

MANGOOLA OPEN CUT

GLENCORE

Plan for

Air Quality Management

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Review History

Version	Date Reviewed	Reviewed By	Amendment
1	2007	Centennial Coal/ Umwelt	Initial development of document.
2	September 2008	Xstrata Mangoola	First Draft sent to DoPI and EPA for review.
3	May 2008	Xstrata Mangoola	Updated following receiving EPL and sent to DoPI.
4	January 2009	DoPI	First approved document.
5	June 2011	Xstrata Mangoola/ Umwelt	Development of AQMP to detail the air quality management and monitoring activities associated with the construction and operational phase of the mine.
6	October 2012	Xstrata Mangoola/ Umwelt	Updates to AQMP following Project Approval modification.
7	April 2013	Xstrata Mangoola	Reviewed in light of DP&I feedback and re-submitted June 2013 for approval.
8	September 2013	Mangoola / DP&I	AQMP approved 11th September 2013. Added evidence of this to appendix and updated document date to reflect approval date.
9	July 2014	Mangoola / DPE	Review following Modification 6 to Project Approval (PA) 06_0014.
10	July 2016	Mangoola	<ul style="list-style-type: none"> Relocation D01-DC to 393 Wybong PO Road, Wybong, to reflect a new nearest private sensitive receptor in this locality following acquisition of the property at 275 Wybong PO Road. As a result of this relocation, D01-DC shall be renamed D06-DC here-on; Conversion of D01-TSP to D01-PM₁₀ at 275 Wybong PO Road, in order to monitor air quality on mine-owned property; Installation of D07-PM₁₀ at 2530 Wybong Road and D06-PM₁₀ at 1171 Mangoola Road in order to monitor air quality on the mine-owned property; Remove DG05 and DG08 from monitoring network due to position within approved disturbance boundary; and EPL12894 Variation dated 14/12/2015: <ul style="list-style-type: none"> Removed requirement for TSP and dust deposition from license D7-DC and D8-DC installed to monitor at near edge of mine site both upwind and downwind in alignment with the predominant wind direction.
11	August 2017	Mangoola	Address comments from DPE dated 17 August 2017.

12	December 2017	Mangoola	<ul style="list-style-type: none"> Removal of DG21 as per technical review following new property owner refusing access to site. Updated Table 4.1-4.3 note, acknowledging risk of data loss due to external events outside the control of Mangoola Coal. Updated 5.4 Corrective action to include prevention of access by landowner.
13	January 2018	Mangoola	<ul style="list-style-type: none"> Minor formatting for publishing to Mangoola website.
14	February 2018	Mangoola	<ul style="list-style-type: none"> Removal of requirement to provide 7 day report to EPA as it is not required under EPL 12894. Correction of air quality criteria Table notes and Appendix condition. Updated Figure 4.1. Updated Section 5.3 Exceedance reporting to include occurrence of extraordinary event.
15	December 2019	Mangoola	<ul style="list-style-type: none"> Added new definition to differentiate between Mangoola mine owned residences and other mine owned residences. Updated figures Changed reporting requirements for mine owned residence in line with recommendation contained in the IEA submitted to DPIE 16 October 2019.

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1 Introduction

Mangoola Open Cut Operations Pty Limited (Mangoola Open Cut) operates an open cut coal mine located near Wybong, approximately 20 kilometres west of Muswellbrook and approximately 10 kilometres north of Denman in the Muswellbrook Local Government Area (refer to **Figure 1.1**).

1.1 Project Description

In accordance with PA 06_0014, Mangoola Open Cut has an approved maximum production rate of 13.5 million tonnes per annum (Mtpa) of run of mine (ROM) coal over a mine life of 21 years. The primary mining method utilises hydraulic excavators loading rear dump trucks assisted by dozer push and cast blasting of overburden where appropriate. Dump trucks haul ROM coal to the coal handling facilities along haul roads. The general mining sequence includes the stripping of topsoil, removal of overburden, extraction of coal resource, in pit overburden emplacement and progressive rehabilitation.

Mining operations, coal handling and washing, rail load out and all associated activities operate on a 24 hours per day, seven days per week basis with the exception of the mobile gravel crushing plant which is restricted to 7am to 6pm Monday to Friday and 8am to 1pm on Saturdays with no operations on public holidays or Sundays. Blasting is typically undertaken between the hours of 9am and 5pm Monday to Saturday. No blasting is undertaken on Sundays or public holidays.

A detailed description of the Mangoola Open Cut project, and the subsequent modifications, is provided in Chapter 3 of the Modification 6 Environmental Assessment (EMGA Mitchell McLennan 2013). An overview of the air quality assessment findings can be found in Chapter 9 of this EA.

The conceptual mine plan scenarios utilised in the Modification 6 Environmental Assessment includes:

- Year 2 (end 2015) – coal extraction in the north-east area of the mine (the Northern Pit) and progressing in a south-easterly direction towards the mine infrastructure area. The overburden emplacement area is established behind the general progression of the pit;
- Year 5 (end 2018) – coal extraction in the north-west area (the Main Pit) and southern area (the Southern Pit) of the mine. The Main Pit progresses in a south-west direction around Anvil Hill and the Southern Pit in a north-west direction; and
- Year 10 (end 2023) – one active pit in the south-western area of the mine (the Southern Pit). The majority of the mined land is rehabilitated by this time and represents the end stage of the mine life.

Mangoola Open Cut is in an area influenced by dust sources from mining, agricultural activities and emissions from local anthropogenic activities such as motor vehicle exhaust and domestic wood heaters. There is also the influence from extraordinary events such as bushfires, prescribed burning and dust storms which can impact regional air quality. Site-specific air quality data has been collected since 2006 to characterise existing particulate matter levels both prior to commencement of mining in 2010, and as part of Mangoola Open Cut's operational air quality monitoring program. In terms of dust deposition, the air quality in proximity to Mangoola Open Cut is considered good, because all gauges recorded an annual average insoluble deposition level below 4g/m²/month during the monitoring period 2006 to present (EMGA Mitchell McLennan 2013).

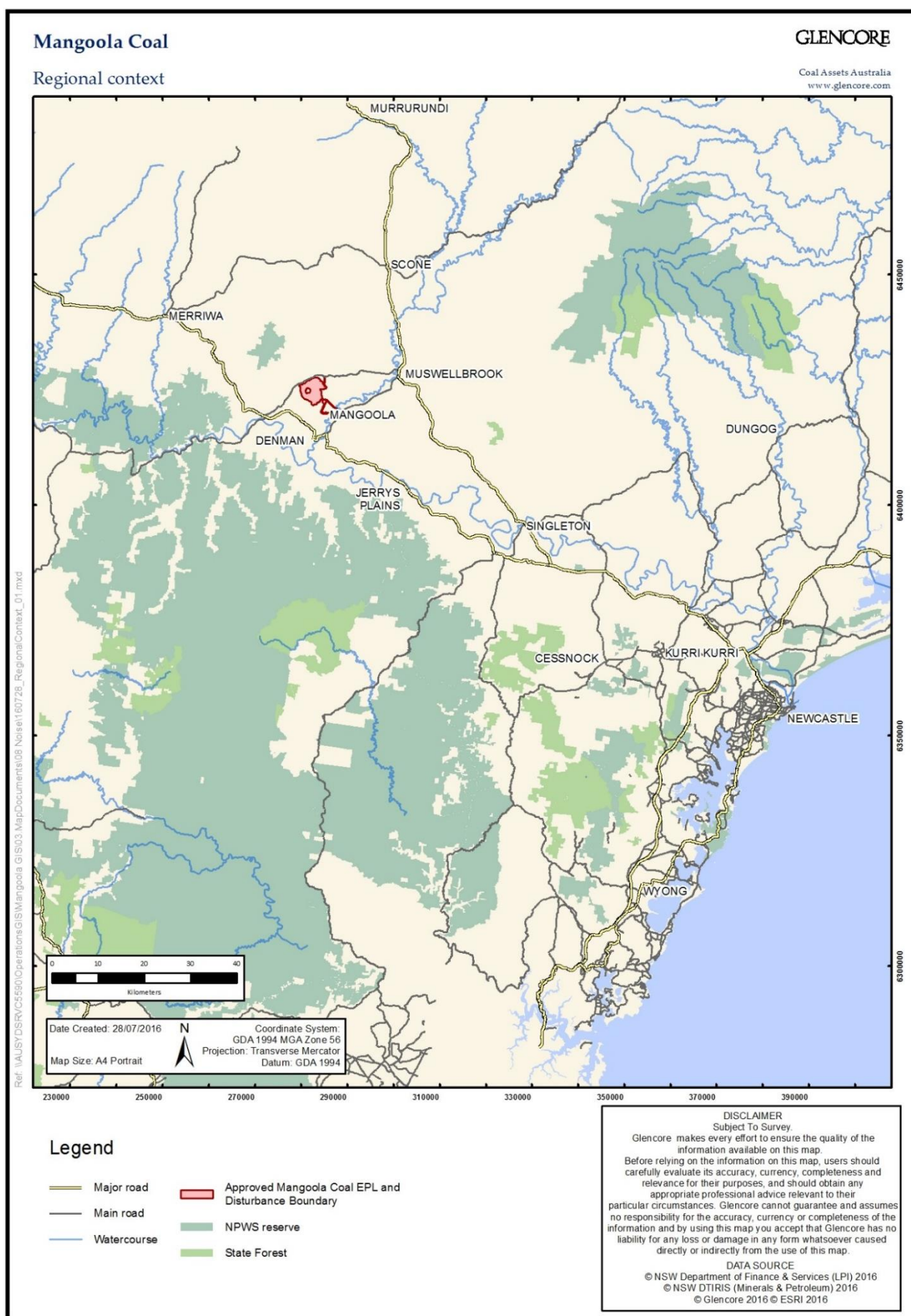


Figure 1.1

To satisfy Schedule 3, Condition 23 of PA 06_0014, an Air Quality Management Plan (AQMP) is required to be prepared and implemented for the project to the satisfaction of the Secretary.

