SOUTH32 Illawarra Metallurgical Coal




APPIN MINE
AIR QUALITY AND GREENHOUSE GAS MANAGEMENT PLAN

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DOCUMENT REVISION LOG

Persons authorising this Plan

Name	Title	Date
Chris Schultz	Superintendent Environment	May 2024

Document Revisions

Revision	Description of Changes	Date
Conversion to APN Document – APNMP0112		
1.0	Review of content/format. Removal of dust deposition gauges and high-volume air sampler from monitoring program. Incorporated comments from consultation.	December 2020
2.0	Review following approval of MOD 3, including EPA comment and response to DPE initial feedback and feedback from the Technical Review.	January 2023
3.0	Update of Continuous Emission Monitoring and Periodic Emission Monitoring. General update.	May 2024

Persons involved in the review of this Plan

Name	Title	Company	Exp (yrs)	Date
Chris Schultz	Superintendent Environment	IMC	28	May 2024
Tim Fan	Specialist Environment	IMC	7	March 2024
Hubert Mhangami	Specialist Environment	IMC	8	March 2024
Polly Barlow	Specialist Environment	IMC	4	March 2024
Chris McEvoy	Approvals and Community Specialist – AMVA Project	IMC	15	March 2024
Josh Carlon	Principal Approvals	IMC	18	March 2024

1. INTRODUCTION

Appin Mine incorporates the underground mining operations, which extract coal from the Bulli Seam, and associated surface activities, including the West Cliff Coal Preparation Plant (WCCPP) and Coal Wash Emplacement Area (CWEA). Appin Mine is located approximately 25 kilometres (km) north-west of Wollongong in New South Wales (See Plan 1). Appin Mine is owned and operated by Endeavour Coal Pty Ltd, a subsidiary of Illawarra Coal Holdings Pty Ltd (ICHPL), which is a wholly owned subsidiary of South32 Limited. Appin Mine, Cordeaux Colliery and Dendrobium Mine (and associated facilities) collectively operate as Illawarra Metallurgical Coal (IMC).

ICHPL received Project Approval 08_0150 (the Project Approval) from the Planning Assessment Commission of NSW under delegation of the Minister for Planning and Infrastructure on 22 December 2011[1] for current and proposed mining of the Bulli Seam Operations (BSO) for the next 30 years, and production of up to 10.5 Mtpa of RoM coal. This approval incorporates underground mining, transport and emplacement activities undertaken 24 hours a day, seven days per week.

This Air Quality and Greenhouse Gas Management Plan (AQMP) has been prepared to detail the relevant air quality criteria, compliance procedures and controls relating to the mining operations and associated activities. This plan has been prepared to satisfy Condition 12 of Schedule 4 of the Project Approval for the Air Quality and Greenhouse Gas Management Plan.

1.1 Objectives

The objectives of the AQMP are to:

- provide the framework for the responsible management of odour, particulate, and greenhouse gas (GHG) emissions associated with Appin Mine, including but not limited to the ventilation shafts;
- describe the control measures for the management of emissions;
- prevent adverse air quality impacts on the amenity of local communities and the environment;
- describe compliance criteria for air quality and compliance criteria exceedance assessment protocols;
- describe the air quality monitoring program; and
- comply with the Project Approval and other relevant standards and requirements.

[1] Project Approval modifications approved in April 2015 (MOD 1), October 2016 (MOD 2) and April 2022 (MOD 3).

1.2 Scope

The scope of the AQMP applies to all existing and future activities related to Appin Mine including operational, construction[2] and traffic air emissions at:

- Appin East, Appin West and Appin North Pit Top areas;
- existing Ventilation Shafts 1 (downcast), 2 (upcast), 3 (downcast) and 6 (upcast);
- Appin Mine Ventilation and Access (AMVA) Project site (including Ventilation Shafts 7 (downcast) and 8 (upcast));[3]
- Douglas North Substation;
- WCCPP; and
- CWEA.

Refer to Plan 1 for locations of the above.

1.3 Environmental Management System

IMC has a comprehensive Environmental Management System (EMS) in place to minimise the impact of its operations on the local environment and community. The AQMP is a component of the EMS which is certified to ISO 14001.

1.4 Consultation

Consultation has been undertaken as part of this review of the AQMP with the Environment Protection Authority (EPA). The comments from the consultation process have been incorporated into the Version 3.0 of the AQMP.

Appendix 4 outlines comments from the relevant government agencies following consultation and the IMC response.

Consultation with agencies as stated in Condition 12 of Schedule 4 will only be undertaken where there is a material change to the air quality management system or if specifically requested by the Department. Administrative or descriptive changes do not constitute a material change.

2. ROLES AND RESPONSIBILITIES

Roles and responsibilities associated with environmental management at Appin Mine are defined in the Environmental Management Strategy. Table 1 outlines the roles and responsibilities associated with the implementation and periodic review of the AQMP.

[2] The AQMP specifically does not address the conditions in Schedule 4A of the Project Approval. These conditions are addressed in the AMVA Project Construction Environmental Management Plan.
[3] Construction at the Ventilation Shaft 7/8 site commenced in FY23 and is expected to be completed in FY26.

Table 1: Roles and Responsibilities

Role	Responsibilities
Superintendent Environment	Implement and periodically review the AQMP. Liaise with government regulators and IMC senior leadership team in relation to air quality issues, including reporting. Ongoing review of environmental performance and associated management/preventative actions.
Site Specialist Environment	Advise, coach and mentor IMC operations with respect to meeting the standards and requirements of the AQMP. Monitor and review compliance against these requirements. Undertake monitoring and inspections as required. Review air quality monitoring data in EQuIS to determine trends and review effectiveness of existing controls. Maintain and calibrate equipment. Identify corrective actions to address deficiencies in controls.
Specialist Environment – Reporting and Technology	Maintain GHG reporting workbooks for internal and external reporting.
Maintenance Technicians Operations Personnel	Operate and maintain air quality and GHG management controls and equipment in a competent, efficient and reliable manner.
Engineering and Maintenance Managers	Maintain plant and equipment to minimise GHG emissions.
External Affairs Team	Meet the commitments contained within the AQMP for stakeholder engagement and landholder notifications.
Manager Approvals Appin Mine General Manager	Provide the necessary resources and systems to meet the requirements of the AQMP.
VAM Project Manager	Implementation of VAM Abatement Project.

3. LEGISLATION AND PLANNING

3.1 Project Approval Conditions and Statement of Commitments

Potential air quality and greenhouse gas impacts associated with Appin Mine were modelled during the preparation of the BSO Project Environmental Assessment (EA) 2009 and the Air Quality and Greenhouse Gas Assessment (Appendix C) for the AMVA Project. The EA and Modification Report were assessed and approved under the *Environmental Planning and Assessment Act 1979* (*EP&A Act*) and associated Regulations.

All activities carried out at Appin Mine will be in accordance with the conditions of the Project Approval, in accordance with any written directions of the Planning Secretary and generally in accordance with the Environmental Assessment (EA), Statement of Commitments and Preferred Project Report.

Appendix 2 outlines the air quality and greenhouse gas management requirements of the Project Approval and cross references where the requirements have been addressed within the AQMP.

Appendix 3 summarises the requirements of the commitments in the EA and cross references where the requirements have been addressed within the AQMP.

Documents as listed in Condition 2 of Schedule 2 will be made available on the IMC website: link.

3.2 Environment Protection Licence Requirements

Environment Protection Licence (EPL) 2504 applies to Appin Mine and associated activities. A copy of the licence can be accessed at the Environment Protection Authority (EPA) website here.

3.3 Relevant Legislation

Key regulatory and AQMP obligations applicable to Appin Mine are managed via an online obligations management database. The obligations are allocated to responsible personnel. This process is detailed in the Environmental Compliance/Conformance Assessment and Reporting Procedure.

Legislation applicable to air quality and greenhouse gas management may include but is not limited to:

- *EP&A Act*;
- *Protection of the Environment Operations Act 1997 (POEO Act)*;
- *Protection of the Environment Operations (General) Regulation 2022;*
- *Protection of the Environment Operations (Clean Air) Regulation 2022*;
- *National Greenhouse and Energy Reporting Act 2007 (NGER Act)*;
- *National Greenhouse and Energy Reporting (Measurement) Determination 2008*;
- *Clean Energy Legislation (Carbon Tax Repeal) Act 2014*;
- *National Environment Protection (Ambient Air Quality) Measure 2021*; and

- *National Environment Protection (National Pollutant Inventory) Measure 1998*.

3.4 Guidelines and Standards

This AQMP has been developed to be consistent with the principles of the following:

- ISO 14001:2015 Environmental Management Systems;
- South32 Sustainability Policy; and
- South32 Environment and Climate Change Standard.

Other relevant guidelines for air quality and greenhouse gas management may include but are not limited to:

- AS 3580.14-2014 – Methods for sampling and analysis of ambient air. Part 14: Meteorological monitoring for ambient air quality monitoring applications;
- AS/NZS 3580.10.1:2016 - Methods for sampling and analysis of ambient air Determination of particulate matter - Deposited matter - Gravimetric method;
- Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales (EPA, 2022);
- Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales (EPA, 2022);
- NSW Coal Benchmarking Study: International Best Practice Measures to Prevent and/or Minimise Emissions of Particulate Matter from Coal Mining (OEH, 2011);
- Coal Mine Particulate Matter Control Best Practice – Site-specific determination guideline (OEH, 2011);
- Technical Framework for Assessment and Management of Odour from Stationary Sources in NSW (NSW DECC 2006); and
- Technical Guidelines as detailed on the Clean Energy Regulator website.

4. BASELINE ASSESSMENT

4.1 Project Approval

A baseline assessment was undertaken as part of the EA. An extensive review of the air quality monitored around the operations is presented in Appendix J of the BSO Project EA (PAE Holmes, 2009).[4]

The EA is available via the IMC website link.

The Air Quality Impact Assessment included baseline data and air quality monitoring data which showed that the annual average PM_{10} (suspended particles that are ≤10 µm in size)

[4] It is noted that this information is from the Air Quality Impact Assessment undertaken in 2009 prior to the BSO Project approval and therefore needs to be considered in the context of the assessment at that date. It is considered to be baseline data to meet the requirements of Condition 2(a) of Schedule 6 of the Project Approval.

concentrations have been and are currently below the current air quality criteria at the monitored locations.

Concentrations of Total Suspended Particulate (TSP), inferred from the particulate matter for PM_{10} concentrations, show compliance with the current criterion. Results from the dispersion modelling, discussed in Section 7 of the Air Quality Impact Assessment, suggested that the Project-specific and cumulative dust concentrations and deposition levels would be in compliance with the air quality assessment criteria at sensitive receptor locations.

4.1.1 PM_{10} Dust Levels

Annual average mine-only PM_{10} concentrations are predicted to be $\leq$11 µg/m^3 at the nearest receptors and annual average mine-only TSP concentrations are predicted to be less than 15 µg/m^3, that are within the criteria.

4.1.2 Dust Deposition

Mine-only dust deposition at the nearest receptors is predicted to be less than 2 g/m^2/month. This is in compliance with the criterion of 2 g/m^2/month for the Project considered alone.

4.1.3 Sensitive Receivers

Table 7.1 of the Air Quality Impact Assessment provides the predicted dust concentrations at each of residential receptors. In relation to the Appin West Pit Top site, sensitive residential receptors are located in the north to south-east sector from site along Douglas Park Drive. Appin East sensitive residential receptors are located towards the north-west to north-east of site towards Appin. The nearest sensitive receptors for Appin North and the WCCPP are located in the western section of the Cataract Scout Camp, north to north-west of site towards Appin and east towards Wedderburn.

4.1.4 Odour

Odour levels in the ventilation shaft outlets are very low. Consequently, no odour impacts from ventilation shafts emissions are predicted at any sensitive receptors.

4.2 AMVA Project

An assessment of existing air quality was undertaken for the AMVA Project (Appendix C of the Modification Report). A summary of existing air quality from the report is provided below.[5]

4.2.1 PM_{10}, $PM_{2.5}$ and TSP concentrations

In 2019, a significantly higher number of exceedances occurred because of the extensive bushfires that occurred in November and December. Exceptional events led to poor air quality on 127 days across NSW, compared with 50 days in 2018 and 18 days in 2017.

[5] It is noted that this information is from the MOD 3 application and therefore needs to be considered in the context of the assessment at that date.

Therefore, 2019 is not considered a representative year for a discussion on existing air quality.

Excluding 2019, annual mean PM_{10} concentrations range from 13.8 µg/m³ in 2015 to 17.9 µg/m³ in 2018 and on average across the region is 16.0 µg/m³, or 64% of the NSW EPA annual average criterion of 25 µg/m³.

Excluding 2019, annual mean $PM_{2.5}$ concentrations range from 6.2 µg/m³ in 2015 to 8.4 µg/m³ in 2018 and on average across the region, background concentrations are 7.1 µg/m³ or 88% of the NSW EPA annual average criterion. Exceedances of the 24-hour average reporting standards for PM_{10} and $PM_{2.5}$ occurred in most years.

To derive an annual average TSP concentration consistent with the 2018 background period, the ratio of 0.4 has been applied to the annual average PM_{10} concentration for 2018, returning a TSP background concentration of 44.2 µg/m³.

4.2.2 NO_2 Concentrations

2018 summary statistics for background NO_2 are provided in Table 2.

