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***East Boggabri Coal Pty Ltd***

ABN: 73 100 742 185

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***Air Quality Monitoring  
Program  
for the  
East Boggabri Coal Mine  
incorporating an  
Air Monitoring Protocol***

Approved

***Prepared by:***



**R. W. CORKERY & CO. PTY. LIMITED**

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Program  
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Air Monitoring Protocol***

**Prepared by:**

R.W. Corkery & Co. Pty. Limited  
Geological & Environmental Consultants  
75 Kite Street  
ORANGE NSW 2800

ABN: 31 002 033 712

Telephone: (02) 6362 5411  
Facsimile: (02) 6361 3622  
Email: RWC@cww.octec.org.au

**On behalf of:**

East Boggabri Coal Pty Ltd  
PO Box 2440  
FORTITUDE VALLEY BC QLD 4006  
ABN: 73 100 742 185

Telephone: (07) 3000 5693  
Facsimile: (07) 3000 5694  
Email: kross@whitehaven.net.au

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## **ACRONYMS USED THROUGHOUT THIS REPORT**

AEMR	-	Annual Environmental Management Report
AMP	-	Air Monitoring Protocol
AQMP	-	Air Quality Monitoring Program
CCC	-	Community Consultative Committee
CHPP	-	Coal Handling and Preparation Plant
DA	-	Development Application
DEC (EPA)	-	Department of Environment and Conservation (Environment Protection Authority)
DoP	-	Department of Planning
DPI (MR)	-	Department of Primary Industries (Mineral Resources)
EBC		East Boggabri Coal Pty Ltd
EIS	-	Environmental Impact Statement
EMS	-	Environmental Management Strategy
GSC	-	Gunnedah Shire Council
GTAs	-	General Terms of Approval
INP	-	Industrial Noise Policy
ISO	-	International Standards Organisation
NSC	-	Narrabri Shire Council



## 1 INTRODUCTION

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The East Boggabri Coal Mine (“the mine”) is located within a 661ha site, approximately 15km northeast of Boggabri, 10km north of the Whitehaven Coal Mine and south of, and adjacent to, the approved Boggabri Coal Project. The mine is being developed by East Boggabri Coal Pty Ltd (EBC).

The mine will involve the following activities.

- Open cut coal mining over an area of approximately 160ha.
- Programmed placement of overburden and interburden materials from the open cut to two out-of-pit overburden emplacements and the open cut void itself.
- On-site crushing and temporary stockpiling of the mined coal.
- Establishment of a transport route between the mine site and the Whitehaven CHPP and rail loading facility.
- Transportation of product coal from the mine site to the Whitehaven CHPP for washing and/or despatch to export markets via rail to the Port of Newcastle.
- Backloading of reject material from the Whitehaven CHPP for placement in the mined-out areas of the mine.
- Installation of a range of services, structures and transportable buildings.
- Progressive shaping and rehabilitation of the mine area and other areas of disturbance.

It is recognised that the operation of the mine has the potential to impact on the air quality beyond the boundaries of the mine site. In order to manage the potential impacts on local air quality, and in compliance with *Condition 4(5)* of Development Consent DA 88-4-2005 (“the Consent”)<sup>a</sup>, the following Air Quality Monitoring Program (AQMP) has been prepared.

The AQMP presents the relevant conditions of the Consent (see Section 2) and includes an Air Monitoring Protocol (AMP) to evaluate compliance with the air quality criteria identified by the Consent (see Section 3). Section 4 presents the specific features of the AQMP including monitoring locations, parameters measured and frequency of monitoring.

The AQMP has been prepared with reference to relevant legislation and guidelines and is consistent with the commitments in the following documentation which was prepared prior to the granting of development consent.

- Environmental Impact Statement – Specifically Section 4.10.
- Air Quality Assessment – included as Volume 2 (Part 8) of the Specialist Consultant Studies Compendium.

The AQMP applies to the construction and operational phases of the mine. A separate monitoring program has been developed as part of a Transport Route Construction Management Plan for construction of the off-site transport route.

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<sup>a</sup> Hereafter all identified conditions refer to DA 88-4-2005, the Consent.



## 2 CONSENT REQUIREMENTS

The Consent incorporates a total of five conditions relating to air quality, air quality management and air quality monitoring. These conditions are presented in full in Box 1. It is noted that a number of conditions arose from the DEC's recommendations to the DoP and as such will be consistent with conditions of an Environment Protection Licence for the mine.