1.2 Objectives

The objectives of the AQMP include the following:

- establish and maintain an air quality monitoring system to assess the air quality impact on surrounding sensitive receivers and performance of Mangoola Open Cut against the specific air quality impact assessment criteria (refer to **Section 4**);
- implement best practice management to minimise the off-site odour, fume and dust emissions of the project (refer to **Section 3.1 to 3.5**);
- implement predictive meteorological forecasting and real-time air quality monitoring to guide the day to day planning of mining operations (refer to **Section 3.2**);
- minimise the air quality impacts of the project during adverse meteorological conditions and extraordinary events (refer to **Section 3.2**);
- minimise any visible off-site air pollution (refer to **Section 3**);
- minimise the surface disturbance of the site, as far as practicable, generated by the project (refer to **Section 3.2**); and
- manage air quality related community complaints in a timely and effective manner (refer to **Section 5.2**).

1.3 Regulatory Requirements

1.3.1 Project Approval

PA 06_0014 for Mangoola Open Cut was granted by the Minister for Planning and Infrastructure under the EP&A Act on 7 June 2007. Eight modifications to PA 06_0014 have since been granted. The requirement for this AQMP arises from Schedule 3, Condition 27 of PA 06_0014. This AQMP was originally approved by the Department of Planning Industry and Environment (DPIE) in January 2008. A detailed list of PA 06_0014 conditions and where they are addressed in this document is included in **Appendix B**.

1.3.2 Environment Protection Licence

Mangoola Open Cut was issued Environment Protection Licence (EPL) 12894 on 7 July 2008. A full list of the current EPL 12894 conditions relating to air quality monitoring and where they are addressed within this document are included in **Appendix B**.

1.4 Roles and Responsibilities

The roles and responsibilities of Mangoola Open Cut employees and contractors in relation to air quality management and monitoring are outlined in **Table 1.4**.

Table 1.4 - Roles and Responsibilities

Role	Responsibilities
Operations Manager	<ul style="list-style-type: none"> providing that sufficient resources are allocated for the implementation of this AQMP.
Mine / CHPP / Maintenance Manager	<ul style="list-style-type: none"> implementation of this plan via site procedures for mining operations to ensure compliance with project approval requirements; implementation of air quality management controls as per this plan; and inform personnel of air quality management obligations.
Environment and Community Manager (ECM)	<ul style="list-style-type: none"> coordinate training to communicate requirements of this AQMP to relevant personnel; provide resourcing and support to allow effective implementation of this AQMP; coordinate, advise and assist with the implementation of air quality monitoring in accordance with the AQMP; identify potential air quality impacts and implement actions to mitigate the identified risks; notify regulatory authorities and affected landholders of any air quality related exceedance and undertake associated reporting; ensure external reporting requirements associated with this plan are met; coordinate incident investigation processes including associated reporting requirements and the implementation of corrective actions and evaluate their effectiveness; coordinate complaints recording & investigation processes including associated reporting requirements; and coordinate the implementation of corrective actions and evaluate their effectiveness associated with community complaints. complete reporting requirements for Annual Review and Annual Return regarding air quality management; update monitoring data on the Mangoola Open Cut website; coordinate maintenance, replacement and repair of monitoring equipment as required in a regular and/or timely manner; coordinate regular inspections to check air quality monitoring units are operating effectively to assess dust emissions; effective maintenance of monitoring records on site; and review air quality monitoring data against criteria as per the specified frequency of management plans.
All employees and contractors	<ul style="list-style-type: none"> undertake all activities in accordance with this AQMP.

1.5 Definitions

The terminology utilised within this AQMP is defined in **Table 1.5**.

Table 1.5 - Terminology utilised within the AQMP

Term	Definition
BAM	Beta Attenuation Monitor
EMS	Environmental Management Strategy
Dust Deposition	Dust particles that settle out from the air - measured in grams per square metre per unit time (g/m ² /month)
HVAS	High Volume Air Sampler
Incident	A set of circumstances that causes or threatens to cause material harm to the environment and/or breaches or exceeds the limits of performance measures/criteria in in PA 06_0014.
Mangoola mine owned	Land owned by Mangoola Open Cut
Other mine owned	Land owned by another mining company
PM₁₀	Particulate matter less than 10 micrometers (µm) in size
PM_{2.5}	Particulate matter less than 2.5 micrometers (µm) in size
Project Approval	PA 06_0014 consolidated project approval
Residence	An occupied dwelling (criteria does not apply to unoccupied dwellings)
Privately-owned land	Land that is not owned by a public agency, or a mining company (or its subsidiary)
TSP	Total Suspended Particulates (µg/m ³). The nominal size of this fraction has particles with a diameter of up to 50 micrometers (µm)
TEOM	Tapered Element Oscillating Microbalance dust sampling unit
µg/m³	Micrograms per cubic metre
UHAQMN	Upper Hunter Air Quality Monitoring Network

2 Impact Assessment Criteria

Schedule 3, Condition 19 of PA 06_0014 outlines the impact assessment criteria related to the project. The Project Approval conditions relating to impact assessment criteria for air quality are provided in **Appendix B**.

Criteria for dust concentration are referred to as long term (annual average) and short term (24 hour maximum) criteria. Relevant criteria for total suspended particulates (TSP) and particulate matter less than 10µm (PM₁₀) are outlined in **Table 2.1** and **Table 2.2** in relation to both project specific and cumulative criteria applied at a regional level. The TSP and PM₁₀ annual average criteria relate to the total dust in the air and not just the dust from Mangoola Open Cut operations.

Dust deposition levels refer to the quantity of dust particles which settle out of the air as measured in grams per square metre per month (g/m²/month) at a particular location. PA 06_0014 expresses dust deposition criteria in terms of an acceptable increase in dust deposition over the existing background deposition levels. For example, in residential areas with annual average dust deposition levels of between 0 and 2 g/m²/month, an increase of up to 2 g/m²/month would be permitted before it would be considered that a significant degradation of air quality had occurred. PA 06_0014 criteria for dust deposition are included in Table 2.3.

Table 2.1 – Long term impact assessment criteria for particulate matter

Pollutant	Averaging Period	^d Criterion
Total Suspended Particulate (TSP) Matter	Annual	^a 90 µg/m ³
Particulate Matter < 10 µm (PM ₁₀)	Annual	^a 30 µg/m ³

Table 2.2 - Short term impact assessment criteria for particulate matter

Pollutant	Averaging period	^d Criterion
Particulate matter < 10 µm (PM ₁₀)	24 hour	^a 50 µg/m ³

Table 2.3 - Long term impact assessment criteria for deposited dust

Pollutant	Averaging Period	Maximum Increase in deposited dust level	Maximum total deposited dust level
^c Deposited Dust	Annual	^b 2 g/m ² /month	^a 4 g/m ² /month

Notes to Tables 2.1 – 2.3:

- a Total impact (i.e. incremental increase in concentrations due to the development plus background concentrations due to all other sources);
- b Incremental impact (i.e. incremental increase in concentrations due to the development 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, fire incidents or any other activity agreed by the Secretary.

There are currently no specific air quality criteria for particulate matter less than 2.5 µm (PM_{2.5}) for Mangoola Open Cut. However, in accordance with Schedule 3, Condition 23 of PA 06_0014, Mangoola Open Cut will continue to undertake PM_{2.5} particulate monitoring, in order to understand the project specific and cumulative air quality impacts of the operations.

2.1 Land Acquisition Criteria

PA 06_0014 conditions relating to land acquisition for air quality impacts are provided in **Appendix B**. If the particulate matter emissions generated by the operation of Mangoola Open Cut exceed the land acquisition criteria, or contribute to the exceedances of the relevant cumulative criteria, in **Tables 2.4, 2.5 and 2.6** at any residence on privately owned land, then upon receiving a written request for acquisition from the landowner, Mangoola will follow the land acquisition process outlined in Schedule 4, Condition 10 of PA 06_0014. **Section 4** of the AQMP explains how compliance with the land acquisition criteria is monitored.

Table 2.4 - Long Term Land Acquisition Criteria for Particulate Matter

Pollutant	Averaging Period	^d Criterion
Total Suspended Particulate (TSP) Matter	Annual	^a 90 µg/m ³
Particulate Matter < 10 µm (PM ₁₀)	Annual	^a 30 µg/m ³

Table 2.5 - Short Term Land Acquisition Criteria for Particulate Matter

Pollutant	Averaging period	^{da} Criterion
Particulate matter < 10 µm (PM ₁₀)	24 hour	^a 150 µg/m ³
Particulate matter < 10 µm (PM ₁₀)	24 hour	^b 50 µg/m ³

Table 2.6 - Long Term Land Acquisition Criteria for Deposited Dust

Pollutant	Averaging Period	Maximum Increase in deposited dust level	Maximum total deposited dust level
^c Deposited Dust	Annual	^b 2 g/m ² /month	^a 4 g/m ² /month

Notes to Tables 2.4 – 2.6:

- ^a Total impact (i.e. incremental increase in concentrations due to the development plus background concentrations due to all other sources);
- ^b Incremental impact (i.e. incremental increase in concentrations due to the development 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, fire incidents or any other activity agreed by the Secretary.

