	

No	Assessment Requirement	Reference/ Evidence	Comments	Compliance Status	Recommendations																												
M2. Requirement to monitor concentration of pollutants discharged																																	
M2.1	For each monitoring/discharge point or utilisation area specified below (by a point number), the licensee must monitor (by sampling and obtaining results by analysis) the concentration of each pollutant specified in Column 1. The licensee must use the sampling method, units of measure, and sample at the frequency, specified in the other columns:	AEMR FY15 AR FY16, FY17	Non-compliance in AR FY16, monthly sampling of point 6 and point 18 required 12 sampling events, but only 11 samples collected for the year. Missed one monthly sample at each point due to faulty equipment. No further action required, noting the mine self-reported this as an NC.	NC																													
M2.2	<p>Air Monitoring Requirements POINTS 6,9,13,17, 18</p> <table border="1"> <thead> <tr> <th>Pollutant</th> <th>Unit of measure</th> <th>Frequency</th> <th>Sampling Method</th> </tr> </thead> <tbody> <tr> <td>Ash</td> <td>Grams per square meter per month</td> <td>Monthly</td> <td>Australian Standard 3580.10.1-2003</td> </tr> <tr> <td>Combustible solids</td> <td>Grams per square meter per month</td> <td>Monthly</td> <td>Australian Standard 3580.10.1-2003</td> </tr> <tr> <td>Insoluble Solids</td> <td>Grams per square meter per month</td> <td>Monthly</td> <td>Australian Standard 3580.10.1-2003</td> </tr> </tbody> </table> <p>POINTS 20,21</p> <table border="1"> <thead> <tr> <th>Pollutant</th> <th>Unit of measure</th> <th>Frequency</th> <th>Sampling Method</th> </tr> </thead> <tbody> <tr> <td>PM10</td> <td>Micrograms per cubic metre</td> <td>Monthly</td> <td>AS/NZS 3580.9.6:2003</td> </tr> <tr> <td>Total suspended particles</td> <td>Micrograms per cubic metre</td> <td>Monthly</td> <td>AS/NZS 3580.9.3:2003</td> </tr> </tbody> </table>	Pollutant	Unit of measure	Frequency	Sampling Method	Ash	Grams per square meter per month	Monthly	Australian Standard 3580.10.1-2003	Combustible solids	Grams per square meter per month	Monthly	Australian Standard 3580.10.1-2003	Insoluble Solids	Grams per square meter per month	Monthly	Australian Standard 3580.10.1-2003	Pollutant	Unit of measure	Frequency	Sampling Method	PM10	Micrograms per cubic metre	Monthly	AS/NZS 3580.9.6:2003	Total suspended particles	Micrograms per cubic metre	Monthly	AS/NZS 3580.9.3:2003	14 Day Monitoring Report	Observed to be measuring required pollutants at correct locations and recorded in 14 Day Monitoring Report.	C	
Pollutant	Unit of measure	Frequency	Sampling Method																														
Ash	Grams per square meter per month	Monthly	Australian Standard 3580.10.1-2003																														
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No	Assessment Requirement	Reference/ Evidence	Comments	Compliance Status	Recommendations																																				
M2.3	Water and/or Land Monitoring Requirements POINT 5 <table border="1"> <thead> <tr> <th>Pollutant</th> <th>Units of measure</th> <th>Frequency</th> <th>Sampling Method</th> </tr> </thead> <tbody> <tr> <td>Arsenic</td> <td>Milligrams per litre</td> <td>Monthly during discharge</td> <td>Grab sample</td> </tr> <tr> <td>Conductivity</td> <td>Microsiemens per centimetre</td> <td>Monthly during discharge</td> <td>Grab sample</td> </tr> <tr> <td>Copper</td> <td>Milligrams per litre</td> <td>Monthly during discharge</td> <td>Grab sample</td> </tr> <tr> <td>Nickel</td> <td>Milligrams per litre</td> <td>Monthly during discharge</td> <td>Grab sample</td> </tr> <tr> <td>Oil and Grease</td> <td>Milligrams per litre</td> <td>Monthly during discharge</td> <td>Grab sample</td> </tr> <tr> <td>Total suspended solids</td> <td>Milligrams per litre</td> <td>Monthly during discharge</td> <td>Grab sample</td> </tr> <tr> <td>Zinc</td> <td>Milligrams per litre</td> <td>Monthly during discharge</td> <td>Grab sample</td> </tr> <tr> <td>pH</td> <td>pH</td> <td>Monthly during discharge</td> <td>In situ</td> </tr> </tbody> </table>	Pollutant	Units of measure	Frequency	Sampling Method	Arsenic	Milligrams per litre	Monthly during discharge	Grab sample	Conductivity	Microsiemens per centimetre	Monthly during discharge	Grab sample	Copper	Milligrams per litre	Monthly during discharge	Grab sample	Nickel	Milligrams per litre	Monthly during discharge	Grab sample	Oil and Grease	Milligrams per litre	Monthly during discharge	Grab sample	Total suspended solids	Milligrams per litre	Monthly during discharge	Grab sample	Zinc	Milligrams per litre	Monthly during discharge	Grab sample	pH	pH	Monthly during discharge	In situ	14 Day Monitoring Report	As above	C	
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M3. Testing methods – concentration limits																																									
M3.1	Monitoring for the concentration of a pollutant emitted to the air required to be conducted by this licence must be done in accordance with: a) any methodology which is required by or under the Act to be used for the testing of the concentration of the pollutant; or b) if no such requirement is imposed by or under the Act, any methodology which a condition of this licence requires to be used for that testing; or c) if no such requirement is imposed by or under the Act or by a condition of this licence, any methodology approved in writing by the EPA for the purposes of that testing prior to the testing taking place. Note: The Protection of the Environment Operations (Clean Air) Regulation 2002 requires testing for certain purposes to be conducted in accordance with test methods contained in the publication "Approved Methods for the Sampling and Analysis of Air Pollutants in NSW".	Sample of air monitoring data 2015, 2016, 2017	Monitoring is conducted by accredited third party provider to ensure appropriate Australian Standard employed.	C																																					
M3.2	Subject to any express provision to the contrary in this licence, monitoring for the concentration of a pollutant discharged to waters or applied to a utilisation area must be done in accordance with the Approved Methods Publication unless another method has been approved by the EPA in writing before any tests are conducted. Note: The Protection of the Environment Operations (Clean Air) Regulation 2010 requires testing for certain purposes to be conducted in accordance with test methods contained in the publication "Approved Methods for the Sampling and Analysis of Air Pollutants in NSW".	Water Management Plan, 2014 Sample of laboratory reports viewed on screen.	The approved WMP report reviewed by the auditor references relevant standards and methodology. Laboratory (ALS) NATA accredited.	C																																					
M4. Recording of pollution complaints																																									
M4.1	The licensee must keep a legible record of all complaints made to the licensee or any employee or agent of the licensee in relation to pollution arising from any activity to which this licence applies.	AEMR FY15 AR FY16, FY17	Reported in the AEMR, AR and website	C																																					

No	Assessment Requirement	Reference/ Evidence	Comments	Compliance Status	Recommendations						
M4.2	The record must include details of the following: a) the date and time of the complaint; b) the method by which the complaint was made; c) any personal details of the complainant which were provided by the complainant or, if no such details were provided, a note to that effect; d) the nature of the complaint; e) the action taken by the licensee in relation to the complaint, including any follow-up contact with the complainant; and f) if no action was taken by the licensee, the reasons why no action was taken.	AEMR FY15 AR FY16, FY17 August 2017 Complaints Report Stakeholder Database	Complaints report provided on website and internally data is recorded in Stakeholder Database. A summary of complaints is provided in the Annual Reviews.	C							
M4.3	The record of a complaint must be kept for at least 4 years after the complaint was made.	Stakeholder Database	Stakeholder Database dates back to 2005	C							
M4.4	The record must be produced to any authorised officer of the EPA who asks to see them.			Noted							
M5. Telephone complaints line											
M5.1	The licensee must operate during its operating hours a telephone complaints line for the purpose of receiving any complaints from members of the public in relation to activities conducted at the premises or by the vehicle or mobile plant, unless otherwise specified in the licence.	AEMR FY14 FY15 AER FY16, FY17	24 hour community call line and general email address for complaints.	C							
M5.2	The licensee must notify the public of the complaints line telephone number and the fact that it is a complaints line so that the impacted community knows how to make a complaint.	AEMR FY14 FY15 AER FY16, FY17	Phone number and email address advertised and distributed to the community.	C							
M5.3	The preceding two conditions do not apply until 3 months after: (a) the date of the issue of this licence or (b) if this licence is a replacement licence within the meaning of the Protection of the Environment Operations (Savings and Transitional) Regulation 1998, the date on which a copy of the licence was served on the licensee under clause 10 of that regulation.	Note	Noted	Note							
M6. Requirements to monitor volume or mass											
M6.1	For each discharge point or utilisation area specified below, the licensee must monitor: a) the volume of liquids discharged to water or applied to the area; b) the mass of solids applied to the area; c) the mass of pollutants emitted to the air; at the frequency and using the method and units of measure, specified below. POINT 24, 25 <table border="1"> <thead> <tr> <th>Frequency</th> <th>Unit of measure</th> <th>Sampling method</th> </tr> </thead> <tbody> <tr> <td>Continuous</td> <td>Megalitres per day</td> <td>In line instrumentation</td> </tr> </tbody> </table> <p><i>Note: The licensee may use flow monitoring data collected from licence discharge point 5 in the event that flow monitoring cannot be undertaken at points 24 or 25.</i></p>	Frequency	Unit of measure	Sampling method	Continuous	Megalitres per day	In line instrumentation	AR FY14, FY15, FY16, FY17 14 Day Monitoring Report	Continuous monitoring of the volume of liquids discharged was undertaken throughout the audit period. The only exception was during some periods of flow monitoring equipment failure. No further action required.	ANC	
Frequency	Unit of measure	Sampling method									
Continuous	Megalitres per day	In line instrumentation									
6. Reporting Conditions											
R1. Annual return documents											
R1.1	The licensee must complete and supply to the EPA an Annual Return in the approved form comprising: 1. a Statement of Compliance,	AEMR FY15, AR FY16, FY17	EPL Annual Return annexed to the AEMR and Annual Report.	C							

No	Assessment Requirement	Reference/ Evidence	Comments	Compliance Status	Recommendations
	2. a Monitoring and Complaints Summary, At the end of each reporting period, the EPA will provide to the licensee a copy of the form that must be completed and returned to the EPA.				
R1.2	An Annual Return must be prepared in respect of each reporting period, except as provided below.	AEMR FY15, AR FY16, FY17	EPL Annual Return annexed to the AEMR and AR.	C	
R1.3	Where this licence is transferred from the licensee to a new licensee: a) the transferring licensee must prepare an Annual Return for the period commencing on the first day of the reporting period and ending on the date the application for the transfer of the licence to the new licensee is granted; and b) the new licensee must prepare an Annual Return for the period commencing on the date the application for the transfer of the licence is granted and ending on the last day of the reporting period.	EPL 3241	Licensee Endeavour Coal Pty Ltd remains unchanged.	NT	
R1.4	Where this licence is surrendered by the licensee or revoked by the EPA or Minister, the licensee must prepare an Annual Return in respect of the period commencing on the first day of the reporting period and ending on: a) in relation to the surrender of a licence - the date when notice in writing of approval of the surrender is given; or b) in relation to the revocation of the licence - the date from which notice revoking the licence operates.	AEMR FY15, AR FY16, FY17	Licence not surrendered during review period.	NT	
R1.5	The Annual Return for the reporting period must be supplied to the EPA by registered post not later than 60 days after the end of each reporting period or in the case of a transferring licence not later than 60 days after the date the transfer was granted (the 'due date').	As above	Annual Returns submitted within 60 days of each reporting period.	C	
R1.6	The licensee must retain a copy of the Annual Return supplied to the EPA for a period of at least 4 years after the Annual Return was due to be supplied to the EPA.	As above	The auditor observed annual returns during audit.	C	
R1.7	Within the Annual Return, the Statement of Compliance must be certified and the Monitoring and the Monitoring and Complaints Summary must be signed by: (a) the licence holder; or (b) by a person approved in writing by the EPA to sign on behalf of the licence holder.	As above	As above	C	
R1.8	A person who has been given written approval to certify a certificate of compliance under a licence issued under the Pollution Control Act 1970 is taken to be approved for the purpose of this condition until the date of first review of this licence.	Note	Noted	Note	
	<i>Note: An application to transfer a licence must be made in the approved form for this purpose. Note: The term "reporting period" is defined in the dictionary at the end of this licence. Do not complete the Annual Return until after the end of the reporting period.</i>	Note	Noted	Note	
R2. Notification of environmental harm					
R2.1	Notifications must be made by telephoning the Environment Line service on 131 555.	Interview Environmental Supervisor	- No requirement to notify environmental harm during this audit period. The Auditor was made aware of environmental harm at Corrimal No.3 Shaft, however this location falls outside the scope of this audit.	NT	
R2.2	The licensee must provide written details of the notification to the EPA within 7 days of the date on which the incident occurred. <i>Note: The licensee or its employees must notify the EPA of incidents causing or threatening material harm to the environment as soon as practicable after the person becomes aware of the incident in accordance with the requirements of Part 5.7 of the Act.</i>	Interview Environmental Supervisor	- No requirement to notify environmental harm during this audit period.	NT	

No	Assessment Requirement	Reference/ Evidence	Comments	Compliance Status	Recommendations					
R3. Written Report										
R3.1	Where an authorised officer of the EPA suspects on reasonable grounds that: a) where this licence applies to premises, an event has occurred at the premises; or b) where this licence applies to vehicles or mobile plant, an event has occurred in connection with the carrying out of the activities authorised by this licence, and the event has caused, is causing or is likely to cause material harm to the environment (whether the harm occurs on or off premises to which the licence applies), the authorised officer may request a written report of the event.	Interview Environmental Supervisor	- No request made with exception of Corrimal No.3 which falls outside the scope of this audit.	NT						
R3.2	The licensee must make all reasonable inquiries in relation to the event and supply the report to the EPA within such time as may be specified in the request.	Interview Environmental Supervisor	- As above	NT						
R3.3	The request may require a report which includes any or all of the following information: a) the cause, time and duration of the event; b) the type, volume and concentration of every pollutant discharged as a result of the event; c) the name, address and business hours telephone number of employees or agents of the licensee, or a specified class of them, who witnessed the event; d) the name, address and business hours telephone number of every other person (of whom the licensee is aware) who witnessed the event, unless the licensee has been unable to obtain that information after making reasonable effort; e) action taken by the licensee in relation to the event, including any follow-up contact with any complainants; f) details of any measure taken or proposed to be taken to prevent or mitigate against a recurrence of such an event; and g) any other relevant matters.	Interview Environmental Supervisor	- As above	NT						
R3.4	The EPA may make a written request for further details in relation to any of the above matters if it is not satisfied with the report provided by the licensee. The licensee must provide such further details to the EPA within the time specified in the request.	Interview Environmental Supervisor	- As above	NT						
7. General Conditions										
G1. Copy of licence kept at the premises										
G1.1	A copy of this licence must be kept at the premises to which the licence applies.	Site Observations	The Auditor observed current version of EPL displayed at Dendrobium Mine Pit Top offices	C						
G1.2	The licence must be produced to any authorised officer of the EPA who asks to see it.	Interview Environmental Supervisor	- No such request made during the audit period.	NT						
G1.3	The licence must be available for inspection by any employee or agent of the licensee working at the premises	Site Observations	The Auditor observed current version of EPL to be displayed at Dendrobium Mine Pit Top offices and is held on the mine's website.	C						
G2. Other General Conditions										
G2.1	Completed Pollution Studies and Reduction Programs (PRPs)									
	<table border="1"> <thead> <tr> <th>PRP</th> <th>Description</th> <th>Completed Date</th> </tr> </thead> <tbody> <tr> <td>PRP 1 - Excess Mine Water Discharge Reduction Program</td> <td>To investigate and implement options to reuse excess mine water on site with the aim of eliminating the discharge or</td> <td>19 Feb 2005</td> </tr> </tbody> </table>	PRP	Description	Completed Date	PRP 1 - Excess Mine Water Discharge Reduction Program	To investigate and implement options to reuse excess mine water on site with the aim of eliminating the discharge or	19 Feb 2005			
PRP	Description	Completed Date								
PRP 1 - Excess Mine Water Discharge Reduction Program	To investigate and implement options to reuse excess mine water on site with the aim of eliminating the discharge or	19 Feb 2005								
			PRP 1-14 was completed prior to reporting period (FY14). No PRPs were required to be carried out during the reporting period FY14, FY15, FY16, FY17	NT						

No	Assessment Requirement			Reference/ Evidence	Comments	Compliance Status	Recommendations
		excess mine water to Allan's Creek.					
	PRP 2 - Freshwater Conservation Program	To investigate and implement options to reuse excess mine water in the Wollongong Industrial area for industrial or commercial purposes, thereby reducing their need for freshwater.	30 Dec 2004				
	PRP 3 - Operational Noise and Vibration Management Plan	To develop and document an Operational Noise and Vibration Management Plan which identifies measures to ensure compliance with licence noise and vibration limits.	1 April 2005				
	PRP 4 - Noise and Vibration Reduction Program	To develop and implement a plan to minimise noise and vibration from the Kemira Valley Rail Line.	3 April 2006				
	PRP 5 - Kemira Valley Biological Assessment Monitoring Program	To develop a monitoring program to characterise potential pollutants and water quality variables and determine impact of possible overflows from sedimentation basin at Kemira Valley. Program must be implemented 18 months after commissioning of stock pile facility.	3 October 2005 3 October 2006				
	PRP 6 - Kemira Valley Discharge Monitoring Program	To develop and implement a monitoring program to characterise discharges from the sedimentation basin.	3 October 2005				
	PRP 7 - Re-injection Monitoring Program	To develop a monitoring program to determine the quality of water discharged underground.	23 March 2006				
	PRP 8 - Implementation of Mine Water Re-use Options	To investigate the use of excess mine water for washdown and dust suppression at the pit top area.	1 August 2006				

No	Assessment Requirement			Reference/ Evidence	Comments	Compliance Status	Recommendations
	PRP 9 - Review of Dust Monitoring Network	To review the dust monitoring network against AS 2922-1987 and its effectiveness in determining amenity impacts.	30 March 2006				
	PRP 10 - Underground re-injection	To monitor the quality of water discharged underground in order to determine whether the discharges will lead to deterioration in the quality of water contained in the old Nebo workings	30 June 2007				
	PRP 11 - Investigation of Zn and Cu Levels	To undertake an investigation into the environmental effects of minewater discharged to Allan's Creek and Port Kembla Harbour through licensed discharge point 5	19 February 2007				
	PRP 12 - Investigation of options for minimal discharge	To identify potential opportunities to enhance the management of sediment control and stormwater capture at the Dendrobium Mine Vent Shafts 2 & 3 construction site with the goal of managing the site as a zero discharge site	21 March 2011				
	PRP 13 - Discharge Point 5 Water Quality Investigation	To determine the concentrations of copper and zinc in Allan's Creek due to the discharge of minewater and brine from licence discharge point 5	21 March 2011				
	PRP 14 - Improve Reliability of LDP5 Flow Monitoring	To implement action(s) to minimise the number of occasions and duration of time that the flowrate of water from LDP5 is not measured and recorded.	16 March 2011				
	PRP 15 - Coal Mine Particulate Matter Control Best Practice	The Licensee must conduct a site specific Best Management Practice (BMP) determination to identify the most practicable means to reduce particle emissions	06 February 2012				

Table A.3:

Consolidated Coal Lease 768 and Mining
Leases 1510 & 1566 - Combine Compliance
Table.