### Schedule 4 Impact Assessment Criteria

1. The Applicant shall ensure that dust emissions generated by the development do not cause exceedances of the air quality criteria listed in Tables 1, 2 and 3 at any residence on, or on more than 25 percent of, any privately-owned land.

Pollutant	Averaging period	Criterion
Total suspended particulate (TSP) matter	Annual	90 µg/m <sup>3</sup>
Particulate matter < 10 µm (PM <sub>10</sub> )	Annual	30 µg/m <sup>3</sup>

Table 1: Long-term Impact Assessment Criteria for Particulate Matter

Pollutant	Averaging period	Criterion
Particulate matter < 10 µm (PM <sub>10</sub> )	24 hour	50 µg/m <sup>3</sup>

Table 2: Short-term Impact Assessment Criterion for Particulate Matter

Pollutant	Averaging period	Maximum increase in deposited dust level	Maximum total deposited dust level
Deposited dust	Annual	2 g/m <sup>2</sup> /month	4 g/m <sup>2</sup> /month

Table 3: Long-term Impact Assessment Criteria for Deposited Dust

Note: Deposited dust is assessed as insoluble solids as defined by Standards Australia, 2003, AS 3580.10.1-2003: Methods for Sampling and Analysis of Ambient Air - Determination of Particulates - Deposited Matter - Gravimetric Method.

### Land Acquisition Criteria

2. If the dust emissions generated by the development exceed the criteria in Tables 4, 5 and 6 at any residence on, or on more than 25 percent of, any privately-owned land, the Applicant shall, upon receiving a written request for acquisition from the landowner acquire the land in accordance with the procedures in conditions 10-12 of schedule 5.

Pollutant	Averaging period	Criterion
Total suspended particulate (TSP) matter	Annual	90 µg/m <sup>3</sup>
Particulate matter < 10 µm (PM <sub>10</sub> )	Annual	30 µg/m <sup>3</sup>

Table 4: Long-term Land Acquisition Criteria for Particulate Matter

**Box 1**  
**Air Quality - related Consent Conditions**



**Schedule 4**  
**Land Acquisition Criteria (cont'd)**

Pollutant	Averaging period	Criterion	Percentile <sup>1</sup>	Basis
Particulate matter < 10 µm (PM <sub>10</sub> )	24 hour	150 µg/m <sup>3</sup>	99 <sup>2</sup>	Total <sup>3</sup>
Particulate matter < 10 µm (PM <sub>10</sub> )	24 hour	50 µg/m <sup>3</sup>	98.6	Increment <sup>4</sup>

Table 5: Short-term Land Acquisition Criteria for Particulate Matter

<sup>1</sup>Based on the number of block 24 hour averages in an annual period.

<sup>2</sup>Excludes extraordinary events such as bushfires, prescribed burning, dust storms, sea fog, fire incidents, illegal activities or any other activity agreed by the Director-General in consultation with the DEC.

<sup>3</sup>Background PM<sub>10</sub> concentrations due to all other sources plus the incremental increase in PM<sub>10</sub> concentrations due to the mine alone.

<sup>4</sup>Incremental increase in PM<sub>10</sub> concentrations due to the mine alone.

Pollutant	Averaging period	Maximum increase in deposited dust level	Maximum total deposited dust level
Deposited dust	Annual	2 g/m <sup>2</sup> /month	4 g/m <sup>2</sup> /month

Table 6: Long-term Land Acquisition Criteria for Deposited Dust

Note: Deposited dust is assessed as insoluble solids as defined by Standards Australia, 2003, AS 3580.10.1-2003: Methods for Sampling and Analysis of Ambient Air - Determination of Particulates - Deposited Matter - Gravimetric Method.

**<sup>a</sup>Operating Conditions**

3. The applicant shall carry out the development in a way that prevents and/or minimises the air pollution generated by the development.
4. The Applicant shall:
  - (a) ensure that trucks entering and leaving the mine site carrying loads with the potential to generate dust are covered at all times, except during loading and unloading; and
  - (b) implement all practicable measures to minimise the off-site odour and fume emissions generated by any spontaneous combustion or blasting at the mine site, to the satisfaction of the Director-General.