2.2 Cumulative Emissions

The Modification 6 Environmental Assessment process involved assessments of cumulative dust emissions (TSP, PM₁₀ and PM_{2.5}) associated with the Mangoola Open Cut project, surrounding mining operations and other sources of dust generation within the surrounding area. With the nearest mines situated approximately 7 km from Mangoola Open Cut operations, the predicted contribution to cumulative impacts on surrounding properties was considered insignificant. Mangoola will continue to monitor and assess air quality data, including data from the Upper Hunter Air Quality Monitoring Network (UHAQMN), in conjunction with meteorological data to determine Mangoola Open Cut's contribution to recorded dust events. If a cumulative impact issue is identified, a process of investigation and mitigation will be undertaken as required.

3 Air Quality Management Controls

Air quality management controls and mitigation practices have been developed to minimise the impact of Mangoola Open Cut's operations on privately- and mine-owned residences. Specifically, these controls and practices aim to minimise the offsite impacts caused by wind-blown, traffic generated and blast dust. These controls and practices are detailed in **Section 3.1, 3.2 and 3.3**.

3.1 Design Controls

A number of air quality controls are incorporated into the design of the Mangoola Open Cut mine and infrastructure. The following mine design features were incorporated into the project design:

- overburden emplacement areas have been designed to minimise air quality impact on sensitive receivers to the east and south-east;
- all active roads will be clearly defined and the development of minor roads will be limited;
- unsealed minor roads used regularly for access will be constructed so as to minimise dust generation (for example, by using well-compacted select material);
- the CHPP, coal stockpiles and associated infrastructure is located near the eastern boundary of the proposed disturbance area, within the valley that forms the upper reach of Anvil Creek. This area provides natural topographic shielding which will reduce dust impacts in the surrounding area;
- enclosures of overland raw coal conveyors;
- enclosure of coal handling and preparation plant; and
- retention of buffer lands surrounding operations.

3.2 Operational Controls

Mangoola Open Cut implements a number of controls to minimise dust emissions which may be generated from trafficable areas, coal preparation and handling, pre-strip operations, blasting, drilling and stemming. As part of this system, Mangoola Open Cut will implement proactive and reactive controls to manage dust generation.

3.2.1 Proactive Controls:

A range of proactive measures are implemented by Mangoola Open Cut to manage dust emissions including:

- use of predictive meteorological forecasting to assist with mine planning when adverse meteorological conditions could give rise to dust emissions. This is sent via email as well as discussed in daily production meetings;
- the air quality model, developed during the Modification 6 environmental assessment will be referred to when setting early warning alarms or analysing data;
- use of water carts to suppress dust generation on unsealed surfaces including haul roads, minor unsealed roads, active extraction areas, dump tip heads, rehabilitation areas and drill pads. Chemical treatments / polymer suppressants may also be added to water carts in order to maintain surface moisture at a level that achieves 80 percent dust suppression along haul roads;
- enforcement of speed limits on all roads across the mine site in line with the site Transport Management Plan;
- only the minimum area necessary for mining operations will be disturbed at any time;
- rehabilitation of mining and overburden emplacement areas, and obsolete roads, will be undertaken according to the approved Mine Operations Plan in order to minimise windblown dust potential;
- temporary revegetation of inactive mining areas, shaped dumps and topsoil stockpiles where there is the potential for excessive dust generation and no plan for use within six months;
- automatic sprays fitted to the dump hopper and coal crushing plant minimise dust from coal processing activities. Any issues of ineffective sprays are to be reported to maintenance for action. Hoppers cannot be operated without sprays unless it is monitored and control over dust emissions is maintained;
- blasting design and operation will be managed to assist with minimising dust generation in the blasting process. This process will include:
- consideration of material and explosives characteristics;
 - hole sizing and stemming material specification;
 - accurate placement and drilling of holes;
 - accurate explosives loading; and
 - correct stemming height of blast holes.

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- mine personnel will be provided with training in dust controls for mine operations.
- minimise double handling of material;
- identify material types that contain fine and/or friable fractions;
- prepare work areas prior to commencement of mining activities to minimise dust generation potential, e.g. watering of extraction areas / tip heads where practicable;
- sheltered dumping during periods of high winds (mine planning to include alternative dumping options in mine plans);
- minimise the distance of fall of overburden materials during loading and tipping as far as practical;
- when the mobile gravel crusher is on site, consideration to the use of sprays and to prevailing wind conditions will be given when siting the mobile plant; and
- drill rigs will be fitted with dust control measures and will be regularly maintained for their effective use. If the dust suppressant measures fail, the drill can only continue to operate if it is monitored and work ceases immediately if dust goes above deck height. Whenever defects are detected which could cause further harm to the equipment, people or the environment, the drill is isolated and tagged 'Out of Service'.

3.2.2 Reactive Controls:

Mangoola will implement a range of reactive dust control measures in addition to proactive measures outlined in **Section 3.2.1**. These include:

- an alarm is sent to CHPP/Mining Supervisors when wind speeds reach >8m/s at either of the sites continuous weather stations. This is a trigger for Supervisors to review the performance of current dust controls under high wind speeds and implement further controls where required;
- an automatic alarm system fitted to the Tapered Element Oscillating Microbalance (TEOM) monitors and e-samplers will inform CHPP/Mining Supervisors when real time dust monitoring indicates dust levels are approaching, or exceeding relevant criteria as defined in **Section 2**. This will trigger a review of current operations and enable appropriate operational response to further mitigate emissions as required;
- water sprays will be used at coal handling transfer points and on permanent raw and product coal stockpiles, with enhanced stockpile watering undertaken as required. Coal stockpile sprays will be activated if visual inspections identify that the moisture content of the coal is not sufficient to manage dust levels without additional application of water;
- modification of operations and other activities under adverse meteorological conditions as identified by field observations and/or the sites continuous meteorological monitoring stations. This includes restricting or ceasing uncontrolled dust-generating activities, targeted use of water carts, defining of trafficked areas and driving to the conditions (reduced vehicle speed limits);
- topsoil stripping and handling activities will cease during adverse meteorological conditions when dust controls are ineffective (e.g. use of water as suppressant); and
- development of a spontaneous combustion management strategy to monitor potential causes of spontaneous combustion events, and actions that can be implemented in the event of spontaneous combustion occurring (refer to **Section 3.5**); and

The potential air quality impact of specific activities such as drilling and stemming, coal handling and trafficable exposed areas will be managed in accordance with this AQMP and relevant operational procedures. The effectiveness of dust controls will continue to be evaluated throughout the life of the mine. Additional dust management controls, including new technologies, will be investigated and implemented where practicable (refer to **Section 3.4**).

3.3 Community Mitigation

Mangoola Open Cut will offer specific mitigation measures to members of the community in accordance with the Modification 6 Environmental Assessment commitment. Mitigation measures have been advertised in the Mangoola Open Cut Community Newsletter and include:

- those private landowners living within a 4 km radius of the active mining area will be offered the following mitigation options upon request:
 - cleaning of solar power panels; and
 - cleaning of residential rainwater tanks once per year.

- private landowner living within a 4 – 6 km radius of active mining operations will be offered cleaning of residential rainwater tanks every two years, upon written request;
- private landowner living within a 6 km radius of the active mining area will be offered installation of a first flush system on residential rainwater tanks upon request;

3.3.1 Mine owned residences

All mine owned residences have had the following information provided to them as part of their general tenancy agreement and rental information:

- The tenants have been provided the NSW Government 'Mine Dust and You' fact sheet;
- Advice on how to access air quality monitoring results through the company website; and
- Have been advised of their ability to terminate the tenancy agreement without penalty at any time.

The monitoring data is also available in a format where advice can be sought from a medical practitioner to assist the tenant in making informed decisions on the health risks associated with occupying the property.

The rental information also includes the offer to provide hard copies of monitoring results for those tenants who do not have internet access.

3.3.2 Other mine owned residences

All other mine owned properties will be treated as sensitive receptors in line with requirements for private properties.

3.4 Continuous Improvement

The basis for continuous improvement of air quality mitigation measures will be through the ongoing monitoring of dust impacts and corrective/preventative actions. Any new mitigation measures that are implemented as a result of these investigations will be reported in the Annual Review. Glencore Coal Assets Australia will also maintain awareness of new technologies for air quality mitigation through participation in relevant industry groups.

3.5 Off-site Odours, Blast Emissions and Spontaneous Combustion

In accordance with Schedule 3, Condition 22 of PA 06_0014 and Section 129 of the POEO Act, Mangoola Open Cut is required to implement best practice air quality management, including all reasonable and feasible measures to minimise off-site odours, fume and dust emissions and spontaneous combustion from the site. Corrective actions for the abovementioned will be undertaken as necessary, in accordance with **Section 5.4**.

Mangoola Open Cut's Spontaneous Combustion Management Plan details the monitoring and control measures used by Mangoola Open Cut to reduce the incidence and impact of spontaneous combustion.

Blast fume is managed in accordance with Mangoola Open Cut's Blast Fume Management Procedure. This document outlines the monitoring and control measures for minimising blast fume potential and impact at Mangoola Open Cut.

Mangoola Open Cut's Blast Management Plan details the control measures use by Mangoola Open Cut to reduce the incidence and impact of blast related dust emissions from the operation.

3.6 Training

All Mangoola Open Cut personnel and contractors will undertake air quality awareness training as part of the Mangoola Open Cut general induction and additional toolbox talks where required to emphasise the importance of dust mitigation.