Table A.3 SMP Approval Compliance Table (Area 3B)

No	Assessment Requirement	Reference/ Evidence	Comments	Compliance Status	Recommendations
Schedule 1					
1.	Condition 7 of Schedule 3 of the development consent granted by the Minister for Urban Affairs and Planning on 20th November 2001 for the development of the Dendrobium Coal Mine and the construction and operation of associated surface facilities (DA 60-03-2001).	Dendrobium Area 3B – Subsidence Management Plan, PDM-001-9.6.1D Rev B	Noted	Note	
Schedule 2					
2.	Underground mining operations, and associated monitoring, management and remediation, In Area 3B of the Dendrobium Coal Mine.	Note	Noted	Note	
Schedule 3					
Terms of approval					
3.	The Applicant shall carry out the development generally in accordance with the: a) conditions of consent DA 60-03-2001; b) conditions of this approval; and c) Subsidence Management Plan. If there is any inconsistency with the subsidence management plan, then the conditions of this approval and/or the conditions of consent DA 60-03-2001 shall prevail to the extent of the inconsistency.		Refer review of DA 60-03-2001 Conditions in Annex A1.	C	
4.	If there is any inconsistency with the Subsidence Management Plan, then the conditions of this approval and/or the conditions of consent DA 60-03-2001 shall prevail to the extent of the inconsistency.	Note	Noted	Note	
Limits on approval					
5.	The Applicant must obtain the approval of the Director-General prior to the commencement of gateroad development for Longwalls 14 to 19 or the extraction of Longwalls 14 to 19. The Director-General's approval will take into account the: (a) documents required to be reviewed or prepared and other measures (including any environmental offset) required to be developed or implemented under the conditions of this approval; and (b) Applicant's performance under the Subsidence Management Plan, the conditions of this approval and the conditions of consent DA 60-03-2001. The Director-General's approval under this condition may vary the conditions of this approval or impose additional conditions on this approval.		Not yet mining Longwalls 14 to 19. The auditor understands that approval has been sought for LW14.	NT	
Biodiversity offset strategy					
6.	The Applicant shall prepare and implement a Biodiversity Offset Strategy to the satisfaction of the Director-General. Initially, the Strategy must compensate for the impacts of Longwalls 9 to 13 on upland swamps and must: (a) be prepared in consultation with OEH and SCA; (b) be submitted by 31 October 2013 to the Director-General for approval; (c) provide a suitable offset for all predicted impacts of the project on upland swamps; (d) give priority to like-for-like physical environmental offsets, but also consider: • measures that result in beneficial effect on water quality, water quantity, aquatic ecosystems and/or the ecological integrity of SCA's special areas or water catchments; • other potential physical environmental offsets; and • potential financial environmental offset contributions payable to a relevant public trust or authority (eg the NSWET, OEH or SCA), where physical offsets or other measures are unavailable or insufficient to provide a suitable offset; (e) propose a process whereby the actual impacts of the development on upland swamps are regularly reviewed (at least every 2 years) against predicted impacts and reported on to all	Letter DP&E to South32 Illawarra Coal (ref: 16/08860; dated: 16/12/2016) Illawarra Coal – Strategic Biodiversity Offset (March 2016) Dendrobium Area 3B: Subsidence Management Plan (Volume 2 – Subsidence Management Plan) Rev: B (BHPBilliton no date)	Letter DP&E to South32 Illawarra Coal (ref: 16/08860; dated: 16/12/2016) states that the DP&E considers the Strategic Biodiversity Offset document fulfils the requirements of condition 9 of this approval however (refer below) that condition does not require DP&E satisfaction. The auditor has assumed the reference is to this condition 6 of the approval as it relates to DP&E Director-General/Secretary acceptance of the Strategic Biodiversity Offset document. The Illawarra Coal – Strategic Biodiversity Offset (March 2016) (SBO) addressed these conditions as follows:	O	Consider reporting on the performance of CMA in the Annual Reviews.

No	Assessment Requirement	Reference/ Evidence	Comments	Compliance Status	Recommendations
	<p>affected agencies, including detailed consideration of the:</p> <ul style="list-style-type: none"> • predictions in the SMP; • performance measures in Table 1; • monitoring results; • application, success and predicted success of measures to mitigate or remediate subsidence impacts and/or associated environmental consequences; • predicted and actual long-term impacts; and • views of OEH and SCA; and <p>(f) propose a process whereby a suitable residual environmental offset is provided where the actual impacts on upland swamps exceed those predicted in the SMP.</p>	<p>Dendrobium Area 3B Swamp Impact, Monitoring, Management and Contingency Plan (BHPBilliton October 2012)</p> <p>ARs FY16, FY17</p> <p>Dendrobium Area 3B Longwall 11 End of Panel Report (25 May 2016) (South32)</p> <p>Dendrobium Area 3B Longwall 12 End of Panel Report (May 2017) (South32)</p>	<p>(a) section 2, specifically section 2.1 discusses consultation with the NSW Government agencies.</p> <p>(b) section 2.1 discusses the timeline where IC had obtained extensions from DP&E to the agreed timeline for submitting the SBO. None of those letters were reviewed during this audit. The Letter DP&E to South32 Illawarra Coal (ref: 16/08860; dated: 16/12/2016) confirms DP&E satisfaction with the SBO.</p> <p>(c) section 4 identifies upland swamp areas in the offset area are greater than in the potential impact area.</p> <p>(d) not detailed, although likely due to section 4 identifying like-for-like offsets.</p> <p>(e) not detailed in this SBO, but monitoring described broadly in the Subsidence Management Plan (Volume 2 – Subsidence Management Plan) Rev: B (no date), specifically terrestrial ecology monitoring and management detailed in section 20 (with further reference to more detailed documents). Predicted impacts, monitoring, management and responses (including contingencies) are detailed in the Dendrobium Area 3B Swamp Impact, Monitoring, Management and Contingency Plan (BHPBilliton October 2012) (SIMMCP).</p> <p>Performance is reported annually in ARs. Notably terrestrial ecology monitoring reported from FY16 (p40) and FY17 (p37) both state that swamp vegetation and associated fauna (frog) impacts are within predicted levels, however that some vegetation and frog species are suffering impacts which require responses. There is no further detail provided. The full detail of performance and impacts relative to those predicted and the TARP is contained in the end of panel reports which are completed following mining area completions and at least the last two have been annually, thus demonstrating compliance with the two year requirement for reporting.</p> <p>No reporting is evident that describes how the remedial actions (CMAs) from the TARP in the previous year are being measured and are the actions succeeding in mitigating the impacts predicted (refer FY16 AR stating that monitoring indicated TARP actions were required, but no mention in AR FY17 of how those actions performed).</p>		

No	Assessment Requirement	Reference/ Evidence	Comments	Compliance Status	Recommendations						
			<p>This point is therefore an ANC (assuming the actions completed were in accordance with the TARP, for which no evidence is available).</p> <p>(f) The SIMMCP (BHPBilliton 2012) contains a trigger action response plan which details actions to be undertaken when exceedances are identified by monitoring, however does not contain any specific statement of how a suitable environmental offset would be provided where impacts exceed those predicted.</p>								
7.	Following any approval by the Director-General under condition 5 of this approval, the Applicant shall review and update the Biodiversity Offset Strategy (referred to in condition 6) to compensate for any impacts of Longwalls 14 to 19 on upland swamps. This review must be carried out in consultation with OEH and SCA, and to the satisfaction of the Director-General.	Interview - Environment Supervisor	Environment Supervisor stated that this was not triggered.	NT							
8.	The Applicant shall pay all reasonable costs incurred by the Department to engage suitably qualified and experienced experts to review adequacy of any component of the Biodiversity Offset Strategy.	<p>Interview - Environment Supervisor</p> <p>Letter DP&E to South32 Illawarra Coal (ref: 16/08860; dated: 16/12/2016)</p>	<p>Environment Supervisor stated that this was not triggered.</p> <p>Letter from DP&E to South32 Illawarra Coal (ref: 16/08860; dated: 16/12/2016) indicates DP&E satisfaction with the Strategic Biodiversity Offset proposal.</p>	NT							
9.	<p>The Applicant shall ensure that the development does not cause any exceedance of the performance measures in Table 1, to the satisfaction of the Director-General.</p> <p>Table 1: Subsidence Impact Performance Measures</p> <table border="1"> <thead> <tr> <th colspan="2">Swamps</th> </tr> </thead> <tbody> <tr> <td>Swamps 1a, 1b, 5, 8, 11,14 and 23</td> <td> <p>Minor environmental consequences including:</p> <ul style="list-style-type: none"> negligible erosion of the surface of the swamps; minor changes in the size of the swamps; minor changes in the ecosystem functionality of the swamp; no significant change to the composition or distribution of species within the swamp; and maintenance or restoration of the structural integrity of the bedrock base of any significant permanent pool or controlling rockbar within the swamp. </td> </tr> <tr> <td>Swamps 3, 4, 10, 13, 35a and 35b</td> <td>No significant environmental consequences beyond predictions in the Subsidence Management Plan.</td> </tr> </tbody> </table> <p>Watercourses</p>	Swamps		Swamps 1a, 1b, 5, 8, 11,14 and 23	<p>Minor environmental consequences including:</p> <ul style="list-style-type: none"> negligible erosion of the surface of the swamps; minor changes in the size of the swamps; minor changes in the ecosystem functionality of the swamp; no significant change to the composition or distribution of species within the swamp; and maintenance or restoration of the structural integrity of the bedrock base of any significant permanent pool or controlling rockbar within the swamp. 	Swamps 3, 4, 10, 13, 35a and 35b	No significant environmental consequences beyond predictions in the Subsidence Management Plan.	<p>Letter DP&E to South32 Illawarra Coal (ref: 16/08860; dated: 16/12/2016)</p> <p>Letter from WaterNSW to ERM (11/9/17)</p> <p>Dendrobium Area 3B Longwall 11 End of Panel Report (25 May 2016) (South32)</p> <p>Dendrobium Area 3B Longwall 12 End of Panel Report (May 2017) (South32)</p>	<p>Letter from DP&E to South32 Illawarra Coal (ref: 16/08860; dated: 16/12/2016) states that the DP&E considers the Strategic Biodiversity Offset document fulfils the requirements of this condition and Condition 6 above.</p> <p>Review of detailed monitoring results has focussed on the End of Panel Reports for Longwalls 11 and 12.</p> <p>Letter from WaterNSW to ERM (11/9/17) notes previous correspondence to DP&E that several Performance Measures for Swamps, Watercourses and Water Storage losses have probably been exceeded in Area 3B regardless of TARP triggers indicated in End of Panel Reports and Annual Reviews. Conclusions based on independent expert reviews of available data.</p> <p>Reported impacts summarised below:</p> <p><i>Swamps</i></p> <p>Dendrobium Area 3B Longwall 12 End of Panel Report (May 2017) (South32) states that terrestrial ecology monitoring is undertaken at swamps 1, 15B, 15A, 1A, 1B and 5. It reports on page 35 that swamps 1A and 5 have observed a decline of a vegetation community type greater</p>	O	<p>CMA – review and where necessary consider any necessary revision of SIMMCP and WIMMCP TARPs with reference to WaterNSW requests (letter to ERM dated 11/09/17) and review against PM for Swamps, Watercourses & Water Storages.</p> <p>CMA - Layout for LW13 & 19 may need to be reviewed pending above plan reviews.</p>
Swamps											
Swamps 1a, 1b, 5, 8, 11,14 and 23	<p>Minor environmental consequences including:</p> <ul style="list-style-type: none"> negligible erosion of the surface of the swamps; minor changes in the size of the swamps; minor changes in the ecosystem functionality of the swamp; no significant change to the composition or distribution of species within the swamp; and maintenance or restoration of the structural integrity of the bedrock base of any significant permanent pool or controlling rockbar within the swamp. 										
Swamps 3, 4, 10, 13, 35a and 35b	No significant environmental consequences beyond predictions in the Subsidence Management Plan.										

No	Assessment Requirement		Reference/ Evidence	Comments	Compliance Status	Recommendations
	Waterfall WC-WF54	Negligible environmental consequences including: <ul style="list-style-type: none"> no rock fall occurs at the waterfall or from its overhang; no impacts on the structural integrity of the waterfall, its overhang and its pool; negligible cracking in Wongawilli Creek within 30 m of the waterfall; and negligible diversion of water from the lip of the waterfall. 		<p>than the comparative data, which the report states is a Level 2 TARP observation. These impacts are reported similarly in the preceding Longwall 11 End of Panel report (page 33) and LW12 where Non-executive Level 3 TARP triggered for Swamps 1a,3,5,10.</p> <p>(Eco-system impact indicator only and not a breach of any Performance Measure). It is noted however, that the approved TARPs allow four consecutive monitoring periods (i.e. years after mining) of decline in swamp size & biodiversity against control swamps before the impact is considered to be > Minor.</p> <p><i>Watercourses</i></p> <p>Surface water quality was reported as meeting the approved TARP values for both Donalds Castle and Wongawilli Creeks (End of Panel Report-Longwall 12, page 43) (level 2 and level 1 TARP respectively).</p> <p>End of Panel Reports for longwalls 11 and 12 also report no surface impacts to Donalds Castle or Wongawilli Creeks.</p> <p>Sections of Donalds Castle Creek tributaries and WC21 have dried out since undermining. Claiming no impact on downstream creek therefore debatable and require CMA on whether the current approved TARPs adequate for Performance Measure (PM) exceedance assessment.</p> <p><i>Water storages</i></p> <p>The End of Panel Report-Longwall 12, page 44) discusses sub catchment approved TARP levels being met however no whole-of-creek magnitude TARPs being reached (when considering the 'overall catchment' of Donalds Castle and Wongawilli Creeks). It also states that flows into the Avon Reservoir are below significant levels (page 33).</p> <p>Estimates of storage losses being negligible in light of independent expert review of groundwater flows to the mine require modelling and impacts to be reviewed. Shallow VWP are considered to be not recording surface water table levels correctly and require verification around Dams.</p>		
	Wongawilli Creek Donalds Castle Creek	Minor environmental consequences including: <ul style="list-style-type: none"> minor fracturing, gas release and iron staining; and minor Impacts on water flows, water levels and water quality. 				
	Water storages					
	Avon Reservoir	Negligible environmental consequences including: <ul style="list-style-type: none"> negligible reduction in the quality or quantity of surface water inflows to the reservoir; negligible reduction in the quality or quantity of groundwater inflows to the reservoir; and negligible leakage from the reservoir to underground mine workings. 				
	Notes: These performance measures apply to Longwalls 9 to 13. The Applicant may meet the requirements of this condition either by avoidance, mitigation or remediation. Most swamps and watercourse features are shown on the site and key natural features plan (see Figure 1).					
10.	Rehabilitation		Interview – Environment Superintendent	Two instances of Impact Performance Measure exceedances are identified in the audit against condition 9 (above) in relation to Swamp 5 and	O	As above

No	Assessment Requirement	Reference/ Evidence	Comments	Compliance Status	Recommendations
	If the Applicant does not meet the performance measures in Table 1, then following consultation with OEH, SCA and DRE, the Director-General may issue the Applicant with a direction in writing to undertake actions or measures to mitigate or remediate subsidence impacts and/or associated environmental consequences. The Applicant must implement the direction in accordance with its terms and requirements, in consultation with the Director-General and affected agencies.		Surface water quality for both Donalds Castle and Wongawilli Creeks. However, in interview the Environment Superintendent it was identified there to have not been any exceedences of the performance criteria. Hence, it is the auditors understanding that these exceedences have not been acted upon.		
11	Watercourse Impact Monitoring, Management and Contingency Plan By 31 May 2013, the Applicant shall review the Watercourse Impact Monitoring, Management and Contingency Plan for Area 3B prepared under condition 4 of Schedule 3 of DA 60-03-2001 to provide for achievement of the performance measures listed in Table 1, to the satisfaction of the Director-General.	Dendrobium Area 3B Watercourse Impact, Management and Contingency Plan (2015).	Dendrobium Area 3B Watercourse Impact, Management and Contingency Plan (2015).	C	
12	Swamp Impact Monitoring, Management and Contingency Plan By 31 May 2013, the Applicant shall review the Swamp Impact Monitoring, Management and Contingency Plan for Area 3B prepared under condition 6 of Schedule 3 of DA 60-03-2001 to provide for achievement of the performance measures listed in Table 1, to the satisfaction of the Director-General.	Dendrobium Area 3B Swamp Impact, Management and Contingency Plan (2015).	Dendrobium Area 3B Swamp Impact, Management and Contingency Plan (2015).	C	
13	Groundwater Model By 31 October 2013, the Applicant shall review the Area 3B Groundwater Model to the satisfaction of the Director-General. The revised model must: (a) include detailed consideration of surficial aquifers, swamps and watercourses; (b) include all available data on groundwater levels; and (c) model baseflow contributions for all sub-catchments from baseline (ie prior to the extraction of Longwall 9 until 30 years post-mining, using 5-yearly increments.	IEA 2014	Verified in previous IEA 2014	C	
Groundwater Monitoring					
14	Prior to the extraction of longwall 12, the Applicant shall: (a) undertake detailed geotechnical and hydrological investigations of the height of cracking in Longwalls 6 to 10; and (b) submit a report to the Department, including: • a model describing the measured height of cracking across Longwalls 6 to 10; and • detailed predictions of the height of cracking for Longwalls 11 to 19; to the satisfaction of the Director General.	Hydrosimulation Report, Mar 2016 & Sep, 2016	A subsequent report was completed in response to Water NSW independent review that did not agree with outcomes – LW14-19 not approved at time of audit.	ANC (potential NC after review)	Provide outcomes of review.
Swamp Rehabilitation Research Program					
15	The Applicant shall prepare and implement a Swamp Rehabilitation Research Program to the satisfaction of the Director-General. This program must: (a) be prepared in consultation with OEH, SCA and ORE; (b) be submitted by 31 October 2013 to the Director-General for approval; (c) investigate methods to rehabilitate swamps subject to subsidence impacts and environmental consequences within Areas 3A and 3B, with the aim of restoring groundwater levels and groundwater recharge response behaviour to pre-mining levels; (d) 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; (e) provide for the expenditure of at least \$3.5 million over this period; and (f) include a schedule for subsequent trials, development of work plans and ongoing reporting.	Swamp Rehabilitation Research Program – Dendrobium Area 3B (August 2016) Interview – Manager Approvals	The Manager Approvals indicated that the DP&E have not yet approved the Swamp Rehabilitation Research Program – Dendrobium Area 3B (August 2016) (SRRP). a) section 3 of the SRRP describes consultation with NSW Government agencies. b) page 2 and section 3 state that a draft report was submitted to DP&E, WaterNSW, OEH and T&I. c) the SRRP contains description of such research activities (section 5). d) SRRP sections 5.8-5.11. e) Dollar (\$) values are quoted as per campaign or per day however a sum total is not expressed.	ANC	Consideration should be given to identifying what is actual expenditure in keeping with the assumed intent of this condition. Establish and document a schedule for subsequent trials, development of work plans and ongoing reporting.