**<sup>a</sup>Monitoring**

5. Prior to carrying out any development on the mine site, the Applicant shall prepare (and following approval implement) an Air Quality Monitoring Program for the development, in consultation with the DEC, and to the satisfaction of the Director-General. This Program must include an air quality monitoring protocol for evaluating compliance with the air quality impact assessment and land acquisition criteria in this consent.

<sup>a</sup> Incorporates DEC GTA

**Box 1 (cont')**  
**Air Quality - related Consent Conditions**



### 3 AIR MONITORING PROTOCOL

#### 3.1 Introduction

The AMP has been prepared with reference to relevant legislation and guidelines to address the following matters relevant to the management of air pollutants produced by activities on the mine site.

- Air quality compliance criteria (see Section 3.2).
- Air quality controls and mitigation measures (see Section 3.3).
- Community consultation (see Section 3.4).
- Management of complaints (see Section 3.5).
- Monitoring methods and programs (see Section 3.6).
- Response to air quality compliance criteria exceedance (see Section 3.7)

#### 3.2 Air Quality Compliance Criteria

Air quality compliance criteria for the operation of the mine, as incorporated in *Condition 4(1)*, have been established using relevant DEC guidelines and with reference to GTA's provided by the DEC to DoP prior to the granting of development consent. EBC will ensure that dust and other particulate matter generated on the mine site does not result in exceedances of the criteria listed in **Table 3.1** at any residence on, or on more than 25 percent of, any privately-owned land.

**Table 3.1**  
**Air Quality Impact Assessment Criteria**

Pollutant	Criterion		Averaging Period
Total suspended particulate matter (TSP)	90µg/m <sup>3</sup>		Annual mean
Particulate matter <10µm (PM <sub>10</sub> )	50µg/m <sup>3</sup>		24-hour maximum
	30µg/m <sup>3</sup>		Annual mean
Deposited dust	<b>Maximum increase in deposited dust level</b>	<b>Maximum total deposited dust level</b>	
	2.0g/m <sup>2</sup> /month	4.0g/m <sup>2</sup> /month	Annual mean
Note: Deposited dust is assessed as insoluble solids as defined by Standards Australia, 1991, AS 3580.10.1-1991: Methods for Sampling and Analysis of Ambient Air - Determination of Particulates - Deposited Matter - Gravimetric Method.			
Source: Modified after DA 88-4-2005 – Tables 1 to 3.			



### 3.3 Air Quality Controls and Management Procedures

EBC will adopt a range of design and operational safeguards and operational procedures for the mine to ensure that the effectiveness of the air quality controls are optimised throughout all stages of the project. The controls have been selected largely based on their proven effectiveness at other mines and were previously presented in the EIS (RWC, 2005) for the East Boggabri Coal Mine.

#### Vegetation Clearing and Soil Stripping

- Cleared trees and branches will be retained for use in stabilising slopes identified for rehabilitation with native woodland communities.
- Where practicable, soil stripping will be undertaken at a time when there is sufficient soil moisture to prevent significant dust lift-off.
- EBC will avoid stripping soil in periods of high winds.
- Dust suppression by water application will be used to increase soil moisture should stripping occur during periods of high wind or low soil moisture.

#### Drilling and Blasting Activities

- The drill rig will utilise water injection or alternatively, be fitted with dust collectors.
- Blast hole stemming will be used to prevent venting of explosion gases.
- Blasting will be conducted both before the establishment, and after the break-up of low-level atmospheric temperature inversions.

#### Overburden Ripping and Placement

- Ripping of softer overburden material will be avoided during periods of high wind.

#### Coal Mining

- Low moisture coal will be sprayed with water prior to excavation to raise moisture content to >5.5%.

#### Internal Road and Hardstand Area Construction

- Clearing ahead of construction activities will be minimised.
- Cleared areas will be watered regularly during construction, where appropriate.

#### Coal Processing Area

- Water will be applied to the coal at the feed hopper, crusher and at all conveyor transfer and discharge points.
- All conveyors will be fitted with appropriate cleaning and collection devices to minimise the amount of material falling from the return conveyor belts.



- Some flexibility will exist to temporarily cease operation in the event of protracted dry periods, high winds, or significant dust generation and dispersal towards the surrounding residences.