4 Air Quality Monitoring Methodology

4.1 Monitoring Standards

Air quality monitoring will be undertaken in accordance with the relevant Australian Standards and OEH approved methods for sampling including:

- EPA 'Approved methods for the sampling and analysis of air pollutants in NSW' (EPA 2007); The dust deposition gauges will be operated in accordance with AS/NZS 3580.10.1:2003 Methods for Sampling and Analysis of Ambient Air – Determination of Particulate Matter – Deposited Matter – Gravimetric Method.
- The dust deposition gauges will be operated in accordance with AS/NZS 3580.10.1:2003 Methods for Sampling and Analysis of Ambient Air – Determination of Particulate Matter – Deposited Matter – Gravimetric Method.
- The High Volume Air Sampler (HVAS) will be operated in accordance with AS/NZ 3580.9.3-2015 Methods for sampling and analysis of ambient air - Determination of suspended particulate matter - Total suspended particulate matter (TSP) - High volume sampler gravimetric method.
- The continuous monitoring network will be operated in accordance with AS 3580.9.8:2008 Methods for Sampling and Analysis of Ambient Air - Determination of Suspended Particulate Matter - PM₁₀ Continuous Direct Mass Method Using a Tapered Element Oscillating Microbalance Analyser).
- The weather stations will be maintained and operated in accordance with AS 3580.14:2014 Methods for sampling and analysis of ambient air – Meteorological monitoring for ambient air quality monitoring applications.

4.2 Air Quality Monitoring Program

The Mangoola Open Cut air quality monitoring program includes a combination of dust deposition gauges, high volume air samplers (TSP and PM₁₀), real-time continuous dust monitoring devices (PM₁₀ and PM_{2.5}) and meteorological stations. All monitoring locations are shown on **Figure 4.1** and summarised in **Tables 4.1, 4.2** and **4.3**. These tables differentiate the compliance monitors representing private receptors, mine owned receptors, other mine owned receptors and complementary monitors.

In accordance with Schedule 3, Condition 21 of PA 06_0014, the air quality monitoring network must suitably represent air quality conditions at surrounding privately owned, mine owned and other mine owned land. Particulate emissions measured on mine owned and other mine owned land must be compliant with PA 06_0014 criteria limits established for privately owned land.

The real-time TEOM data, including from the Upper Hunter Air Quality Monitoring Network, will be used to compliment HVAS data and will assist by means of the following:

- provide an understanding of regional episodic dust events;
- provide an understanding of local episodic dust events; and
- provide an understanding of potential dust episodes resulting from mining activities.

The real-time TEOM and E-samplers will be used to alert Mangoola Open Cut personnel so that the operation can be adjusted accordingly (refer to Section 3).

Table 4.1 – Compliance Monitoring Points – Private Receptors

Monitoring Site	Type of Monitoring	Frequency*
DG01 to DG04, DG06, DG07, DG09, DG10, DG12 - DG20	Depositional Dust Gauges	Monthly
D02-DC to D06-DC	TEOM: PM ₁₀	Continuous
D05-PM ₁₀	HVAS: PM ₁₀	Every 6 days
D02-TSP to D04-TSP	HVAS: TSP	Every 6 days*

* Units may not operate at this frequency 100% of the time due to maintenance and calibration requirements, power outages, prevention of access by landowner, no access due safety concerns of personnel and other external events outside the control of Mangoola Coal.

Table 4.2 – Compliance Monitoring Points – Mine Owned and Other Mine Owned Receptors

Monitoring Site	Type of Monitoring	Frequency*
D02-DC to D06-DC	TEOM: PM ₁₀	Continuous
D01-PM ₁₀ , D06-PM ₁₀ , D05-PM ₁₀ D07-PM ₁₀	HVAS: PM ₁₀	Every 6 days

* Units may not operate at this frequency 100% of the time due to maintenance and calibration requirements, power outages, prevention of access by landowner, no access due safety concerns of personnel and other external events outside the control of Mangoola Coal.

Table 4.3 – Other Monitoring

Monitoring Site	Type of Monitoring	Frequency*	Purpose
DG11	Depositional Dust Gauges	Monthly	Compliments compliance monitoring network for determination at mine owned and other mine owned.
D7-DC, D8-DC	E-sampler: PM ₁₀	Continuous	EPL Points 19 and 20 – situated immediately to the north and south of mining operations respectively. Alarms will be established based on air quality modelling contours.
D04-PM _{2.5} , D06-PM _{2.5}	BAM: PM _{2.5}	Continuous	Schedule 3, Condition 23 of PA 06-0014. Support regional monitoring network.
WSN	Meteorological	Continuous	Schedule 3, Condition 24 of PA 06_0014. EPL Point 5 Meteorological Station (North).
WSS	Meteorological	Continuous	EPL Point 18 Meteorological Station (South).

* Units may not operate at this frequency 100% of the time due to maintenance and calibration requirements, power outages, prevention of access by landowner, no access due safety concerns of personnel and other external events outside the control of Mangoola Coal.

Air quality monitoring locations will be reviewed and where necessary, modified over the life of operations according to progressive monitoring results, physical changes in mining operations, or following the acquisition of private property by Mangoola. Locations may also be reviewed where access to a private property is unavailable or a landowners written request to remove the gauge is received. These are unforeseeable over the life of the project.

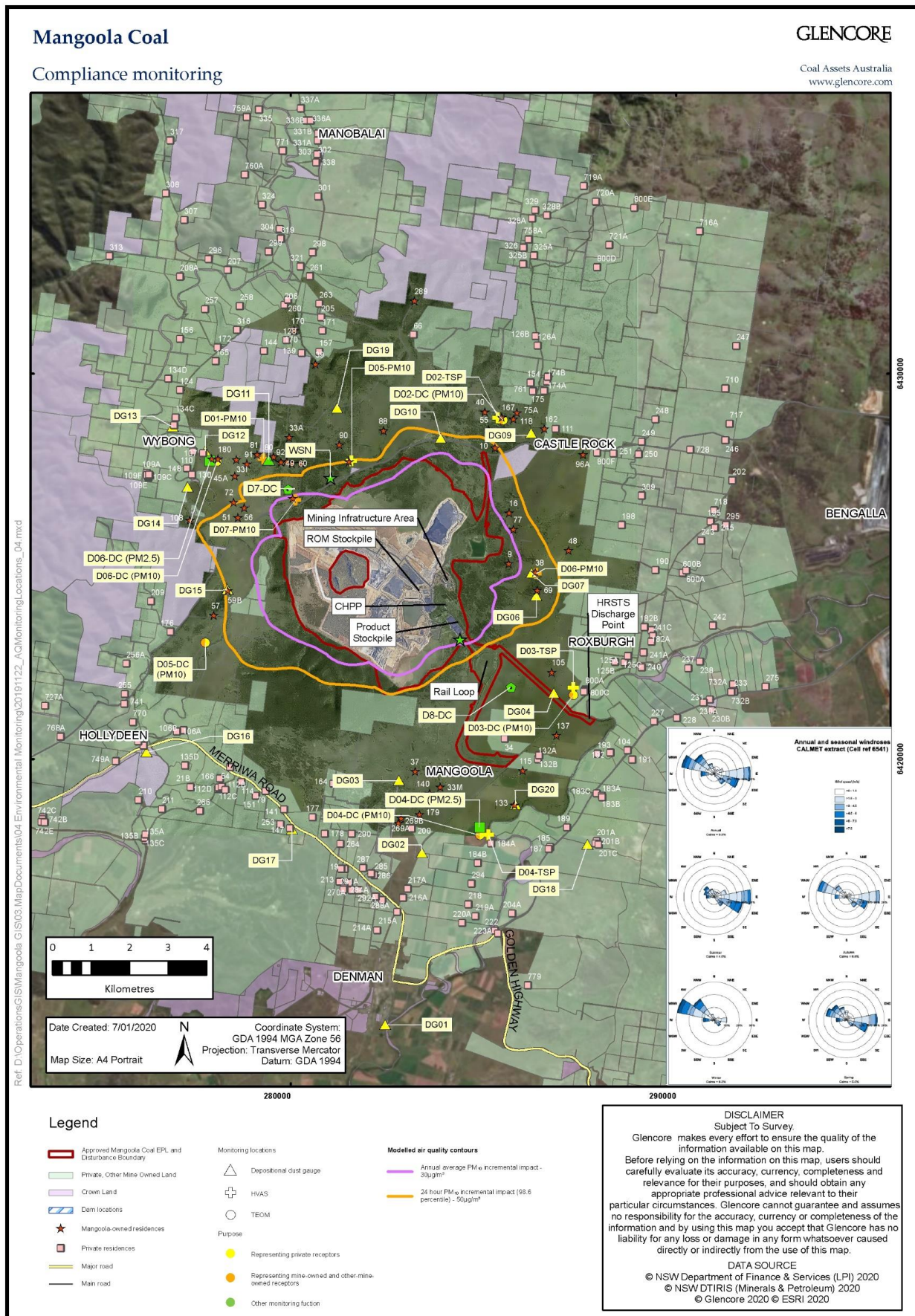


Figure 4.1

The meteorological station (North) will be operated for the life of mining activities in accordance with Schedule 3, Condition 24 of the Project Approval. Both meteorological station (North) and meteorological station (South) will be operated in accordance with Condition P1.1 and Condition M4.1 of EPL 12894.

Both meteorological stations consist of instruments and a data-logging system attached to a 10 metre mast. Logged meteorological parameters include:

- wind speed at 10 metres above ground;
- wind direction at 10 metres above ground;
- sigma-theta from sampled wind direction measurements;
- temperature at 2 metres and 10 metres above ground;
- solar radiation; and
- rainfall.