No	Assessment Requirement	Reference/ Evidence	Comments	Compliance Status	Recommendations
			f) section 5.8 only contains a statement referencing that subsequent trials may be required with no schedule outlined.		
Area 3C Mine Layout and Monitoring Program					
16.	By 30 June 2018, and prior to the commencement of any longwall gateroad development in Area 3C, the Applicant shall submit the: (a) proposed mine layout and mining geometry for Area 3C; and (b) proposed baseline monitoring program for Area 3C, for approval by the Director General and the Executive Director Mineral Resources.		Not triggered at the time of the audit.	NT	
Independent Environmental Audit					
17.	The Applicant shall ensure that the audit team for the Independent Environmental Audit, required under Condition 6 of Schedule 8 of the development consent (DA 60-03-2001), includes suitable experts in the fields of mine subsidence impacts and remediation, upland swamps, and stream hydrology and water quality; and carries out an extensive audit of the impacts of mining in Area 3B, and the efficacy of the Biodiversity Offset Strategy.	Dendrobium Underground Coal Mine (DA 60-03-2001) Independent Environmental Audit 2017, DRE Letter dated 29/8/17	DRE approved the current audit team.	C	

Table A.4:

Statement of Commitments Compliance
Table

Table A.4 Statement of Commitments Compliance Table

No	Assessment Requirement	Reference/ Evidence	Comments	Compliance Status	Recommendations						
WEST CLIFF STAGE 3 COAL WASH EMPLACEMENT STATEMENT OF COMMITMENTS											
1. Coal Wash Alternatives											
	<p>(a) Prepare an implement an End of Resource coal wash strategy within 5 years of the issue of the Stage 3 emplacement approval issue date. The strategy should be reviewed every three years from the date of the State 3 emplacement approval. The strategy should be provided to the Department of Planning (DoP), Department of Environment and Climate Change (DECC) and Department of Primary Industries – Minerals (DPIM).</p> <p>(b) Give priority to the development and implementation of coal wash management solutions and strategies that maximise the beneficial use of coal wash and offer long term, large volume and sustainable opportunities.</p> <p>(c) Maximise the reuse of coal wash as fill in development sites. Reusing should be carried out in a safe, practical and commercially effective way.</p> <p>(d) Report the volume of coal wash reuse and the annual progress on the development of coal wash management solutions to the Government via the West Cliff Colliery Annual Environment Management Report (AEMR), submitted to DPI and copied to the DoP and DECC.</p>	Interview – Environmental Superintendent	The Environment Superintendent confirmed this condition is no longer considered relevant to the Dendrobium operation and is now part of the Bulli Seam Operation approval.	NA							
2. Stage 3 Emplacement											
	<p>(e) The West Cliff Stage 3 Emplacement and associated infrastructure will be entirely contained within the footprint shown in Figure 1.</p> <p>(f) The management and operation of the Stage 3 emplacement will be undertaken in accordance with the Emplacement Management Plan as amended from time to time in light of current best practice.</p>	As above	As above	NA							
3. Vegetation and Fauna											
	<p>(g) No more than 60.5 ha of native vegetation will be cleared for the West Cliff Stage 3 emplacement.</p> <p>(h) The management of vegetation and fauna at the West Cliff site (including the Stage 3 coal wash emplacement) will be undertaken in accordance with the Vegetation and Fauna Management Plan as amended from time to time in light of current best practice.</p> <p>(i) The Vegetation and Fauna Management Plan will be implemented to achieve the following performance indicators and targets:</p> <table border="1"> <thead> <tr> <th>Performance Indicator</th> <th>Performance Target</th> <th>Proposed Monitoring Methods</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>	Performance Indicator	Performance Target	Proposed Monitoring Methods				As above	As above	NA	
Performance Indicator	Performance Target	Proposed Monitoring Methods									

No	Assessment Requirement			Reference/ Evidence	Comments	Compliance Status	Recommendations	
	Weed management	Zone 1; Low levels of weed infestation in soil translocation compartments. Zone 2; A reduction in weed cover of perennial exotic grasses on disturbed edges. Zone 3; Weed free condition maintained. Eradication of noxious and serious environmental weeds from the colliery. Focus particularly on <i>Cortaderia selloana</i> and <i>Juncus acutus</i> .	Control methods used and justification Species treated and rates of herbicide application Weed density/condition of bushland mapping Inspections targeting noxious weeds					
	Success of Emplacement Area Rehabilitation (Zone1)	Adequate regeneration of translocated communities, Exposed Sandstone Scribbly Gum Woodland and Sandstone Gully Peppermint Forest. Regeneration to reflect composition and structure of the two communities. Condition; no more than 20 per cent weed cover in translocated compartments after 2 years. 15 per cent accepted plant losses over 2 years. Additional losses to be replaced by tubestock. 50 per cent vegetative cover of compartments achieved after 2 years. The degree to which fauna, threatened or otherwise, use the rehabilitated emplacement area including constructed habitats and nest boxes.	Permanent photographic points within translocated compartments. Monitoring vegetation quadrats in translocated patches measuring species richness, structure and composition, condition, death rates and replacement requirements, growth rates of key indicator species. Control sites to be set up in remnants. Random meanders for threatened flora that may have regenerated from translocation. Site assessments. Condition of bushland mapping. An assessment of areas regenerated per unit effort. A comparison of the environmental outcome to the type and size of the input. Soil testing (materials characterisation where revegetation fails). A BHPBIC staff member qualified and experienced in natural area restoration to project manage monitoring system.					
	Site stabilisation	Success of translocation as per the above targets. Stabilisation of sediment and erosion control measures.	Regular self audit and inspections including photographs of structures and the Emplacement benching, especially post storm flows.					

No	Assessment Requirement			Reference/ Evidence	Comments	Compliance Status	Recommendations
	Protection of Threatened Flora	Loss of threatened plants (<i>Persoonia hirsuta</i> , <i>Acacia bynoeana</i> and <i>Pultenaea aristata</i>) restricted to those identified in area described by Figure 1.	Inspections of on-site exclusion zones to ensure protection of remnant populations. Inspections and assessment of translocated <i>Persoonia hirsuta</i> (if required)				
	Protection of Threatened Fauna Habitats	No additional losses or loss of potential habitat outside the area described by Figure 1.	Annual habitat level surveys.				
	Phytophthora infection	Prevention of the introduction of Phytophthora Identification of Phytophthora infection If detected, development and implementation of a Phytophthora infection control plan	Annual soil sampling in vegetation within proximity to on site traffic (track, drainage and roadside edges) and areas of previous disturbance. If detected, further sampling from areas within the stage 3 footprint pre-construction and post construction will be undertaken.				
	Bushfire	The entire West Cliff mine lease currently operates under a fire exclusion policy. This policy will continue. Boundary and internal fire trails and other suppression advantages will be maintained. A hot work permit system will be maintained on the site. The Rural Fire Service will be offered regular orientations of the lease site. West Cliff Colliery is not currently subject to a hazard reduction burn regime and hazard reduction burns are not planned for the site. Any future bushfire management will consider fire regimes that are appropriate to ecological requirements (including management of threatened species and their habitats) of the site. Any proposed hazard reduction activities will only be undertaken in consultation with all relevant stakeholders.	Reporting by exception on the extent and intensity of unplanned bushfire.				
	Reporting	Annual Report to be supplied to regulatory authorities addressing outcomes of the project to date in relation to the above performance targets.	Reporting of project to regulatory authorities. Annual review of monitoring system and management methods. Adjustments made to systems and methods as required. Pro formas.				

No	Assessment Requirement	Reference/ Evidence	Comments	Compliance Status	Recommendations
	<p>(j) Emplacement clearing and rehabilitation actions will take place in the following manner as specified in the Vegetation and Fauna Management Plan.</p> <p>Vegetation clearing <u>Pre-clearing actions</u> Flagging area to be cleared and habitat features to be preserved or redistributed <u>Two staged vegetation clearing</u> Clearing of sub-canopy vegetation first to allow fauna opportunity to move Relocation of any fauna species encountered during the initial clearing of non-habitat trees Removal of habitat trees the next day Relocation of any remaining fauna prior to and during clearing of habitat trees <u>Habitat reinstatement</u> Transplanting dead stags Addition of habitat logs and woody debris Nest box use and installation Reconstruction of rocky outcrops Maintenance and monitoring</p> <p>Rehabilitation <u>Pre-translocation actions</u> Identify clearing compartments Timing of vegetation clearing Collection and storage of seed Identification and preparation of recipient sites <u>Soil salvage and handling</u> Vegetation clearing and stockpiling Stripping of soil in relevant horizons Soil and rock stockpiling <u>Soil replacement</u> Respreading soil horizons Redistribution of rocks, logs, cleared/stockpiled vegetation and habitat features on recipient sites Sediment and erosion control <u>Revegetation supplementary to soil translocation</u> Direct seeding of previously collected seed Weed control (where necessary)</p> <p>(k) The Broad headed Snake Management Plan will be implemented in three key stages including: Relocation of Broad headed snakes during the pre-clearing period, preferably during the winter season; Progressive two-stage clearing and habitat translocation; Monitoring and maintenance during the post-clearing period</p>				
4. Water					
	<p>(l) All stormwater runoff storage and treatment systems will be designed to cater for a 1:10 year ARI 72 hour duration rainfall event.</p> <p>(m) All emplacement stormwater runoff will be captured and treated in a <i>two pond in series</i> treatment system. The first pond will provide passive setting and the second pond chemically assisted settling. An automated chemical dosing system will be installed and operated between the first and second pond.</p> <p>(Note: During the last phase of emplacement, there will be only one stormwater treatment pond available. The area of the active emplacement will be minimised during this phase.)</p>	As above	As above	NA	

No	Assessment Requirement	Reference/ Evidence	Comments	Compliance Status	Recommendations																		
	<p>(n) Clean water will be separated from dirty water to minimise dirty water volumes that must be captured and treated.</p> <p>(o) The Brennans Creek diversion channel will be designed and constructed to cater for a 1:100 year ARI 2 hour duration storm event.</p> <p>(p) The Brennans Creek diversion channel will be rehabilitated to incorporate; riffles, pools, bedslope, channel roughness, floodplain pockets and riparian vegetation that approximate as close as possible the characteristics of Brennans Creek.</p> <p>(q) Illawarra Coal will negotiate a Pollution Reduction Program (PRP) with the Environment Protection Authority that will be incorporated into the West Cliff Colliery Environment Protection Licence to investigate, trial and implement appropriate strategies, technologies or works to achieve an agreed water quality discharge criteria from Brennans Creek Dam over an agreed time period.</p>																						
5. Final landform																							
	(r) The emplacement final landform will be contoured to form a stable landform that is sympathetic to the surrounding landscape.	As above	As above	NA																			
6. Dust																							
	(s) The emission of dust generated at the emplacement will be minimised by the use of water spray cart.	As above	As Above	NA																			
7. Compensatory measure																							
	(t) Illawarra Coal will transfer ownership of 153.4 ha of land at Bulli Tops to the Minister for the Environment and Climate Change for gazettal under the National Parks and Wildlife Act and/or the Sydney Water Catchment Management Act. This commitment also includes: funding the transfer costs to transfer land title from Illawarra Coal to the NSW Government; funding the agreed scope of site improvement works	As above	As above	NA																			
8. Aboriginal cultural heritage																							
	<p>(u) Aboriginal cultural heritage site impacted by the Stage 3 Coal Wash Emplacement will be restricted to:</p> <table border="1"> <thead> <tr> <th>Site</th> <th>Impact</th> </tr> </thead> <tbody> <tr> <td>BC2 (Shelter with Art)</td> <td>Destroyed by Emplacement landform</td> </tr> <tr> <td>BC5 (Axe Gr. Groove)</td> <td>Destroyed by Emplacement landform</td> </tr> <tr> <td>BC6 (Shelter with Art)</td> <td>Destroyed by Emplacement landform</td> </tr> <tr> <td>WC4 (Shelter with Art)</td> <td>Destroyed by Emplacement landform</td> </tr> <tr> <td>BCPAD4</td> <td>Destroyed by Emplacement landform</td> </tr> <tr> <td>BCPAD5</td> <td>Destroyed by Emplacement landform</td> </tr> <tr> <td>BC7 (Shelter with Art)</td> <td>Indirect via Landscape context – low potential for damage</td> </tr> <tr> <td>D11 (Shelter with Artefacts)</td> <td>Indirect via Landscape context – low potential for damage</td> </tr> </tbody> </table>	Site	Impact	BC2 (Shelter with Art)	Destroyed by Emplacement landform	BC5 (Axe Gr. Groove)	Destroyed by Emplacement landform	BC6 (Shelter with Art)	Destroyed by Emplacement landform	WC4 (Shelter with Art)	Destroyed by Emplacement landform	BCPAD4	Destroyed by Emplacement landform	BCPAD5	Destroyed by Emplacement landform	BC7 (Shelter with Art)	Indirect via Landscape context – low potential for damage	D11 (Shelter with Artefacts)	Indirect via Landscape context – low potential for damage	As above	As above	NA	
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No	Assessment Requirement	Reference/ Evidence	Comments	Compliance Status	Recommendations
	<p>(Note: relevant s87/90 consents under the National Parks and Wildlife Act will be sought for the Aboriginal cultural heritage site impacted by the Stage 3 Coal Wash Emplacement)</p> <p>(v) An Aboriginal Cultural Heritage Management Plan will be developed and implemented in consultation with relevant Aboriginal stakeholders for all sites located at West Cliff.</p> <p>(w) Illawarra Coal will enter into an agreed Aboriginal Community Enhancement Program with the Tharawal Local Aboriginal Land Council.</p>				

9. Community consultation										
	(x) Illawarra Coal will continue to operate an office in a local Shopping Precinct to enable the community easy access to information and Illawarra Coal staff (y) Illawarra Coal will continue to operate the 24-hour contact telephone line.		Contact telephone line tested and found to be active at the time of the audit. South32 offices located at Innovation Campus, Squires Way, North Wollongong, 2500.	C						
DENDROBIUM AREA 3 AMENDED STATEMENT OF COMMITMENTS										
1. Longwall layouts in Dendrobium Area 3										
	Optimal longwall layouts will be designed to achieve the following objectives for Dendrobium Area 3: <ul style="list-style-type: none"> Avoid fracturing in controlling rockbars of Sandy and Wongawilli Creek that is sufficient to result in water loss from pools (e.g. lower pool levels due to increased flow through controlling rockbars due to fracturing); Avoid fracturing in the Sandy Creek waterfall that is sufficient to result in increased water flow through the rockmass (e.g. water flowing through the rock overhang at the Sandy Creek waterfall); and Minimise volume of sterilised coal which could be efficiently extracted within the mining and environmental constraints of the area. 	Area 3b SMP (6/2/13) AEMR 2015, AR 2016, 2017 EoPR 10,11,12	Refer to Annex A - DA Compliance table review.	C						
2. Subsidence Impact – Monitoring										
	Pre, during and post mining subsidence impact monitoring will be undertaken in accordance with the approved Subsidence Management Plan. The monitoring component of the Subsidence Management Plan includes but is not necessarily limited to: <ul style="list-style-type: none"> Subsidence movement of natural and man made features Surface waters Groundwater Terrestrial flora and fauna Aquatic flora and fauna Aboriginal cultural heritage sites Swamps 	Area 3b SMP (6/2/13) AEMR 2015, AR 2016, 2017 EoPR 10,11,12	Refer to Annex A - DA Compliance table review and Annex 9 Subsidence Specialist Report.	C						
3. Subsidence Impact – Avoidance, Mitigation and Rehabilitation										
Subsidence can result in the conveyance of a portion of surface water flows to sub-surface fractures and reduce the riparian use of landholders.										
	If the monitoring program identifies impacts to natural features that exceed those predicted, the following contingent measures will be implemented.	Area 3b SMP (6/2/13) AEMR 2015, AR 2016, 2017 EoPR 10,11,12	Refer to <i>Annex A3</i> SMP Compliance table review re; Swamp impacts and water quality, and <i>Annex B</i> Subsidence Impact Management Compliance Assessment.	O						
	<table border="1"> <thead> <tr> <th>Description of Item</th> <th>Key Potential Impacts</th> <th>Avoidance, Mitigation and Rehabilitation</th> </tr> </thead> <tbody> <tr> <td><i>Permanently Flowing Creeks (Flow)</i></td> <td>Predicted Impacts Minor fracturing in the beds of Wongawilli and Sandy Creeks.</td> <td>Avoidance & Mitigation Not mining under Wongawilli & Sandy Creeks to avoid major fracturing and loss of surface flow. Commitment to avoid significant impacts to major natural features in Area 3b and 3c</td> </tr> </tbody> </table>	Description of Item	Key Potential Impacts	Avoidance, Mitigation and Rehabilitation	<i>Permanently Flowing Creeks (Flow)</i>	Predicted Impacts Minor fracturing in the beds of Wongawilli and Sandy Creeks.	Avoidance & Mitigation Not mining under Wongawilli & Sandy Creeks to avoid major fracturing and loss of surface flow. Commitment to avoid significant impacts to major natural features in Area 3b and 3c			Refer SMP Condition 9 above.
Description of Item	Key Potential Impacts	Avoidance, Mitigation and Rehabilitation								
<i>Permanently Flowing Creeks (Flow)</i>	Predicted Impacts Minor fracturing in the beds of Wongawilli and Sandy Creeks.	Avoidance & Mitigation Not mining under Wongawilli & Sandy Creeks to avoid major fracturing and loss of surface flow. Commitment to avoid significant impacts to major natural features in Area 3b and 3c								

		<p>Fracturing in the bed of SC10 leading to pool water level loss in some pools or loss of stream flow at some controlling rockbars.</p> <p>Impacts Exceeding Those Predicted</p> <p>Major fracturing in the beds of Wongawilli and Sandy Creeks leading to pool water level loss or loss of stream flow.</p> <p>Major fracturing in the bed of SC10 leading to pool water level loss in all pools or loss of stream flow at all controlling rockbars.</p> <p>Major fracturing in the rockmass of Sandy Creek waterfall leading to significant flow through the rock overhang.</p>	<p>Grouting and repair of significant surface water controlling features within SC10, where it is appropriate to do so, in consultation with SCA, DPIM, DECC and other stakeholders.</p> <p>Contingent Measure</p> <p>Grouting and repair of significant surface water controlling features where it is appropriate to do so in consultation with SCA, DPIM, DECC and other stakeholders.</p> <p>Grouting and repair of the waterfall rockmass where it is appropriate to do so in consultation with SCA, DPIM, DECC and other stakeholders.</p>					
	<p><i>Ephemeral watercourses</i></p> <p><i>(Flow)</i></p>	<p>Predicted Impacts</p> <p>Fracturing of the beds of some minor streams & diversion of flows.</p>	<p>Avoidance & Mitigation</p> <p>Not mining under Wongawilli & Sandy Creeks reducing subsidence movements in the more deeply incised parts of the tributaries. Commitment to avoid</p>					

		<p>Impacts Exceeding Those Predicted</p> <p>Major fracturing in the beds of streams leading to total pool water loss or complete loss of surface flow through controlling rockbars.</p>	<p>significant impacts to major natural features in Areas 3B and 3C.</p> <p>Contingent Measure</p> <p>Grouting and repair of significant surface water controlling features where it is appropriate to do so in consultation with SCA, DPIM, DECC and other stakeholders.</p>					
	<i>Lakes</i>	<p>Predicted Impacts</p> <p>Negligible impacts.</p> <p>Impacts Exceeding Those Predicted</p> <p>Connectivity of the lake with the mining area.</p>	<p>Avoidance & Mitigation</p> <p>The layout has been designed to avoid or minimise impacts on the lake. Potential impacts are considered negligible.</p> <p>Contingent Measure</p> <p>As per the DSC Contingency Plan.</p>					
	<i>Cliffs</i>	<p>Predicted Impacts</p> <p>Isolated rockfalls estimated to occur along ~ 10% of the cliff lines.</p> <p>Impacts Exceeding Those Predicted</p>	<p>Avoidance & Mitigation</p> <p>Monthly monitoring during subsidence.</p> <p>Signage & Fencing where they present safety risks.</p> <p>Communication strategy to stakeholders where they present safety risks.</p> <p>Contingent Measure</p>					

		<p>Rock falls occurring along >10% of the cliff lines or total cliff failure (e.g. entire length of cliff impacted).</p>	<p>As above.</p> <p>Scaling rocks loosened by subsidence where they present safety risks.</p> <p>Minor civil/earthworks to prevent erosions such as overland flow diversion works, establishment of banks, smoothing and re-contouring, where this is practical.</p> <p>Revegetation works such as planting, seeding, mulching, weed control and plant maintenance, where this is practical.</p>					
	<i>Steep slopes</i>	<p>Predicted Impacts</p> <p>Some impacts are possible if slopes are marginally stable.</p> <p>Large cracks or compressive ridges. No significant diversion of surface water flow direction or increase in soil erosion/sedimentation of waterways.</p> <p>Impacts Exceeding Those Predicted</p> <p>Large cracks, large compressive ridges or mass movements causing significant erosion if left</p>	<p>Avoidance & Mitigation</p> <p>Monthly monitoring during subsidence.</p> <p>Signage & Fencing where they present safety risks.</p> <p>Communication strategy to stakeholders where they present safety risks.</p> <p>Minor sediment control works such as silt fencing.</p> <p>Contingent Measure</p> <p>As above.</p> <p>Minor civil/earthworks to</p>					

		untreated.	<p>prevent erosions such as overland flow diversion works, establishment of banks, smoothing and re-contouring, where this is practical.</p> <p>Revegetation works such as planting, seeding, mulching, weed control and plant maintenance, where this is practical.</p> <p>Erosion control and revegetation establishment where required to prevent further impacts.</p> <p>Infill of surface cracks with soil or other suitable material where appropriate, local regrading or compacting of the surface. Temporary sediment and erosion control measures.</p> <p>Monitoring – event specific mitigation and rehabilitation.</p>					
	<i>Aquatic fauna and flora</i>	<p>Predicted Impacts</p> <p>Impacts on fauna are possible due to 'loss' of water from pools. Impacts on vegetation expected to be very small.</p> <p>Impacts Exceeding Those Predicted</p>	<p>Avoidance & Mitigation</p> <p>Not mining under Wongawilli & Sandy Creeks to avoid major fracturing and loss of surface flow.</p> <p>Commitment to avoid significant impacts to major natural features in Areas 3B and 3C.</p> <p>Contingent Measure</p>					