### **Wind Erosion of Open Cut and Stockpiles**

- The extent of clearing/site preparation in advance of mining will be minimised.
- Progressive rehabilitation of areas of disturbance, including topsoil and subsoil stockpiles, will be undertaken.
- Bund walls and windbreaks will be constructed as required.

### **Internal Transport**

- The road for the transportation of coal product between the mine facilities area and mine entrance will be sealed.
- Internal haul roads will be regularly watered.
- Earthmoving equipment and on-site vehicles will:
  - be fitted with exhaust controls which satisfy NSW DEC emission requirements;
  - be properly maintained and any mobile equipment which does not comply with NSW DEC guidelines will be removed; and
  - have the exhausts of all equipment directed upwards or to the side so as not to cause dust lift-off.

### **Blasting**

- The following factors contributing to non-ideal detonation behaviour and higher emission (principally NO<sub>2</sub>) concentrations, will be avoided whenever possible.
  - Weak overburden which reduces the necessary explosive confinement, will be ripped in preference to blasting.
  - Water infiltration.
  - Long explosive columns.
  - Explosive pre-compression, caused by hole-to-hole shock propagation due to wet overburden and clay veins.

The controls and management procedures will be reviewed in response to the results of air quality monitoring, complaints or comments identified through EBC's consultation effort. Any changes made will be noted as part of annual environmental reporting (in the Annual Environmental Management Report (AEMR)).



### 3.4 Community Consultation

EBC is keen to maintain a positive dialogue with all members of the local community to avoid any adverse impacts and/or misunderstandings arising from its activities. Consultation will be undertaken in several ways.

1. Formal and informal meetings with landowners / residents of land surrounding the site and other members of the local community with the greatest potential to be impacted by mine operations.
2. The establishment and involvement in a Community Consultative Committee (CCC) as required by *Condition 4(5)* of DA 88-4-2005. The CCC is to be comprised of:
  - two EBC representatives, including the person responsible for environmental management of the mine;
  - one representative from each of Narrabri Shire Council and Gunnedah Shire Council; and
  - at least four representatives from the local community.

The appointment of the nominated representatives will be approved by the Director-General in consultation with the two Councils.

The CCC will be chaired by an independent chairperson, whose appointment has also been endorsed by the Director-General, meet at least four times per year, and review the environmental performance of the development.

EBC will ensure that the CCC is provided with the most up-to-date information on the environmental performance of the mine and respond to any comments made by representatives of the CCC.

3. Inviting representatives of the local Aboriginal community to monitor surface disturbing activities and potential sites of significance (as and if identified).

### 3.5 Management of Complaints (Complaints Management Protocol)

Whilst all endeavours will be made by EBC to avoid adverse air quality impacts on local landowners / residents, it is acknowledged that from time to time such impacts may occur. To ensure an appropriate and consistent level of reporting, response and follow-up to any complaints is adopted by EBC, the following complaints management protocol will be followed.

- A publicly advertised telephone complaints line will be in place to receive complaints during operating hours and record complaints at other times.



- Each complaint received will be recorded on a Complaints Register which will take the form of a log book or similar database. The mine Complaints Register will include the following details for air quality complaints.
  - The date and time of complaint.
  - Any personal details the complainant wishes to provide or if no such details are provided a note to that effect.
  - The nature of the incident that led to the complaint, including the time of the dispersal and its duration.
  - The action taken by EBC in relation to the complaint, including any follow-up contact with the complainant.
  - If no action was taken by EBC, the reason why no action was taken.
- The Mine Manager will be responsible for ensuring that an initial response is provided within 24 hours of receipt of a complaint (except in the event of complaints recorded when the mine is not operational).
- Additional measures will be undertaken as required to address the complaint. This may include visiting the complainant, or inviting the complainant to the mine site.
- Once the identified measures are undertaken, the Mine Manager will sign off on the relevant complaint within the Complaints Register.
- If necessary, follow-up monitoring will take place to confirm the source of the complaint is adequately mitigated.
- A copy of the Complaints Register will be kept by EBC and made available to the CCC and the complainant (on request). A summary of complaints received every 12 months (if any) will be provided to DoP, NSC, GSC, DEC, DPI (MR) and the CCC through the AEMR.

Based on the nature of individual complaints, specific contingency measures may be implemented to the (reasonable) satisfaction of the complainant. The Mine Manager retains ultimate responsibility to ensure that complaints received are properly recorded and addressed appropriately.