4.3 Independent Review and Land Acquisition Process

In the event that a landowner considers that Mangoola Open Cut is exceeding air quality criteria at his or her property, the landowner may request an independent review of the air quality impacts at the property. The independent review will be conducted in accordance with the procedure described in Schedule 4 Condition 4 - 11 of the Project Approval (refer to **Appendix B**).

5 Reporting and Reviewing

5.1 Reporting

Reporting conditions for the Mangoola Open Cut AQMP are summarised in **Table 5.1** below.

Table 5.1 - Reporting Conditions

Condition	Requirement	Frequency
Project Approval Schedule 5 Condition 6	<p>By the end of March each year, or other timing as may be agreed by the Secretary, the Proponent must submit a report to the Department reviewing the environmental performance of the project to the satisfaction of the Secretary. This review must:</p> <p>(a) describe the development that was carried out in the previous calendar year, and the development that is proposed to be carried out over the next year;</p> <p>(b) include a comprehensive review of monitoring results and complaints records of the project over the previous calendar year, which includes a comparison of these results against the:</p> <ul style="list-style-type: none"> <input type="checkbox"/> relevant statutory requirements, limits or performance measures/criteria; <input type="checkbox"/> monitoring results of previous years; and <input type="checkbox"/> relevant predictions in the documents listed in condition 2 of Schedule 2; <p>(c) identify any non-compliance over the last year, and describe what actions were(or are being) taken to ensure compliance;</p> <p>(d) identify any trends in monitoring data over the life of the project;</p> <p>(e) identify any discrepancies between the predicted and actual impacts of the project, and analyse the potential cause of any significant discrepancies; and</p> <p>(f) describe what measures will be implemented over the next year to improve the environmental performance of the project.</p>	Annually
Project Approval Schedule 5 Condition 11	A summary of air quality monitoring results to be made publicly available on the Mangoola Open Cut website.	Quarterly
Project Approval Schedule 5 Condition 11	<p>The Proponent must:</p> <p>(a) make the following information publicly available on its website:</p> <ul style="list-style-type: none"> <input type="checkbox"/> the documents listed in condition 2 of Schedule 2; <input type="checkbox"/> current statutory approvals for the project; <input type="checkbox"/> approved strategies, plans or programs required under the conditions of this approval; <input type="checkbox"/> a comprehensive summary of the compliance monitoring results of the project, which have been 	Monthly

	<p>reported in accordance with the various plans and programs approved under the conditions of this approval;</p> <ul style="list-style-type: none"> <input type="checkbox"/> a complaints register, which is to be updated on a monthly basis; <input type="checkbox"/> minutes of CCC meetings; <input type="checkbox"/> the last five annual reviews; <input type="checkbox"/> any independent environmental audit; and the Proponent's response to the recommendations in any audit; and <p>(b) keep this information up to date; to the satisfaction of the Secretary.</p>	
EPL R1	A summary of air quality monitoring points results for the previous reporting period to be provided to the EPA within the Annual Return.	Annually

5.2 Community Complaints Response

Mangoola Open Cut will maintain a centralised location to record details of relevant external stakeholder communications. A Community Response Line (1800 014 339) will be in operation 24 hours per day, seven days a week and will be regularly advertised in a local newspaper. Complaints will be recorded and investigated. Follow up communication with the complainant will be undertaken to explain the outcome of complaint investigations where requested. A monthly summary of complaints will be uploaded to the website as per Schedule 5, Condition 11 of PA 06_0014.

5.3 Exceedance Reporting

In accordance with Schedule 5, Condition 2 of PA 06_0014 (Refer to **Appendix B.1**), Mangoola Open Cut must assess and manage project-related risks to ensure that there are no exceedances of the criteria and/or performance measures outlined in **Section 2**.

If air quality monitoring results identify an exceedance of the air quality impact assessment criteria on Privately-owned or other mine owned land then DPIE will be informed:

- verbally immediately to DPIE compliance officer; and
- in writing within seven days.

The written report in accordance with Schedule 5, Condition 4 of PA 06_0014 (refer to **Appendix B**) shall follow a detailed investigation of the exceedance and include the following:

- date, time and nature of the exceedance/incident;
- the cause (or likely cause) of the exceedance/incident;
- actions taken to date; and
- proposed measures to address the exceedance/incident and to prevent a re-occurrence.

As per Schedule 4, Condition 3 of PA 06_0014 (refer to **Appendix B.1**), in the event an exceedance of the air quality impact assessment criteria is identified at Private residence or other mine owned land, Mangoola will notify any affected landowner and provide the them with monitoring results in an appropriate format as per Schedule 3, Condition 21.

For tenants of mine owned land no additional exceedance reporting will occur as all information required for Schedule 3, Condition 21 and Schedule 4 Condition 3 is provided through the tenancy agreement and all monitoring data is available on the company website in an appropriate format.

Where land acquisition assessment criteria (**Section 2.2**) are exceeded and a landowner provides written request, Mangoola Open Cut will commence an independent review and the land acquisition process as outlined in **Section 4.3**.

In addition to reporting required by PA 06_0014, incidents resulting or having the potential to result in material harm to the environment (as defined by Section 147 of the POEO Act) shall be reported and may require initiation of the Pollution Incident Response Management Plan (PIRMP).

When an extraordinary event such as bushfires, prescribed burning, dust storms, fire incidents or any other activity, is suspected to be the cause of the exceedance of air quality criteria the DPIE will be contacted to confirm an extraordinary event has taken place and subsequent reporting required under Schedule 4, Condition 6 of PA 06_0014. This will also confirm any further reporting required under Schedule 4, Condition 3 of PA 06_0014.

5.4 Corrective Action

Table 5.2 summarises the potential air quality related issues that may arise and the appropriate corrective action to be taken.

Table 5.2 – Corrective Actions

Problem	Corrective Action
Exceedance of Project Approval air quality conditions at private and other mine-owned receptors.	<p>Report exceedance verbally immediately to DPIE compliance officer</p> <p>Investigation of exceedance, implementing reactive control measures where applicable.</p> <p>Provision of relevant monitoring data and notification of health risks associated with such exceedances to the affected resident as soon as practicable.</p> <p>Provide regular monitoring results until the results show that the operation is again complying with the relevant criteria.</p> <p>Report exceedance to DPIE in writing within seven days.</p> <p>Review this AQMP within 3 months of submission of incident as per Schedule 5, Condition 9 of PA 06_0014.</p>
Exceedance of Project Approval air quality conditions at tenanted Mangoola mine-owned receptors.	Investigation of exceedance, implementing reactive control measures.
Exceedance of Project Approval air quality land acquisition criteria.	<p>Report exceedance verbally immediately to DPIE compliance officer.</p> <p>Investigation of exceedance, implementing reactive control measures where applicable.</p> <p>Provision of relevant monitoring data and notification of health risks associated with such exceedances to the affected resident as soon as practicable.</p> <p>Provide regular monitoring results until the results show that the operation is again complying with the relevant criteria.</p> <p>Report exceedance to DPIE in writing within seven days.</p> <p>Review this AQMP within 3 months of submission of incident as per Schedule 5, Condition 9 of PA 06_0014.</p> <p>Initiation of land acquisition process detailed in Section 4.3.</p>
Emission of odour, fume, blast dust or spontaneous combustion from site.	<p>Report emission / incident verbally immediately to DPIE compliance officer and via the EPA Environment Line</p> <p>Investigation of emission / incident, implementing reactive control measures where applicable.</p>

	<p>Provision of relevant monitoring data and notification of health risks associated with such exceedances to the affected resident as soon as practicable.</p> <p>Report exceedance to DPIE and EPA in writing within seven days.</p> <p>Review this AQMP within 3 months of submission of incident as per Schedule 5, Condition 9 of PA 06_0014.</p>
Community complaints.	<p>Upon receiving a complaint, Mangoola will contact the complainant to acknowledge receipt of the complaint and to discuss details of the complaint. Contact will be made in accordance with the timeframe requested by the complainant in the notification text/email.</p> <p>Investigation of complaint implementing reactive control measures where applicable.</p> <p>Assessment of impacts at the residence against air quality impact assessment criteria and land acquisition criteria, if required.</p> <p>Provide feedback to the complainant in agreed timeframe. Report complaint to senior management. Provide feedback to mine planning and production personnel, where relevant.</p> <p>Record and include in complaint reports published on the Mangoola Coal website.</p>
Landholder prevents access and has formally advised Mangoola that they no longer want monitoring to be conducted on their property.	<p>Report prevention of access verbally to DPIE compliance officer prior to next sampling event.</p> <p>Suitably qualified air specialist to provide technical review on air quality monitoring point and need for further monitoring or relocation.</p> <p>Based on the above technical review, submit a revised AQMP to DPIE for approval.</p>

5.5 Records

In accordance with Condition M1.2 of EPL 12894, monitoring records will be maintained on site for at least four years.

5.6 Review

In accordance with Schedule 5, Condition 9 of PA 06_0014 Mangoola Open Cut will review and where necessary revise the AQMP within three months of the submission of an audit, Annual Review, an incident report, or any modification to the conditions of the Project Approval. The AQMP will further be subject to a 3 year periodic review. The review of the AQMP will reflect changes in environmental requirements, technology and operational procedures. In addition, the document review table is to be completed as part of each review (refer to cover pages).