Table 2: 2018 summary statistics for background NO_2

Statistic	Campbelltown West Air Quality Monitoring Station (AQMS)	Camden AQMS	Regional Average
1-hour maximum	101.5 µg/m³	54.4 µg/m³	68.6 µg/m³
Annual Average	20.1 µg/m³	9.8 µg/m³	15.0 µg/m³

5. AIR QUALITY MANAGEMENT AND MITIGATION

The Project Approval requires implementation of best practice air quality management, including all reasonable and feasible measures to minimise the off-site odour, fume and dust emissions generated by the project, including from any spontaneous combustion on site.

5.1 Odour

5.1.1 General

Odours from mining operations may be caused by hydrocarbon emissions from ventilation shafts. Historical odour monitoring indicates that hydrocarbon levels in the ventilation shafts are generally low. This has informed predicted odour emission rates, which are not expected to result in detectable or distinguishable odour at the sensitive receptors of:

- Douglas Park;
- Appin;

- Wilton; and
- Menangle.

The location where the greatest odour is expected are elevated and in sparsely populated locations. Ventilation Shaft No. 6 fan facilities have been designed to mitigate air quality impacts associated with odour and particulates by:

- directing emissions away from Douglas Park and towards the Hume Highway transport corridor; and
- discharging mine ventilation air through evases at an angle of ~45 degrees to the vertical to ensure the plume has initial momentum flux to aid dispersion of odour and particulates.

Odour has not historically been or is expected to be an issue at any of the pit tops.

Coal from the Bulli Seam is not susceptible to spontaneous combustion.

5.1.2 AMVA Project

There are no instrument-based methods that can measure an odour response in the same way as the human nose. Therefore “dynamic olfactometry” is typically used as the basis of odour quantification by regulatory authorities.

The odour nuisance level can be as low as 2 odour units (ou) and as high as 10 ou (for less offensive odours), whereas an odour assessment criterion of 7 ou is likely to represent the level below which ‘offensive’ odours should not occur. The Technical Framework for Assessment and Management of Odour from Stationary Sources in NSW (NSW DECC 2006) recommends that, as a design criterion, no individual should be exposed to ambient odour levels of greater than 7 ou.

For individual rural residences an odour goal of 6 to 7 ou is appropriate. The population of the community in the vicinity of the Project that could potentially be affected by odour is estimated to be in the region of 125 people, therefore an odour goal of 4 ou was applied for the assessment.

All assessment locations are below the most stringent odour and hydrogen sulphide (H_2S) impact assessment criteria for both flow scenarios.

Ventilation Shaft No. 8 fan facilities have been designed to mitigate air quality impacts associated with odour and particulates by:

- directing emissions away from sensitive receivers and towards the Hume Highway transport corridor; and
- discharging mine ventilation air through evases to provide the plume with initial momentum flux to aid dispersion of odour and particulates.

5.2 Greenhouse Gas Emissions

GHG emissions are categorised as either Scope 1 (direct) or Scope 2 (indirect) emissions.

- Scope 1: the release of greenhouse gas into the atmosphere as a direct result of an activity, or series of activities (including ancillary activities) that constitute the facility. Scope 1 emissions for the mine include fugitive mine air emissions (containing

methane and carbon dioxide gas) and emissions associated with diesel fuel combustion on site.

- Scope 2: The release of greenhouse gas as a result of one or more activities that generate electricity, heating, cooling or steam that is consumed by the facility but that does not form part of the facility. The Scope 2 emissions associated with the mine are related to consumption of imported electricity.

Appin Mine does not account for Scope 3 emissions and it is not a legal or prescribed obligation to report it. The Scope 3 emissions cannot be accurately accounted for by the operation as these are essentially third-party downstream emissions for which the operation has very limited to no control.

Gas released from mining coal is the main source of fugitive GHG emissions and accounts for up to 93% of total GHG emissions for Appin Mine. Total GHG emissions are in the order of 1800 to 2600 kt $CO_{2\text{-}e}$ per annum (depending on production performance and regional mining area gassiness). Appin Mine accounts for a large percentage of the total overall IMC level fugitive emissions for up to 90%.

All measures to minimise the release of GHG are directed towards reducing methane emissions.

Electricity is the main energy source for mining operations, followed by diesel fuel consumption, natural gas consumption, and petroleum-based oils and greases (PBOGs) consumption. No other energy source is consumed at the mine. Total energy consumption is in the order of 1 PJ/annum.

5.2.1 Electricity, Diesel, Natural Gas and PBOGs

The main electricity demands in relative order are the mine ventilation fans, coal conveyance equipment, coal cutting equipment, compressors, bathhouse heating and other underground services. Electricity consumption shows a close relationship to production but does not reduce relatively due to the base-load of the mine still being supported. The key base-loads are the mine ventilation fans, pumping and conveyor systems.

Appin Mine consumes a total of ~250,000 MWh of electricity annually which is supplied by the Endeavour Energy High Voltage Distribution Network (state grid).

Diesel fuel consumption, natural gas consumption, and petroleum-based oils and greases (PBOGs) consumption account for a small percentage of the total overall GHG emission at Appin Mine. Diesel fuel demand is associated with the use of mobile equipment (personnel and materials transporters and vehicles servicing the underground workings). Natural gas, which is supplied by AGL Energy, is being used for the hot water system on-site. PBOGs including gear oil, hydraulic oil, engine oil, soluble oil and grease are used for both underground and surface equipment.

Opportunities to upgrade equipment to improve performance and efficiency are addressed as part of an item's overall design lifecycle and maintenance/overhaul cycle. Potential initiatives may present themselves as opportunities to be re-evaluated in the future as circumstances and operational requirements change and the equipment ages.

Where there is an opportunity to consider new and improved energy efficient apparatus and processes for new projects, equipment or upgrades, energy efficiency and cost

effectiveness are evaluated as an integral part of the Project review and Project justification process.

5.2.2 Fugitive Methane Emissions

Fugitive methane emissions are released from the coal seam and overlying strata during development and longwall mining activities. IMC has programs in place to extract and utilise or flare methane from the coal seam and adjacent strata, minimising the volume of methane being vented to atmosphere in the mine ventilation air stream. This has both environmental and safety benefits.

Variability in fugitive emissions is associated with mine production volumes and rates in addition to regional gassiness of the immediate mining area. As a consequence of the number of variables associated with the production process, fugitive mine gas emissions may not necessarily have a direct relationship to annual RoM production volumes.

5.2.3 Methane Gas Capture, Flaring and Beneficial Use

Means of capturing mine methane may include:

- underground drilling programs which pre-drain methane from the coal seam and adjacent geological units prior to longwall mining; and
- goaf drainage drilling programs which capture methane from the coal seam and adjacent geological units which have been fractured by the longwall as coal is extracted.

Methane captured through these processes is preferentially piped to two existing, interconnected gas fired power stations, located at Appin Ventilation Shaft No. 2 and the Appin West Pit Top. Where gas cannot be transferred to the power stations it is flared to reduce its greenhouse gas intensity.

The primary function of the gas drainage system at Appin Mine is to remove methane gas before it enters the mine ventilation system and creates unsafe conditions for mining. A key requirement of this process is to maintain high levels of gas drainage plant reliability and high levels of integrity of the underground gas pipe range to keep the mine continuously under suction to maximise the volume of gas being drained from the mine.

Specific measures implemented to minimise the release of greenhouse gas emissions associated with Appin Mine are summarised in Table 3.

Table 3: GHG Emission Minimisation Measures

Mitigation Action	Detail
Methane Drainage System	Comprehensive methane drainage extraction infrastructure is in place above and below ground for Appin Mine. This infrastructure will be expanded to support future underground mining. The extracted gas is beneficially utilised in the Energy Developments Ltd (EDL) Appin and Tower Power Plants. Utilisation of mine gas in the power generation projects results in the destruction of methane resulting in the release of carbon dioxide which has a Global Warming Potential (GWP) 28 times less than that of methane.
Flaring	Where methane gas cannot be transferred to the power stations, it is flared to reduce its GWP.
VAM Abatement (technology currently being explored/implemented)	Methane in upcast vent shaft processed through a Regenerative Thermal Oxidizer (RTO) unit, oxidising the methane, and converting it to carbon dioxide and water. This reduces the GWP by up to 28 times, compared with methane.

Both Appin and Tower Power Stations are owned and operated by EDL. A Tolling Services Agreement (TSA) defines the commercial arrangements between IMC and EDL, whereby both parties benefit from the utilisation of mine gas for electricity generation. EDL are required to maintain a minimum GHG abatement capacity at both power stations.

5.2.4 GHG Reductions and Climate Change

All measures to minimise the release of GHG are directed towards reducing methane emissions. The mitigation hierarchy for decarbonisation is shown in Figure 1.

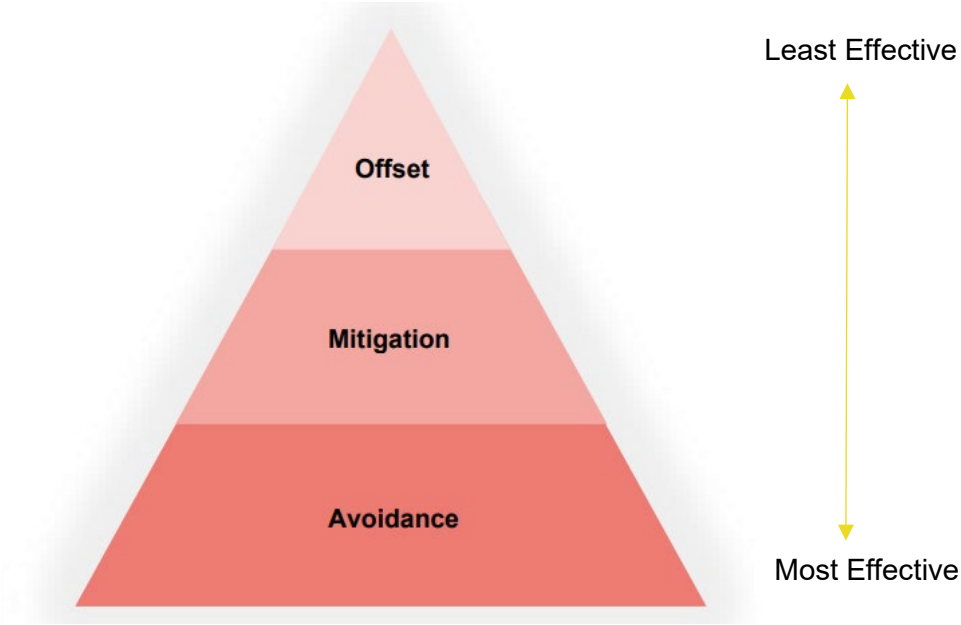


Figure 1: Decarbonisation Mitigation Hierarchy

South32 has established greenhouse gas emission targets. Since setting these, IMC has met its short-term goal of maintaining Scope 1 emissions at FY15 levels through to the end of FY21. IMC is now working towards its medium-term emissions reduction target of 50% by 2035 on a FY21 baseline (operational emissions only). The plan is then to progressively reduce emissions, such that the business is carbon neutral by 2050.

Future actions taken by IMC to minimise GHG emissions will be reported in the Annual Review that is available on the IMC website here.

5.2.5 Ventilation Air Methane Abatement Demonstration Facility

Ventilation air methane (VAM) is a significant GHG. VAM alone accounts for 6.1% of NSW's GHG emissions, and for 5% of Australia's GHG emissions. Appin Mine is one of the largest mine emitters in NSW, i.e. high emitting industries defined in the NSW Net Zero Industry and Innovation Program. 57% of its total GHG emissions is contributed from VAM. Addressing VAM abatement in a safe and sustainable manner is one of the key areas South32 is focusing on to achieve net zero emissions by 2050.

IMC is currently seeking planning approval to install a demonstration RTO unit on an upcast ventilation shaft associated with Appin Mine. RTO technology works by heating the residual low levels of methane extracted by the upcast shaft, to a point where the methane is oxidised, producing carbon dioxide and water as a byproduct.

The average achievable methane emissions reduction is estimated as 27,847 t CO_2-e per year, based on an average VAM concentration of 0.3% over one year.

Upon the successful completion of this project, the proposed demonstration facility will remain on site for continuous operation to achieve further methane emissions reduction. In addition, the longer-term strategy will assess the technical feasibility of additional RTO units across IMC to abate the maximum possible VAM.

5.3 Particulate Matter

5.3.1 Sources and Controls

Particulate matter (dust) is a potential source of visible air pollution that may be generated by the project. The potential sources of dust emissions and emission management measures to address these sources that have been implemented across Appin Mine are outlined in Table 4 to Table 9.

Table 4: Particulate Matter Sources and Controls - Appin East

Area and/or Source	Management Measure/Control
Stockpile	Water cart Dust suppression system (sprays) Front loader drop height reduced during loading Working to conditions/ ceasing works in area during high-risk dust periods
Internal haulage roads	Water cart Road sweeper Truck/Wheel wash facility[6] Road sprays Covered loads Speed limit and driving to conditions Sealed roads
Coal clearance/Coal bins	Enclosed conveyor system Enclosed transfer point (conveyor to bin) Minimal gap between bin unloading chute and truck trailer Sealed surface
Yard Area	Road sweeper Speed limit and driving to conditions
Site external road	Road sweeper

[6] Truck wash may be isolated in winter to prevent black ice forming on Appin Road.

