RAVENSWORTH
OPEN CUT

GLENCORE

Air Quality and Greenhouse Gas Management

Plan

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1. Introduction

1.1 Background

The Ravensworth Complex is located between the townships of Singleton and Muswellbrook, in the Upper Hunter Valley region of New South Wales (NSW) (refer to Figure 1.1).

The Ravensworth Operations Project Approval (09_0176) was granted on 11 February 2011 by the then NSW Minister for Planning. The approval allowed for the expansion of existing approved mining operations at the Ravensworth Complex and enabled the consolidation of existing approvals for open cut mining and infrastructure within the Ravensworth area. Specifically, the approval consolidated existing approvals for the Narama Mine, Ravensworth West Mine, Cumnock Open Cut, Ravensworth Underground Mine (RUM) surface facilities and the Ravensworth Coal Handling and Preparation Plant (RCHPP). Subsequence modifications of PA 09_0176 were approved in August 2013, December 2014 and February 2016.

RUM operates under Development Consent DA 104/96 dated 20 November 1996 (File No. N95/00395/001). A ninth modification (MOD 9) was submitted during 2012, primarily relating to changes in the longwall (LW) layout of the Liddell Seam (Liddell Seam Project). MOD 9 was approved by the DP&I on 20 June 2013.

The original 1996 development application was supported by an EA for the construction and operation of an underground coal mine. Through subsequent EA modifications, RUM has an approved maximum production of 7 Mtpa of ROM coal.

Continued operations in the current climate have proven to be uneconomical and RUM was placed in Care and Maintenance in October 2014.

The Ravensworth Complex is shown in Figure 1.2. A number of company entities are responsible for managing the operations, which are undertaken at the respective facilities that comprise the Ravensworth Complex. For the purpose of this management plan, these respective entities will collectively be referred to as the Ravensworth Complex, with all activities ultimately being undertaken by Glencore Coal Assets Australia (GCAA) managed businesses.

A single Project Approval has provided for the integration of operational aspects of the mining operations in the area, allowing for a consistent and integrated approach to environmental management and mine planning. The Ravensworth Complex is committed to implementing continued mining operations in the context of updated and contemporary environmental management

1.2 Purpose and Scope

The purpose of this Air Quality and Greenhouse Gas Management Plan (the Plan) is to:

- Comply with the relevant conditions of the Project Approval 09_0176, Development Consent 104/96 and Environment Protection Licence (EPL) 2652;
- Provide a description of the measures to be implemented by the Ravensworth Complex to mitigate air quality and greenhouse gas (GHG) impacts and to detail air quality and GHG monitoring requirements associated with its operations;
- Provide a clear description and mechanism for assessing air quality monitoring results against the relevant air quality impact assessment criteria and land acquisition criteria;
- Provide employees and contractors with a clear and concise description of their responsibilities in relation to air quality and GHG management during the operation of the mine;
- Address all relevant commitments made in the Ravensworth Operations Environmental Assessment (EA) (Umwelt, 2010);and
- Address all relevant conditions of the Development Approval 104/96.

The Plan outlines the control measures that are to be implemented as a part of the continued operations at the Ravensworth Complex to minimise the potential for air quality and GHG impacts on the local community and the environment.

The Plan has been prepared for the Ravensworth Complex, which includes the following mining operations and infrastructure:

- A multi-seam open cut mining operation within an area west of Bayswater Creek, known as the Ravensworth North Pit which will encompass the existing Ravensworth West open cut mine;
- The current Narama Mine, Narama West Mine, Cumnock No. 1 open cut and the surface operations of RUM; and
- The RCHPP facility.

In addition to being prepared in accordance with the requirements of the Project Approval, this Plan has also been prepared in accordance with the goals and objectives relating to air quality management that are contained within the GCAA Air Quality Management Protocol.