		<p>Major reduction in pool water level or complete loss of pool water.</p> <p>Major reduction in aquatic habitat for an extended timeframe or complete loss of habitat.</p> <p>Identified mortality of fauna/flora in proximity to identified mining impact.</p>	<p>Grouting and repair of significant surface water controlling features where it is appropriate to do so in consultation with SCA, DPIM, DECC and other stakeholders.</p> <p>Active preservation of life such as relocation of stranded fish.</p> <p>Temporary ecosystem maintenance such as watering aquatic plants until final rehabilitation completed, where this is practical.</p>					
	<p><i>Terrestrial fauna and flora including endangered ecological communities</i></p>	<p>Predicted Impacts</p> <p>Impacts on fauna are possible due to 'loss' of water in creeks. Proposal assessed as likely to have a significant local impact on three frog and one dragonfly species.</p> <p>Impacts Exceeding Those Predicted</p> <p>Large areas of impacted vegetation (by rockfalls, soil slippage) that is unlikely to commence natural regeneration within 6 months.</p>	<p>Avoidance & Mitigation</p> <p>Monthly monitoring during subsidence.</p> <p>Not mining under Wongawilli & Sandy Creeks to avoid major fracturing and loss of surface flow.</p> <p>Commitment to avoid significant impacts to major natural features in Areas 3B and 3C.</p> <p>Contingent Measure</p> <p>Site rehabilitation to reinstate habitat values – increased monitoring.</p>					

		<p>Significant surface soil cracking or rock bar fracturing resulting in loss of standing water and or erosion in creeks or swamps.</p> <p>Gas emissions with extensive vegetation die off and no evidence of self regeneration within 6 months of cessation of gas release.</p>	<p>Remediation of subsidence related fracturing or dilation within creek beds and surface cracks where it is appropriate to do so in consultation with SCA, DPIM, DECC and other stakeholders.</p> <p>Minor civil/earthworks to prevent erosions such as overland flow diversion, establishment of banks, smoothing and re-contouring, where this is practical.</p> <p>Revegetation such as planting, seeding, mulching, weed control and plant maintenance, where this is practical.</p> <p>Active preservation of life such as relocation of stranded fauna and watering of stressed vegetation where this is beneficial and practical.</p> <p>Temporary ecosystem maintenance such as watering plants until final rehabilitation completed, where this is practical.</p>					
	<p><i>Aboriginal Places of Cultural Significance - Archaeological sites</i></p>	<p>Predicted Impacts</p> <p>Unlikely that the sites will sustain structural impacts. Empirical data suggests the probability of impacts to a site is less than 10%.</p>	<p>Avoidance & Mitigation</p> <p>Baseline, active subsidence and post mining monitoring. Appropriate</p>					

		<p>Impacts Exceeding Those Predicted</p> <p>Change in shelter conditions not attributable to natural weathering or preservation – cracking or exfoliation of art panel, movement of existing planes and joints at panel, block fall within shelter or overhang, shelter or overhang collapse.</p>	<p>consultation and approvals.</p> <p>Contingent Measure</p> <p>Site and event specific mitigation and rehabilitation will be developed with appropriate Aboriginal representatives, DECC and SCA.</p> <p>Techniques may involve installing artificial drip lines, detailed recording of art, stabilising and cleaning rock faces. Refer Area 3A SMP section 22.9.</p>					
<p><i>Water quality–</i></p> <p><i>Permanently Flowing Creeks</i></p> <p><i>Wongawilli Creek</i></p> <p><i>Sandy Creeks.</i></p>	<p>Predicted Impacts</p> <p>Impacts on water quality are possible due to reduced flow and/or increased interaction of ground and surface water. These impacts are likely to include reduced oxygen, higher dissolved ions and precipitates. There is also a possibility of lower pH and lower temperature variation as a result of groundwater inflows.</p> <p>Impacts Exceeding Those Predicted</p> <p>Major reduction in water quality when comparing baseline period to mining period, i.e. comparing baseline data to mining period: pH drop of >2 EC increase >100 uS/cm</p>	<p>Avoidance & Mitigation</p> <p>Not mining under Wongawilli & Sandy Creeks to avoid major fracturing and loss of surface flow.</p> <p>Commitment to avoid significant impacts to major natural features in Areas 3B and 3C.</p> <p>Contingent Measure</p> <p>Grouting and repair of surface water controlling features and the beds of streams where fracturing is evident where it is</p>						

		<p>ORP* drop >200 mV</p> <p>A > 2 standard deviation reduction in water quality apparent at downstream monitoring site when comparing pre-mining to baseline data.</p>	<p>appropriate to do so in consultation with SCA, DPIM, DECC and other stakeholders.</p> <p>Limestone emplacement to raise pH where it is appropriate to do so in consultation with SCA, DPIM, DECC and other stakeholders.</p>					
	<i>Water quality-ephemeral streams</i>	<p>Predicted Impacts</p> <p>Some buckling and fracturing of creek beds & diversion of flows.</p> <p>Impacts on water quality are possible due to reduced flow and/or increased interaction of ground and surface water.</p> <p>These impacts are likely to include reduced oxygen, higher dissolved ions and precipitates. There is also a possibility of lower pH and lower temperature variation as a result of groundwater inflows. However, volumes of pooled water in ephemeral streams are small relative to the entire catchment.</p> <p>Impacts Exceeding Those Predicted</p> <p>Major reduction in water quality when comparing baseline period to mining period, i.e. comparing baseline data to mining period: pH drop of >2 EC increase >100 uS/cm ORP* drop >200 mV</p>	<p>Avoidance & Mitigation</p> <p>Monitoring, measurement and reporting.</p> <p>Contingent Measure</p> <p>Grouting and repair of surface water controlling features and the beds of streams where fracturing is evident</p>					

		<p>A > 2 standard deviation reduction in water quality apparent at downstream monitoring site when comparing pre-mining to baseline data.</p>	<p>where it is appropriate to do so in consultation with SCA, DPIM, DECC and other stakeholders.</p> <p>Limestone emplacement to raise pH where it is appropriate to do so in consultation with SCA, DPIM, DECC and other stakeholders.</p>					
	<p><i>Groundwater quality, quantity and levels</i></p>	<p>Predicted Impacts</p> <p>Impacts on groundwater are possible due to increased interaction of ground and surface water as well as increased interaction of groundwater with existing and freshly created fractures within the rock and soil mass. These impacts are likely to include reduced oxygen, higher dissolved ions and lower pH. Shallow groundwater systems are likely to be depressed by increased permeability as a result of fracturing.</p> <p>Impacts Exceeding Those Predicted</p> <p>Major reduction (monitoring bore dry where it has not been prior to mining) in groundwater level at the majority of bores within any particular aquifer or swamp system or complete loss of groundwater.</p>	<p>Avoidance & Mitigation</p> <p>Monitoring, measurement and reporting.</p> <p>Not mining under Wongawilli & Sandy Creeks to avoid major fracturing and loss of surface flow.</p> <p>Commitment to avoid significant impacts to major natural features in Areas 3B and 3C.</p> <p>Contingent Measure</p> <p>Mitigation of flow-on ecological effects as described above.</p>					

		High reduction in water quality, i.e. comparing baseline data to mining period: pH drop of >2 EC increase >100 uS/cm ORP* drop >200 mV						
	<i>Surface of the land</i>	<p>Predicted Impacts</p> <p>Some surface cracking posing safe access constraints.</p> <p>Impacts Exceeding Those Predicted</p> <p>Major surface cracking preventing safe access.</p>	<p>Avoidance & Mitigation</p> <p>Monitoring, measurement and reporting during active subsidence.</p> <p>Signage & Fencing where they present safety risks.</p> <p>Communication strategy to stakeholders where they present safety risks.</p> <p>Fill crack with appropriate material in consultation with infrastructure owner. Install temporary erosion and sediment controls were appropriate.</p> <p>Contingent Measure</p> <p>As above.</p> <p>Establishment of alternative access to critical areas.</p>					
	<i>Swamps</i>	<p>Predicted Impacts</p> <p>No change in hydrology or ecological function of swamps.</p> <p>Impacts Exceeding Those Predicted</p>	<p>Avoidance & Mitigation</p> <p>Monitoring before, during and after active subsidence.</p> <p>Contingent Measure</p>					

	Major controlling rockbar cracking leading to water loss in swamp Burning and/or erosion of peat material.	Implement swamp contingency plan.					
4. Swamp Contingency Plan							
	Prior to the commencement of mining within Dendrobium Area 3A, 3B and 3C, Illawarra Coal will prepare a swamp remediation contingency plan for all swamps within each area.	SWIMMCP (June 2015)	Swamp Research and Rehabilitation Plan (SRRP) first submitted to the DPE in May 2013 for regulatory approval, however not yet approved. The SRRP was updated in August 2016 based on DP&E feedback (dated 29-June 16) and further discussion.	O	Confirm status of SRRP Approval.		
5. Water Quality Offset							
	Illawarra Coal will negotiate an offset with the SCA to account for the small and unquantifiable water quality impact resultant from the proposal.			NV			
6. Sandy Creek Waterfall							
	Prior to the commencement of longwall mining within Dendrobium Area 3A, Illawarra Coal will: establish a "technical committee" that includes BHPB, DPI, MSEC, and independent subsidence and geotechnical experts to advise on Sandy Creek Waterfall, develop and implement detailed management outcomes such as a Trigger Action Response Plan (TARP) that identifies detailed monitoring and management triggers, including but not necessarily limited to a decision to stop mining, where Longwalls 6-8 extract coal within 400 m of the Sandy Creek Waterfall. Illawarra Coal will establish cut throughs at 50 m intervals at the finishing end of Longwalls 6 and 7 in order to be able to comply with any decision to stop mining based on the triggers in the TARP. Consideration will be given in the design of development roads for Longwalls 8-10 in regard to the provision of Longwall take off cut throughs in order to achieve compliance with the triggers in the TARP.		Not applicable to Area 3B.	NA			
7. Green House Gas Emission - Measuring and Reporting							
	Illawarra coal is required to monitor and report green house gas emissions from Dendrobium Mine in accordance with the National Greenhouse and Energy Reporting Act 2007. This emissions data will be reported in the AEMR. The AEMR will also discuss current and proposed future action to minimise and/or abate green house gas emissions.		Refer Annex A.1 DA Compliance table, Schedule 6, Condition 1.	C			

Table A.5:

Subsidence Management Plan Compliance
Table

Table A.5 Mining Lease Consolidated Compliance Table

No	Assessment Requirement	Reference/ Evidence	Comments	Compliance Status	Recommendations
Mining, Rehabilitation, Environmental Management Process (MREMP)					
Mining operations plan (MOP) - ML 1510, ML 1566, CCL 768					
1.1	Mining operations, including mining purposes, must be conducted in accordance with a mining operations plan (the Plan) satisfactory to the Director-General. The Plan together with the environmental conditions of development consent and other approvals will form the basis for:- (a) ongoing mining operations and environmental management; and (b) ongoing monitoring of the project.	Dendrobium Area 3B – Subsidence Management Plan, PDM-001-9.6.1D Rev B	MOP not required in lieu of SMP Approval.	C	
1.2	The plan must be prepared in accordance with the Director-General’s guidelines current at the time of lodgement.	As above	As above	C	
1.3	A Plan must be lodged with the Director-General:- (a) prior to the commencement of operations; (b) subsequently as appropriate prior to the expiry of any current Plan; and (c) in accordance with any direction issued by the Director-General.	As above	As above	C	
1.4	The Plan must present a schedule of proposed mine development for a period of up to seven (7) years and contain diagrams and documentation which identify:- (a) area(s) proposed to be disturbed under the Plan; (b) mining and rehabilitation method(s) to be used and their sequence; (c) areas to be used for disposal of tailings/waste; (d) existing and proposed surface infrastructure; (e) progressive rehabilitation schedules; (f) area of particular environmental sensitivity (g) water management systems (including erosion and sediment controls) (h) proposed resource recovery; and (i) where the mine will cease extraction during the term of the Plan, a closure plan including final rehabilitation objectives/methods and post mining landuse/vegetation	As above	The SMP addresses this condition.	C	
1.5	The Plan when lodged will be reviewed by the Department of Mineral Resources.	Note	Noted	Note	
1.6	The Director-General may within two (2) months of the lodgement of a Plan, require modification and relodgement.	Note	Noted	Note	
1.7	If a requirement in accordance with clause (6) is not issued within two months of the lodgement of a Plan, lease holder may proceed with implementation of the Plan submitted subject to the lodgement of the required security deposit within the specified time.	Note	Noted	Note	
1.8	During the life of the Mining Operations Plan, proposed modifications to the Plan must be lodged with the Director-General and will be subject to the review process outlined in clauses (5) - (7) above.	Dendrobium Area 3B – Subsidence Management Plan, PDM-001-9.6.1D Rev B	SMPs are lodged with DPE for approval.	C	

Shafts, Drifts, Audits - ML 1510					
2	Operations shall be conducted in such a manner so as not to cause any danger to persons or stock and the lease holder shall provide and maintain adequate protection to the satisfaction of the Minister around each shaft or excavation opened up or used by the lease holder.	Site Observations Interview – Environmental Superintendent	Operational areas inspected by the auditor were secured appropriately to prevent access by non-operational persons and stock. No reported incidents in relation to unauthorised access during the audit period.	C	
Dumps - ML 1510					
3.1	The lease holder shall comply with any direction, given or which may be given by the inspector regarding the dumping, depositing, or removal of material extracted as well as the stabilisation and revegetation of any dumps of coal, minerals, mine residues, tailings or overburden situated on the subject area or the associated colliery holding.	Site Observations Interview – Environmental Superintendent	Waste from washery is deposited at West Cliff Emplacement Area, no dumping within ML1510.	NT	
3.2	The lease holder shall comply with any direction given or which may be given by the Minister regarding the spraying of coal dumps on the subject area.	Site Observations Interview – Environmental Superintendent	Coal stockpile provided with dust suppression water cannons, connected to water detection and weather monitoring triggers. Manual activation is possible.	C	
Management and rehabilitation of lands (general) - ML 1510					
4.1	The lease holder shall not interfere in any way with any fences on or adjacent to the subject area unless with the prior written approval of the owner thereof or the Minister and subject to such conditions as the Minister may stipulate.	Interview – Environmental Superintendent	No fences removed or installed during the audit period. Ongoing maintenance and repairs conducted following livestock interaction.	NT	
4.2	The lease holder shall observe any instruction given or which may be given by the Minister with a view to minimising or preventing public inconvenience or damage to public or private property.	Interview – Environmental Superintendent	No Ministerial instruction during the audit period.	NT	
4.3	If required to do so by the Minister and within such time as may be stipulated by the Minister the lease holder shall carry out to the satisfaction of the Minister surveys of structures, buildings and pipelines on adjacent landholdings to determine the effect of operations on any such structures, buildings and pipelines.	Interview – Environmental Superintendent	No Ministerial instruction during the audit period.	NT	
4.4	Upon completion of operations on the surface of the subject area or upon the expiry or sooner determination of this authority or any renewal thereof, the lease holder shall remove from such surface such buildings, machinery, plant, equipment, constructions and works as may be directed by the Minister and such surface shall be rehabilitated and left in a clean, tidy and safe condition to the satisfaction of the Minister.	Interview – Environmental Superintendent	Operations at ML1510 are ongoing on the surface of the subject area.	NT	
Trees (planting and protection of) flora and fauna and arboreal screens - ML 1510					
5.1	If so directed by the Minister, the lease holder shall ensure that operations are carried out in such a manner so as to minimise disturbance to flora and fauna within the subject area.	Interview - Environment Supervisor	No such direction has been provided during the audit period.	NT	
5.2	The lease holder shall maintain an arboreal screen to the satisfaction of the Minister within such parts of the subject area as may be specified by the Minister and shall plant such trees or shrubs as may be required by the Minister to preserve the arboreal screen in a condition satisfactory to the Minister.	Interview - Environment Supervisor	No such direction has been provided during the audit period.	NT	
Transmission lines, communication lines and pipelines - ML 1510 and ML 1566 and CCL768					
6.1	The lease holder shall as far as is practicable so conduct operations as not to interfere with or impair the stability or efficiency of any transmission line, communication line or pipeline traversing the surface or the excepted surface of the subject area and shall comply with any direction given or which may be given by the Minister in this regard.	Site Observations Interview – Environmental Superintendent	Within mining area transmission line, communication line or pipeline traversing the surface are reinforced and pipeline and transmission line operators conduct ongoing maintenance.	C	
6.2	Unless with the consent of Integral Energy, the lease holder shall not carry out any operations within any easement for power transmission line traversing the subject area.	Interview – Environmental Superintendent and correspondence with Superintendent Electrical Standards	No surface operations within power transmission line easement areas.	NT	
Labour/Expenditure - ML 1566					

7	The lease holder shall during each year of the term of the authority: (a) ensure that at least 2 workers are efficiently employed on the subject area; or (b) expend on operations carried out in the course of prospecting or mining the subject area, an amount of not less than \$35,000. The Minister may, at any time after a period of two (2) years from the date on which this authority has effect or from the date on which the renewal of this authority has effect, increase or decrease the amount of expenditure or labour required.	End of Panel Report for Long Wall 12. Energy Data.	ML 1566 covers Dendrobium Fan Site 2 & 3. Current workforce directly employed for Dendrobium Mine is 265 strong and approximately 400 strong including management and contractors. Spend on electricity alone for Dendrobium Mine is over \$35,000 each month.	C	
Additional information					
8	The lease holder shall if directed by the Minister and within such time as the Minister may stipulate furnish to the Minister: (a) information regarding the ownership of the land within the subject area; (b) information regarding the ownership of the coal within the subject area prior to 1 st January, 1982; (c) an indemnity in a form approved by the Minister indemnifying the Crown and the Minister against any wrong payment effected as a result of incorrect information furnished by the lease holder; (d) information regarding the financial viability of the lease holder and operations within and associated with the subject area; and (e) information regarding shareholdings in the lease holder.	Interview – Environmental Superintendent	No Ministerial instruction during the audit period.	NT	
Service of notices - ML 1510					
9	Within a period of three (3) months from the date of this authority or a period of three (3) months from the date of a service of the notice of renewal, or within such further time as the Director General may allow, the lease holder shall serve on each landholder within the subject area a notice in writing indicating that this authority has been granted or renewed and whether the authority includes the surface. The notice shall be accompanied by an adequate plan and description of the subject area. If there are ten (10) or more landholders affected the lease holder may serve the notice by publication in a newspaper circulating in the region where the subject area is situated. The notice shall indicate that this authority has been granted or renewed, state whether the authority includes the surface and shall contain an adequate plan and description of the subject area.	Note	Condition does not relate to this audit period.	NT	
Inspectors - ML 1510					
10	(a) Where an inspector under the Mining Act 1992 is of the opinion that any condition of this authority relating to operations within the subject area, or any provision of the Mining Act, 1992, relating to operations within the subject area, are not being complied with by the lease holder, the Inspector may serve on the lease holder a notice stating that and give particulars of the reason why, and may in such notice direct the lease holder: (i) to cease operations within the subject area in contravention of that condition or Act; and (ii) to carry out within the specified time works necessary to rectify or remedy the situation. (b) The lease holder shall comply with the directions contained in any notice served pursuant to sub paragraph (a) of this condition. The Director General may confirm, vary or revoke any such direction. (c) A notice referred to in this condition may be served on the Colliery Manager.	Note	Noted	Note	
Indemnities - ML 1510 and ML 1566					
11	The lease holder must indemnify and keep indemnified the Crown from and against all actions suits and claims and demands of whatsoever nature and all costs charges and expense which may be brought against the lease holder or which the lease holder may incur respect of any accident or injury to any person or property which may arise out of the construction maintenance or working of any workings now existing or to be made by the lease holder within the boundaries of the subject area or in connection with any of the operations notwithstanding that all other conditions of this authority shall in all respects have been observed by the lease holder or that any such accident or injury shall arise from any act or thing which the lease holder may be licensed or compelled to do hereunder.	Insurance Certificates	The auditor sighted Public Liability Insurance and Workers Compensation Insurance.	C	
Prospecting (general) - ML 1510					