6 References

- Australian Standard AS 3580.14:2014 Methods for sampling and analysis of ambient air – Meteorological monitoring for ambient air quality monitoring applications.
- Australian Standard AS/NZS 3580.10.1:2003 Methods for Sampling and Analysis of Ambient Air – Determination of Particulate Matter – Deposited Matter – Gravimetric Method.
- Australian Standard AS 3580.9.8-2008 Methods for Sampling and Analysis of Ambient Air – Determination of Suspended Particulate Matter – PM₁₀ Continuous Direct Mass Method Using a Tapered Element Oscillating Microbalance Analyser.
- AS/NZ 3580.9.3-2015 Methods for sampling and analysis of ambient air – Determination of suspended particulate matter – Total suspended particulate matter (TSP) – High volume sampler gravimetric method.
- AS/NZS 3580.9.6:2015 Methods for sampling and analysis of ambient air - Determination of suspended particulate matter - PM₁₀ high volume sampler with size-selective inlet-gravimetric method.
- EMGA Mitchell McLennan, 2013. Mangoola Open Cut Modification 6 Environmental Assessment, Report prepared for Xstrata Mangoola Pty Limited.
- Mangoola Open Cut, Blast Fume Management Procedure as revised from time to time.
- Mangoola Open Cut, Blast Management Plan as revised from time to time.
- Mangoola Open Cut, Spontaneous Combustion Management Plan as revised from time to time.
- NSW Environment Protection Authority (EPA), 2007. Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales.
- Todoroski Air Sciences, 2016. Mangoola Open Cut Mine – Mine-owned Receptors.
- Todoroski Air Sciences, 2017. Mangoola Coal Operations – Depositional Dust Gauge Analysis.
- Umwelt (Australia) Pty Limited, 2006. Anvil Hill Project Environmental Assessment, Report prepared for Centennial Hunter Pty Limited.
- Umwelt (Australia) Pty Limited, 2010. Environmental Assessment – Modifications to Mangoola Open Cut Mine Plans and Relocation of 500 kV Electricity Transmission Line. Report prepared for Xstrata Mangoola Pty Limited.
- Umwelt (Australia) Pty Limited, Mangoola Open Cut Environmental Management Strategy as revised from time to time.
- Umwelt (Australia) Pty Limited, Mangoola Open Cut Blast Monitoring Program as revised from time to time.
- Hansen Bailey, 2019. Mangoola Coal Mine Independent Environmental Audit Report. For Mangoola Coal Operations Pty Ltd October 2019.

Appendix A - Authority Correspondence

Appendix B - Approvals Summary

A.1 Project Approval Conditions

Condition	Project Approval Condition	Section of Document																							
Schedule 3 Condition 18	Odour The Proponent must ensure that no offensive odours, as defined under the POEO Act, are emitted from the site.	3.5																							
Schedule 3 Condition 19	Impact Assessment Criteria The Proponent must ensure that all reasonable and feasible avoidance and mitigation measures are employed so that particulate matter emissions generated by the project do not cause exceedances of the criteria listed in Tables 5, 6 and 7 at any residence on privately-owned land (excluding the dust affected properties listed in Table 1). <i>Table 5: Long term impact assessment criteria for particulate matter</i> <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/m³</td></tr><tr><td>Particulate matter < 10µm (PM₁₀)</td><td>Annual</td><td>^a 30 µg/m³</td></tr></table> <i>Table 6: Short term impact assessment criterion for particulate matter</i> <table><tr><th>Pollutant</th><th>Averaging period</th><th>^d Criterion</th></tr><tr><td>Particulate matter < 10µm (PM₁₀)</td><td>24 hour</td><td>^a 50 µg/m³</td></tr></table> <i>Table 7: Long term impact assessment criteria for deposited dust</i> <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/m²/month</td><td>^a 4 g/m²/month</td></tr></table> <i>Notes to Tables 5-7:</i> <i>a</i> Total impact (i.e. incremental increase in concentrations due to the development plus background concentrations due to all other sources); <i>b</i> Incremental impact (i.e. incremental increase in concentrations due to the development on its own); <i>c</i> 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 <i>d</i> Excludes extraordinary events such as bushfires, prescribed burning, dust storms, fire incidents or any other activity agreed by the Secretary.	Pollutant	Averaging period	^d Criterion	Total suspended particulate (TSP) matter	Annual	^a 90 µg/m ³	Particulate matter < 10µm (PM ₁₀)	Annual	^a 30 µg/m ³	Pollutant	Averaging period	^d Criterion	Particulate matter < 10µm (PM ₁₀)	24 hour	^a 50 µg/m ³	Pollutant	Averaging period	Maximum increase in deposited dust level	Maximum total deposited dust level	^c Deposited dust	Annual	^b 2 g/m ² /month	^a 4 g/m ² /month	2, 3.1-3.4
Pollutant	Averaging period	^d Criterion																							
Total suspended particulate (TSP) matter	Annual	^a 90 µg/m ³																							
Particulate matter < 10µm (PM ₁₀)	Annual	^a 30 µg/m ³																							
Pollutant	Averaging period	^d Criterion																							
Particulate matter < 10µm (PM ₁₀)	24 hour	^a 50 µg/m ³																							
Pollutant	Averaging period	Maximum increase in deposited dust level	Maximum total deposited dust level																						
^c Deposited dust	Annual	^b 2 g/m ² /month	^a 4 g/m ² /month																						

Schedule 3
Condition 20

Land Acquisition Criteria

If particulate matter emissions generated by the project exceed the criteria, or contribute to the exceedances of the relevant cumulative criteria, in Tables 8, 9 and 10 at any residence on privately-owned land then upon receiving a written request for acquisition from the landowner, the Proponent must acquire the land in accordance with the procedures in conditions 10-11 of schedule 4.

Table 8: Long term land acquisition criteria for particulate matter

Pollutant	Averaging period	^d Criterion
Total suspended particulate (TSP) matter	Annual	^a 90 µg/m ³
Particulate matter < 10 µm (PM ₁₀)	Annual	^a 30 µg/m ³

Table 9: Short term land acquisition criteria for particulate matter

Pollutant	Averaging period	^{da} Criterion
Particulate matter < 10 µm (PM ₁₀)	24 hour	^a 150 µg/m ³
Particulate matter < 10 µm (PM ₁₀)	24 hour	^b 50 µg/m ³

Table 10: Long term land acquisition criteria for deposited dust

Pollutant	Averaging period	Maximum increase in deposited dust level	Maximum total deposited dust level
^c Deposited dust	Annual	^b 2 g/m ² /month	^a 4 g/m ² /month

Notes to Tables 8-10:

a Total impact (i.e. incremental increase in concentrations due to the development plus background concentrations due to all other sources);

b Incremental impact (i.e. incremental increase in concentrations due to the development 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, fire incidents or any other activity agreed by the Secretary.

If the air quality acquisition criteria in Tables 8, 9 and 10 are being exceeded, and more than one mine is responsible for this non-compliance, then the Proponent must, together with the relevant mine/s acquire the land on as equitable a basis as possible with the relevant mine/s, in accordance with the procedures in conditions 10-11 of schedule 4.

If the Proponent cannot agree on the arrangements for the acquisition of the land with the relevant/ mine/s within 3 months of the written request from the landowner, then the Proponent must refer the matter to the Secretary for resolution.

2.2, 4.3

<p>Schedule 3</p> <p>Condition 21</p>	<p>Mine-owned Land</p> <p>The Proponent must ensure that all reasonable and feasible avoidance and mitigation measures are employed so that particulate matter emissions generated by the project do not cause exceedances of the criteria listed in Tables 8, 9 and 10 at any occupied residence on mine-owned land (including land owned by another mine) unless:</p> <ul style="list-style-type: none"> (a) the tenant and landowner has been notified of any health risks associated with such exceedances in accordance with the notification requirements under schedule 4 of this approval; (b) the tenant of any land owned by the Proponent can terminate their tenancy agreement without penalty at any time, subject to giving reasonable notice; (c) air quality monitoring is regularly undertaken to inform the tenant and landowner of the actual particulate emissions; and (d) data from this monitoring is presented to the tenant in an appropriate format, for a medical practitioner to assist the tenant in making informed decisions on the health risks associated with occupying the property, to the satisfaction of the Secretary. 	<p>3.1-3.4, 5.1, 5.3, 5.4</p> <p>Mangoola Tenant Pack</p>
<p>Schedule 3</p> <p>Condition 22</p>	<p>Operating Conditions</p> <p>The Proponent must:</p> <ul style="list-style-type: none"> (a) implement all reasonable and feasible measures to minimise the off-site odour, fume and dust emissions of the project; (b) implement all reasonable and feasible measures to minimise the release of greenhouse gas emissions from the site; (c) minimise any visible off-site air pollution generated by the project; (d) minimise the surface disturbance of the site; (e) operate a comprehensive air quality management system that uses a combination of predictive meteorological forecasting and real-time air quality monitoring data to guide the day to day planning of mining operations and the implementation of both proactive and reactive air quality mitigation measures to ensure compliance with the relevant conditions of this approval; (f) minimise the air quality impacts of the project during adverse meteorological conditions and extraordinary events (see Noted above under Table 10), to the satisfaction of the Secretary. 	<p>3.5</p> <p>3.0</p> <p>4.2</p> <p>3.3, 3.2</p>