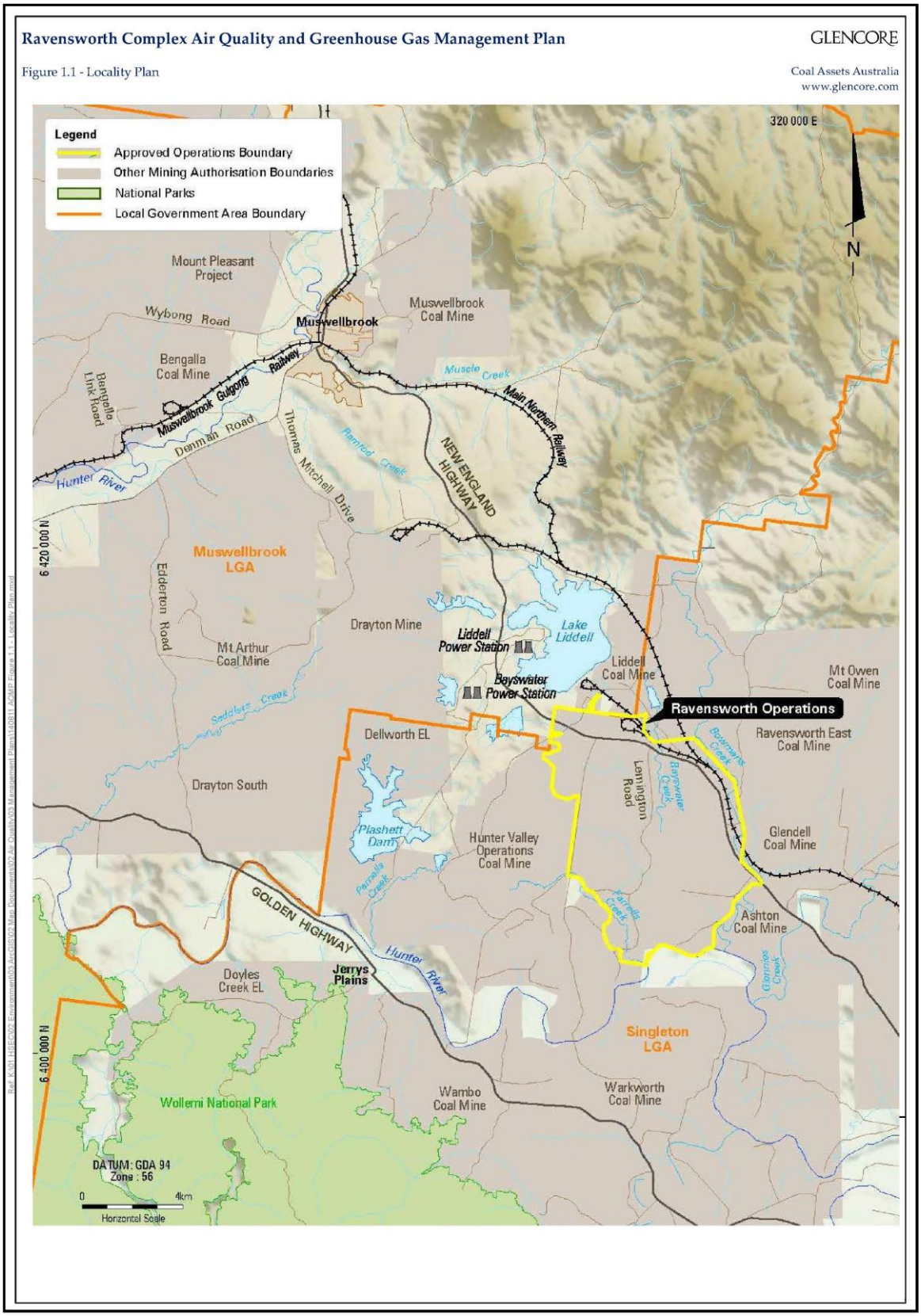

Figure 1.1 Locality Plan

Figure 1.2 Ravenswoth Complex Mine Layout

1.3 Regulatory Requirements

1.3.1 Project Approval 09_0176

The Project Approval for the Ravensworth Complex was granted in accordance with the provisions of the Environmental Planning and Assessment Act 1979 (EP&A Act). Approval for the Ravensworth Complex was granted by the Minister for Planning on 11 February 2011, with subsequent modifications approved in August 2013, December 2014 and February 2016. The requirement for this Plan arises from Condition 24 of Schedule 3 of PA 09_0176.