12	(a) Where the lease holder desires to commence prospecting operations in the subject area the lease holder shall notify the Director General in writing and shall comply with such additional conditions as the Minister may impose including any condition requiring the lodgement of an additional bond or other form of security for rehabilitation of the area affected by such operations. (b) Where the lease holder notifies the Director General pursuant to sub paragraph (a) of this condition the lease holder shall furnish with that notification details of the type of prospecting methods that would be adopted and the extent and location of the area that would be affected by them.	Interview Environmental Superintendent	-	No exploration within ML1510 during the audit period.	NT	
Security deposit - ML 1510 and ML 1566 Group Security						
13	(a) The lease holder shall, upon request by the Director General, lodge with the Minister the sum of \$1,864,000 (see amendment 080216) as security for the fulfilment of the obligations of the lease holder under this authority. In the event that the lease holder fails to fulfil any of the lease holder's obligations under this authority the said sum may be applied at the discretion of the Minister towards the cost of fulfilling such obligations. For the purposes of the clause a lease holder shall be deemed to have failed to fulfill the lease holder's obligations under this authority, if the lease holder fails to comply with any condition or provision of this authority, any provision of the Act or regulations made thereunder or any condition or direction imposed or given pursuant to a condition or provision of this author or of any provision of the Act or regulations made thereunder. (b) The lease holder must provide the security required by sub-clause (a) hereof in one of the following forms:- (i) cash, or (ii) a security certificate in such form and given by such surety as may from time to time be approved by the Minister. (c) The Minister may at any time after the commencement of this authority or any renewal thereof, vary the amount of security required in accordance with this condition.	Rehabilitation Cost Calculation Tool 2016		Rehabilitation costs for 1510 and 1566 calculated as \$2,705,116 through the Rehabilitation Cost Calculation Tool 2016.	C	
Security - CCL768						
	The lease holder is required to provide and maintain a security deposit to secure funding for the fulfilment of obligations of all or any kind under the mining lease, including obligations of all or any kind under the mining lease that may arise in the future. The amount of the security deposit to be provided has been assessed by the Minister at \$11,742,000.	DPE Security Bond Letter (August 2017)		Letter detailing Security Bond held for Dendrobium Mine from DPE on 18 August 2017. Bond totalling \$12,449,000.	C	
Royalty at additional rate - ML 1510						
14	The lease holder shall during the term of this authority pay to the Minister royalty at the additional rate as prescribed by the Regulations for coal recovered by open cut mining methods from the area.	Note		No coal extracted from ML1510 during audit period.	NT	
Amendment of the subsidence management plan condition (1 July 2014) - ML 1510 and ML 1566 and CCL768						
15	In accordance with the provisions of Section 239(2) of the <i>Mining Act 1992</i> , the Minister has amended the Subsidence Management Plan (SMP) condition on this lease by imposing an alternative Extraction Plan condition. The new condition requires the lease holder to have an approved Extraction Plan in place which provides for the effective management of subsidence risks prior to undertaking underground mining operations that may cause subsidence.	Dendrobium Area 3B – Subsidence Management Plan, PDM-001-9.6.1D Rev B Area 3B SMP Approval 6/2/13		SMP for Area 3B approved in February 2013 for current Extraction Plan. Mining undertaken in accordance with the SMP during the audit period.	O	Refer Annex A3 – SMP compliance table and suggested CMAs.

	<p>Extraction Plan Condition</p> <p>(a) In this condition:</p> <p>(i) approved Extraction Plan means a plan, being:</p> <p>A. an extraction plan or subsidence management plan approved in accordance with the conditions of a relevant development consent and provided to the Secretary; or</p> <p>B. a subsidence management plan relating to the mining operations subject to this lease:</p> <p>I. submitted to the Secretary on or before 31 December 2014; and</p> <p>II. approved by the Secretary.</p> <p>(ii) relevant development consent means a development consent or project approval issued under the <i>Environmental Planning & Assessment Act 1979</i> relating to the mining operations subject to this lease.</p> <p>(b) The lease holder must not undertake any underground mining operations that may cause subsidence except in accordance with an approved Extraction Plan.</p> <p>(c) The lease holder must ensure that the approved Extraction Plan provides for the effective management of risks associated with any subsidence resulting from mining operations carried out under this lease.</p> <p>(d) The lease holder must notify the Secretary within 48 hours of any:</p> <p>(i) incident caused by subsidence which has a potential to expose any person to health and safety risks;</p> <p>(ii) significant deviation from the predicted nature, magnitude, distribution, timing and duration of subsidence effects, and of the potential impacts and consequences of those deviations on built features and the health and safety of any person; or</p> <p>(iii) significant failure or malfunction of a monitoring device or risk control measure set out in the approved Extraction Plan addressing:</p> <p>A. built features</p> <p>B. public safety; or</p> <p>C. subsidence monitoring.</p>	Refer above			
Fences, Gates - ML 1566					
16	Gates within the lease area must be closed or left open in accordance with the requirements of the land holder.	Site observations	Auditor observed gates within lease area to be closed and provided with locks with limited access to keys.	C	
Roads and tracks - ML 1566					
17	Access tracks must be kept to a minimum and be positioned so that they do not cause any unnecessary damage to the land. Temporary access tracks must be ripped, topsoiled and revegetated as soon as possible after they are no longer required for mining operations. The design and construction of access tracks must be in accordance with specifications fixed by the Department of Infrastructure, Planning and Natural Resources.	Site observations	Temporary access tracks within lease area observed by auditor to be rehabilitated.	C	
Trees and timber - ML 1566					
18	<p>(a) The lease holder must not fell trees, strip bark or cut timber on the lease without the consent of the landholder who is entitled to the use of the timber, or if such a landholder refuses consent or attaches unreasonable conditions to the consent, without the approval of a warden.</p> <p>(b) The leaseholder must not cut, destroy, ringbark or remove any timber of other vegetative cover on the lease area except such as directly obstructs or prevents the carrying on of operations. Any clearing not authorised under the Mining Act 1992 must comply with the provisions of the Native Vegetation Conservation Act 1997.</p> <p>(c) The lease holder must obtain all necessary approvals or licences before using timber from any Crown land within the lease area.</p>	Interview - Environment Supervisor	<p>Environment Supervisor advised that no trees were cleared during this audit period.</p> <p>Clearing is maintained in asset protection zone for bushfire controls and the Environment Supervisor indicated this condition is not applicable to such clearing.</p>	NT	
Sydney Catchment Authority Catchment Area - ML 1566					

20	<p>(a) The lease holder shall carry out operations in such a way as to conform strictly to all provisions of the Sydney Water Catchment Management Act 1998 and the regulations thereunder applying to the prevention of pollution of the Metropolitan Special Area or the preservation of the purity of the water supply provided thereby or derived therefrom or for the protection of the property of Sydney Catchment Authority ('the Authority') on the Special Area and also to all requirements of the Authority from time to time under the said Act or any of the regulations for the time being in force.</p> <p>(b) If the lease holder shall at any time be using or about to use any process which in the opinion of the Authority is likely to pollute the Special Area or the water supply or to endanger any property of the Authority on the Special Area the lease holder upon service of a notice in writing under the hand of the Minister to do so shall:</p> <p>(i) discontinue the use of such process immediately, or</p> <p>(ii) thereafter refrain from adopting such process at any time, as the case may require.</p> <p>(c) The lease holder shall provide and maintain to the satisfaction of the Minister efficient means to prevent the contamination, pollution, erosion or siltation of any stream or watercourse or Special Area and shall observe any instruction given or which may be given by the Minister with a view to preventing or minimising the contamination, pollution or siltation of any stream watercourse or Special Area.</p> <p>(d) The lease holder hereby covenants with Us Our Heirs and Successors and as a separate covenant the lease holder hereby covenants with the Authority and its Successors that the lease holder shall at all times hereafter save harmless and keep Us and the said Authority and Our Heirs and Successors and the Successors of the said Authority indemnified from payment of compensation and from and against all actions proceedings claims and demands in respect of any injury loss or damage arising out of or in any way connected with any interference with or deprivation or loss of access to the land and premises of this authority which may occur by reason of any works or operations undertaken or carried out by the said Authority or arising out of or in any way connected with any discontinuance or alteration of any process consequent upon the service of a notice in pursuance of the provisions of Condition 31(b) or arising out of or in any way connected with the operation of any regulations relating to Special Area in force at the date hereof or made by the said Authority at</p>	<p>Water Management Plan (2014)</p> <p>Landscape Management Plan (2014)</p> <p>Site Observations</p>	<p>The Auditor observed appropriate sediment controls in place in areas of ground disturbance, including access tracks, and examples of revegetation of disturbed areas.</p> <p>Construction Management Plan in place for the 2008 construction of Dendrobium Fan Site 2 & 3. Area currently covered by the Water Management Plan and Landscape Management Plan for Dendrobium Mine.</p>	C	
	any time hereafter and the lease holder hereby agrees that for the purpose of this condition the said Authority shall be deemed to be a party to this authority.				
	<p>The lease holder shall:</p> <p>(a) Make such provisions for sanitation as may be directed by the Authority and shall at all times observe and perform any requirements of the said Authority respecting sanitation.</p> <p>(b) not establish any camps or habitations within any area under the control of the Authority unless with the consent of the Authority.</p> <p>(c) Not sink any drillhole within the stored waters on the subject area nor within 40 metres of the top water level thereof unless with the consent of the Authority.</p> <p>(d) Not sink any drillhole within any watercourse on the Metropolitan Special Area nor within 100 metres thereof unless with the consent of the Authority.</p> <p>(e) Not construct any road to the sites of any drillholes unless with the consent of the Authority to the proposed route and type of road construction.</p> <p>(g) Not interfere in any way with any fences on or adjacent to the Metropolitan Special Area unless with the consent in writing of the owner thereof or the Authority.</p> <p>(h) Give twenty eight days' notice to the General Manager, Catchment Operations and Major Projects, Sydney Catchment Authority, Penrith, of its intention to commence drilling operations.</p> <p>(i) Not cut or remove any timber except such as directly obstructs or prevents the carrying on of operations and the lease holder shall obtain the consent in writing of the Authority before making use of the timber so cut for other than in connection with operations.</p> <p>(j) Complete work in relation to rehabilitation within the Metropolitan Special Area before termination of the authority to the satisfaction of the Authority.</p>	<p>Site observations and Interview – Environment Supervisor</p> <p>Annual Exploration Report October 2015 – October 2016 (supporting GIS overlays)</p>	<p>a – b) The Auditor observed sanitation provision at Dendrobium Fan Site 2 & 3, no habitations observed.</p> <p>c – d) The Auditor reviewed exploration reports and GIS overlays to demonstrate borehole locations.</p> <p>e & h) REFs prepared for seismic lines provide access. Sample of REF and Approval sighted by auditor.</p> <p>g & i) No impact on fences or timber observed or reported.</p> <p>j) Not Triggered</p>	C	
	The lease holder shall undertake all works in accordance with the conditions contained in the Development Consent [DA 60-03-2001] issued by the then Minister for Urban Affairs and Planning on 20 November 2001 (File No. S00/01177).	Note	The detailed compliance tables of this audit have been prepared and respond to this condition.	Note	
Prescribed dam - ML 1566 and CCL768					

21	<p>(A) Notwithstanding any Mining Operations Plan, the lease holder must not mine within any part of the lease area which is within the notification area of the Avon, Cataract, Cordeaux and Upper Cordeaux No.2 Dams without the prior written approval of the Minister and subject to any conditions stipulated.</p> <p>(B) Where the lease holder desires to mine within the notification area he/she must:</p> <p>(i) at least twelve (12) months before mining is to commence or such lesser time as the Minister may permit, notify the Minister of the desire to do so. A plan of the mining system to be implemented must accompany the notice; and</p> <p>(ii) provide such information as the Minister may direct.</p> <p>(C) The Minister must not, except in the circumstances set out in sub-paragraph (ii), grant approval unless sub-paragraph (i) of this paragraph has been complied with .</p> <p>(i) This sub-paragraph is complied with if:</p> <p>(a) the Dams Safety Committee as constituted by Section 7 of the Dams Safety Act 1978 and the owner of the dam have been notified in writing of the desire to mine referred to in paragraph (B).</p> <p>(b) the notifications referred to in clause (a) are accompanied by a description or plan of the area to be mined.</p> <p>(c) the Director-General has complied with any reasonable request made by the Dams Safety Committee or the owner of the dam for further information in connection with the mining proposal.</p> <p>(d) the Dams Safety Committee has made its recommendations concerning the mining proposal or has informed the Minister in writing that it does not propose to make any such recommendations; and</p> <p>(e) where the Dams Safety Committee has made recommendations the approval is in terms that are:</p> <p>(i) in accordance with those recommendations; or</p> <p>(ii) where the Minister does not accept those recommendations or any of them - in accordance with a determination under sub-paragraph (ii) of this paragraph.</p> <p>(ii) Where the Minister does not accept the recommendations of the Dams Safety Committee or where the Dams Safety Committee has failed to make any recommendations and has not informed the</p>	<p>SMP for Area3B dated 4/10/12</p> <p>Area 3B SMP Approval 6/2/13</p>	<p>Mining within notification area of Avon dam commenced March 2015, approval from the Minister was received in February 2015.</p>	C	
	<p>Minister in writing that it does not propose to make any recommendations, the approval shall be in terms that are, in relation to matters dealing with the safety of the dam:</p> <p>(a) as determined by agreement between the Minister and the Minister administering the Dams Safety Act 1978; or</p> <p>(b) in the event of failure to reach such agreement - as determined by the Premier.</p> <p>(D) The Minister, on notice from the Dams Safety Committee, may at any time or times:</p> <p>(i) cancel any approval given where a notice pursuant to Section 18 of the Dams Safety Act 1978 is given.</p> <p>(ii) suspend for a period of time, alter, omit from or add to any approval given or conditions approved.</p>				
	<p>(a) The details of the monitoring outlined below will be as determined by the Dam Safety Committee from time to time. In order to simplify the approval process the lease holder shall prepare a proposed program for each of the following Conditions (where applicable), and submit this to the Dam Safety Committee for its approval before mining within the notification area or within such other time as may be as specified by the Dam Safety Committee. Dam Safety Committee staff will be available to comment on proposed monitoring programs informally, prior to a formal lodgement of the program.</p> <p>(b) The lease holder shall arrange for Dam Safety Committee staff to inspect the workings and the surface above the workings, and any significant geological features, from time to time when required by the Dam Safety Committee. Opportunities shall be provided during the inspections for the lease holder to discuss the results of monitoring with the Dam Safety Committee and/or its staff.</p> <p>(c) References to the commencement of mining refers to the commencement of mining in the area of the ventilation shafts 2 and 3 of the Dendrobium Colliery.</p>	<p>Monthly reports on water quality sampling for the NSW Dam Safety Committee.</p>	<p>DSC Monitoring: Discernible loss of flows along the watercourse LA4, which is tributary of Lake Avon.</p> <p>Not seeing more than 0.5ML/day of modern water make in the mine, TARP not triggered. Monthly report on water quality sampling is prepared for the NSW Dam Safety Committee.</p>	C	

	<p>(a) All correspondence with the Dam Safety Committee in regard to this approval shall be clearly labelled 'Dendrobium 3' and shall be sent to:-</p> <p>The Executive Engineer NSW Dam Safety Committee Floor 3 - Macquarie Tower 10 Valentine Avenue PO Box 3720 Parramatta NSW 2150 Parramatta NSW 2124</p> <p>Phone:- (02) 9895 7363 Fax:- (02) 9895 7354 Email:- dsc@damsafety.nsw.gov.au</p> <p>(b) Copies of any reports or plans required to be provided to the Dam Safety Committee shall also be provided to the Director General.</p>	Note	Noted	C	
	So that the Dam Safety Committee is aware that mining in an approved area has commenced (and can therefore expect to receive reports on monitoring) the lease holder shall notify the Dam Safety Committee that mining has commenced in the notification area within seven (7) days of the commencement of mining.	DSC Notification Letter, dated 10 March 2017	Notification of commencement of mining at longwall 13 dated 10 March 2017 following mining commencement on 4 March 2017	C	
	<p>The Dam Safety Committee shall be notified immediately if:-</p> <p>(a) Water monitoring indicates that total outflow is significantly greater than total inflow;</p> <p>(b) A significant groundwater flow into any of the subject workings or within 300 metres is observed;</p> <p>(c) Significantly increasing water flows are encountered at any time during the development of workings; or</p> <p>(d) Any visible flow is discoloured by the presence of clay, sand or silt.</p> <p>[Significant in relation to groundwater flows into the workings is defined herein as meeting any of the following criteria:-</p> <ul style="list-style-type: none"> - The volume or rate of flow, or the change in the volume or rate of flow, or the location causes surprise among persons familiar with the workings; - The volume or rate of flow doubles over a few days; or - The volume or rate of flow is more than 3 standard deviations away from the mean value (i.e. larger or smaller than about 99% of recent readings)] 	Monthly reports on water quality sampling for the NSW Dam Safety Committee.	DSC monitoring reports reviewed by auditor. No items triggered during audit period. Discernible loss of flows along the watercourse LA4, which is tributary of Lake Avon. Not seeing more than 0.5ML/day of modern water make in the mine, TARP not triggered.	NT	
	If a significant change in the groundwater inflows or discolouration of water flows is noted, the Dam Safety Committee may require chemical, biological nuclear or other testing to be carried out.	Monthly reports on water quality sampling for the NSW Dam Safety Committee.	No discolouration or significant change in groundwater inflows noted during audit period.	NT	
	All plans referred to by Condition No. 45, shall share the same scale and base map to facilitate the comparison and correlation between different factors.	Note	Noted	Note	