<p>Schedule 3</p> <p>Condition 23</p>	<p>Air Quality Management Plan</p> <p>The Proponent must prepare and implement an Air Quality Management Plan for the project to the satisfaction of the Secretary. This plan must:</p> <ol style="list-style-type: none"> describe the measures that would be implemented to ensure compliance with the relevant air quality criteria and operating conditions of this approval; describe the project air quality management system; include an air quality monitoring program that: <ul style="list-style-type: none"> uses a combination of real-time monitors and supplementary monitors, to evaluate the performance of the project against the air quality criteria in this approval; adequately supports the proactive and reactive noise management system; includes PM_{2.5} monitoring (although this obligation could be satisfied by the regional air quality monitoring network if sufficient justification is provided); evaluates and reports on the effectiveness of the air quality management system; and defines what constitutes an air quality incident, and includes a protocol for determining and notifying the Department and relevant stakeholders of any air quality incidents; and describe the management process and apply the necessary mitigation measures to minimise the effect of dust deposits on the performance of rainwater filtration for human consumption and electronic solar systems on private residential properties. <p>The proponent must implement the approved management plan as approved from time to time by the Secretary.</p>	<p>Entire Document</p> <p>3.1, 3.2</p> <p>3.3</p> <p>4.2</p> <p>3.3.2</p> <p>4.2.3</p> <p>5.1</p> <p>5.3</p> <p>3.3</p>
<p>Schedule 3</p> <p>Condition 24</p>	<p>Meteorological Monitoring</p> <p>During the life of the project, the Proponent must ensure that there is a suitable meteorological station in the vicinity of the site that:</p> <ol style="list-style-type: none"> complies with the requirements in <i>the Approved Methods for Sampling of Air Pollutants in New South Wales guideline</i>; and is capable of continuous real-time measurement of temperature lapse rate in accordance with the <i>NSW Industrial Noise Policy</i>, unless a suitable alternative is approved by the Secretary following consultation with the EPA. 	<p>4.2.2</p>
<p>Schedule 4</p> <p>Condition 1</p>	<p>Notification of Landowners</p> <ol style="list-style-type: none"> Within 1 month of this approval, the Proponent must: <ol style="list-style-type: none"> notify in writing the owners of: <ul style="list-style-type: none"> any residence on the land listed in Table 2 of schedule 3 that they have the right to request the Proponent to ask for additional noise mitigation measures to be installed at their residence at any stage during the project; and any privately-owned land within 2 kilometres of the approved open cut mining pit/s that they are entitled to ask for an inspection to establish the baseline condition of any buildings or structures on their land, or to have a previous property inspection report updated; notify the tenants of any mine-owned land of their rights under this approval; and send a copy of the NSW Health fact sheet entitled "Mine Dust and You" (as may be updated from time to time) to the owners and/or existing tenants of any land (including mine-owned land) where the predictions in the EA identify that dust emissions generated by the project are likely to be greater than the relevant air quality criteria in schedule 3 at any time during the life of the project. 	<p>N/A</p>

Schedule 4 Condition 2	<p>Prior to entering into any tenancy agreement for any land owned by the Proponent that is predicted to experience exceedances of the recommended dust and/or noise criteria, or for any of the land listed in Table 2 that is subsequently purchased by the Proponent, the Proponent must:</p> <p>(a) advise the prospective tenants of the potential health and amenity impacts associated with living on the land, and give them a copy of the NSW Health fact sheet entitled "Mine Dust and You" (as may be updated from time to time); and</p> <p>(b) advise the prospective tenants of the rights they would have under this approval,</p> <p>to the satisfaction of the Secretary.</p>	3.3
Schedule 4 Condition 3	<p>As soon as practicable after obtaining monitoring results showing:</p> <p>(a) an exceedance of any relevant criteria in schedule 3, the Proponent must notify affected landowners in writing of the exceedance, and provide regular monitoring results to each affected landowner until the project is again complying with the relevant criteria; and</p> <p>(b) an exceedance of the relevant air quality criteria in schedule 3,</p> <p>the Proponent must 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).</p>	5.3, 5.4 Mangoola Tenant Pack
Schedule 4 Condition 4	<p>Independent Review</p> <p>If a landowner considers the project to be exceeding the impact assessment criteria in schedule 3, except where this is predicted in the EA, then he/she may ask the Secretary in writing for an independent review of the impacts of the project on his/her land.</p> <p>If the Secretary is satisfied that an independent review is warranted, the Proponent must within 3 months of the Secretary advising that an independent review is warranted:</p> <p>(a) consult with the landowner to determine his/her concerns;</p> <p>(b) commission a suitably qualified, experienced and independent person, whose appointment has been approved by the Secretary, to conduct monitoring on the land, to determine whether the project is complying with the relevant impact assessment criteria in schedule 3, and identify the source(s) and scale of any impact on the land, and the project's contribution to this impact; and</p> <p>(c) give the Secretary and landowner a copy of the independent review.</p>	4.3
Schedule 4 Condition 5	<p>If the independent review determines that the project is complying with the relevant impact assessment criteria in schedule 3, then the Proponent may discontinue the independent review with the approval of the Secretary.</p>	4.3

<p>Schedule 4</p> <p>Condition 6</p>	<p>If the independent review determines that the project is not complying with the relevant impact assessment criteria in schedule 3, and that the project is primarily responsible for this non-compliance, then the Proponent must:</p> <ul style="list-style-type: none"> (a) take all reasonable and feasible measures, in consultation with the landowner, to ensure that the project complies with the relevant criteria; and (b) conduct further monitoring to determine whether these measures ensure compliance; or (c) secure a written agreement with the landowner to allow exceedances of the criteria in schedule 3, <p style="padding-left: 40px;">to the satisfaction of the Secretary.</p> <p>If the additional monitoring referred to above subsequently determines that the project is complying with the relevant criteria in schedule 3, then the Proponent may discontinue the independent review with the approval of the Secretary.</p> <p>If the Proponent is unable to finalise an agreement with the landowner, then the Proponent or landowner may refer the matter to the Secretary for resolution.</p> <p>If the matter cannot be resolved within 21 days, the Secretary shall refer the matter to an Independent Dispute Resolution Process (see Appendix 8).</p> <p>If the measures referred to in (a) do not achieve compliance with the air quality and/or noise land acquisition criteria in schedule 3, and the Proponent cannot secure a written agreement with the landowner to allow these exceedances within 3 months, then the Proponent shall, upon receiving a written request from the landowner, acquire all or part of the landowner's land in accordance with the procedures in conditions 10-11 below.</p>	<p>4.3</p> <p>5.2</p>
<p>Schedule 4</p> <p>Condition 7</p>	<p>If the independent review determines that the relevant criteria in schedule 3 are being exceeded, but that more than one mine is responsible for this non-compliance, then the Proponent must, together with the relevant mine/s:</p> <ul style="list-style-type: none"> (a) take all reasonable and feasible measures, in consultation with the landowner, to ensure that the relevant criteria are complied with; and (b) conduct further monitoring to determine whether these measures ensure compliance; or (c) secure a written agreement with the landowner and other relevant mines to allow exceedances of the criteria in schedule 3, <p style="padding-left: 40px;">to the satisfaction of the Secretary.</p> <p>If the additional monitoring referred to above subsequently determines that the projects are complying with the relevant criteria in schedule 3, then the Proponent may discontinue the independent review with the approval of the Secretary.</p> <p>If the Proponent is unable to finalise an agreement with the landowner and/or other mine/s, then the Proponent or landowner may refer the matter to the Secretary for resolution.</p> <p>If the matter cannot be resolved within 21 days, the Secretary shall refer the matter to an Independent Dispute Resolution Process (see Appendix 9).</p> <p>If the measures referred to in (a) do not achieve compliance with the air quality and/or noise land acquisition criteria in schedule 3, and the Proponent together with the relevant mine/s cannot secure a written agreement with the landowner to allow these exceedances within 3 months, then upon receiving a written request from the landowner, the Proponent must acquire all or part of the landowner's land on as equitable a basis as possible with the relevant mine/s, in accordance with the procedures in conditions 10-11 below.</p>	<p>4.3</p>

Air Quality Management

Schedule 4 Condition 8	If the landowner disputes the results of the independent review, either the Proponent or the landowner may refer the matter to the Secretary for resolution. If the matter cannot be resolved within 21 days, the Secretary shall refer the matter to an Independent Dispute Resolution Process.	4.3
Schedule 4 Condition 9	If, following the Independent Dispute Resolution Process, the Secretary decides that the Proponent shall acquire all or part of the landowner's land, then the Proponent shall acquire this land in accordance with the procedures in conditions 10-11 below.	4.3