	Covered loads Speed limit and driving to conditions

Table 5: Particulate Matter Sources and Controls - Appin West

Area and/or Source	Management Measure/Control
Internal roads	Road sweeper Sealed roads Speed limit and driving to conditions
Yard and mine handling area	Road sweeper Vehicle washdown bays
Waste Area and Access Road	Road sprays (section of access road near waste sorting area) Use of dust suppressant Driving/operating equipment to conditions

Table 6: Particulate Matter Sources and Controls - Appin North

Area and/or Source	Management Measure/Control
Internal roads	Road sweeper
Yard Area	Road sweeper

Table 7: Particulate Matter Sources and Controls - WCCPP, Stockpile Areas and CWEA

Area and/or Source	Management Measure/Control
Internal haulage roads	Water carts Road sweeper Truck wash facility
Coal bins/conveyors	Dust abatement sprays
Emplacement (Active)	Water carts

	Moisture content of coal wash product Compaction
Emplacement (rehabilitation areas)	Progressive rehabilitation Vegetation cover
Stockpile/s (ROM and Clean)	Water carts
Yard Area/s	Water carts Road sweeper
Conveyors/transfer points	Enclosed transfer points (within the WCCPP footprint) Dust suppression system at some tripper locations
Site external road	Water cart Road sweeper Designated truck tarping/cleaning area

Table 8: Particulate Matter Sources and Controls - Other

Area and/or Source	Management Measure/Control
Exhaust particulate emissions – mine vehicles	Wet diesel exhaust scrubbers on all underground type mine vehicles Diesel particulate filters or low emission Tier 3 engines on underground type mine vehicles Low emission diesel fuel used by mining vehicles
Transport of coal and coal wash on public roads	Truck wash facilities for all outbound truck movements Designated load inspection and tarping areas Water cart at designated load inspection and tarping areas Covered loads (outbound movements) Road sweeper cleaning program – Appin Road
Ventilation Shaft No. 6 Site	Sealed access road Vegetation cover (where possible)

General Construction Activities	Appropriate and effective dust control measures are implemented, which may include: • wetting of potential dust generation areas; • amending, halting or revising times of activities to minimise dust generation; • maintaining vehicle cleanliness for vehicles leaving site on public or private roads; • wetting or covering material stockpiles where appropriate; and/or • use of water sprays, water carts and mobile vacuum sweepers where appropriate.

Table 9: Particulate Matter Sources and Controls - AMVA

Area and/or Source	Management Measure/Control
Construction activities	Water carts Refer to: • AMVA Project CEMP for construction activities
Operational Areas[7]	Sealed access road Vegetation cover (where possible)
Ventilated underground air[8]	Dust suppression sprays on underground mining equipment Maintenance of travel roads Application of salt of roads Wet diesel exhaust scrubbers on all underground type mine vehicles Diesel particulate filters or low emission Tier 3 engines on underground type mine vehicles Low emission diesel fuel used by mining vehicles

[7] Post construction period.
[8] Existing controls at Appin Mine. Ventilation shafts not yet operational.

5.3.2 Trigger Action Response Plan

The Appin and WCCPP Wind and Dust Response Trigger Action Response Plan (TARP) is in place based on alerts received from the Early Warning Network (refer to Section 6.3.7) and laser photometers (refer to Section 6.3.2).

5.3.2.1 Early Warning Network

Actions required based on wind forecasts from the Early Warning Network are provided in Table 10.

Table 10: Wind and Dust Response TARP

Wind Forecast Ranking	Actions Required	
	Appin North/WCCPP	**Appin East**
Negligible	Normal water cart operations as per the Stockpile Area Water Cart and Road Sweeper Procedure.	Normal stockpile spray operations as per the Stockpile Area Water Cart and Road Sweeper Procedure.
Low	Normal water cart operations plus monitor for additional water cart requirements.	Normal stockpile spray operation – automated spray based on wind speed thresholds.
Moderate	Normal water cart operations plus monitor for and activate additional water cart during predicted moderate wind period if required.	Normal stockpile spray operation – automated spray based on wind speed thresholds plus pre-watering (manual activation) before wind hits if possible.
High	Normal water cart operations plus additional water cart operating during predicted high wind period. <u>Linfox</u>: Two hours prior to high dust forecast ranking, water haul roads and base of stockpiles. During high dust forecast ranking, water Wedderburn Road and base of stockpiles. <u>SCE</u>: Two hours prior to high dust forecast ranking, one water cart watering stockpiles with canon (coal stockpiles).	Normal stockpile spray operation – automated spray based on wind speed thresholds plus pre-watering (manual activation) before wind hits if possible, plus no manual loading off stockpile without review of controls.

5.3.2.2 Laser Photometer Alerts

Actions required based on alerts from the laser photometers are provided in Table 11.

Table 11: DustTrak Alarm TARP

SMS Alarm Triggers	Actions Required		
	Appin East (Point 27)[9]	**Appin East (Point 28)**	**Appin North (Point 35)**
On/off SMS received (1 – 2 within the hour)	Visual inspection required by Logistics Supervisor. Deploy water cart and/or sweeper if dust plumes or drag-out observed.	Visual inspection required by Logistics Supervisor. Visual inspection required by Specialist Environment.	Visual inspection required by Logistics Supervisor. Deploy water cart and/or sweeper if dust plumes or drag-out observed.
Multiple SMS received (>2 within the hour)	Logistics Supervisor to deploy water cart and/or sweeper and check operation of stockpile sprays (activate sprays manually if needed) and truck wash. Follow up visual inspection required by Logistics Supervisor.	Logistics Supervisor to deploy water cart and/or sweeper and check operation of stockpile sprays (activate sprays manually if needed) and truck wash. Follow up visual inspection required by Logistics Supervisor. Specialist Environment to undertake inspection and arrange for Cleanaway sweeper if required.	Logistics Supervisor to deploy water cart and/or sweeper and check operation of truck wash and wash down bay. If significant dust drag-out onto Appin Road is noted, arrange for the Appin Road entry to be swept. Follow up visual inspection required by Logistics Supervisor.

[9] Refer to Appendix 1 for monitoring location details.

6. AIR QUALITY MONITORING PROGRAM

In accordance with Condition 12 of Schedule 2 of the Project Approval, monitoring equipment, as applicable, will be maintained in a proper and efficient condition and operated in a proper and efficient manner.

6.1 Odour Monitoring

During site inspections at ventilation shaft sites, including the AMVA Project site, by the Specialist Environment, odour monitoring (in the form of a sensory review) will be undertaken. Where unusual odour is detected, further investigation will be undertaken, considering aspects such as the conditions underground, surface activities and data obtained from the relevant site weather station.

Should it be required, sampling of mine ventilation air emissions will be undertaken.

Targeted odour surveys may also be undertaken in response to community complaints should they be received.

IMC will investigate contingency measures for odour abatement where required.

6.2 GHG Monitoring

GHG data is reported to the Clean Energy Regulator annually in the form of a Section 19 Energy and Emissions Report. GHG emissions data is assured by a third party annually and the opinion is published on the South32 website.

IMC's emissions monitoring systems are separated into three categories:

- Continuous Emissions Monitoring (CEM) system is used for monitoring CH_4 and CO_2 at Appin Mine Gas Drainage Plants
- Periodic Emissions Monitoring (PEM) system is used for monitoring CH_4 and CO_2 at mine upcast ventilation shafts
- Other emission sources monitoring systems including emissions from diesel, electricity, natural gas, and production.

IMC's CEM system is designed to continuously monitor GHG emissions from flares and the GDP. Raw data is extracted from the site SCADA system and transferred into a spreadsheet-based system for data computation, review and reporting purposes.

IMC's PEM system is designed to monitor GHG emissions from all upcast ventilation shafts. Gas raw data is extracted from the site SCADA system while ventilation flowrate, temperature and absolute pressure are sourced from ventilation surveys. All data is transferred into a spreadsheet-based system for data computation, review and reporting purposes.

Emissions recorded from other emissions sources monitoring systems are captured in a similar process to the CEM and PEM systems. The data are consolidated and recorded in the Master NGER Reporting Workbook for each financial year. Validation of data differs from CEM and PEM processes as most data for these Other Emission Sources are provided by external third parties (vendors).

A CEM will be implemented at the AMVA Project site prior to operation of Ventilation Shaft 8.

GHG emissions are reported in the Annual Review, copies of which are available on the IMC website here.

6.3 Particulate Matter Monitoring

Sites selected for the air quality monitoring program are considered to be the most appropriate locations to provide a reliable and representative indication of air quality impacts associated with Appin Mine.

The particulate matter monitoring program incorporates:

- use of real-time air quality monitors (laser photometers); and
- visual inspections and audits.

Dust deposition gauges and high volume air samplers may be used if required to investigate complaints or operational dust related issues, however, they are not included in the regular dust monitoring program.

When samples are collected, the following information is to be recorded:

- the date(s) on which the sample was taken;
- the time(s) at which the sample was collected;
- the point at which the sample was taken; and
- the name of the person who collected the sample.

Air quality monitoring equipment is operated for operational management purposes, providing data for internal assessment of air quality and potential impacts from operations. The data can also be used for investigation of any community complaints. An IMC Specialist Environment reviews key data trends on a monthly frequency during monitoring, with this information used to supplement the information being obtained from inspections. Monitoring equipment is checked and calibrated as required.

Analysis and provision of results from dust monitoring apparatus will be undertaken by appropriately qualified laboratories, personnel, or subject matter experts.

Data from the particulate matter monitoring program is uploaded into EQuIS. All monitoring data will be routinely reviewed, analysed and validated for compliance with the relevant criteria and in consideration of prevailing factors. The Specialist Environment will be involved in the review, analysis and validation of monitoring data for recording and reporting purposes, and to review the effectiveness of existing controls.

6.3.1 Air Quality Criteria

Appin Mine will implement reasonable and feasible avoidance and mitigation measures to ensure particulate emissions do not exceed the criteria in Condition 9 of Schedule 4 (Table 4, 5, 6 and 6A) of the Project Approval, which are replicated in Table 12 to Table 15 respectively. The air quality criteria apply to any residence on privately-owned land or on more than 25 percent of any privately-owned land.

Table 12: Long term criteria for particulate matter

Pollutant	Averaging Period	Criterion[10]
Total suspended particulate (TSP) matter	Annual	[11]90 µg/m^3
Particulate matter <10 µg (PM_{10})	Annual	[13]30 µg/m^3

Table 13: Short term criterion for particulate matter

Pollutant	Averaging Period	Criterion[12]
Particulate matter <10 µg (PM_{10})	24 hour	[13]50 µg/m^3

Table 14: Long term criteria for deposited dust

Pollutant	Averaging Period	Maximum increase in deposited dust level	Maximum total deposited dust level
Deposited dust[12]	Annual	[13]2 g/m^2/month	[13]4 g/m^2/month

Table 15: Criteria for AMVA Project

Pollutant	Averaging Period	Criterion[12]
Particulate matter <10 µg (PM_{10})	Annual	[13]25 µg/m^3
Particulate matter <2.5 µg ($PM_{2.5}$)	Annual	[13]8 µg/m^3
Particulate matter <2.5 µg ($PM_{2.5}$)	24 hour	[13]25 µg/m^3

[10] Excludes extraordinary events such as bushfires, prescribed burning, dust storms, sea fog, fire incidents, illegal activities or any other activity agreed to by the Secretary in consultation with the EPA.
[11] Total impact (i.e. incremental increase in concentrations due to the project plus background concentrations due to other sources)
[12] Deposited dust is to be assessed as insoluble solids.
[13] Incremental impact (i.e. incremental increase in concentrations due to the project on its own.

These criteria do not apply if IMC has a written agreement with the relevant landowner to exceed the criteria, and IMC has advised the Department in writing of the terms of this agreement.

The assessment of results will consider the influence of external sources of dust and the contribution to measured dust levels by the relevant IMC operation (see Section 7.2.1).

6.3.2 Laser Photometers[14]

The fixed laser photometer (AE-PF3) located at the Appin East Pit Top is used to provide an indication of compliance[15] against both the long term criteria and short term criteria for particulate matter (as listed in Table 12 and Table 13).

Laser photometers AE-PF1 (located at the coal haulage exit at Appin East) and W-PF1 (located adjacent to Wedderburn Road) are used to inform operational activities and are not used for assessment of compliance. Alerts from these monitors are sent by either text-message or email to the Specialist Environment when levels ≥40 µg/m^3 (greater than 80% of the PM_{10} criteria) are recorded, to enable the mobilisation of water trucks or road sweepers as required.

Laser photometer VS6-PF1 (located at Ventilation Shaft 6) is used to monitor particulate matter in the vicinity of Ventilation Shaft 6 and is not used for assessment of compliance. Data from VS6-PF1 will be made available to the Community Consultative Committee (CCC) and community members on request and may be used to investigate complaints or events.

The locations of the laser photometers are shown on Plan 2 and Plan 3. Additional detail on the laser photometers is provided in Appendix 1.

A portable laser photometer may be used to conduct spot checks, surveys and audits in addition to the specified program on an as required basis (i.e. in response to complaints and/or specific dust issues, or to gather background data for projects).

Targeted temporary residential air quality monitoring may be undertaken where residential receivers will possibly experience adverse air quality impacts directly associated with operational or construction activities, or in response to community complaints. Where required, consultation with relevant residents will be undertaken to establish additional air quality monitoring sites at private residences and privately-owned land.

6.3.3 AMVA Project

The intent of this monitoring program at the AMVA Project site is to:

- collect information about air quality dynamics at the site and provide insights into how construction activities may be impacting on air quality; and
- compare site air quality monitoring results to local and regional scale air quality.

[14] The laser photometers currently used are DustTraks.
[15] As AE-PF3 is located within the premises boundary, the criteria are not technically applicable at this location and therefore the results provide an indication of compliance.