	<p>(a) If the lease holder, at any time, desires to alter approved mining within the notification area in a minor way (termed 'minor variation'), applications for such minor variations must be lodged with the Director General, who will refer the matter to the Dam Safety Committee for consideration.</p> <p>(b) The Dam Safety Committee requires all proposed variations (including minor variations) be referred to it (via the Director General) for consideration. To expedite the approval process where the variation is urgent and minor, Dam Safety Committee staff will give a decision by phone, fax or email to the lease holder and will inform the Director General for formal approval or otherwise, with both parties aware of the Dam Safety Committee's decision. This procedure should only be followed in urgent situations.</p> <p>(c) The usual procedure is to submit a written application, with appropriate supporting documentation, to the Director General who will then forward it to the Dam Safety Committee for consideration. The lease holder should also send a copy of the application to the Dam Safety Committee so that it may begin processing it. Where the variation is sufficiently extensive (as determined by the Dam Safety committee) the lease holder is required to submit a full application to mine within the notification area.</p> <p>(d) The Director General shall not approve any minor variation unless an endorsement by the Dam Safety committee is received.</p>	Dendrobium Coal Mine Area 3B Subsidence Management Plan Variation Approval (2014)	Auditor reviewed a letter from DPE dated 8 August 2014, Dendrobium Coal Mine Area 3B Subsidence Management Plan Variation Approval. The letter provides Secretary approval for the reduction in length of Longwall 9 (29.8m), Longwall LL (68m) and Longwalls 12 and 13 (0.2m).	C	
	Regardless of the status of mining or location of the active face, all monitoring and reporting shall continue as specified until the Dam Safety Committee considers that it is no longer required, or that the frequency of the monitoring can be altered. The lease holder may apply to the Dam Safety Committee for modification to the frequency of monitoring, or for the discontinuance of monitoring.	Monthly reports on water quality sampling for the NSW Dam Safety Committee.	Monitoring is ongoing with the last report sent September 2017.	C	
	The Minister, on notice from the Dam Safety Committee, may at any time or times, suspend for a period of time, cancel, alter, omit from or add to this consent or the conditions of this consent.	Note	Noted	Note	
	The lease holder shall report, in writing, to the Dam Safety Committee the total tonnage of coal extracted and any other statistics related to the approval as specified by the Dam Safety Committee from time to time, for the 12 month period to June 30 each year, by 31 July of that year.	Monthly reports on water quality sampling for the NSW Dam Safety Committee.	Monitoring is ongoing with the last report sent September 2017.	C	
	The lease holder shall provide a plan to the Dam Safety Committee showing the location of any active faces, to the satisfaction of the Dam Safety Committee, weekly or at intervals as specified by the Dam Safety Committee from time to time. These reports are to continue until such time as the Dam Safety Committee agrees that it should cease, regardless of whether there is active mining in the notification area.	Monthly reports on water quality sampling for the NSW Dam Safety Committee.	Monitoring is ongoing with the last report sent September 2017.	C	
	No mining shall be undertaken in the approved area after 1 December 2006 unless such date is extended by the Dam Safety Committee, or unless as part of a separate Ministerial approval to mine within the notification area.	Dendrobium Area 3B – Subsidence Management Plan, PDM-001-9.6.1D Rev B	Mining within notification area of Avon dam commenced March 2015, approval from the Minister received February 2015.	C	
	The lease holder shall supply to the Dam Safety Committee the results of all site investigations, including drilling, core logging, packer testing and any other investigation undertaken in preparation for the sinking of the shafts. Such information to be provided to the Dam Safety Committee prior to the commencement of shaft sinking.	Interview – Environment Supervisor	Not triggered since 2008 and therefore not within reporting period.	NT	
Compliance report - CCL768					

22	<p>(a) The lease holder must submit a Compliance Report to the satisfaction of the Minister. The report must be prepared in accordance with any relevant guidelines or requirements published by the Minister for compliance reporting.</p> <p>(b) The Compliance Report must include:</p> <ul style="list-style-type: none"> (i) the extent to which the conditions of this mining lease or any provisions of the Act or the regulations applicable to activities under this mining lease, have or have not been complied with; (ii) particulars of any non-compliance with any such conditions or provisions, (iii) the reasons for any such non-compliance; (iv) any action taken, or to be taken, to prevent and recurrence, or to mitigate the effects, of that non-compliance. <p>(c) The Compliance Report must be lodged with the Department annually on the grant anniversary date for the life of this mining lease.</p> <p>(d) In addition to annual lodgement under condition 4(c) above, a Compliance Report:</p> <ul style="list-style-type: none"> (i) must accompany any application to renew this mining lease under the Act; (ii) must accompany any application to transfer this mining lease under the Act; and (iii) must accompany any application to cancel, or to partially cancel, this mining lease under the Act. <p>(e) Despite the submission of any Compliance Report under (c) or (d) above, the titleholder must lodge a Compliance Report with the Department at any date or dates otherwise required by the Minister.</p> <p>(f) A Compliance Report must be submitted one month prior to the expiry of this mining lease, where the licence holder is not seeking to renew or cancel this mining lease.</p>	AEMR FY15, AR FY16, FY17	AEMR (now AR) and Exploration reports submitted annually during audit period.	C	
Environmental Incident report - CCL768					
23	<p>(a) The lease holder must notify the Department of all:</p> <ul style="list-style-type: none"> (i) breaches of the conditions of this mining lease or breaches of the Act causing or threatening material harm to the environment; and (ii) breaches of environmental protection legislation causing or threatening material harm to the environment (as defined in the <i>Protection of the Environment Administration Act 1991</i>), <p>Arising in connection with significant surface disturbing activities, including mining operations, mining purposes and prospecting operations, under this mining lease. The notification must be given immediately after the lease holder becomes aware of the breach.</p> <p>(b) The lease holder must submit an Environmental Incident Report to the Department within seven (7) days of all breaches referred to in condition 5(a)(i) and (ii). The Environmental Incident Report must include:</p> <ul style="list-style-type: none"> (i) the details of the mining lease; (ii) contact details for the lease holder; (iii) a map identifying the location of the incident and where material harm to the environment has or is likely to occur; (iv) a description of the nature of the incident or breach, likely causes and consequences; (v) a timetable showing actions taken or planned to address the incident and to prevent future incidents or breaches referred to in 5(a). (vi) a summary of all previous incidents or breaches which have occurred in the previous 12 months relating to significant surface disturbing activities, including mining operations, mining purposes and prospecting operations under this mining lease. <p>(c) In addition to the requirements set out in conditions 5(a) and (b), the lease holder must immediately advise the Department of any notification made under section 148 of the <i>Protection of the Environment Operations Act 1997</i> arising in connection with significant surface disturbing activities including mining operations, mining purposes and prospecting operations, under this mining lease.</p>	Interview Environmental Supervisor	– No environmental incident notifications made during the audit period, with exception of Corrimal No.3 which falls outside the scope of this audit.	NT	
Resource recovery - CCL768					
	The lease holder must optimise recovery of the minerals that are the subject of this mining lease to the extent economically feasible.	Note	Noted	Note	
Cooperation agreement - CCL768					

	<p>The lease holder must make every reasonable attempt, and be able to demonstrate its attempts, to enter into a cooperation agreement with the holder(s) of any overlapping title(s). The cooperation agreement should address but not be limited to issues such as:</p> <ul style="list-style-type: none"> - Access agreements - Operational interaction procedures - Dispute resolution - Information exchange - Well location - Timing of drilling - Potential resource extraction conflicts; and - Rehabilitation issues. 	<p>Interview Environmental Supervisor</p> <p>GIS Overlays</p>	<p>– Auditor review GIS overlays and there are no overlapping titles for CCL768 in current audit period.</p>	<p>NT</p>	
Barriers, mining and prospecting restrictions - CCL768					
	<p>(a) Unless with the consent of the Minister first had and obtained and subject to such conditions as he may impose the lease holder shall not work or cause to be worked any seam of coal by underground methods within the subject area within the barrier defined as follows:-</p> <p>The land within the zone beneath and adjacent to the Moss Vale to Port Kembla Railway and Moss Vale to Unanderra Railway enclosed by an angle of draw of 35° from the vertical plane of the boundary parallel to and thirty (30) metres horizontally distant from either side of the railway lands, such angle of draw being measured outwards from the point on the vertical plane of the said boundary at the surface or at the level of the horizontal plane of the railway track, whichever may be the higher, to the floor of the coal seam in which mining operations are being carried out.</p> <p>(b) Any approval or consent given by the Minister including any approval or consent given pursuant to any condition or term contained in the coal lease to the effect that the lease holder may mine for, work, win or remove any coal from those parts of the subject area within the barrier defined in Condition No 11(a) shall be deemed to be a consent given for the purposes of the said Condition No 11(a) subject to the same conditions of that approval or consent.</p>	<p>GIS Overlays</p>	<p>Extracting coal from the approved area outside defined area. Auditor reviewed longwall overlay in GIS</p>	<p>C</p>	
Purposes - CCL768					
	<p>The lease holder shall not prospect or mine for coal within the areas shown on the plan annexed hereto and marked "B" insofar as such areas relate to the strata specified on that plan other than the mining of coal for the purposes of:-</p> <ol style="list-style-type: none"> i. Tunnel in the area numbered 1 ii. Shaft in the area numbered 2 iii. Adit, borehole and shaft in the area numbered 5 iv. Shaft in the area numbered 6 v. Borehole and shaft in the area numbered 7 vi. Adit, borehole, shaft and tunnel in the area numbered 13 vii. Shaft in the area numbered 18 viii. Tunnel in the area numbered 25 ix. Drive, shaft and tunnel in the area numbered 29 x. Adit, borehole, drift and shaft in the area numbered 30. 	<p>Communication with Land Management Specialist</p> <p>Mining Operations Plan</p>	<p>Mining leases cover surface operations and managed by property department.</p> <p>Communication with Property Specialist indicate activities are limited to those schedule activities permissible.</p>	<p>C</p>	
Details of lands, purposes and additional conditions - CCL768					

	<p>The lease holder shall be limited to the following operations and conditions within the specified areas described on the plan annexed hereto and marked "B".</p>	<p>Communication with Land Management Specialist</p> <p>Mining Operations Plan (2012-2019)</p>	<p>Mining leases cover surface operations and managed by property department.</p> <p>Communication with Property Specialist indicate activities are limited to those scheduled activities as permissible.</p>	<p>C</p>	
	<p>Column 1</p>	<p>Column 2</p>			
<p>Lands shown numbered 1 on sheet 1 of the Plan annexed hereto and marked "B"</p>	<p>The construction, maintenance or use (in or in connection with mining operations) of a tunnel.</p>				
<p>Lands shown numbered 2 on sheet 1 of the Plan annexed hereto and marked "B"</p>	<p>The construction, maintenance or use (in or in connection with mining operations) any of the following: road, shaft, shaft appurtenances The erection, maintenance and use of standards, posts, wires, and appliances for the transmission of electricity.</p>				
<p>Lands shown numbered 3 on sheet 1 of the Plan annexed hereto and marked "B"</p>	<p>The erection, maintenance and use of standards, posts, wires and appliances for the transmission of electricity.</p>				
<p>Lands shown numbered 4 on sheet 1 of the Plan annexed hereto and marked "B"</p>	<p>The construction, maintenance or use (in or in connection with mining operations) any road. The erection, maintenance and use of standards, posts, wires, and appliances for the transmission of electricity. The generation of electricity.</p>				
<p>Lands shown numbered 5 on sheet 1 of the Plan annexed hereto and marked "B"</p>	<p>The construction, maintenance or use (in or in connection with mining operations) any of the following: adits, boreholes, building, dam, drain, drift, machinery, reservoir, road, shaft, shaft appurtenances and telephone line. Laying, maintaining and using a pipeline or cable in connection with mining.</p>				

Lands shown numbered 6 on sheet 1 of the Plan annexed hereto and marked "B"	<p>The construction, maintenance or use (in or in connection with mining operations) any of the following: building, machinery, road, tramway, shaft, shaft appurtenances.</p> <p>The erection, maintenance and use of standards, posts, wires, and appliances for the transmission of electricity.</p>					
Lands shown numbered 7 on sheet 1 of the Plan annexed hereto and marked "B"	<p>The construction, maintenance or use (in or in connection with mining operations) any of the following: borehole, bridge, building, dam, drain, machinery, magazine, railway, reservoir, road, shaft, shaft appurtenances and telephone line.</p> <p>The generation of electricity.</p> <p>The erection, maintenance, and use of standards, posts, wires, and appliances for the transmission of electricity.</p> <p>The storing of fuel, machinery, tools, timber or equipment in connection with mining.</p> <p>Laying, maintaining and using a pipeline or cable in connection with mining.</p> <p>The dumping or depositing of any overburden, coal, mineral, mine residues or tailings.</p>					
Lands shown numbered 8 on sheet 1 of the Plan annexed hereto and marked "B"	The construction, maintenance or use (in or in connection with mining operations) any drain					

Lands shown numbered 9 on sheet 1 of the Plan annexed hereto and marked "B"	The construction, maintenance or use (in or in connection with mining operations) any road. The erection, maintenance and use of standards, posts, wires and appliances for the transmission of electricity. The generation of electricity.					
Lands shown numbered 10 on sheet 1 of the Plan annexed hereto and marked "B"	The construction, maintenance or use (in or in connection with mining operations) any road.					
Lands shown numbered 11 on sheet 1 of the Plan annexed hereto and marked "B"	The construction, maintenance or use (in or in connection with mining operations) any of the following: building, machinery, road. The generation of electricity. The erection, maintenance and use of standards, posts, wires, and appliances for the transmission of electricity. Laying, maintaining and using a pipeline or cable in connection with mining.					
Lands shown numbered 12 on sheet 1 of the Plan annexed hereto and marked "B"	The construction, maintenance or use (in or in connection with mining operations) any road. The erection, maintenance or use of standards, posts, wires, and appliances for the transmission of electricity. Laying, maintaining and using a pipeline or cable in connection with mining.					

<p>Lands shown numbered 13 on sheet 1 of the Plan annexed hereto and marked "B"</p>	<p>The construction, maintenance or use (in or in connection with mining operations) any of the following: adits, bin, borehole, bridge, building, conveyor system, dams, drain, drift, machinery, magazine, railway, reservoir, road, shaft, shaft appurtenances, telephone line, tramway and tunnels.</p> <p>The erection, maintenance and use of standards, posts, wires, and appliances for the transmission of electricity.</p> <p>The dumping or depositing of any overburden, coal, mineral, mine residues or tailings.</p> <p>The storing of fuel, machinery, tools, timber or equipment in connection with mining.</p> <p>Laying, maintaining and using a pipeline or cable in connection with mining.</p> <p>The generation of electricity.</p>					
<p>Lands shown numbered 14 on sheet 1 of the Plan annexed hereto and marked "B"</p>	<ol style="list-style-type: none"> 1. The construction, maintenance or use (in or in connection with mining operations) any of the following: dam, drain, road. 2. Laying, maintaining and using a pipeline in connection with mining. 3. Constructing, maintaining or using a signalling device being a purpose which is connected or associated with or incidental to, a purpose specified in 1 or 2. 					

Lands shown numbered 15 on sheets 1 & 2 of the Plan annexed hereto and marked "B"	The construction, maintenance or use (in or in connection with mining operations) any road. The erection, maintenance and use of standards, posts, wires, and appliances for the transmission of electricity.					
Lands shown numbered 16 on sheet 2 of the Plan annexed hereto and marked "B"	The erection, maintenance and use of standards, posts, wires, and appliances for the transmission of electricity.					
Lands shown numbered 17 on sheet 2 of the Plan annexed hereto and marked "B"	The construction, maintenance or use (in or in connection with mining operations) any road. The erection, maintenance and use of standards, posts, wires, and appliances for the transmission of electricity.					
Lands shown numbered 19 on sheet 2 of the Plan annexed hereto and marked "B"	The construction, maintenance or use (in or in connection with mining operations) any road.					
Lands shown numbered 22 on sheet 2 of the Plan annexed hereto and marked "B"	The construction, maintenance or use (in or in connection with mining operations) any road.					
Lands shown numbered 23 on sheet 2 of the Plan annexed hereto and marked "B"	The construction, maintenance or use (in or in connection with mining operations) any of the following: building, machinery.					
Lands shown numbered 24 on sheet 2 of the Plan annexed hereto and marked "B"	The construction, maintenance or use (in or in connection with mining operations) any telephone line. The erection, maintenance and use of standards, posts, wires, and appliances for the transmission of electricity.					

Lands shown numbered 25 on sheet 2 of the Plan annexed hereto and marked "B"	The construction, maintenance or use (in or in connection with mining operations) any railway and tunnel.					
Lands shown numbered 26 on sheet 2 of the Plan annexed hereto and marked "B"	The construction, maintenance or use (in or in connection with mining operations) any of the following: building, machinery.					
Lands shown numbered 27 on sheet 2 of the Plan annexed hereto and marked "B"	The erection, maintenance and use of standards, posts, wires, and appliances for the transmission of electricity.					
Lands shown numbered 28 on sheet 2 of the Plan annexed hereto and marked "B"	The erection, maintenance and use of standards, posts, wires, and appliances for the transmission of electricity.					
Lands shown numbered 29 on sheet 2 of the Plan annexed hereto and marked "B"	The construction, maintenance or use (in or in connection with mining operations) any of the following: drives, shaft, shaft appurtenances, tunnels. The erection, maintenance and use of standards, posts, wires, and appliances for the transmission of electricity.					
Lands shown numbered 32 on sheet 2 of the Plan annexed hereto and marked "B"	The erection, maintenance and use of standards, posts, wires, and appliances for the transmission of electricity. The generation of electricity.					
Lands shown numbered 33 on sheet 2 of the Plan annexed hereto and marked "B"	The construction, maintenance or use (in or in connection with mining operations) any road. The erection, maintenance and use of standards, posts, wires, and appliances for the transmission of electricity.					

	Lands shown numbered 34 on sheet 2 of the Plan annexed hereto and marked "B"	The erection, maintenance and use of standards, posts, wires, and appliances for the transmission of electricity. The generation of electricity.					
	Lands shown numbered 35 on sheet 2 of the Plan annexed hereto and marked "B"	The construction, maintenance or use (in or in connection with mining operations) any reservoir. The erection, maintenance and use of standards, posts, wires, and appliances for the transmission of electricity. Laying, maintaining and using a pipeline or cable in connection with mining. The generation of electricity.					

Annex B

Subsidence Management Compliance Report

Ditton Geotechnical Services Pty Ltd
82 Roslyn Avenue Charlestown NSW 2290
PO Box 5100 Kahibah NSW 2290



21 May, 2018

William Weir
Principal Environmental Engineer
ERM
Level 4 201 Leichardt St
Spring Hill QLD 4004

Report No. DEN-004/1

Dear Will,

Subject: Subsidence Impact Management Compliance Assessment for the 5th Triennial Independent Audit of Dendrobium Mine, Mount Kembla

1.0 Introduction

This report provides an independent review of the environmental performance of the Area 3B Subsidence Management Plan at the Dendrobium Mine, Mount Kembla.

The report forms part of the 5th Triennial Independent Audit Report by ERM Pty Ltd, which is required by the NSW Department of Planning & Environment's Consent Condition 8.6 *Independent Environmental Audit* in the Modified Development Approval (DA-60-03-2001) No. 7 dated April 2015 for the Dendrobium Mine.

This audit has included the outcomes of mining impacts for the period from October, 2014 to September, 2017. Mining activities resulting in the development of subsidence and associated impacts during this period include the extraction of longwalls LWs 10 to 13 in Area 3B. LW13 was still being extracted during the audit.

The Subsidence Management Plan (SMP) for Area 3B was developed and approved (6/2/13) before mine subsidence impact occurred in accordance with Consent Condition 7, Schedule 3 of the Modified DA. Monitoring and reporting of the impacts and consulting with the relevant stakeholders in regard to these have been on-going throughout the audit period.

2.0 Abbreviations

The abbreviations used in this report are as follows:

CMA - Corrective Management Action

DCCC - Dendrobium Community Consultative Committee

DP&E - Department of Planning and Environment

DRE - Department of Resources & Energy

DSC - Dams Safety Committee

IC - Illawarra Coal

ICEFT - Illawarra Coal Environmental Field Team

WaterNSW - NSW Office of Water

OEH - Office of Environment and Heritage

SCA - Sydney Catchment Authority

SIMMCP - Swamp Impact Monitoring, Management and Contingency Plan

TARP - Trigger Action Response Plan

WIMMCP - Watercourse Impact Monitoring, Management and Contingency Plan

3.0 Scope of Work

The requirements of the Condition 6, Schedule 8 of the Modified DA are provided below:

6. *By 31 December 2011, and every 3 years thereafter, unless the Director-General directs otherwise, the Applicant shall commission and pay the full cost of an Independent Environmental Audit of the development. This audit must:*
 - (a) *be conducted by suitably qualified, experienced and independent team of experts whose appointment has been endorsed by the Director-General;*
 - (b) *include consultation with the relevant agencies;*
 - (c) *assess the environmental performance of the development and assess whether it is complying with the relevant requirements in this approval and any relevant EPL or mining lease (including any strategy, plan or program required under these approvals);*
 - (d) *review the adequacy of strategies, plans or programs required under these approvals; and, if appropriate,*

(e) *recommend measures or actions to improve the environmental performance of the development, and/or any strategy, plan or program required under these approvals.*

Note: This audit team must be led by a suitably qualified auditor and include experts in the fields of a) mine subsidence impacts and remediation and b) stream hydrology and water quality.