<p>Schedule 4</p> <p>Condition 10</p>	<p>LAND ACQUISITION</p> <p>Within 3 months of receiving a written request from a landowner with acquisition rights, the Proponent must make a binding written offer to the landowner based on:</p> <p>(a) the current market value of the landowner's interest in the property at the date of this written request, as if the property was unaffected by the project the subject of the project application, having regard to the:</p> <ul style="list-style-type: none"> existing and permissible use of the land, in accordance with the applicable planning instruments at the date of the written request; and presence of improvements on the property and/or any approved building or structure which has been physically commenced at the date of the landowner's written request, and is due to be completed subsequent to that date, but excluding any improvements that have resulted from the implementation of the 'additional noise mitigation measures' in condition of schedule 3; <p>(b) the reasonable costs associated with:</p> <ul style="list-style-type: none"> relocating within the Muswellbrook local government area, or to any other local government area determined by the Secretary; obtaining legal advice and expert advice for determining the acquisition price of the land, and the terms upon which it is required; and <p>(c) reasonable compensation for any disturbance caused by the land acquisition process.</p> <p>However, if at the end of this period, 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, then either party may refer the matter to the Secretary for resolution.</p> <p>Upon receiving such a request, the Secretary shall request the President of the NSW Division of the Australian Property Institute (API) to appoint a qualified independent valuer to:</p> <p>(a) consider submissions from both parties;</p> <p>(b) 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;</p> <p>(c) prepare a detailed report setting out the reasons for any determination; and</p> <p>(d) provide a copy of the report to both parties.</p> <p>Within 14 days of receiving the independent valuer's report, the Proponent must make a binding written offer to the landowner to purchase the land at a price not less than the independent valuer's determination.</p> <p>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 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 Secretary shall 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 and the detailed report of the party that disputes the independent valuer's determination.</p> <p>Within 14 days of the Secretary determination, the Proponent shall make a binding written offer to the landowner to purchase the land at a price not less than the Secretary's determination.</p> <p>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</p>	<p>4.3</p>
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	obligations to acquire the land shall cease, unless the Secretary determines otherwise.	
Schedule 4 Condition 11	The Proponent must pay all reasonable costs associated with the land acquisition process described in condition 10 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 Registrar-General.	4.3
Schedule 5 Condition 2	<p>ADAPTIVE MANAGEMENT</p> <p>The Proponent must assess and manage project-related risks to ensure that there are no exceedances of the criteria and/or performance measures in schedule 3. 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.</p> <p>Where any exceedance of these criteria and/or performance measures has occurred, the Proponent must, at the earliest opportunity:</p> <ul style="list-style-type: none"> (a) take all reasonable and feasible steps to ensure that 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 those options and any preferred remediation measures or other course of action; and (c) implement remediation measures as directed by the Secretary, to the satisfaction of the Secretary. 	5.3, 5.4
Schedule 5 Condition 3	<p>The Proponent shall ensure that the management plans required under this approval are prepared in accordance with any relevant guidelines, and include:</p> <ul style="list-style-type: none"> (d) detailed baseline data (where available); (e) a description of: <ul style="list-style-type: none"> • 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; (f) a description of the measures that would be implemented to comply with the relevant statutory requirements, limits, or performance measures/criteria; (g) a program to monitor and report on the: <ul style="list-style-type: none"> • impacts and environmental performance of the project; • effectiveness of any management measures (see c above); (h) a program to investigate and implement ways to improve the environmental performance of the project over time; (i) a protocol for managing and reporting any: <ul style="list-style-type: none"> • incidents; • complaints; • non-compliances with statutory requirements; and • exceedances of the impact assessment criteria and/or performance criteria; and (j) a protocol for periodic review of the plan. 	Appendix B 2.0 3.0 4.0 5.0

A.2 Environmental Protection Licence (EPL) 12894 Conditions

EPL Conditions				Section of Document
P1 Location of Monitoring Points and Areas				4.2
P1.1 The following points referred to in the table below are identified in this licence for the purposes of monitoring and / or the setting of limits for the emission of pollutants to the air from the point.				
<i>Air</i>				
EPA identi- fication no.	Type of Monitoring Point	Type of Discharge Point	Location Description	
5	Meteorological Monitoring		Weather Station North (WSN) defined as "Monitoring Point 5 in plan titled "Mangoola Coal EPL 12894 - HRSTS discharge point, air quality, blast, surface water and groundwater monitoring locations" dated 21/08/2017. EPA Reference Doc17/288912-02	
18	Meteorological Monitoring		Weather Station South (WSS), defined as "Monitoring Point 18 in plan titled "Mangoola Coal EPL 12894 - HRSTS discharge point, air quality, blast, surface water and groundwater monitoring locations" dated 21/08/2017. EPA Reference Doc17/288912-02	
19	Particulate Matter Monitoring		Monitoring Point 19 coordinates 279920 6426993 (Easting Northing) defined as "Monitoring Point 19 in plan titled "Mangoola Coal EPL 12894 - HRSTS discharge point, air quality, blast, surface water and groundwater monitoring locations" dated 21/08/2017.	
20	Particulate Matter Monitoring		Monitoring point 20 at coordinates 285715 6421858 (Easting Northing) defined as "Monitoring Point 31 in plan titled "Mangoola Coal EPL 12894 - HRSTS discharge point, air quality, blast, surface water and groundwater monitoring locations" dated 21/08/2017.	
These points are:				
<ul style="list-style-type: none">Point 5, meteorological monitoring at Wybong Road (Weather Station North, WSN);Point 18, meteorological monitoring south of the Coal Handling and Preparation Plant (WSS);Point 19, Dust monitoring north-west of the site; andPoint 20, Dust monitoring south-east of the site;				

<p>M2 Requirement to monitor concentration of pollutants discharged</p> <p>M2.1 For each monitoring/discharge point or utilisation area specified below (by a point number), the licensee must monitor (by sampling and obtaining results by analysis) the concentration of each pollutant specified in Column 1. The licensee must use the sampling method, units of measure, and sample at the frequency, specified opposite in the other columns:</p> <p>M2.2 Air Monitoring Requirements</p> <p>POINT 19,20</p> <table><tr><th>Pollutant</th><th>Units of measure</th><th>Frequency</th><th>Sampling Method</th></tr><tr><td>PM10</td><td>micrograms per cubic metre</td><td>Continuous</td><td>Special Method 1</td></tr></table> <p>Note: Special Method 1 requires the Licensee to undertake the monitoring of PM10 concentration in strict accordance with the manufacturer's operating manual supplied with the continuous monitoring equipment and titled "E-Sampler-9800 Particulate Monitor Operation Manual Revision K", or any updated version as published by the maufacturer.</p>	Pollutant	Units of measure	Frequency	Sampling Method	PM10	micrograms per cubic metre	Continuous	Special Method 1	<p>4.2</p>
Pollutant	Units of measure	Frequency	Sampling Method						
PM10	micrograms per cubic metre	Continuous	Special Method 1						
<p>M3 Testing methods – concentration limits</p> <p>M3.1 Monitoring for the concentration of a pollutant emitted to the air required to be conducted by this licence must be done in accordance with:</p> <ul style="list-style-type: none">a) any methodology which is required by or under the Act to be used for the testing of the concentration of the pollutant; orb) if no such requirement is imposed by or under the Act, any methodology which a condition of this licence requires to be used for that testing; orc) if no such requirement is imposed by or under the Act or by a condition of this licence, any methodology approved in writing by the EPA for the purposes of that testing prior to the testing taking place. <p>Note: <i>The Protection of the Environment Operations (Clean Air) Regulation 2010</i> requires testing for certain purposes to be conducted in accordance with test methods contained in the publication "Approved Methods for the Sampling and Analysis of Air Pollutants in NSW".</p>	<p>4.1</p>								

<p>M4 Weather monitoring</p> <p>M4.1 For each monitoring point specified in the table below, the licensee must monitor (by sampling and obtaining results by analysis) the parameters specified in Column 1. The licensee must use the sample method, units of measure, averaging period and sample at the frequency, specified opposite in the columns:</p> <p>Point 5 and Point 18</p> <table><tr><th>Parameter</th><th>Units of Measure</th><th>Frequency</th><th>Averaging Period</th><th>Sampling Method</th></tr><tr><td>Rainfall</td><td>mm</td><td>Continuous</td><td>1 hour</td><td>AM-4</td></tr><tr><td>Wind speed @ 10 metres</td><td>m/s</td><td>Continuous</td><td>15 minutes</td><td>AM-2 & AM-4</td></tr><tr><td>Wind direction @ 10 metres</td><td>0</td><td>Continuous</td><td>15 minutes</td><td>AM-2 & AM-4</td></tr><tr><td>Temperature @ 2 metres</td><td>0C</td><td>Continuous</td><td>15 minutes</td><td>AM-4</td></tr><tr><td>Temperature @ 10 metres</td><td>0C</td><td>Continuous</td><td>15 minutes</td><td>AM-4</td></tr><tr><td>Sigma theta @ 10 metres</td><td>0</td><td>Continuous</td><td>15 minutes</td><td>AM-2 & AM-4</td></tr><tr><td>Solar radiation</td><td>W/m2</td><td>Continuous</td><td>15 minutes</td><td>AM-4</td></tr><tr><td>Additional requirements - siting - measurement</td><td></td><td></td><td></td><td>AM-2 & AM-4 AM-2 & AM-4</td></tr></table>	Parameter	Units of Measure	Frequency	Averaging Period	Sampling Method	Rainfall	mm	Continuous	1 hour	AM-4	Wind speed @ 10 metres	m/s	Continuous	15 minutes	AM-2 & AM-4	Wind direction @ 10 metres	0	Continuous	15 minutes	AM-2 & AM-4	Temperature @ 2 metres	0C	Continuous	15 minutes	AM-4	Temperature @ 10 metres	0C	Continuous	15 minutes	AM-4	Sigma theta @ 10 metres	0	Continuous	15 minutes	AM-2 & AM-4	Solar radiation	W/m2	Continuous	15 minutes	AM-4	Additional requirements - siting - measurement				AM-2 & AM-4 AM-2 & AM-4	<p>4.2.2</p>
Parameter	Units of Measure	Frequency	Averaging Period	Sampling Method																																										
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Additional requirements - siting - measurement				AM-2 & AM-4 AM-2 & AM-4																																										
<p>M8 Other monitoring and recording conditions</p> <p>M8.6 Requirement to Monitor Particulate Matter</p> <p>The Licensee must record the average PM₁₀ concentration at Monitoring Points 19 and 20 at intervals of 10 minutes. This data must be made available upon request by any Authorised Officer of the EPA who asks to see them.</p>	<p>4.2</p>																																													
<p>O3 Dust control</p> <p>O3.1 The premises must be maintained in a condition which minimises or prevents the emission of dust from the premises.</p> <p>O3.2 Activities occurring in or on the premises must be carried out in a manner that will minimise the generation or emission from the premises, of wind-blown or traffic generated dust.</p> <p>O3.3 All trafficable areas, coal storage areas and vehicle manoeuvring areas in or on the premises must be maintained, at all times, in a condition that will minimise the generation, or emissions from the premises, of wind-blown or traffic generated dust.</p>	<p>3.0</p>																																													