The monitoring units will collect the following data in 15-minute increments:

- $PM_{10.}$
- $PM_{2.5.}$

IMC will receive daily data from each monitoring station with air quality dynamics ($PM_{2.5}$, PM_{10} and PM_{50}) over the day. IMC will also be issued with alerts when potential exceedances for the 24-hour $PM_{2.5}$ criteria occurs.

Any exceedances of criteria will be notified to relevant site personnel for assessment and to determine management actions to be implemented.

The SiteHive monitors are located within the site boundary and are not used for a determination of compliance with air quality criteria.[16]

Data from the monitoring network at the AMVA Project site will be made available to the Community Consultative Committee (CCC), Menangle Advisory Panel (MAP) and community members on request and may be used to investigate complaints or events.

Following the completion of the construction phase, an assessment of results obtained will be undertaken and the air quality monitoring program will be revised for the operational phase. It is planned that a laser photometer will be installed at the site to monitor particulate matter.

6.3.4 Dust Deposition Gauges

Targeted temporary residential air quality monitoring may be undertaken using Dust Deposition Gauges (DDGs) in response to community complaints, or for construction activities (for background data and air quality during construction). Where required, consultation with relevant residents will be undertaken to establish additional air quality monitoring sites at private residences and privately-owned land. The DDGs would be installed for a minimum three-month period. A DDG would also be installed between the dust source and the sensitive receiver to provide a reference point.

6.3.5 Weather Stations

Weather (meteorological monitoring) stations are located at multiple locations across Appin Mine to monitor and record weather parameters such as wind speed and direction, temperature, humidity, and rainfall. Data from these stations may be used to inform evaluation of compliance with air quality criteria. Details on the weather stations is provided in the Meteorological Station Operation and Data Management Procedure.

Ambient air temperature readings will be monitored and recorded. Weather stations are installed on the Appin East and Appin North fixed laser photometers, with standalone weather stations installed at the Ventilation Shaft No. 6, Appin North and Appin West sites.

The locations of the weather stations are shown on Plan 2 and Plan 3.

[16] Since installation, the SiteHive monitors have experienced significant issues with condensation and high humidity affecting the accuracy of results and equipment was also periodically operating erratically. The dust sensor is light-based, therefore when water droplets form on the sensor the light is refracted in a way that causes a spike in readings.

6.3.6 Weather Alerts

IMC subscribes to an early warning weather alert service. With the assistance of the early warning weather alerts service for impending adverse weather conditions, pre-emptive dust control measures will be implemented where required. These measures may include adjustments to existing dust control measures, manually activating suppression sprays, deployment of mobile sweepers or modification and/or suspension of activities.

7. COMPLAINTS AND NON-COMPLIANCE MANAGEMENT

7.1 Complaints and Dispute Resolution

IMC has a 24-hour, free community call line (1800 102 210) and email address (illawarracommunity@south32.net) which is displayed at IMC Projects and Mine Sites, and included in newsletters, letters and other correspondence. The call line and email address are for all complaints and general enquiries regarding environmental or community issues associated with IMC's operations.

Community complaints and enquiries may also be received in person by any employee of IMC, with details to be immediately shared with the relevant operations personnel for investigation. All air quality complaints received in relation to Appin Mine will be managed in accordance with the Handling Community Complaints, Enquiries and Disputes Procedure.

Upon receipt of a community complaint, preliminary investigations will commence as soon as practicable to determine the likely cause of the complaint. An initial response will be provided to the complainant within 24 hours of the complaint being made, with a follow up response being provided as soon as practicable once a more detailed investigation is complete.

Supplementary air quality monitoring will also be undertaken as required and until satisfactory resolution of the issue.

A summary of all complaints received during the reporting year will be provided as part of the Annual Review. A log of complaints is also maintained on the IMC website here.

7.2 Events, Non-Compliance, Corrective Action, and Preventative Action

Events, non-compliances, corrective actions and preventative actions are managed in accordance with the Reporting and Investigation Standard and Environmental Compliance/Conformance Assessment and Reporting Procedure. These procedures, which relate to all IMC operations, detail the processes to be utilised with respect to event and hazard reporting, investigation and corrective action identification. The key elements of the process include:

- identification of events, non-conformances and/or non-compliances:
- recording of the event, non-conformance and/or non-compliance in the event management system (G360);
- investigation/evaluation of the event, non-conformance and/or non-compliance to determine specific corrective and preventative actions;

- assigning corrective and preventative actions to responsible persons in G360; and
- review of corrective actions to ensure the status and effectiveness of the actions.

Incidents, exceedances and non-compliances with air quality criteria will be reported to all relevant stakeholders as detailed in Section 8.3.

7.2.1 Protocol for Assessing Compliance

The process for assessing compliance considers whether external extraordinary factors unrelated to Appin Mine have adversely influenced a monitoring result. This is necessary to verify that air quality accounting is reliable and accurate and stakeholders are properly informed.

PM_{10} and $PM_{2.5}$[17] is measured directly by the laser photometers and the results are compared to the annual and 24-hour criteria for PM_{10} (in Table 8) to assess compliance.

TSP is estimated based on the continuous PM_{10} data, and this result is compared to the annual TSP criteria (in Table 8) to assess compliance. PM10 and TSP ratio has been determined to be approximately 64% for the mine[18].

Compliance against the long term criteria for deposited dust will be assessed as achieved if compliance with PM_{10} criteria has been met.

The protocol for confirmation of monitoring results, including exceedances of criteria in the Project Approval, includes the consideration of extraordinary factors unrelated to Appin Mine operations and not within Appin Mine's operational control. Such external factors include the adverse consequences of dust storm events, severe weather events, regional dry and dusty conditions elevating regional dust levels, local or regional bushfires or hazard reduction burns, laboratory or analysis errors by external service providers, invalid or contaminated samples and other external unrelated operations or activities adversely influencing project air quality results (e.g.: construction, roadworks, regional traffic, land clearing, rural activities, unauthorised monitoring station interference).

Where results are likely to have been influenced by extraordinary events, the NSW Government air quality data (Daily air quality data | Air Quality NSW) will be reviewed as a reference for a regional air quality comparison.

7.2.1.1 Exceedances due to operational activities

Where an exceedance has been recorded and it has been validated that it is due to operational activities or the failure of controls, notifications to Government Agencies and landowners will occur as detailed in Section 8.2. The exceedance will be classified as a non-compliance.

[17] For AMVA Project
[18] The PM10 and TSP ratio is assessed based on Dendrobium Mine air quality data between 2012 and 2021. The methodology has been endorsed by EPA.

7.2.1.2 Exceedances due to extraordinary events

Where an exceedance of air quality criteria has been recorded due to extraordinary events, the following process will be followed:

- the result will be recorded in the 14-day report with a qualifying comment;
- the result will be recorded in the Annual Review with a qualifying comment; and
- the data will be used in the calculation of average, minimum and maximum values for the project, with the inclusion of a qualifying comment.

Where deposited dust deposition rates or particulate matter mass data indicates levels that exceed the relevant criteria, further analysis of the particulate matter may be undertaken where necessary to identify the constituents of the particulate matter sampled.

Exceedances due to extraordinary events will be notified to Government Agencies as detailed in Section 8.2.3, for information only. Landholders will not be notified.

7.2.1.3 Exceedances due to invalid samples

Where an exceedance of air quality criteria has been recorded due to an invalid sample (e.g. laboratory error or tampering with monitoring equipment), and this has been validated, these results will not be recorded. A file note will be maintained in the document management system providing justification for disregarding the sample. Notification to the relevant Government Agency will occur if the sample is required for compliance monitoring, providing justification for disregarding the sample.

7.2.2 Adaptive Management

In accordance with Condition 3 of Schedule 6 of the Project Approval, where any exceedance of the criteria in Condition 9 of Schedule 4 has occurred, IMC is required to:

a) take all reasonable and feasible steps to ensure the exceedance ceases and does not recur;

b) consider all reasonable and feasible options for remediation and submit a report to the Department describing these options and any preferred remediation measures or other course of action; and

c) implement remediation measures as directed by the Planning Secretary.

If adverse weather conditions are predicted, dust emission controls will be reviewed and additional measures undertaken as required. This may include hose down of areas of use of additional water trucks.

Monitoring results will be reviewed when received and as part of the Annual Review process to identify continual improvement opportunities. Improvement opportunities may also be identified during internal and external audits. These improvement opportunities will be discussed with relevant site personnel and raised through senior leadership team meetings as appropriate, and will be documented in the Environment Improvement Plan or actions assigned in G360.

7.3 Entitlements of Impacted Landowners and Residents

If the particulate matter emissions generated by Appin Mine exceed the criteria in Condition 10 (Table 7, 8 and 9) of Schedule 4 of the Project Approval on a sustained basis, at any residence on privately-owned land or on more than 25 percent of any privately owned land, then upon receiving a written request for acquisition from the landowner, IMC will proceed with the process as reflected in Conditions 2 – 3 of Schedule 5 of the Project Approval. The land acquisition criteria are replicated in Table 16, Table 17 and Table 18.

Table 16: Long term acquisition criteria for particulate matter

Pollutant	Averaging Period	Criterion[19]
Total suspended particulate (TSP) matter	Annual	[22]90 µg/m^3
Particulate matter <10 µg (PM_{10})	Annual	[22]30 µg/m^3

Table 17: Short term acquisition criteria for particulate matter

Pollutant	Averaging Period	Criterion[19]
Particulate matter <10 µg (PM_{10})	24 hour	[20]150 µg/m^3
Particulate matter <10 µg (PM_{10})	24 hour	[21]50 µg/m^3

Table 18: Long term acquisition criteria for deposited dust

Pollutant	Averaging Period	Maximum increase in deposited dust level	Maximum total deposited dust level
Deposited dust[22]	Annual	[23]2 g/m^2/month	[22]4 g/m^2/month

[19] Excludes extraordinary events such as bushfires, prescribed burning, dust storms, sea fog, fire incidents, illegal activities or any other activity agreed to by the Secretary in consultation with the EPA.
[20] Total impact (i.e. incremental increase in concentrations due to Appin Mine plus background concentrations due to other sources)
[21] Incremental impact (i.e. incremental increase in concentrations due to Appin Mine exclusively)
[22] Deposited dust is to be assessed as insoluble solids.

7.4 Independent Review

If the owner of privately-owned lands considers that Appin Mine is exceeding the air quality criteria in Condition 10 of Schedule 4 (refer to Section 7.3), they are entitled to request, in writing, an Independent Review.

In accordance with Condition 2 and 3 of Schedule 5 of the Project Approval, IMC will comply with the requirements of the Planning Secretary and commission an Independent Review where the Planning Secretary is satisfied that an Independent Review is warranted.

8. REPORTING AND REVIEW

8.1 Reporting

8.1.1 Annual Review

IMC will report on the performance of the AQMP in the Annual Review.

The Annual Review is prepared in accordance with the requirement of Condition 4 of Schedule 6 of the Project Approval and is be submitted to relevant agencies in September each year. Annual Reviews are made available to the general public via the IMC website.

The Annual Review will include:

- air quality monitoring results and comparison to relevant statutory requirements, limits or performance measures/criteria, requirements of the AQMP, monitoring results of previous years and relevant predictions in the EA;
- identification of trends in monitoring data over the life of the project;
- identify any discrepancies between the predicted and actual impacts of the development, and analyse the potential cause of any significant discrepancies;
- identify any non-compliance over the past financial year, and describe what actions were (or are being) taken to achieve compliance;
- a summary of GHG emission data and any GHG related improvement opportunities implemented;
- air quality related complaints and management/mitigation measures undertaken;
- management/mitigation measures undertaken in the event of any confirmed exceedance of criteria for particulate matter;
- review of the performance of management/mitigation measures and the monitoring program; and
- describe what measures will be implemented over the next financial year to improve the environmental performance of the project.

8.1.2 Public Reporting of Results (via website)

A summary of the particulate matter monitoring results, including details of exceedances and non-compliances (as determined in accordance with the protocol for assessing

compliance as described in Section 7.2.1 of the AQMP), will be provided on the IMC website in the 14 day report, available here.

Results provided in the 14-day Report will be summarised and submitted to the EPA in the Annual Return for EPL 2504.

8.1.3 National Greenhouse and Energy Reporting Scheme (NGERS)

Appin Mine accounts for all emissions and energy use as required by NGERS and as per reporting boundaries verified by legal advice.

8.1.4 Internal Sustainability Reporting

GHG emission data is collated monthly and reported to Head Office for aggregation.

8.2 Incident, Non-compliance and Exceedance Notifications

8.2.1 Notification of Incidents – Government Agencies

In accordance with Condition 7 of Schedule 6 of the Project Approval, the Planning Secretary is to be notified in writing via the Major Projects website immediately after becoming aware of an air quality incident[23]. Reports are to be provided in accordance with the requirements set out in Appendix 7. Notification to the EPA will also be undertaken in accordance with the reporting requirements of the Pollution Incident Response Management Plan (if applicable) or via email/phone.

8.2.2 Notification of Non-compliances – Government Agencies

In accordance with Condition 7A of Schedule 6 of the Project Approval, the Planning Secretary must be notified in writing via the Major Projects website within seven (7) days after becoming aware of a non-compliance[24].

The EPA is also to be notified of the non-compliance (via email).

8.2.3 Notification of Criteria Exceedances – Government Agencies

If the exceedance was as a result of regional or other non-operational factors, the EPA will be notified via email for information only. The Department will not be notified.