If any complainant does not consider the response from EBC to adequately address their concerns, the Independent Review procedure detailed in Development Consent *Conditions 5(4) to 5(9)* will be adopted.

### **3.6 Monitoring Methods and Programs**

Section 4 presents the air quality monitoring methods and procedures including details on monitoring locations, methods, frequency, parameters and reporting.



### 3.7 Response to Air Quality Compliance Criteria Exceedance

On identification of an exceedance of the air quality compliance criteria presented in Section 3.2, the following response protocol is to be followed. It is noted that the response to an exceedance will vary depending on whether it is an exceedance of dust deposition or PM<sub>10</sub> criteria.

#### 1. Confirmation of Exceedance

The analysing laboratory will be contacted to ensure no error has been made in storing, analysing or recording the sample or result. Should this investigation conclude the treatment, analysis and result recording for the sample are satisfactory, EBC will proceed to response point 2.

#### 2. Notification (of exceedance)

Monthly dust deposition exceedance (4.0g/m<sup>2</sup>/month)<sup>b</sup>: The Mine Manager and Area Manager will be notified.

Exceedance of 24 Hour PM<sub>10</sub> criteria (50µg/m<sup>3</sup>): In the event that the PM<sub>10</sub> level recorded for a single 24 hour period exceeds 50µg/m<sup>3</sup>, the Mine Manager will notify the DEC as to the nature of the exceedance(s). A single exceedance may be considered anomalous, however, repeated exceedances will require the preparation of a corrective action plan.

Annual Average exceedance of dust deposition (4.0g/m<sup>2</sup>/month) or PM<sub>10</sub> (30µg/m<sup>3</sup>): In the event that the annual average dust deposition recorded at any site exceeds 4.0g/m<sup>2</sup>/month, or PM<sub>10</sub> exceeds 30µg/m<sup>3</sup>, the Mine Manager will notify the DEC as to the nature of the exceedance(s). Exceedance of the annual average levels will require the preparation of a corrective action plan.

#### 3. Corrective Action Plan

EBC will prepare a corrective action plan to reduce dust generation and thereby reduce dust deposition and/or PM<sub>10</sub> concentrations around the mine site and return the operation to compliance. Preparation of the plan may require the assistance of a specialist air quality consultant and/or the involvement of environmental personnel at IBC's Boggabri Coal Project. Details on the preparation of the corrective action plan will be included in the relevant AEMR and Environment Protection Licence Annual Return and to the DEC prior to implementation.

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<sup>b</sup> It should be noted that the criteria for dust deposition is an annual average value and therefore a dust deposition value of >4.0g/m<sup>2</sup> for any given month is not strictly an exceedance, rather an indication that should there be no change to dust generating or suppression activities the probability of an exceedance once the annual average is calculated is high.



#### 4. Re-assessment

Dust Deposition: In the event the annual average dust deposition level is exceeded in any calendar year, particular attention will be paid during the following 12 months to achieve compliance. The corrective action plan discussed above will be main control designed to lower the annual average dust deposition level.

In the event that the annual average does not comply in a second year, a revised corrective action plan (of Step 3) will be required, this time requiring the input of a specialist air quality consultant.

PM<sub>10</sub>: Compliance with PM<sub>10</sub> concentration compliance criteria will be reassessed following the completion of the corrective action plan. In the event that a repeated non-compliant result is recorded, a revised corrective action plan (Step 3) will be implemented, this time requiring the input of a specialist air quality consultant.

#### 5. Notification (of compliance)

EBC will notify the DEC and other relevant government agency(ies) and local stakeholder(s) of the return to compliance following the successful completion of Step 4.

#### 6. Independent Review and Land Acquisition

If EBC fails to establish compliance with the air quality criteria at surrounding residences, or on 25% of privately-owned land, or following a legitimate complaint from a resident / land owner of criteria exceedance, EBC will, following instruction from the Director-General, commission a suitably qualified person to conduct an independent review as specified in *Conditions 5(4-9)*. If the independent review does not lead to resolution between the complainant and EBC, land acquisition procedures will follow as specified in *Conditions 5(10 to 12)*.

#### 7. Reporting

The recorded exceedance, corrective actions and reassessment will be reported to the CCC and included in each relevant AEMR.