A detailed list of the Project Approval conditions and the relevant Statement of Commitments outlined in the Project Approval, and where they are addressed in this document is included in Appendix 1.

1.3.2 Development Approval 104/96

RUM operates under development consent DA 104/96 dated 20 November 1996 (File No. N95/00395/001). A ninth modification (MOD 9) was submitted during 2012, primarily relating to changes in the longwall (LW) layout of the Liddell Seam (Liddell Seam Project). MOD 9 was approved by the DP&I on 20 June 2013.

The original 1996 development application was supported by an EA for the construction and operation of an underground coal mine. Through subsequent EA modifications, RUM has an approved maximum production of 7 Mtpa of ROM coal.

RUM was placed in Care and Maintenance in October 2014.

1.3.3 Environment Protection Licence 2652

Air quality and GHG monitoring at the Ravensworth Complex will be undertaken in accordance with the relevant Environment Protection Licence (EPL) conditions for the Ravensworth Complex. The EPL includes conditions relating to monitoring, recording and reporting of air quality monitoring data as well as conditions relating to incident and complaint recording. Air quality related conditions within the EPL are reproduced in Appendix A. a

1.4 Stakeholder Consultation Regarding this Document

As per Condition 24 of Schedule 3 of PA 09_0176, the Air Quality and Greenhouse Gas Management Plan is to be prepared in consultation with the Environment Protection Authority (EPA). This plan has been submitted to the EPA concurrent with its submission to the Department of Planning, Industry and Environment (DPIE).

As such, any comments provided by the EPA, will be subsequently addressed in a revised document which will be resubmitted to DPIE.

1.5 Management Plan Structure

In order to identify specific air quality and GHG requirements and where they are satisfied within this plan, the Plan has been separated into two parts:

- Part 1 provides the requirements and controls for air quality management at the Ravensworth Complex; and
- Part 2 addresses the GHG management at the Ravensworth Complex.

1.6 Roles and Responsibilities

Relevant roles and responsibilities associated with the Plan are presented in Table 1.1.

Table 1.1 - Roles and Responsibilities

Role	Responsibilities
Operations Manager	• Ensure sufficient resources are allocated for the implementation of this Plan; • Confirm that the plan is relevant to current operations; • Authorise the implementation of specific management measures to minimise air quality impacts in accordance with this Plan; • Confirm the outcomes of monitoring are systematically evaluated as part of ongoing planning; and • Authorise internal and external reporting requirements.
Environment and Community Manager (ECM)	• Confirm the requirements of this Plan are effectively implemented; • Confirm adequate resources are available for the implementation of this plan; • Coordinate, advise and assist with the implementation air quality monitoring in accordance with the Plan; • 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; • Confirm the results of monitoring are systematically evaluated and reported to relevant personnel for consideration as part of ongoing planning; and • Confirm all internal and external reporting requirements are met;
Environment and Community Coordinator (ECC)	• Maintain procedures to confirm air quality impacts are identified; • Confirm all relevant personnel are aware of air quality management practices and mitigation measures; • Monitor compliance based on legal and reporting requirements; • Confirm monitoring equipment is maintained, replaced and repaired in a regular and/or timely manner; • Confirm any air quality related incident is recorded and reported in accordance with legal requirements and incident reporting procedures; • Use appropriate risk management tools to identify potential air quality impacts and monitor that teams are assessing and controlling risks accordingly; • Assist in the coordination of monitoring surveys and development of proactive strategies to minimise air quality impacts; • Confirm the requirements of this Plan are effectively implemented; • Coordinate incident investigation processes including associated reporting requirements; • Confirm all monitoring records are effectively maintained on site; • Assist with all internal and external reporting requirements; • Provide ongoing environmental advice to site personnel; • Review air quality monitoring data against criteria as per the specified frequency of monitoring programs; and • Update relevant monitoring data on the internet.
Department Managers	• Comply with the requirements of this Plan including reporting requirements; • Use appropriate risk management tools to identify potential air quality impacts and monitor that teams are assessing and controlling risks accordingly; and • Confirm personnel and contractors carry out work in accordance with this Plan;
All Supervisors	• Ensure activities under their control are completed in accordance with the EMS; • Ensure environmental controls within their jurisdiction are operated and maintained in a proper and efficient manner; and • Report all environmental incidents and community complaints to the ECC.