8.2.4 Notification of Criteria Exceedances – Landowners

In accordance with Condition 1 of Schedule 5 of the Project Approval, where an exceedance of criteria due to operational activities has been confirmed, the affected landowners will be notified in writing of the exceedance as soon as practicable and no longer than seven (7)

[23] The definition of an incident in the Project Approval is "A set of circumstances that causes or threatens to cause material harm to the environment; and/or breaches or exceeds the limits or performance measures/criteria in this approval"

[24] A non-compliance that has been notified as an incident does not need to also be notified as a non-compliance.

days following confirmation of the exceedance. Notification of exceedances is to be undertaken prior to inclusion in the 14-day report.

Regular monitoring results will be provided to each affected landowner until compliance with criteria is achieved. In addition, a copy of the NSW Health fact sheet entitled “Mine Dust and You” is to be provided to the affected landowners and/or existing tenants of the land.

Additional targeted particulate matter monitoring and analysis at the affected landowners’ premises may be required to verify exceedances of criteria attributable to Appin Mine.

The CCC and MAP will also be advised of exceedances of criteria at the next available meeting.

8.3 Review of AQMP

In accordance with Condition 5 of Schedule 6 of the Project Approval, the AQMP will be reviewed, and if necessary revised, within three months of:

- the submission of an annual review;
- the submission of an incident report;
- the submission of an Independent Environmental Audit report; and
- any modification to the conditions of the Project Approval (unless the conditions require otherwise); or
- a direction of the Planning Secretary under Condition 4 of Schedule 2.

Outcomes from each review will be documented in the Management Plan Review Log (unless the AQMP is being updated as part of the review). The AQMP will only be revised where a material change to site operations or environmental management has occurred, or in accordance with the review period on the AQMP. Administrative or descriptive changes do not constitute a material change.

Where a review triggers a revision of the AQMP, the AQMP will be revised and submitted to the Planning Secretary for approval. Once approved, the AQMP will be uploaded to the IMC website.

The approved AQMP will be implemented.

8.4 Audits

8.4.1 Independent Environmental Audit

In accordance with Condition 9 of Schedule 6 of the Project Approval, an Independent Environmental Audit (IEA) shall be commissioned every three years, that will include a review of the AQMP. The report, together with the response to any recommendations contained in the audit report, and a timetable for the implementation of the recommendations, is required to be submitted to the Secretary within six weeks of completion of the IEA, in accordance with Condition 10 of Schedule 6.

The IEA is also undertaken to comply with Condition 18 of EPBC Approval 2010/5350. A copy of the report is also submitted to the Department of Agriculture, Water and the Environment to satisfy Condition 18 (g).

IEAs have been conducted every three years since 2013, with the last IEA being conducted in 2022, with the next IEA to be conducted in 2025. Recommendations from the IEA will be incorporated into the AQMP where appropriate.

8.4.2 ISO 14001

As part of the ISO 14001 certification, IMC maintains an environmental auditing and governance program across all of its operational sites. The program, which includes the use of competent internal and accredited external auditors, is an integral part of maintaining certification under the ISO 14001 standard.

External surveillance audits are undertaken on an annual basis, with recertification audits undertaken every three years.

Internal Governance Reviews of the AQMP are nominally undertaken on an annual basis.

9. SUMMARY OF COMMITMENTS

Commitment	Section in AQMP
IMC will provide personnel and resources to implement the AQMP.	Section 2
IMC will comply with the conditions of the approval and relevant legislation.	Section 3
IMC will implement and maintain reasonable and feasible air quality and GHG mitigation measures across all sites to comply with air quality criteria and minimise the impact on the environment and community.	Section 5
IMC will undertake air quality monitoring as required by the Project Approval and EPL.	Section 6
IMC will review monitoring data and review controls where data analysis indicates controls are not effective.	Section 6.3
IMC will conduct additional monitoring and spot checks to investigate complaints and ineffective controls.	Section 6.3.2 and 6.3.4
IMC will maintain and calibrate monitoring equipment as required.	Section 6.3
IMC will subscribe to early warning weather alerts.	Section 6.3.7
IMC will take all reasonable and feasible measures to ensure exceedances cease as soon as practicable and take appropriate remedial action as required.	Section 7.2.2
IMC will progress land acquisition where air quality land acquisition criteria are exceeded on a sustained basis.	Section 7.3
IMC will commission an Independent Review where requested by the Secretary.	Section 7.4
IMC will report and investigate complaints, incidents and exceedances of limits as required, and identify and implement corrective actions.	Section 7
IMC will undertake reporting as required.	Section 8
IMC will review the AQMP as required.	Section 8.4
IMC will undertake audits as required.	Section 8.5

10. ACRONYMS

Term	Definition
AQMP	Air Quality and GHG Management Plan
AMVA	Appin Mine Ventilation and Access Project
BSO	Bulli Seam Operations
CEM	Continuous Emissions Monitoring
CCC	Community Consultative Committee
CH_4	Methane
CO_2-e	Carbon dioxide equivalent
CWEA	Coal Wash Emplacement Area
DDG	Dust deposition gauge
Department	Department of Planning, Housing and Infrastructure, previously • Department of Planning and Environment (DPE) • Department of Planning, Infrastructure and Environment (DPIE)
EA	Environmental Assessment
EDL	Energy Developments Limited
EMS	Environmental Management System
EPA	Environment Protection Authority
EP&A Act	*Environmental Planning and Assessment Act*
EPL	Environment Protection Licence
EQuIS	Environmental Quality Information Systems
FY	Financial year
G360	IMC event reporting system
GHG	Greenhouse Gas
GWP	Global Warming Potential
ICHPL	Illawarra Coal Holdings Pty Ltd
IEA	Independent Environmental Audit

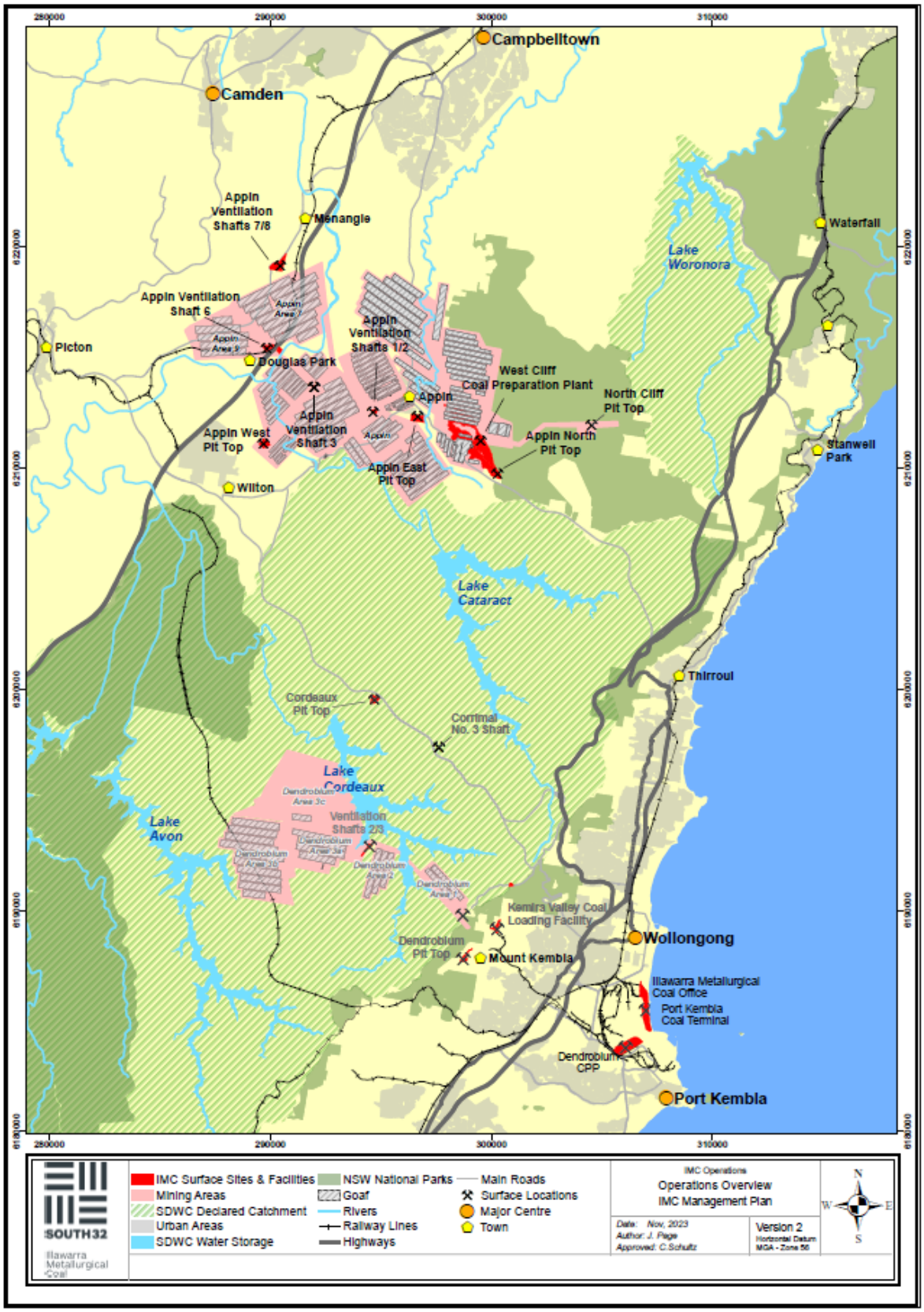
IMC	Illawarra Metallurgical Coal
km	kilometre
kPa	kilopascal
MAP	Menangle Advisory Panel
NGER	National Greenhouse Emissions Reporting scheme
N_2O	Nitrous oxide
Mtpa	Million tonnes per annum
PBOGs	Petroleum-based Oils and Greases
PEM	Periodic Emissions Monitoring
PLC	Programmable Logic Control
PM_1	Particulate matter 1 micron or less in diameter
$PM_{2.5}$	Particulate matter 2.5 microns or less in diameter
PM_4	Particulate matter 4 microns or less in diameter
PM_{10}	Particulate matter 10 microns or less in diameter
POEO Act	*Protection of the Environment Operations Act*
TARP	Trigger Action Response Plan
TSP	Total Suspended Particulate
VAM	Ventilation Air Methane
VAMMIT	Ventilation Air Methane Mitigation
WCCPP	West Cliff Coal Preparation Plant

11. REFERENCES

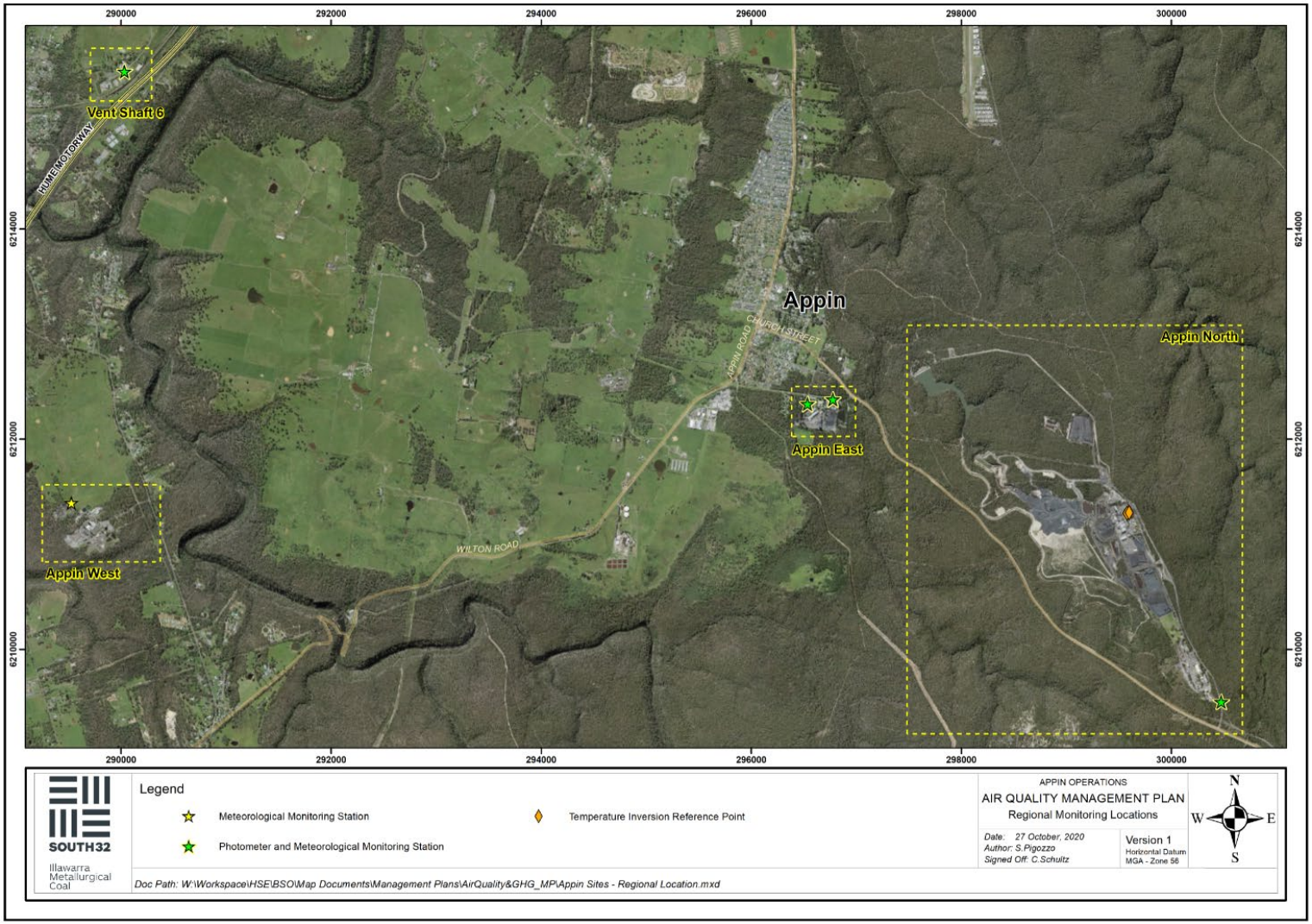
- Project Approval 08_0150, as modified
- EPL 2504
- BSO Project Environmental Assessment
- Air Quality Impact Assessment: Bulli Seam Operations – PAE Holmes (13 July 2009)
- AMVA Modification Report (link)
- Air Quality and Greenhouse Gas Assessment: Appin Mine Ventilation and Access Project – EMM (June 2021)
- Handling Community Complaints, Enquiries and Disputes Procedure (IMCP0112)
- AMVA Project CEMP – Primary Works
- Reporting and Investigation Standard (IMCSTD0069)
- Environmental Compliance/Conformance Assessment and Reporting Procedure (IMCP0186)
- ISO 14001:2015 Environmental Management Systems Standard
- Carbon Emissions Measurement and Reporting Management Plan (IMCMP0255)
- Meteorological Station Operation and Data Management (IMCP0206)
- Air Quality Monitoring Procedure (IMCP0209)
- Mine Dust and You Fact Sheet: available here
- Appin and WCCPP Wind and Dust Response TARP (APNTARP0070)
- Stockpile Area Water Cart and Road Sweeper Procedure (APNP0752)