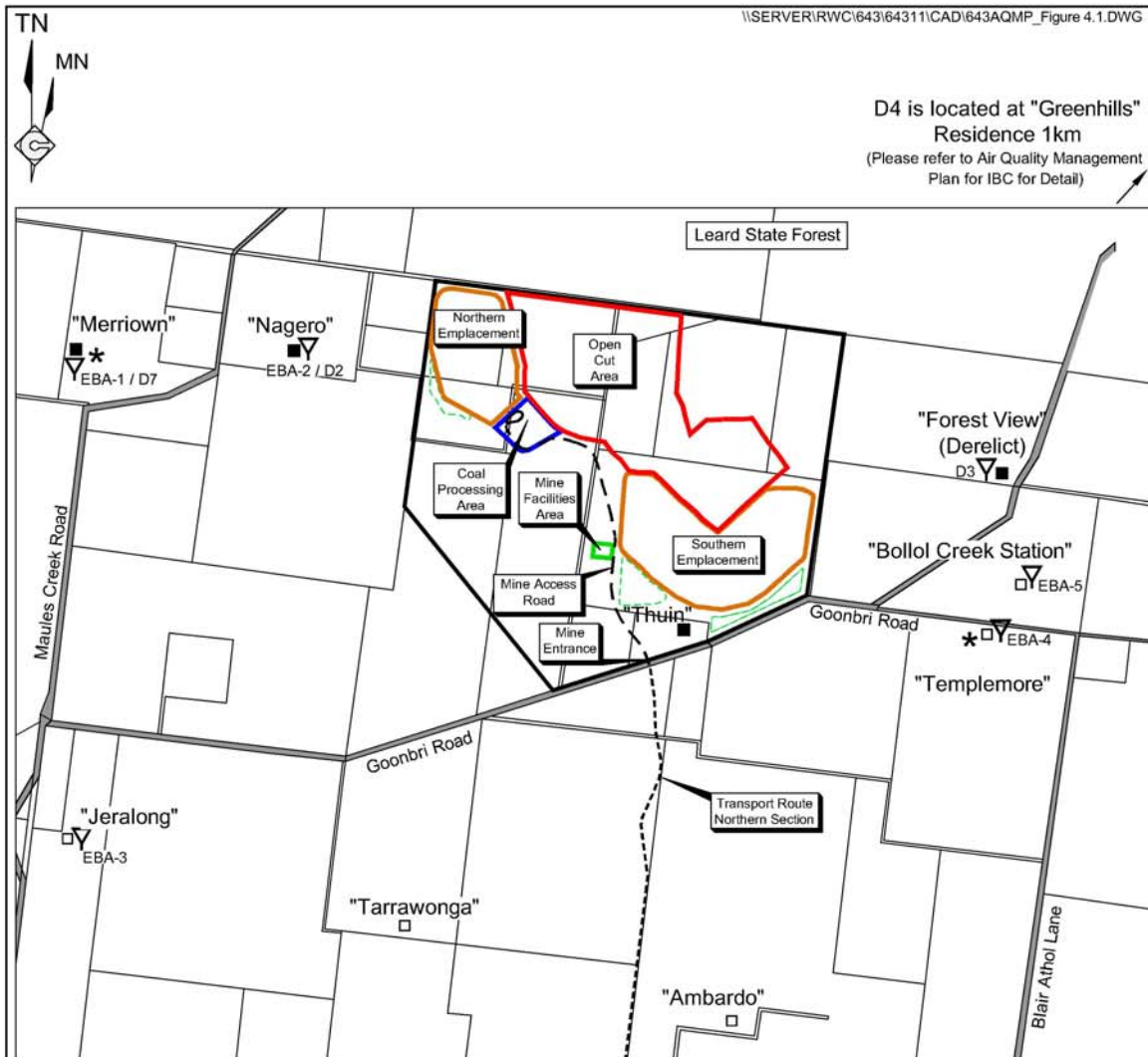
### 3.8 Responsibilities and Accountabilities

Throughout the mine's operational life, the Mine Manager will have overall responsibility for ensuring contractors, employees and service providers comply with all laws, regulations, licences, approvals and conditions of the consent.

All persons undertaking any form of work on the site will be required to attend a site-specific induction at which they will be instructed in the environmental rules, procedures and processes applicable to their activities whilst they are on the site.