The work completed by DgS for the review period included:

- (i) A desktop review of the following subsidence prediction, monitoring and impact management documentation for Area 3B:
 - Dendrobium Mine's Modified Development Approval Conditions of Consent and Statement of Commitments (DA 60-03-2001, Mod 7 dated April, 2015)
 - Dendrobiums Environmental Management Strategy (DENMP0039.4 dated Oct 2017)
 - Subsidence Management Plan (SMP) for Area 3B (6 Feb, 2013)
 - Swamp Impact Monitoring, Management & Contingency Plan (SIMMCP) Rev 3, May 2015.
 - Watercourse Impact Monitoring, Management & Contingency Plan (WIMMCP) Rev 4, Jun 2015.
 - Revised Swamp and Watercourse TARPS (May 2015 and Jun 2015)
 - Annual Environmental Management Reports (AEMR) for FY 2015, and Annual Reviews (AR) for FY 2016 and FY 2017.
 - End of Panel Reports (EoPRs) for LWs 10, 11 and 12 (LW13 is still being extracted).
 - Bio-diversity Offset Strategy for Area 3B (approval pending)
 - Swamp Rehabilitation and Research Program (approval pending)
 - Relevant Government Agency Correspondence (WaterNSW)
- (ii) A walkover inspection on 13/9/2017 of Wongawilli Creek Tributary WC21 above LW 9 - 11, Upland Swamp No. 5 on Donalds Castle Creek above LW 9 - 10 (Area 3B) and upstream of Sandy Creek Waterfall (Area 3A) with representatives of the ICEFT to inspect surface impacts described in annual reviews and end of panel reports.
- (iii) Provide an assessment of the effectiveness of the SMP/SIMMCP/WIMMCP and proposed CMA remediation measures or strategies.
- (iv) Provide recommendations on any changes to the SMP/SIMMCP/WIMMCP and or the overall reporting process that may improve the effectiveness of above plans in future mining areas.

4.0 Desktop Review

4.1 Conditions of Consent and Subsidence Management Plan (SMP) Overview

The DA Conditions of Consent and SMP for Area 3B provide a framework for addressing monitoring and impact management strategies / requirements for the following features within the area of longwall mining influence:

Features requiring ‘minor’ environmental consequences:

- Wongawilli Creek and Donalds Castle Creek and their tributaries (1st, 2nd & 3rd Order Watercourses, according to the Strahler System).
- Upland Swamps (1a, 1b, 5, 8, 11, 14 and 23).
- Shallow and deep groundwater aquifers.

Features requiring ‘negligible’ environmental consequences:

- Lake Avon storage area.
- Waterfall WC-WF54.

Other features required to be monitored and remediated as required include:

- Steep slopes (up to 1V:1H).
- Terrestrial and aquatic flora and fauna.
- Aboriginal Heritage Sites (rock shelters/overhangs with art or artefacts).
- Fire trails.

The conditions require that subsidence predictions and impact management plans (with TARPs) are to be developed for each feature in consultation with the relevant stakeholders.

Baseline studies of pre-mining conditions for natural features such as swamps and watercourses should be completed for a minimum period of two years to allow a reasonable assessment of post-mining impacts. The monitoring program must be carefully designed to capture the relevant data and environmental response to mine subsidence effects and impacts.

The measured impacts are compared to predicted impacts, TARPs and Performance Measures to ascertain if the project complies with the approval conditions and/or whether remediation works or CMAs are necessary to restore functionality.

The Performance Measures provided in the DA generally allow for a ‘minor’ impact to sensitive natural, culturally significant and man-made features. In some cases, the impacts will naturally recover within a reasonable time frame or be able to be remediated to the satisfaction of Stakeholders. Overall, the intended outcome is to satisfy both Schedule 2.1 of the DA:

1. The Applicant shall implement all reasonable and feasible measures to prevent and/or minimise any harm to the environment that may result from the construction, operation, or rehabilitation of the development.

and 1.3 of the Statement of Commitments in Appendix 4 of the DA:

Minimise volume of sterilised coal which could be efficiently extracted within the mining and environmental constraints of the area.

The mine was also required by Condition 14, Schedule 3 of the DA to provide Environmental Offsets for “losses to water quality and flows to SCA storages” and measures to have a “beneficial effect on water quality, water quantity, aquatic ecosystems and/or ecological integrity of SCA’s special areas or water catchments”.

The mine must therefore (i) develop mining layouts that seek to meet the required Performance Measures for each recognised feature and minimise the loss of coal resource, (ii) predict and measure the impacts due to subsidence movements against relevant performance measures defined in the SMP, (iii) determine if impacts are within predictions or if exceedances have occurred, (iv) what CMAs should be considered in consultation with the relevant Stakeholders, and (v) provide a ‘bio-diversity offset’ to compensate for any mining impacts to upland swamps, watercourses and Special Areas (Sydney Water Catchment & Reservoirs).

The TARP trigger levels for watercourse, swamp and landscape management plans (WIMMCP & SIMMCP) were originally defined using the terms of ‘minor’, ‘moderate’ and ‘severe’ impact. Consideration of CMAs were invoked when mine subsidence damage was assessed by mining representatives as being ‘moderate’ or ‘severe’.

Subsequent review of observed impacts and consequences in Area 3A resulted in the modification of the TARPs to a Level 1 to 3 Impact-based system in 2013. The system requires increased monitoring frequency and/or specialist consultancy advice be sort for impact review or that CMAs be considered when Level 2 or 3 TARPs are triggered. The new TARP system was developed in consultation with OEH/WaterNSW/SCA and linked observed impact magnitudes with associated environmental consequences and appropriate CMA responses.

According to the SMP/SIMMCP and WIMMCPs, monitoring of all significant features will continue during and for a period of 2 years after mining is completed. Periodic inspections (i.e. annual) by ICEFT of the subsided areas will be undertaken to identify any impacts that may require CMAs to be implemented in consultation with the relevant Stakeholders.

Several significant DA/SMP Approval Conditions plus amendments to the DA and development of swamp and watercourse impact management plans and associated TARPs for Area 3B are noted for the current audit period:

- Requests for revision of Trigger Action Response Plans after LW10 and 11 by WaterNSW (see **Section 4.4**) are requesting that further improvements are still required

after reported impacts from LW9 to 12, based on apparent Performance Measure breaches of Donalds Castle Creek stream flow impact, greater than Negligible storage losses from Avon Dam and greater than Minor impacts to Swamps 1a/b and 5.

- The TARPs for the Landscape Features (cliffs, steep slopes, fire trails and aboriginal archaeological sites) have remained unchanged in Area 3B.
- A Bio-diversity Offset Strategy was also required in the SMP Approval to “compensate for the impacts of Longwalls 9 to 13 on Upland Swamps”. The mine applied for a modification to the DA conditions (Mod 7) to include a Bio-diversity Offset strategy, which was duly granted in April, 2015. A 598 ha parcel of land (Maddens Plain) was subsequently offered to provide 140 ha of like-for-like upland swamp land for the 54 ha of upland swamp affected by mining in Area 3 (LW9-19) in March 2016 to satisfy Conditions 6 and 7 of SMP Approval (Feb 2013).
- A detailed groundwater model and impact monitoring review was required before the extraction of LW12 and was required to include surficial aquifers, swamps and watercourses and height of cracking (based on data from above LW6-10). Two reports were produced by Hydrosimulations Pty Ltd dated March 2016 and September 2016 that claimed to demonstrate reasonable groundwater level impact calibration. WaterNSW requested an independent review by **PSM, 2017** initially, with subsequent reviews by Galvin & Associates (Feb 2017) and Mackie Environmental Research (Feb 2017).
- A response to the groundwater modelling and height of fracturing estimate criticisms was addressed by Hydrosimulations in their letter dated 25 September 2017. The outcome of the above work resulted in additional conservatism being introduced into the groundwater model which lead to the approval of LW14 and 15 in Area 3C.
- The Swamp Research and Rehabilitation Plan (SRRP) was prepared and submitted to DP&E in June 2015 to rehabilitate rock bars in Swamp 5 (Area 3B) and 15B (Area 3A). It is understood that the plan is pending approval from DP&E and WaterNSW.

The performance of the SMP/SIMMCP/WIMMCPs during and after mining of LWs 10 to 12 has been assessed in the EoPs and AEMR for 2015 and AR for 2016 & 2017. The outcomes are summarised in **Section 4.2**.

4.2 Annual Environmental Management Reports (AEMR/AR) and EoP Reports

Three AEMR/ARs and three EoPRs have been submitted to DP&E/DRE during the audit period. The longwall start and finishing dates are summarised below with the relevant end of panel report submission dates and annual review documents below:

Longwall	Start Date	Finish Date	EoP Report Submission Date	Annual Review Report
LW10	20/1/14	20/1/15	Apr 2015	2015
LW11	18/2/15	26/1/16	May 2016	2015 & 2016
LW12	22/2/16	31/1/17	May 2017	2016 & 2017
LW13	4/3/17	TBA	N/A	N/A

A summary of the predicted subsidence effects and associated impacts within Area 3B after LWs 9 to 12 are presented below:

- Subsidence profile cross lines and longitudinal lines were derived from Lidar surveys across the mining area at 3 locations.
- Maximum subsidence predictions above LW10, 11 and 12 ranged between 2.9 m and 3.2 m with tailgate chain pillar subsidence from 1.2 m to 1.4 m. The measured maximum subsidence from the Lidar surveys ranged from 1.95 m to 2.5 with chain pillar subsidence from 0.5 m to 1.1 m.
- Valley closure monitoring crosslines were located along the watercourses or drainage lines above the panels (WC21 D-L Lines, DCC A-F Lines, LA4) and between the 3A and 3B mining areas (Wongawilli Creek A-C Lines). Valley closure lines were also placed on the Avon Dam storage area and across key swamps (1a, 1b, 3-5,8 & 10).
- The predicted valley closure values for Wongawilli Creek ranged between 125 mm and 200 mm and were higher than the measured values of 46 mm to 124 mm. No impacts to the watercourse were detected.
- Maximum valley closure measurements ranged from 25 mm to 881 mm across Wongawilli Creek Tributary (WC21) and Donalds Castle Creek (DCC) after LW10-12. The movements were within predicted values, which ranged between 100 mm and 975 mm. The first and second order watercourses (Strahler System) were impacted by Level 1 to Level 2 cracking of rock bars, changes in water colour (iron staining or turbidity), flow diversion and pond water level losses. The observed impacts were reported as being within the predicted ranges presented in the WIMMCPs for Area 3B.
- For LW10, predicted subsidence of 1.575 m and 1.325 m for Swamps 1a and 1b were lower than measured values of 1.956 and 1.911 m respectively. Swamp 5 subsidence was predicted to be less than 20 mm with a measured value of 122 mm. The predicted valley closure movements of 125 mm to 300 mm were higher or slightly lower than the observed values of 30 mm to 311 mm.
- It was noted after LW9 and 10 that several subsidence prediction exceedances (up to 30%) have occurred in Area 3B. It was also noted the exceedance generally occurred along the drainage lines at the western ends of LW9 and 10. It was assessed in MSEC Report No. 792 (RevC) dated Dec 2015 that the model was underpredicting because of (i) increased panel width and cover depth compared to Area 1 data which was used to calibrate the model (ii) thicker claystone and shale units associated with the Wombarra Shale formation above the western end of the panels and (iii) a 10% to 20% increase in actual v. assumed mining heights used for the predictions.
- It was also noted that the subsidence prediction exceedances did not result in higher impact as the measured differential subsidence (tilt and strains) profiles were still similar to the predicted values. The subsidence model was subsequently recalibrated and there have been no further subsidence prediction exceedances noted for subsequent panels LW11 and 12.

- For LW11 and 12, predicted subsidence of 2.25 m to 2.875 m for Swamps 3, 4 and 10 were lower than measured values of 1.314 to 2.047 m. The predicted valley closure movements of 100 mm to 375 mm were higher than the observed values of 50 mm to 188 mm.
- Reported impacts to swamps include shallow groundwater declines and recession rate increases below the swamps, which have resulted in Level 2 and 3 TARPS being triggered since shallow groundwater levels have not recovered since LW9 was completed. It is noted that soil moisture content profiling is now included as a potential loss of eco-system functionality in the latest SIMMCP, however, this version is not provided on the South32 website.

The Level 2 and 3 TARPs for shallow groundwater and soil moisture content falls below baseline readings are not linked specifically to a Swamp Performance Measure so are not considered a breach if the TARPs are exceeded. It is noted however that a CMA has been proposed in the Swamp Rehabilitation Research Plan, including Swamp 5 and 15b rock bars in Area 3A/B. The CMA is understood to be still awaiting approval from DP&E/WaterNSW/SCA and OEH.

- Avon Dam storage area was 400 m to 2 km from LW12 (1 to 5 times the cover depth). Closure measurements ranged from 21 mm to - 3 mm (opening) and were generally within the predicted range of < 20 mm.
- Area 3B 3-Dimensional monitoring points were established at several locations over the mining area and measured horizontal displacements due to mining have ranged between 271 mm to 411 mm over LW12 and 12 mm to 27 mm around Avon Dam. The direction of movement was generally towards valleys in the terrain with some towards the developing subsidence affected areas.
- Forty-seven Level 1 and 2 TARPs were reported for the undermined watercourses (WC21, DC, DC13, LA4 and LA5). The impacts included rock bar cracking and uplift, loss of pools and surface water diversions. The TARPs were reported as all being within approved impacts.
- The water quality monitoring included Fe, Mn, Ni, pH, Ec, Dissolved Oxygen, Oxidation-Reduction Potential readings. A Level 2 TARP was triggered at LA4_S1 by two consecutive DO readings below baseline levels after LW12. As the tributary flows into Lake Avon, consultant advice was sort on whether a CMA was required. No CMA was recommended at this stage.
- There have been losses of aquatic biota habitat as a consequence of surface cracking above LW9 to 12 along watercourses. There have been no TARPS triggered concerning detectable changes to aquatic and terrestrial plant communities and fauna habitats (or threatened species) since the impacts occurred over 1 year ago.
- Level 1 TARPS were triggered along WC21 and DC13 for loss of habitat for one season where Littlejohn's Tree Frog has been detected. CMAs involving increased monitoring were initiated.

- Groundwater level drawdowns in deep piezos after LW9-12 were consistent with levels predicted by numerical modelling with incremental drawdowns identified in Scarborough and Bulgo Sandstone. Lower Hawkesbury Sandstone drawdowns is spatially variable and largest above LW12. An independent review of the groundwater impact to Area 3B was commissioned by WaterNSW. Due to concerns regarding surface to seam connectivity, incremental mining approvals for LW14 to 19 have been adopted at this stage. LW14 and 15 only have been approved with further approvals requiring satisfactory updates to the groundwater modelling.
- Storage losses from Avon Reservoir were assessed to be < 0.4 ML/day, which is within the tolerable loss limit of 1 ML/day prescribed by SCA. The outcome of this result is disputed by WaterNSW however (refer **Section 4.4** for details).
- Level 1 and 2 surface cracking/uplift between 10 mm and 110 mm wide and > 10 m long in soil and rock across access tracks or fire trails have generally in-filled naturally or required remediation as per the CMAs.
- Level 1 and 2 surface cracks up to 110 mm wide and < 10 m long occurred on steep slopes and rock faces with small rock falls over LWs 9 and 10 only. The impacts were assessed to be within the predicted range. No CMAs for steep slopes have been required to-date.
- Level 1 cracking along the Maldon - Dombarton Railway Corridor has not caused any impact to the feature.
- No TARPS due to impacts to Aboriginal Heritage sites have been triggered after LW10 to 12.

Several Corrective Management Actions (CMAs) were triggered during the current audit period by the Dendrobium SIMMCP & WIMMCP which required back filling of surface cracks across fire trails and review of surface water groundwater impacts associated with rock bar cracking, flow path diversion and water quality and storage loss impacts to Avon reservoir and its feeder tributaries.

The mine has subsequently prepared and submitted swamp and watercourse rehabilitation trial plans to DP&E for approval/consultation advice. It is noted that the assessed storage losses of < 0.5ML/day were within the expected range, however the method of how this was assessed has been questioned by WaterNSW. It is also noted that a minimum set-back distance of 400 m has been imposed on the longwall extraction limits for LW12 to 18 in the SMP Approval.

4.3 Swamp Rehabilitation Research Program

It is understood that the proposed SRRP has been submitted to the above agencies and is under review by DP&E, OEH, SCA and WaterNSW.

The purpose of the SRRP is to provide the framework of BHPBIC's swamp research program and comply with Condition 15 of the Area 3B SMP Approval. Rehabilitation and research

activities described in the SRRP will be undertaken in accordance with the DP&E Area 3B SMP Approval.

The objectives of the SRRP are to:

- Investigate methods to rehabilitate swamps subject to subsidence impacts and environmental consequences within Areas 3A and 3B, with the aim of restoring groundwater;
- levels and groundwater recharge response behaviour to pre-mining levels;
- 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;
- Provide for the expenditure of at least \$3.5 million over this period; and
- Include a schedule for subsequent trials, development of work plans and ongoing reporting.

There are two broad mechanisms by which subsidence could cause changes in swamp hydrology:

- The bedrock below the swamp cracks as a consequence of strains and water drains into the fracture zone. The extent and permanence of these changes relate to the size of the fracture zone (increase in porosity/storage) and whether the fractures are connected to a deeper aquifer, the mine workings or bedding shear pathway to the surface lower in the catchment.
- Tilting, cracking, desiccation and/or changes in vegetation health result in concentration of runoff and erosion which alters water distribution in the swamp.

Changes to swamp hydrology can result in environmental consequences. The likelihood and timing of these consequences relate to the size and duration of the effect. The environmental consequences which could relate to changes in hydrology include:

- Increased rates or frequency of erosion events;
- Increased frequency and extent of the organic components of the swamp soil burning during intense bushfires;
- Increased rates of species composition change and/or changes in vegetation communities.

It is understood the mine will be applying their experience gained during crack sealing rehabilitation works along the Georges River above four West Cliff longwalls. The following remediation techniques will be considered for remediation works at Swamp 15b (Area 3A) and Swamps 1a/1b and 5 (Area 3B):

- grout type and injection methods;
- erosion and knick-point control methods;
- water spreading.

The above techniques will be assessed on their ability to restore shallow groundwater levels, soil erosion and moisture losses, surface flows and pond levels during low-flow periods within an impacted catchment.

At the end of the last audit, it was advised that the mine intended to consult with key stakeholders (OEH/SCA/DCCC) and published the research findings and outcomes. The SRRP has since been prepared and submitted to the above agencies for approval during the current audit period. The status of whether the SRRP is likely to be approved in its current proposed format is still unclear at present (see also **Section 4.4**).

Due to the on-going disputes with WaterNSW/OEH and SCA on the impacts of the Area 3B mining layout, the mine commissioned SCT to prepare a report on the pre and post mining impacts of mining to a depth of ~ 50 m directly below the WC21 watercourse (**SCT, 2016**). SCT completed the study after the completion of LW11 on the in-situ condition of the strata with several cored boreholes that were drilled at centrelines of the unmined LW12 and previously mined LW10.

SCT and other sub-contractors drilled and geotechnically logged the core, inspected the boreholes with a wireline video camera, geophysically logged the hole and conducted several pneumatic packer and falling/constant head tests to assess changes to the fracture density and rock mass permeability. It was discovered that the water table had dropped from approximately 5 m to 10 m below the surface before mining, and to a depth of 35 m after mining. It was noted that vertical drainage was occurring from the undermined borehole. Subsidence induced fractures were noted along the entire borehole section and increased in number by 55% to 70%. Hydraulic conductivity had also increased by 2 to 4 magnitudes.

The above information resulted in the issue of shallow VWP recording false post mining water table depths of 5 m in the study area. The extent of sub-surface fracturing in the rock mass in the first 50 m below the surface was also an important discovery in understanding the observed drop of groundwater level below swamp and water courses.

4.4 Correspondence with WaterNSW

A letter to ERM dated 11/09/17 from WaterNSW indicated the following issues they had with the performance of the Dendrobium during the current Audit Period:

“WaterNSW is concerned about impacts of the Dendrobium Mine over the Audit Period to surface water volumes, ecological systems and to a lesser extent, groundwater level reductions and surface water quality degradation. The reasons for our concerns are provided in Attachment 1.”