12. PLANS

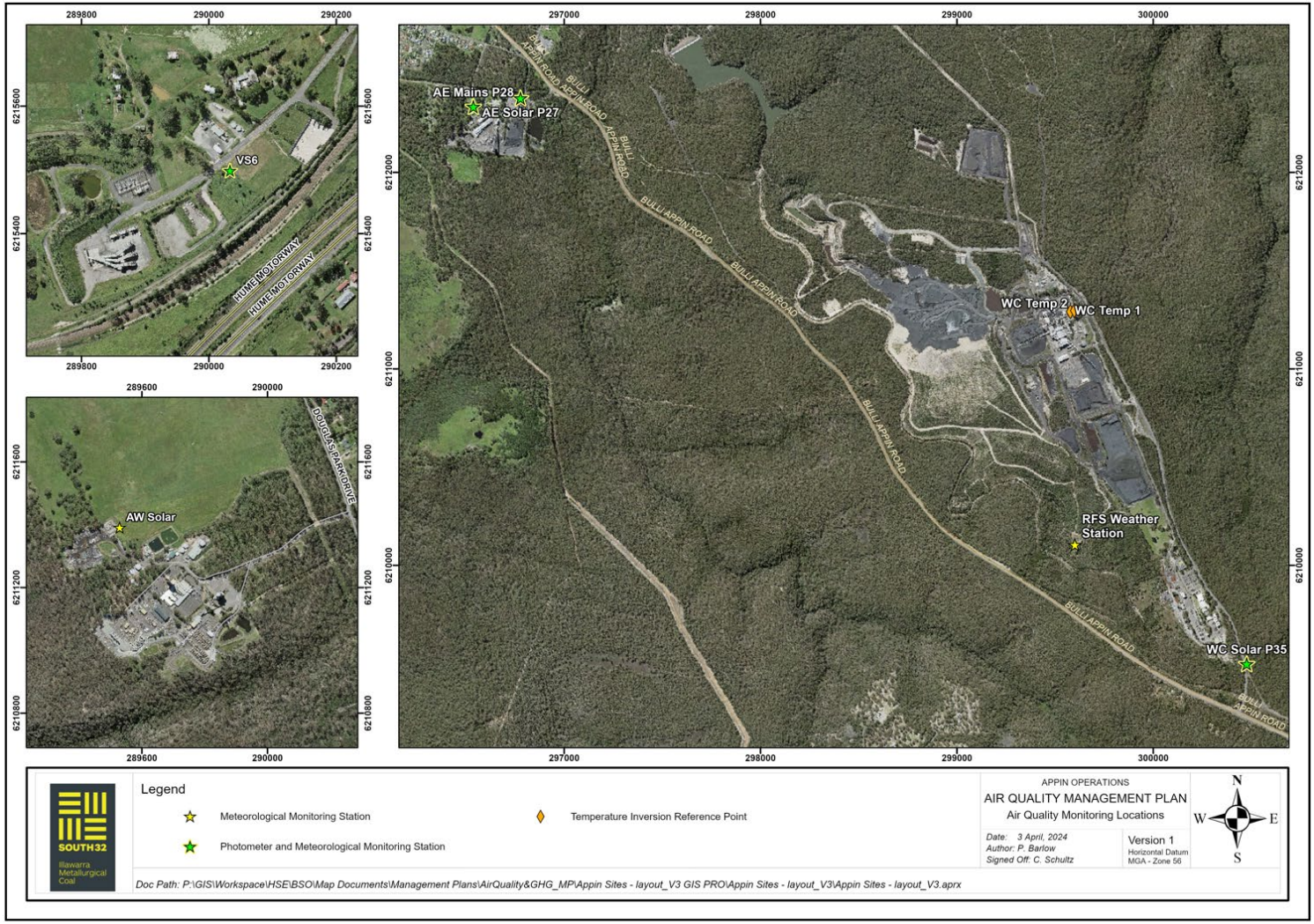
Plan 1: Appin Mine Locality Plan



Plan 2: Appin Mine Monitoring Locations - Regional



Plan 3: Appin Mine Monitoring Locations – Sites



Plan 4: Ventilation Shaft 7/8 Monitoring Locations - Sites

13. APPENDICES

Appendix 1: Particulate matter monitoring program

Site ID	Location	Parameter	Measurement Method	Frequency	Function
AE-PF1 (Point 27)	NE corner of pit top property boundary – coal stockpile vehicle entry/exit point	Particulate Matter: PM_{10}	Real-time Photometer (fixed)	Continuous	Real-time monitoring of dust emissions at the coal stockpile area truck entry/exit point onto public roads. Real-time Operational Control – stockpile, internal roads and public road dust control measures performance reference monitor.
AE-PF3 (Point 28)	Adjacent to Appin East helipad between stockpile and nearest residential receivers	Particulate Matter: PM_1, $PM_{2.5}$, PM_4 and PM_{10}	Real-time Photometer (fixed)	Continuous	Site dust control/Amenity goal reference (noting that monitor is located within premises boundary). Real-time Operational Control.
W-PF1 (Point 35)	Appin North southern property boundary at the Wedderburn and Appin Road intersection	Particulate Matter: PM_{10}	Real-time Photometer (fixed)	Continuous	Fixed monitor for real-time monitoring of dust emissions at the Wedderburn Road and Appin Road intersection. Real-time Operational Control – roadway dust emissions.
VS6-PF1	Ventilation Shaft 6	Particulate Matter: PM_1, $PM_{2.5}$, PM_4 and PM_{10}	Real-time Photometer (fixed)	Continuous	Fixed monitor for real-time monitoring of particulate matter at the Ventilation Shaft 6 site (from the ventilation shaft, Hume Highway and other ambient sources). Long term trends and general amenity. Not used for assessment of compliance.
FINNS	Western site boundary near the intersection of Finns and Menangle Road	Particulate Matter: $PM_{2.5}$ and PM_{10}	Real-time Photometer (fixed)	Continuous	Fixed monitor for real-time monitoring of dust emissions at the western boundary near the intersection of Finns and Menangle Road. Close to most of the residences near the site. Real-time operational control.

Site ID	Location	Parameter	Measurement Method	Frequency	Function
TED	Northern end of site adjacent to a site office	Particulate Matter: $PM_{2.5}$ and PM_{10}	Real-time Photometer (fixed)	Continuous	Fixed monitor for real-time monitoring of dust emissions at the northern boundary of the site. Adjacent to site office to incorporate dust emissions from the site and office. Real-time operational control.
FOCK	South-eastern boundary adjacent to Foot Onslow Creek	Particulate Matter: $PM_{2.5}$ and PM_{10}	Real-time Photometer (fixed)	Continuous	Fixed monitor for real-time monitoring of dust emissions at the eastern boundary of the site. Real-time operational control.

Appendix 2: Project Approval Conditions: Air Quality and GHG Management

Condition	Requirement	Section
Condition 1 of Schedule 2	**Obligation to minimise harm to the environment** In addition to meeting the specific performance criteria established under this approval, the Proponent 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 project.	Section 5
Condition 2 of Schedule 2	**Terms of Approval** The Proponent must carry out the project: (a) generally in accordance with the EA, Statement of Commitments and PPR; (b) in accordance with the conditions of this approval; and (c) in accordance with any written directions of the Planning Secretary.	Section 3.1
Condition 4 of Schedule 2	Consistent with the requirements of this approval, the Planning Secretary may make written directions to the Proponent in relation to: (a) the content of any strategy, study, system, plan, program, review, audit, notification, report or correspondence submitted under or otherwise made in relation to this approval, including those that are required to be, and have been, approved by the Planning Secretary; and (b) the implementation of any actions or measures contained in any such document referred to in condition 4(a).	Section 3.1
Condition 12 of Schedule 2	**Operation of Plant and Equipment** The Proponent shall ensure that all plant and equipment used at the site is: (a) maintained in a proper and efficient condition; and (b) operated in a proper and efficient manner.	Section 6
Condition 7 of Schedule 4	**Odour** The Proponent shall ensure that no offensive odours are emitted from the site, as defined under the POEO Act.	Section 5.1

<table>
<tr>
<td>Condition 8 of Schedule 4</td>
<td>Greenhouse Gas Emissions

The Proponent shall implement all reasonable and feasible measures to minimise the release of greenhouse gas emissions from the site to the satisfaction of the Planning Secretary.</td>
<td>Section 5.2</td>
</tr>
<tr>
<td>Condition 9 of Schedule 4</td>
<td>Air Quality Criteria

The Proponent shall ensure that all reasonable and feasible avoidance and mitigation measures are employed so that the particulate emissions generated by the project do not exceed the criteria listed in Tables 4, 5 and 6 at any residence on privately-owned land or on more than 25 percent of any privately-owned land and that the particulate emissions from the Appin Mine Ventilation and Access Site do not exceed the criteria listed in Tables 4 - 6A at any residence on privately-owned land or on more than 25 percent of any privately-owned land..

Table 4: Long term criteria for particulate matter
<table>
<tr><th>Pollutant</th><th>Averaging period</th><th>[d] Criterion</th></tr>
<tr><td>Total suspended particulate (TSP) matter</td><td>Annual</td><td>[a] 90 µg/m^3</td></tr>
<tr><td>Particulate matter < 10 µm (PM_{10})</td><td>Annual</td><td>[a] 30 µg/m^3</td></tr>
</table>
Table 5: Short term criterion for particulate matter
<table>
<tr><th>Pollutant</th><th>Averaging period</th><th>[d] Criterion</th></tr>
<tr><td>Particulate matter < 10 µm (PM_{10})</td><td>24 hour</td><td>[a] 50 µg/m^3</td></tr>
</table>
Table 6: Long term criteria for deposited dust
<table>
<tr><th>Pollutant</th><th>Averaging period</th><th>Maximum increase in deposited dust level</th><th>Maximum total deposited dust level</th></tr>
<tr><td>[c] Deposited dust</td><td>Annual</td><td>[b] 2 g/m^2/month</td><td>[a] 4 g/m^2/month</td></tr>
</table>
Table 6A: Criteria for Appin Mine Ventilation and Access Site
<table>
<tr><th>Pollutant</th><th>Averaging period</th><th>[d] Criterion</th></tr>
<tr><td>Particulate matter < 10 µm (PM_{10})</td><td>Annual</td><td>[a] 25 µg/m^3</td></tr>
<tr><td>Particulate matter < 2.5 µm ($PM_{2.5}$)</td><td>Annual</td><td>[a] 8 µg/m^3</td></tr>
<tr><td>Particulate matter < 2.5 µm ($PM_{2.5}$)</td><td>24 hour</td><td>[a] 25 µg/m^3</td></tr>
</table>
Notes for Tables 4-6A:

[a] Total impact (ie incremental increase in concentrations due to the project plus background concentrations due to other sources);
[b] Incremental impact (ie incremental increase in concentrations due to the project on its own);
[c] Deposited dust is to be assessed as insoluble solids as defined by Standards Australia, AS/NZS 3580.10.1:2003: Methods for Sampling and Analysis of Ambient Air - Determination of Particulate Matter - Deposited Matter - Gravimetric Method; and
[d] Excludes extraordinary events such as bushfires, prescribed burning, dust storms, sea fog, fire incidents, illegal activities or any other activity agreed to by the Planning Secretary in consultation with EPA.

However, these criteria do not apply if the Proponent has a written agreement with the relevant landowner to exceed the criteria, and the Proponent has advised the Department in writing of the terms of this agreement.</td>
<td>Section 5.3</td>
</tr>
</table>

<table>
<tr>
<td>Condition 10 of Schedule 4</td>
<td>
Air Quality Acquisition Criteria

If the particulate matter emissions generated by the project exceed the criteria in Tables 7, 8 and 9 at any residence on privately-owned land or on more than 25 percent of any privately-owned land, then upon receiving a written request for acquisition from the landowner the Proponent shall, subject to the independent review procedure in Conditions 2 – 3 of Schedule 5, acquire the land in accordance with the procedures in Conditions 4 - 5 of Schedule 5.