D4 is located at "Greenhills" Residence 1km  
(Please refer to Air Quality Management Plan for IBC for Detail)

- REFERENCE
- Mine Site Boundary
  - Open Cut Area Boundary
  - Out-of-Pit Emplacement Boundary
  - Coal Processing Area Boundary
  - Mine Facilities Area Boundary
  - Soil Stockpile Area
  - Mine Access Road
  - Transport Route
  - Project-related Residence
  - Non Project-related Residence
  - Deposited Dust Monitoring Location
  - High Volume Sampler Location
  - EBC Air Quality Monitoring Location
  - IBC Air Quality Monitoring Location

SCALE 1:50 000

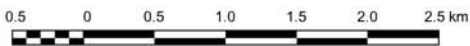


Figure 4.1

AIR QUALITY MONITORING LOCATIONS

**Table 4.2** presents a summary of the air quality monitoring sites included in the EBC monitoring program. The prefix *EBA* refers to *East Boggabri Air* whereas the prefix *D* is a pre-existing prefix used for *Dust* by IBC to identify its air quality monitoring locations.

**Table 4.2**  
**Air Quality Monitoring Locations**

Reference*	Location			Parameters	
	Easting	Northing	Residence / Property	Deposited Dust	PM <sub>10</sub>
EBA – 1 (D7)	224440	6607790	"Merriown"	✓	✓
EBA – 2 (D2)	226050	6607860	"Nagero"	✓	
EBA – 3	224450	6604430	"Jeralong"	✓	
EBA – 4	230920	6605850	"Templemore"	✓	✓
EBA – 5	221150	6606220	"Bolloi Creek Station"	✓	
D3	230920	6606990	"Forest View"	✓	
D4	232610	6609110	"Greenhills"	✓	

\* See Figure 4.1

#### 4.4 Monitoring Frequency

Monitoring of deposited dust will be undertaken monthly at the mine.

Monitoring of PM<sub>10</sub> will be undertaken once every 6 days in accordance with the DEC state schedule for PM<sub>10</sub> monitoring..

#### 4.5 Monitoring Procedures, Data Recording and Reporting

##### 4.5.1 Monitoring Procedures

Monitoring of dust deposition and data recording will be undertaken in accordance with:

- AS 2922-1987 "Ambient Air - Guide for the Siting of Sampling Units" (NSW DEC Method AM-1); and
- AS 3580.10.1-2003 "Methods for Sampling and Analysis of Ambient Air - Determination of Particulates - Deposited Matter - Gravimetric Method" (NSW DEC Method AM-19).

Monitoring of PM<sub>10</sub> and data recording will be undertaken in accordance with:

- "Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales", DEC 2001;
- AS 2922-1987 "Ambient Air - Guide for the Siting of Sampling Units" (NSW DEC Method AM-1); and
- AS / NZS 3580.9.6 – 2003 "Methods for sampling and analysis of ambient air – Determination of suspended particulate matter PM<sub>10</sub> high volume sampler with size-selective inlet – Gravimetric Method".



- AS / NZS 3580.9.3 – 2003 “*Methods for sampling and analysis of ambient air – Determination of suspended particulate matter – Total Suspended Particulate Matter (TSP) – High volume sampler gravimetric method*”.

#### 4.5.2 Data Recording

For each dust monitoring location, once each month the glass container used to capture the deposited dust will be removed, replaced and sent to a NATA accredited laboratory for analysis. For the HVAS, the pre-weighed filter will be removed, replaced and sent to a NATA accredited laboratory for analysis generally in monthly batches to coincide with the despatch of the deposited dust samples.

The following information will be recorded at each deposited dust monitoring location.

- Date and time of removal and replacement.
- Condition of the dust gauge.
- Notable ground disturbances or activities ongoing in the general activity (not associated with the activities on the mine site).
- Any other notable activities or conditions at or around the monitoring location.

#### 4.5.3 Data Reporting

The results of all air quality monitoring will be made publicly available at the offices of NSC and GSC and at EBC’s Boggabri office. These results will be updated at least every three months. Each year, the results of air quality monitoring program will be summarised and presented in the AEMR. This will include an analysis of the monitoring results against the criteria listed in **Table 3.1**, previous monitoring results and predictions made in the EIS. Based on these results, trends in the air quality levels will be identified and any non-compliances noted.

The recording of an exceedance of air quality criteria identified in **Table 3.1** will trigger the implementation of contingency measures described in Section 3.7 of the AMP.