A review of the attachment of concerns raised by WaterNSW regarding the DA(Mod 7) Conditions of Consent are summarised below:

Scd.3 Con.3. - Negligible Reduction of Surface Water and Groundwater Inflows

The groundwater modelling-based estimates of surface water reductions of 0.2 to 0.3 ML/day may be higher than this based on the following sources:

- Dr Colin Mackie's observations (**Mackie, 2016**) that there are strong correlations between rainfall data and underground mine water makes in Areas 1, 2 and 3, suggesting surface water losses of 5 GL over 6 years (2.3 ML/d) to the mine workings. It is noted that the tolerable losses for both DSC Avon and Cordeaux Reservoirs is 1 ML/dam/day.
- Parsons Brinkerhoff (**PB, 2015**) estimates that rock mass storage volumes in the overburden due to subsidence induced fracturing above each longwall is in the order of 2 GL/ longwall panel. This volume is considered to be in addition to the Mackie estimates.

DgS Comment: *This is probably double dipping to some degree as the PB report assumes the increased storage occurs in the Hawkesbury Sandstone, which was found not to be connected to the mine workings. Therefore, the storage volume would be significantly reduced if there was direct fracturing from the surface to the mine workings according to Mackie.*

- Pells Sullivan Meynink (**PSM, 2017**) identified anomalous water head patterns in piezometers adjacent to Cordeaux Reservoir which indicated leakage from the reservoir.
- Measurements of pre-mining and post mining rock mass permeability by DSC between the Lake Avon have indicated an order of magnitude increase. Intermediate ground water levels that were previously above the lake (i.e. flowing towards it) are now below the lake level (i.e. flowing towards the mine workings area). Complete reversal of flow has not developed higher up in the strata, but may occur as mining progresses.
- Shallow groundwater levels along the 2nd order water course, WC21, above Area 3B have dropped by 80 m since LW12 and have changed the stream from a 'gaining' one to a 'losing' one.
- Wongawilli Creek has recently ceased to flow on a much more regular basis and it is expected that the Minor environmental consequences of minor impacts on groundwater flows, water levels and water quality may be breached as mining progresses.

Bio-Diversity Offset Strategy

- WaterNSW has advised DP&E on several occasions that the proposed offset of Maddens Plain is not considered suitable as it is not benefitting the effected swamps or Special Areas.

Swamp Rehabilitation Research Program

- The progress of finalising the SRRP has been frustratingly slow, given the intention was to have it finalised before mining in Area 3B. The approval of LWs 14 and 15 in

Area 3C have added additional requirements on the program. WaterNSW is working with DP&E and Dendrobium to finalise the program soon.

SMP Performance Measures for Swamps and Watercourses

- In contrast to the predictions made in approved mine planning documents of Area 3B, all undermined swamps have dried. It is noted that a Performance Measure (PM) for the swamps is “Minor consequences that require maintenance or restoration of the structural integrity of the bedrock base of any significant permanent pool or controlling rock-bar within the swamp”.

It is noted that LW14 and 15 in Area 3C have been approved and that not all controlling rock bars above Swamp 14 (LW15) are being monitored yet. The mine has indicated that they will be.

- Avon Reservoir and Wongawilli Creek water quality preservation PMs are likely to be exceeded and will be further exceeded due to current and future longwalls proposed.
- The PM for Donald Castle Creek that expects only ‘minor’ impacts on water flow, water levels and water quality has been exceeded, with the two tributaries at the head of the creek having stopped flowing (apparently permanently) following their undermining of LW11.

Adequacy of Approved Strategies, Plans and Programs

- WaterNSW wrote to DP&E in July 2016 recommending changes to the PMs and TARPes with regards to swamps, watercourses and reservoirs. They also attended a meeting with DP&E to explain the recommendations. The submission explained the reasoning behind the recommendations was due to apparent short-comings in the monitoring of shallow groundwater levels (i.e. the water table) and methods used to assess flow reductions in monitored streams.
- It has been found that the use of Vibrating Wire Piezometers (VWP) to measure the water table can and has resulted in false positive water level readings due to the entrapment of water in the grouted borehole when the water table was actually below the instrument. Screened Standpipe piezometers should be used as VWP do not allow readings to be verified by hand dipping.

For example, the water table below the perennial stream WC21 above Area 3B was indicated by the VWPs to remain at 5 m depth below ground level after mining, when it had actually fallen to 88 m depth.

- The preferred location of the VWPs over ridges and chain pillars means that there is no data from mined panels directly beneath valleys. Recent investigations below a WC21, which is located in a valley, has started to provide information on the impacts of mining on groundwater at the low points in the terrain.

- It was concluded that the above results “call into question the accuracy of the entire groundwater monitoring array at Dendrobium Mine”. WaterNSW has subsequently requested that upper aquifer levels be verified with screened piezometers. The current coverage of these types of monitoring system is however, insufficient to enable the status of the upper aquifer over all the mining areas to be verified.
- The other key on-going issue identified by WaterNSW relates to the use of an apparently inappropriate modelling technique to measured streamflow, which was demonstrated above LW10 by Professor Tom McMahon on behalf of the DCCC. Water NSW note that there has been no change to the assessment approach in the EoPR for LW12. It is also assessed that previous TARP exceedances for streams for the LW11 EoPR had been re-set in the LW12 report.

Other correspondence concerning end of panel reports for LW 10 and 11 from WaterNSW to DP&E (Letters dated 19/10/15 and 08/08/16) and OEH (letters dated 11/01/16 and 18/04/16) demonstrate shortcomings in the surface water, swamp and groundwater modelling v. monitoring data and TARP trigger levels, which enable the mine to claim compliance with Performance Measures when actual impacts are considered to be higher than Negligible or Minor.

4.5 Previous Audit Issues and Actions

The following items/issues were raised during the previous audit in 2014 that required action by DP&E during the current audit period:

- (i) It is noted however that the observed subsidence exceedance above the starting end of LW9 has not been addressed adequately, and further review of the possible reasons for the increased subsidence magnitude should be reviewed by MSEC and an independent expert if necessary. It is considered however, that the issue could be resolved during the next audit period;
- (ii) whether sub-surface cracking impacts on shallow groundwater levels and increased recession rates beneath the swamps will represent more than a ‘minor’ environmental consequence in terms of a vegetation or erosion response (the two key parameters defining swamp impacts);
- (iii) whether the mine will be in breach of its consent conditions in regard to (ii).
- (iv) It is recommended that environmental monitoring sites for groundwater below swamps be installed as early as possible and impact explanations be provided to consider limitations of available base line readings.
- (v) the request by some stakeholders for raw monitoring data for all impacted areas of the mine is yet to be resolved. In the interests of transparency, it would probably be a beneficial exercise to present all raw, on-going monitoring data for previously mined areas to stakeholders if requested.

Based on the available documentation, the status of the above items is summarised below:

- (i) **Status: Completed & Resolved.** Review of subsidence predictions presented in MSEC Report No. 792 Rev C) dated Dec, 2015 re-calibrated subsidence prediction model to LWs 7 and 8 in Area 3A. It was discussed that although subsidence, tilt and strain predictions for Area 3B longwalls were subsequently increased by 1.3, 1.25 and 1.4 times, the predicted impacts were based on 2 x the predicted values, so no increase in predicted impacts occurred.
- (ii) **Status: Pending** - WaterNSW have written to DP&E several times during the audit period claiming they have strong evidence to show that > Minor impact is occurring to all undermined swamps due to extensive cracking and subsequent lowering of the water table and loss of saturation across the swamps. It is also claimed that the TARPs are therefore inadequate and do not correlate with the Performance Measures or include the effects of de-saturation from the above mechanisms.
- (iii) **Status: Pending** - It is noted that the mine has not technically breached any Level 3 Swamp TARPs to-date, as there has been (i) only two periods of consecutive decline and (ii) < 5 monitoring periods since undermining of each Area 3B swamp so far. However, it is concerning that by the time a breach is registered, it may be difficult to remediate or halt the decline in swamp condition within the required Performance Measure impact. The relevant TARPs should therefore be reviewed in consultation with the Stakeholders in terms of their ability to provide a timely CMA response (e.g. mine planning or rectification works) before the PMs are indeed exceeded.

It is noted however, that the mine has been actively seeking approval from DP&E, WaterNSW, OEH & SCA in order to undertake remediation works of several swamp rock bars through the Swamp Research and Rehabilitation Program. WaterNSW have indicated in their letter to ERM (11/09/18) that they are frustrated with the slow progress of the SRRP, inferring that it is the mine who is holding up the finalisation of the SRRP. It is also noted that the land to be provided for the Bio-diversity Offset Strategy has already been secured by the mine during the current audit period and approved by DP&E and OEH, but not WaterNSW.

It is also noted that the mine reviewed the potential reduction in the impact to surface effects by decreasing the width of the longwalls from 300 m to 180 m as requested by OEH during the last audit period. The assessment concluded that the subsidence effects would not result in a significant improvement to the surface cracking and tilting caused by narrowing the longwalls and therefore result in the same impact to surface and groundwater levels below the swamps (refer to SIMMCP, June 2015).

- (iv) **Status: Unclear** - It is unclear whether this request refers to (i) the shallow groundwater piezometers to 0.5 m depth that have been installed in swamps and monitoring & interpretation results provided by appropriate consultants in AR/EoPRs, or (ii) the claim in the SMP Application and SIMMCP that surface water impacts are unlikely to occur

deeper than the surface crack depth estimates of 15 m by installing deeper screened piezo wells to depths of 50 m or thereabouts.

- (v) **Status: Unclear** - It is unclear whether the mine has provided or has been requested to provide raw monitoring data to any stakeholder during the current audit period. It is considered reasonable that the raw data be provided to Stakeholders in the interests of transparency, but only if any requirement that the mine must pay for additional independent reviews is revoked from all of the Consent Conditions. It is noted that the current approach being adopted by the mine is not particularly efficient, considering this issue is always raised by Stakeholders during each of the audit periods to-date.

5.0 Site Inspection Results

Several impacted sites in Areas 3A and 3B were visited on 13/09/2017. The attached photos show typical subsidence impacts at the creeks, swamps and landscape sites visited above LWs 9 to 11. It was noted that the observed impacts were consistent with the documentation provided by the mine to government agencies and stakeholders.

Photos of the condition of surface features inspected are attached to the end of this document.

6.0 Discussion and Recommendations

6.1 Predicted v. Measured Subsidence Effects

Measured conventional subsidence effects (subsidence, tilt and strain) and non-conventional effects (far field horizontal displacements, steep slope displacements and valley uplift/closure) within the area of influence of Area 3B longwalls 9 to 10 were generally greater than the original SMP predictions. It is commented by MSEC that the subsidence prediction model used for Area 3B was initially calibrated to Area 1 & 2 longwalls plus LW6 in Area 3A. The model was re-calibrated after LW10 to account for the 30% increase in chain pillar compression effects observed between LW 9 and 10.

The up-dated predictions for LW11 and 12 were generally greater than measured values in subsequent End of Panel Reports, with some minor subsidence and closure prediction exceedances occurring along WC21 and Donalds Castle Creek.

It is still unclear why the model was underpredicting the subsidence and how it was re-calibrated, considering that the mining height and overburden geometry was unchanged. It is however, a common problem with all empirical subsidence models that are based solely on historical subsidence profiles with no mechanistic assessment capability. It is therefore recommended that future risk assessments continue to review the possibility that subsidence exceedances will occur and what the likely effect will be on the estimated impacts.

To-date, it would appear that the exceedances have not resulted in significant exceedance in impact (according to the Approved TARPs). The TARPs themselves however, may require further review as discussed below.

6.2 Performance of Area 3B SMP

It is of note that the mine is required to consider requests by relevant government departments and stakeholders to adjust proposed mining layouts if the uncertainties and consequences of possible subsidence impacts are considered too great a risk to the environment and the mine's operations. Examples of this having occurred include the re-orientation and shortening of Area 3A/B longwalls to avoid impacting Wongawilli Creek, Sandy Creek.

The development of TARPs for assessing impacts against the Performance Measures for Upland Swamps, Watercourses and loss of storage from Cordeaux and Avon Dams still appears to be an on-going concern between the mine and WaterNSW/OEH/SCA however. Claims of poor consultation and response to stakeholder concerns by the mine have also been made during the audit period.

Overall, the SMP/SIMMCP/WIMMCPs do not appear to be performing reasonably well in regard to the predicted subsidence and management of impacts. The auditors note that although the proposed SRRP and on-going monitoring of impacted features is occurring, it would appear that the Swamp and Watercourse TARPS are too aggressive to allow a reasonable assessment of actual impacts that allow appropriate responses to occur in a timely manner.

It is clear to the Auditors and Stakeholders that there has been a drying out of the upland swamps, and sections of perennial streams WC21 and Donalds Castle Creek after Area 3B longwalls to-date. It has been noted by the mine and its consultants that here may be a contribution to the drying caused by climate, however, it is considered that this has already been largely factored into the TARPs by allowing a comparison between control swamps and creeks.

It is concerning that the sub-surface fracturing extent and flaws in the assessment of water storage losses from the overburden may mean that leakage from the dams is not 'negligible' as reported. It is therefore recommended that a time lag and GW-age analysis be undertaken during the next audit period.

It is also a concern that the proposed grouting of cracks along selected creeks and swamp rock bars may not restore the drained pool function as aquatic biota habitats or restore lost water yield to the dams. It is noted that the Middens Plain Bio-diversity Offset is therefore likely to be required. It is unclear to the Auditors whether the Offset will be able to replace the lost catchment yield to the Special Area reservoirs or the impacted biodiversity however.

The TARPs for Area 3B have now included a non-executive TARP for potential loss of ecosystem functionality in the latest SIMMCP, however, this version is not provided on the South32 website. As the Level 2 and 3 TARPs for less than baseline shallow groundwater

levels and soil moisture contents are not linked specifically to a Swamp Performance Measure, it is not considered a breach if the TARPs are exceeded. It was noted that the dry soil moisture conditions are apparent in swamps that have not been undermined and therefore demonstrates the effect the current climate has had on all swamps (**HydroSimulations, 2016**).

A Swamp Rehabilitation Research Plan has been submitted to DP&E to repair cracks to Swamp 5 and 15b rock bars due to the Level 2 and 3 TARPs being triggered in Areas 3A and 3B. This demonstrates that the mine acknowledges that the impacts to the swamps and water courses may be significant (i.e. > Minor) in the medium to long-term if nothing is done. It is understood that this rock bar remediation CMA is still awaiting approval from DP&E, WaterNSW, SCA and OEH however.

It was mentioned in the previous audit that the ability of the swamps and ecological communities to survive years of drought and bush fire impacts indicates a high resilience to surface and groundwater level variation. However, the analysis by WaterNSW on the impacts of the Area 3B strongly suggests that the resilience of the swamps and watercourse ecologies have probably been reduced by the current mining layout impacts in the medium to long-term.

It is considered that the proposed SRRP will improve our understanding of the effectiveness of the available rehabilitation measures to mitigate the impacts of the current mining layouts. However, it may also be the case that they don't restore the overall function of the swamps and water courses due to the extent of the cracking impact.

At this stage, it would appear that the Biodiversity Offset will probably be required to counter the impacts to the undermined swamps and perennial watercourses. It will also probably be necessary to consider whether the offset will actually be effective in restoring the water and biodiversity lost from the impacted areas.

It is concluded that the SIMMCP and WIMMCP have TARPs that have not been developed in full consultation with the Stakeholders and that the outstanding issues need to be resolved as soon as possible.

6.3 Recommended SMP Improvements

The performance of the Area 3B Swamp, Watercourse and Water Storage TARPs have been subject to a high level of scrutiny by Stakeholders concerned that they are not providing an appropriate response or CMA to the observed impacts.

It is therefore strongly suggested that the mine resolve these concerns by firstly adopting the alternative approaches suggested by WaterNSW (refer letter dated 11/9/18) to (i) allow productive discussions and resolution of the questionable TARPs, and (ii) to determine objectively whether the SSRP and/or CMAs or Offsets proposed in impacted areas to-date are appropriate responses to the impacted swamps, watercourses, biodiversity and catchment yield losses. It is understood that the above review will have significant implications regarding the proposed mine plan approvals sought in the remainder of Area 3C.

It is considered the previous assessment of reducing the longwall width for LW 14 and 15 should be reviewed again for subsequent panels (i.e. LW 16 to 19) under the appropriate performance measure context of achieving a multiple sub-critical mining layout to reduce mining impacts if required. It is noted that the mining height has already been decreased from 4.6 m to 3.9 m as advised by the DP&E's independent subsidence expert for the LW3B SMP Approval for LW14 & 15. The expert was of the opinion that reducing the mining width by >40% (i.e. from 305 m to 180 m) would be necessary to significantly reduce the environmental impacts to key surface features and that this would not be economically feasible. It is noted by the auditors however, that this conclusion could be at odds with the Performance Measures for the Special Areas (i.e. the risks to catchment yield and Avon Dams storage capacity may be found to be significant after the approved longwalls are extracted).

Furthermore, the mine has also agreed to increase the set-back distance of LW14 to 320 m from Avon Dam storage and Wongawilli Creeks to reduce impact. The SCA has also the capability of increasing the set-back distances from the dam based on monitoring data obtained during mining.

It is noted that the mine found it necessary to stop mining at distances > 450 m from Sandy Creek Waterfall in Area 3A (which had narrower longwalls and reduced cover depth of ~ 300 m). Reference to the most recent letter from the Chief Scientist and Engineer (dated 27/04/18) states that there is not enough data at this stage to reach a confident conclusion that LW16 would result in a breach of the [approval] conditions.

It is therefore unclear how the DP&E and their subsidence expert were able to approve a wider group of longwall panels in Area3B in the Special Area, when the impact of the narrower Area 3A Panels is of a concern and basically still unknown until further expansion of the groundwater monitoring network is implemented and reviewed. It is therefore strongly suggested that the adaptive management approach for LW14 & 15 and proposed LW16 to 19 be reviewed before the completion of LW14 and 15.

During the document review, it became apparent that that current status of proposed CMAs and SRRP for the Swamps was not clearly described. It would therefore help if a section providing the status of subsidence impact CMAs (complete or proposed) could be tabulated. A remediation and CMA works register on the website would also assist future auditors.

For and on behalf of
Ditton Geotechnical Services Pty Ltd

A handwritten signature in black ink, appearing to read 'Steven Ditton', written in a cursive style.

Steven Ditton
Principal Engineer and Director
BE(Civil/Hons) C.P.Eng(Civil), M.I.E.(Aust)
NPER 342140
MAusIMM
M/N 318977

References:

Hydrosimulations, 2016. **Dendrobium Area 3B Groundwater Assessment.** Report No. HC2016/02 (March)

SCT, 2016. **Factual Report on Observations Made in Area 3B at Dendrobium Mine.** SCT Report No. 4575 (22/11/16).

Attachments:

Photos 1 - 11

Photo 1 - Inspection of Rock Bar Cracking along 2nd Order Creek No. WC21, Area 3B (>2 years since mining of LW10)



Photo 2 - Cracked Rock Bar along 2nd Order Creek No. WC21, Area 3B (>2 years since mining of LW 10)



Photo 3 - Cracked and Dry Pool along 2nd Order Creek No. WC21, Area 3B (>2 years since mining of LW 10)



Photo 4 - Rock Bar Pool along 2nd Order Creek No. WC21, Area 3B (>2 years since mining of LW10)



Photo 5 - Dry Section of 2nd Order Creek No. WC21, Area 3B (>2 years since mining of LW10)



Photo 6 - Third-order Section of Wongawilli Creek between Areas 3A and 3B



Photo 7 - Third-order Section of Wongawilli Creek between Areas 3A and 3B



Photo 8 - Upland Swamp No. 5 along Donalds Castle Creek in Area 3B above LWs 9-10 (>2 years after LW10)



**Photo 9 - Upland Swamp No. 5 along Donalds Castle Creek in Area 3B above LWs 9-10
(>2 years after LW10)**



Photo 10 - Stream Gauging Weir along Sandy Creek to east of Area 3A



Photo 11 - Immediately Upstream of the Sandy Creek Waterfall and Cordeaux Reservoir in Area 3A



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