Table 7: Long term acquisition criteria for particulate matter
<table>
<tr><th>Pollutant</th><th>Averaging period</th><th>[d] Criterion</th></tr>
<tr><td>Total suspended particulate (TSP) matter</td><td>Annual</td><td>[a]90 µg/m^3</td></tr>
<tr><td>Particulate matter < 10 µm (PM_{10})</td><td>Annual</td><td>[a]30 µg/m^3</td></tr>
</table>
Table 8: Short term acquisition criteria for particulate matter
<table>
<tr><th>Pollutant</th><th>Averaging period</th><th>[d]Criterion</th></tr>
<tr><td>Particulate matter < 10 µm (PM_{10})</td><td>24 hour</td><td>[a]150 µg/m^3</td></tr>
<tr><td>Particulate matter < 10 µm (PM_{10})</td><td>24 hour</td><td>[b]50 µg/m^3</td></tr>
</table>
Table 9: Long term acquisition criteria for deposited dust
<table>
<tr><th>Pollutant</th><th>Averaging period</th><th>Maximum increase in deposited dust level</th><th>Maximum total deposited dust level</th></tr>
<tr><td>[c]Deposited dust</td><td>Annual</td><td>[b]2 g/m^2/month</td><td>[a]4 g/m^2/month</td></tr>
</table>
Notes for Tables 7 - 9:

[a]Total impact (ie incremental increase in concentrations due to the project plus background concentrations due to other sources);
[b] Incremental impact (ie incremental increase in concentrations due to the project on its own);
[c] Deposited dust is to be assessed as insoluble solids as defined by Standards Australia, AS/NZS 3580.10.1:2003: Methods for Sampling and Analysis of Ambient Air - Determination of Particulate Matter - Deposited Matter - Gravimetric Method; and
[d] Excludes extraordinary events such as bushfires, prescribed burning, dust storms, sea fog, fire incidents, illegal activities or any other activity agreed to by the Planning Secretary in consultation with EPA.

</td>
<td>Section 7.3</td>
</tr>
<tr>
<td>Condition 11 of Schedule 4</td>
<td>
Operating Conditions

The Proponent shall:

(a) implement best management air quality management on site, including all reasonable and feasible measures to minimise the off-site odour, fume and dust emissions generated by generated by the project, including from any spontaneous combustion on site;

(b) minimise any visible air pollution generated by the project; and

(c) regularly assess the air quality monitoring and meteorological forecasting data, and relocate, modify and/or stop operations on site to ensure compliance with the relevant conditions of this approval;

to the satisfaction of the Planning Secretary.
</td>
<td>Section 5

Section 5

Section 5.3.2</td>
</tr>
<tr>
<td>Condition 12 of Schedule 4</td>
<td>Air Quality & Greenhouse Gas Management Plan</td>
<td></td>
</tr>
</table>

	The Proponent shall prepare a detailed Air Quality & Greenhouse Gas Management Plan for the project to the satisfaction of the Planning Secretary. This plan must: (a) be prepared in consultation with EPA, and submitted to the Secretary for approval by 30 September 2012; (b) describe the measures that would be implemented to ensure compliance with the relevant conditions of this approval, including consideration of applying a real-time air quality management system that employs both reactive and proactive mitigation measures; (c) describe the measures that would be implemented to minimise the release of greenhouse gas emissions from the site; (d) include an air quality monitoring program that evaluates the performance of the project, and includes a protocol for determining exceedances with the relevant conditions of this approval; and (e) include a site specific air quality monitoring and management plan for the Appin Mine Ventilation and Access Site which includes: - an odour management plan and gaseous emissions monitoring program for the operation of the ventilation shafts; - a comprehensive air quality management system that uses real-time monitoring and implements both proactive and reactive air quality mitigation measures.	Section 1.4 Section 6 Section 5.2 Section 6 Sections 5.1.2 and 5.2. Section 6.3.3
Condition 12A of Schedule 4	The Proponent must implement the Air Quality and Greenhouse Gas Management Plan approved by the Planning Secretary.	Section 8.4
Condition 13 of Schedule 4	**Meteorological Monitoring** During the life of the project, the Proponent shall ensure that there is a suitable meteorological station operating in the vicinity of the site that: a) complies with the requirements in the *Approved Methods for Sampling of Air Pollutants in New South Wales* guideline; and b) is capable of continuous real-time measurement of temperature lapse rate in accordance with the *NSW Industrial Noise Policy*	Section 6.3.5
Condition 11 of Schedule 4A	**Construction Environmental Management Plan** Prior to the commencement of Appin Mine Ventilation and Access Site early works, the Proponent must prepare a Construction Environmental Management Plan for the construction phase of the Appin Mine Ventilation and Access Site to the satisfaction of the Planning Secretary. This plan must:	Section 1.2 The requirements of this condition

	(a) be prepared in consultation with the EPA; (b) provide specific environmental management and monitoring measures for construction works, including for: i. minimising construction-related noise, dust, visual impacts, and surface disturbance; … (g) include a Construction Air Quality Management Plan that: i. describes the proactive and reactive air quality mitigation measures that would be implemented to ensure compliance with Condition 9 of Schedule 4 of this approval; ii. includes an air quality monitoring program that: • includes real time monitoring to evaluate air quality impacts during construction; and • includes a protocol for determining exceedances of the relevant conditions of this approval.	are covered in the relevant CEMP (separate to this management plan)
Condition 1 of Schedule 5	**Notification of Landowners** As soon as practicable and no longer than 7 days after obtaining monitoring results showing: a) an exceedance of any relevant criteria in schedule 4, the Proponent shall notify affected landowners in writing of the exceedance, and provide regular monitoring results to each affected landowner until the project is again complying with relevant criteria; and b) an exceedance of any air quality criteria in Schedule 4, the Proponent shall send a copy of the NSW Health fact sheet entitled "Mine Dust and You" (as may be updated from time to time) to the affected landowners and/or existing tenants of the land (including the tenants of any mine-owned land).	Section 8.3.3
Condition 2 of Schedule 5	**Independent Review** If an owner of privately-owned land considers the project to be exceeding the relevant criteria in Schedule 4, then he/she may ask the Planning Secretary in writing for an independent review of the impacts of the project on his/her land. If the Planning Secretary is satisfied that an independent review is warranted, then within 2 months of the Planning Secretary's decision the Proponent shall: (a) commission a suitably qualified, experienced and independent person, whose appointment has been approved by the Planning Secretary, to:	Section 7.4

	• consult with the landowner to determine his/her concerns; • conduct monitoring to determine whether the project is complying with the relevant criteria in Schedule 4; and • if the project is not complying with these criteria then identify the measures that could be implemented to ensure compliance with the relevant criteria; and (b) give the Planning Secretary and landowner a copy of the independent review.	
Condition 3 of Schedule 5	If the independent review determines that the project is complying with the relevant criteria in Schedule 4, then the Proponent may discontinue the independent review with the approval of the Planning Secretary. If the independent review determines that the project is not complying with the relevant impact assessment criteria in Schedule 4, and that the project is primarily responsible for this non-compliance, then the Proponent shall: (a) implement all reasonable and feasible mitigation measures, in consultation with the landowner and appointed independent person, and conduct further monitoring until the project complies with the relevant criteria; or (b) secure a written agreement with the landowner to allow exceedances of the relevant criteria, to the satisfaction of the Planning Secretary. If the independent review determines that any relevant acquisition criteria in schedule 4 are being exceeded and that the project is primarily responsible for this non-compliance, then upon receiving a written request from the landowner, the Proponent shall acquire all or part of the landowner's land in accordance with the procedures in Conditions 4-5 below	Section 7.4
Condition 4 of Schedule 5	**Land Acquisition** Within 3 months of receiving a written request from a landowner with acquisition rights, the Proponent shall make a binding written offer to the landowner based on: (a) the current market value of the landowner's interest in the land at the date of this written request, as if the land was unaffected by the project, having regard to the: • 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 land and/or any approved building or structure which has been physically commenced on the land 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	Section 7.4

	resulted from the implementation of any additional noise mitigation measures under Condition 6 of Schedule 4; (b) the reasonable costs associated with: • relocating within the Wollondilly local government area, or to any other local government area determined by the Planning Secretary; and • obtaining legal advice and expert advice for determining the acquisition price of the land, and the terms upon which it is to be acquired; and (c) reasonable compensation for any disturbance caused by the land acquisition process. If the Proponent and landowner cannot agree on the acquisition price of the land and/or the terms upon which the land is to be acquired within 28 days after the Proponent makes its written offer, then either party may refer the matter to the Planning Secretary for resolution. Upon receiving such a request, the Planning Secretary will request the President of the NSW Division of the Australian Property Institute to appoint a qualified independent valuer to: • consider submissions from both parties; • determine a fair and reasonable acquisition price for the land and/or the terms upon which the land is to be acquired, having regard to the matters referred to in paragraphs (a)-(c) above; • prepare a detailed report setting out the reasons for any determination; and • provide a copy of the report to both parties. Within 14 days of receiving the independent valuer's report, the Proponent shall make a binding written offer to the landowner to purchase the land at a price not less than the independent valuer's determination. However, if either party disputes the independent valuer's determination, then within 14 days of receiving the independent valuer's report, they may refer the matter to the Planning Secretary for review. Any request for a review must be accompanied by a detailed report setting out the reasons why the party disputes the independent valuer's determination. Following consultation with the independent valuer and both parties, the Planning Secretary will determine a fair and reasonable acquisition price for the land, having regard to the matters referred to in paragraphs (a)-(c) above, the independent valuer's report, the detailed report disputing the independent valuer's determination, and any other relevant submissions.	

	Within 14 days of this determination, the Proponent shall make a binding written offer to the landowner to purchase the land at a price not less than the Planning Secretary's determination. If the landowner refuses to accept the Proponent's binding written offer under this condition within 6 months of the offer being made, then the Proponent's obligations to acquire the land shall cease, unless the Planning Secretary determines otherwise.	
Condition 5 of Schedule 5	The Proponent shall pay all reasonable costs associated with the land acquisition process described in Condition 4 above, including the costs associated with obtaining Council approval for any plan of subdivision (where permissible), and registration of this plan at the Office of the Registrar-General.	Section 7.4
Condition 2 of Schedule 6	**Management Plan Requirements** The Proponent shall ensure that the management plans required under this approval are prepared in accordance with any relevant guidelines, and include: (a) detailed baseline data; (b) a description of: • the relevant statutory requirements (including any relevant approval, licence or lease conditions); • any relevant limits or performance measures/criteria; • the specific performance indicators that are proposed to be used to judge the performance of, or guide the implementation of, the project or any management measures; (c) a description of the measures that would be implemented to comply with the relevant statutory requirements, limits, or performance measures/criteria; (d) a program to monitor and report on the: • impacts and environmental performance of the project; • effectiveness of any management measures (see c above); (e) a contingency plan to manage any unpredicted impacts and their consequences and to ensure that ongoing impacts reduce to levels below relevant impact assessment criteria as quickly as possible; (f) a program to investigate and implement ways to improve the environmental performance of the project over time; (g) a protocol for managing and reporting any: • incident; • complaints; • non-compliances with statutory requirements; and • exceedances of the impact assessment criteria and/or performance criteria; and • a protocol for periodic review of the plan.	Section 4 Section 3 Section 6.3.1 Section 5 Section 8 Section 7.2 Section 7.2 Section 7 Section 8 Section 8.4

	Note: The Planning Secretary may waive some of these requirements if they are unnecessary or unwarranted for particular management plans.	
Condition 3 of Schedule 6	**Adaptive Management** The Proponent must assess and manage project-related risks to ensure that there are no exceedances of the criteria and/or performance measures in Schedules 3 and 4. Any exceedance of these criteria and/or performance measures constitutes a breach of this approval and may be subject to penalty or offence provisions under the EP&A Act or EP&A Regulation. Where any exceedance of the criteria and/or performance measures has occurred, the Proponent must, at the earliest opportunity: a) take all reasonable and feasible steps to ensure the exceedance ceases and does not recur; b) consider all reasonable and feasible options for remediation (where relevant) and submit a report to the Department describing these options and any preferred remediation measures or other course of action; and c) implement remediation measures as directed by the Planning Secretary to the satisfaction of the Planning Secretary.	Section 7.2.2
Condition 4 of Schedule 6	**Annual Review** By 30 September 2012, and annually thereafter, the Proponent shall review the environmental performance of the project to the satisfaction of the Planning Secretary. This review must: (a) describe the development (including any rehabilitation) that was carried out in the past financial year, and the development that is proposed to be carried out over the next year; (b) include a comprehensive review of the monitoring results and complaints records of the project over the past financial year, which includes a comparison of these results against the: • relevant statutory requirements, limits or performance measures/criteria; • requirements of any plan or program required under this approval; • monitoring results of previous years; and • relevant predictions in the EA;	Section 8.1

	(c) identify any non-compliance over the past financial year, and describe what actions were (or are being) taken to ensure compliance; (d) identify any trends in the monitoring data over the life of the project; (e) identify any discrepancies between the predicted and actual impacts of the project, and analyse the potential cause of any significant discrepancies; and (f) describe what measures will be implemented over the current financial year to improve the environmental performance of the project.	
Condition 5 of Schedule 6	**Revision of Strategies, Plans and Programs** Within 3 months of: (a) the submission of an annual review under Condition 4 above; (b) the submission of an incident report under Condition 7 below; (c) the submission of an audit report under Condition 9 below; and (d) any modification to the conditions of this approval, (unless the conditions require otherwise); or (e) a direction of the Planning Secretary under Condition 4 of Schedule 2; the Proponent shall review, and if necessary revise, the strategies, plans, and programs required under this approval to the satisfaction of the Planning Secretary.	Section 8.4
Condition 7 of Schedule 6	**Incident Notification, Reporting and Response** The Planning Secretary must be notified in writing via the Major Projects website immediately after the Proponent becomes aware of an incident. The notification must identify the project (including the development application number and the name of the development if it has one) and set out the location and nature of the incident. Subsequent notification requirements must be given, and reports submitted in accordance with the requirements set out in Appendix 7.	Section 8.3.1
Condition 7A of Schedule 6	**Non-compliance Notification** The Secretary must be notified in writing via the Major Projects website within seven days after the Proponent becomes aware of any non-compliance. A non-compliance notification must identify the project and the application number for it, set out the condition of approval that the project is non-compliant with, the way in which it does not comply and the reasons for the non-compliance (if known) and what actions have been, or will be, undertaken to address the non-compliance. *Note: A non-compliance which has been notified as an incident does not need to also be notified as a noncompliance.*	Section 8.3.2

Condition 8 of Schedule 6	**Regular Reporting** The Proponent shall provide regular reporting on the environmental performance of the project on its website, in accordance with the reporting arrangements in any plans or programs approved under the conditions of this approval.	Section 8
Condition 9 of Schedule 6	**Independent Environmental Audit** By the end of December 2013, and every 3 years thereafter, unless the Planning Secretary directs otherwise, the Proponent shall commission and pay the full cost of an Independent Environmental Audit of the project. This audit must: (a) be conducted by a suitably qualified, experienced and independent team of experts whose appointment has been endorsed by the Planning Secretary; (b) include consultation with the relevant agencies; (c) assess the environmental performance of the project and assess whether it is complying with the requirements in this approval and any relevant EPL or Mining Lease (including any assessment, plan or program required under these approvals); (d) review the adequacy of strategies, plans or programs required under the abovementioned approvals; and (e) recommend appropriate measures or actions to improve the environmental performance of the project, and/or any assessment, plan or program required under the abovementioned approvals. *Note: This audit team must be led by a suitably qualified auditor and include experts in any field specified by the Planning Secretary*	Section 8.5.1
Condition 10 of Schedule 6	Within 6 weeks of the completion of this audit, or as otherwise agreed by the Planning Secretary, the Proponent shall submit a copy of the audit report to the Planning Secretary, together with its response to any recommendations contained in the audit report.	Section 8.5.1
Condition 11 of Schedule 6	**Access to Information** From 30 June 2012, the Proponent shall: (a) make copies of the following publicly available on its website: • the documents referred to in Condition 2 of Schedule 2; • all current statutory approvals for the project; • all approved strategies, plans and programs required under the conditions of this approval;	 Section 3.1 Section 7.1 Section 8.2

	• a comprehensive summary of the monitoring results of the project, reported in accordance with the specifications in any conditions of this approval, or any approved plans and programs; • a complaints register, updated on a monthly basis; • minutes of CCC meetings; • the annual reviews of the project; • any independent environmental audit of the project, and the Proponent's response to the recommendations in any audit; • any other matter required by the Planning Secretary; and (b) keep this information up-to-date, to the satisfaction of the Planning Secretary	Section 8.4 Section 8.5.1

Appendix 3: EA Commitments: Air Quality and GHG Management

EA Section	EA Commitment	Section
5.13.4	Management measures for the Project would include, but would not necessarily be limited to: • compaction of moist coal wash material following emplacement in the West Cliff Coal Wash Emplacement; • progressive rehabilitation of the West Cliff Coal Wash Emplacement; • watering of unsealed and some sealed haul roads; • enclosure of crushing and screening processes; • enclosure of transfer conveyors; • water sprays at ROM and product coal stockpiles; • truck wash for all heavy vehicles travelling off-site; • coal covers on trucks transporting ROM coal and product coal off-site; and • speed limits for all roads around the surface facilities.	Section 5
5.13.4	Air quality monitoring will continue to be undertaken using the dust monitoring network. The results of air quality monitoring would be used to optimise air quality controls, validate the air quality modelling predictions and would be reported to the relevant authorities via the AEMRs.	Section 6
5.13.4	Odour In the event of an issue or complaint arising with respect to odour, suitable complaint response, monitoring and/or management measures would be implemented.	Section 7
5.13.4	Air Quality Management Plan An Air Quality Management Plan (AQMP) will be developed that builds on existing site management plans, describes mitigation and management measures and would provide a framework for the ongoing monitoring and management of air quality at the Project, complaint response protocols and reporting requirements.	This document
5.13.5	An Energy Savings Action Plan will be prepared and implemented for the Project to further improve energy performance and management systems.	An Energy Savings Plan was developed and implemented.
5.14.3	WestVAMP would continue to be used at the West Cliff Colliery subject to future contract negotiations and ongoing economic viability.	WestVAMP is no longer operational.

5.14.3	Implement surface goaf gas drainage at the Project that involves flaring or power generation.	Section 5.2
5.14.3	Comply with the requirements of the Carbon Pollution Reduction Scheme.	Section 5.2

Appendix 4: Agency Consultation

Agency Comments	IMC Response
Environment Protection Authority (EPA)	
Response received 16 November 2020 The Environment Protection Authority (EPA) refers to Endeavour Coal's request for comments on the Appin Mine Air Management Plan, APNMP0112 version 1.0 (version 5 old format). The EPA has reviewed the updated management plan and has no general comments to make. The EPA notes that Endeavour proposes to remove the dust deposition gauges and use monitoring results from aerosol photometers for comparison with health and amenity guideline criteria. The dust gauges will be kept and used to investigate fallout complaints as required. The HVAS and dust gauges currently in use are limited in that they can only provide historical time averaged data. The proposed changes will provide real time monitoring results for a range of parameters such as PM10, PM2.5 and PM1 that can be correlated with site operations and wind direction. The EPA previously agreed in principal to the proposed changes and will modify the licence following submission of a request for licence variation. The EPA notes that the existing air quality monitoring requirements on the licence must be followed until the variation has been approved.	Comments noted
Response received 30 August 2022 The EPA has reviewed the plan which has been updated to include monitoring and management of air emissions from construction and operation of the Appin Mine Ventilation and Access (AMVA). The EPA has no comments on the plan and would appreciate receiving a copy of the final plan or a link to its location on Illawarra Coal's website after it has been approved by the Planning Secretary.	Noted.

Response received 30 April 2024 The EPA refers to your request for comments on the above plan which is required to be prepared under Project Approval 08_0150 issued for the Bulli Seam Operation. The EPA notes that the plan has been updated to include the proposed Ventilation Air Methane Abatement Demonstration Facility and also continuous monitoring of particulates at the Appin Vent Shaft construction site at Menangle. The EPA has reviewed the plan and has no specific comments to make.	Noted
Department of Planning, Industry and Environment	
Response received 7 December 2020 Update Section 8.4 to clarify that the management plan will only be revised then submitted and approved by the Secretary in accordance with the requirements of the conditions of approval.	Section 8.4 has been revised as requested
Response received 22 November 2022 **Operation of Plant and Equipment** Condition 2 of Schedule 12: The Proponent shall ensure that all plant and equipment used at the site is: (a) maintained in a proper and efficient condition; and (b) operated in a proper and efficient manner. *Include that all plant and equipment used at the site will be maintained in a proper and efficient condition and proper and efficient manner.*	Requirement added under Section 6 heading.
Air Quality Criteria Condition 9 of Schedule 4: The Proponent shall ensure that all reasonable and feasible avoidance and mitigation measures are employed so that the particulate emissions generated by the project do not exceed the criteria listed in Tables 4, 5 and 6 at any residence on privately-owned land or on more than 25 percent of any privately-owned land, and that the particulate emissions from the Appin Mine Ventilation and Access Site do not exceed the criteria listed in Tables 4 - 6A at any	

residence on privately-owned land or on more than 25 percent of any privately-owned land. *Include the provision in section 6.3.1 that the air quality criteria apply to any residence on privately-owned land or on more than 25 percent of any privately-owned land.*	Provision has been included in Section 6.3.1.
Operating Conditions Condition 11 of Schedule 4: The Proponent shall: (b) minimise any visible air pollution generated by the project; *Specify the sources of visible pollution.*	Further clarification has been provided in Section 5.3.
Condition 11 of Schedule 4: The Proponent shall: (c) regularly assess the air quality monitoring and meteorological forecasting data, and relocate, modify and/or stop operations on site to ensure compliance with the relevant conditions of this approval; to the satisfaction of the Planning Secretary. *Include a summary of the triggers and responses (e.g. relocate, modify and/or stop operations) to ensure compliance with the relevant conditions.*	TARPs included in Section 5.3.2.
Air Quality & Greenhouse Gas Management Plan The Proponent shall prepare and implement a detailed Air Quality & Greenhouse Gas Management Plan for the project to the satisfaction of the Planning Secretary. This plan must: (b) describe the measures that would be implemented to ensure compliance with the relevant conditions of this approval, including consideration of applying a real-time air quality management system that employs both reactive and proactive mitigation measures; *Refer to Condition 11(c) above. Include a summary of the reactive mitigation measures.*	Refer to TARPs in Section 5.3.2.
The Proponent shall prepare and implement a detailed Air Quality & Greenhouse Gas Management Plan for the project to the	

satisfaction of the Planning Secretary. This plan must: (d) include an air quality monitoring program that uses a combination of high volume samplers and dust deposition gauges to evaluates the performance of the project, and includes a protocol for determining exceedances with the relevant conditions of this approval *Include the details for the use of high volume air samplers, should they be required.*	This condition was modified in MOD 3. The text 'uses a combination of high volume samplers and dust deposition gauges to' was deleted. This comment is therefore not applicable.
Meteorological Monitoring During the life of the project, the Proponent shall ensure that there is a suitable meteorological station operating in the vicinity of the site that: (b) is capable of continuous real-time measurement of temperature lapse rate in accordance with the NSW Industrial Noise Policy. *Specify if the stations are capable of continuous real-time measurement of temperature lapse rate in accordance with the NSW Industrial Noise Policy.*	The real-time measurement of temperature lapse rate will be undertaken at the WCCPP weather station. This is discussed in more detail in the Appin Mine Noise Management Plan where it is relevant.
<u>Technical Review received 19 January 2023</u> South32 are mitigating substantial volumes of GHGs by beneficially using pre-drainage and goaf drainage gas in EDL-operated power stations. However it is important that the residual emissions start to be reduced as early as possible. The source of these emissions is the ventilation air methane understood to be released from upcast shafts no.2, no.6 and no.8. There is no discussion on the $15M Coal Innovation NSW South 32 VAM abatement demonstration facility. Provide a discussion in section 8.1.1 of the VAM abatement demonstration facility. Include a commitment to review outcomes of the demonstration facility. Discuss the practice technology and the potential to operate as low as 0.2%	Discussion included in Section 5.2.5. The results from the demonstration facility will be utilised in the further study of the wider VAM abatement solution at IMC. Operating down to 0.2% CH_4 is part of the operational testing process. This will confirm if the reaction is self-sustaining at lower concentrations.

The VAM abatement demonstration facility There is no mention of the facility and if the Bulli Seam Op will adopt outcomes from the facility in the future. Include in section 8.1.1 a discussion on the safe ducting systems. Include a commitment to implement the technology being demonstrated on a large scale in future mine operations. In the first instance commit to a feasibility study.	Discussion included in Section 5.2.5. South32 commit to undertaking a Prefeasibility Study to assess the technical suitability of a wide scale VAM abatement solution. All upcast ventilation shafts will be considered in the assessment.
The VAM abatement demonstration facility It is understood the demonstration facility is using a small proportion of the VAM flow from shaft No. 2. Consider increasing the proportion of the VAM flow at shaft #2 post the demonstration project. Commit to a feasibility study. Include a commitment to implement the technology at shafts #6 and #8 and any new shaft using a substantial fraction of the VAM flows. Commit to a feasibility study.	The Prefeasibility Study will include assessments of VS2, VS6, VS8 and future ventilation shafts for any wider scale implementation across IMC.

Appendix 5: Management Plan Approval

Department of Planning, Housing & Infrastructure

Our ref: MP08_0150-PA-104

Mr Chris Schultz
Superintendent Environment
Illawarra Coal Holdings Pty. Ltd.
PO BOX 514
Unanderra, NSW, 2526

16/05/2024

Subject: Air Quality and Greenhouse Gas Management Plan

Dear Mr Schultz

I refer to the Air Quality and Greenhouse Gas Management Plan submitted in accordance with Condition 12, Schedule 4 of the consent for the Bulli Seam Operations Project (MP08_0150).

The Department has carefully reviewed the document and note:

- it has been prepared in consultation with the NSW EPA, and
- contains the information required by the conditions of approval.

Accordingly, as nominee of the Planning Secretary, I approve the Air Quality and Greenhouse Gas Management Plan (Rev 3.0, May 2024).

You are reminded that if there are any inconsistencies between the Plan and the conditions of consent, the conditions prevail. Please ensure you make the document publicly available on the project website at the earliest convenience.

The Department notes that for future versions of the Plan, consideration should be given to amendments that provide for a more concise and focussed operational document.

If you wish to discuss the matter further, please contact Emily Pemberton on [redacted].

Yours sincerely

Jessie Evans
Director, Resource Assessments
Resource Assessments

As nominee of the Planning Secretary

4 Parramatta Square, 12 Darcy Street, Parramatta NSW 2150 www.dphi.nsw.gov.au 1
Locked Bag 5022, Parramatta NSW 2124