Role	Responsibilities
All Employees	• Conduct all activities in accordance with the EMS and in an environmentally responsible manner; • Report all environmental incidents and community complaints to their immediate supervisor; and • Participate in the required environmental training.
All Contractors	• Conduct all activities in accordance with the EMS and in an environmentally responsible manner; • Report all environmental incidents and community complaints to their immediate supervisor; and • Participate in the required environmental training.

1.7 Definitions

The terminology utilised within this Plan is defined in Table 1.2.

Table 1.2 – Terminology utilised within the Plan

Term	Definition
Dust Deposition	Dust particles that settle out from the air - measured in grams per square metre per unit time (g/m^2/time)
HVAS	High Volume Air Sampler
PM_{10}	Particulate matter less than 10 micrometers (µm) in size
TSP	Total Suspended Particulates ($\mu g/m^3$). The nominal size of this fraction has particles with a diameter of up to 50 micrometers (µm)
$\mu g/m^3$	Micrograms per cubic metre
TEOM	Tapered Element Oscillating Microbalance. An instrument capable of measuring particulate matter in real time.

2. Commitment

All commitments outlined within this management plan including timing are outlined in Table 2.1 below. Management commitments requiring actioning will be entered into the Ravensworth Compliance Management system (CMO) and actioned, records of documentation associated with the management commitments will be maintained within the compliance management system

Table 2.1 Commitments within this management plan

Commitment No.	Management Plan Commitment	Location in Document
1	Overburden emplacement areas designed to minimise air quality impact on sensitive receivers to the east and south east;	3.4.1
2	Monitor operations, including RCHPP areas via camera or visual inspections to alter operations particularly when forecast meteorological conditions indicate increase risk of dust generation; for example wind speeds up to 10m/s;	3.4.2
3	Regular housekeeping for example of conveyors and areas where coal material can accumulate	3.4.2
4	Provide suitable water cart fill points within close proximity to mining activities;	3.4.2
5	All drill rigs utilised for purposes other than exploration drilling are equipped with dust control systems and are regularly maintained for effective use, and may include a combination of dust extractors, dust curtains, water injection systems and extraction systems;	3.4.2
6	Installation of two automatic alarm system on TEOM monitors to inform mine operators when dust monitoring indicates dust levels are approaching relevant criteria to enable appropriate operational response (refer to **Section 3.52**);	3.4.2
7	Restricting or ceasing dust generating activities during adverse weather conditions such as loading or dumping of material in elevated areas will be avoided based on visual observation.	3.4.2
8	Minimising the area of disturbance by restricting topsoil removal ahead of mining operations and rehabilitating mine spoil dumps as soon as practicable after mining;	3.4.2
9	Undertaking blasting activities in accordance with the Ravensworth Complex Blast Management Plan	3.4.2
10	Increased watering, where practicable, of exposed areas in the event of excessive dust generation;	3.4.2
11	Ripping and revegetation any obsolete haul roads where required and practicable	3.4.2
12	Progressive site rehabilitation and revegetation, including undertaking progressive rehabilitation as close as possible to mining operations to minimise disturbed areas as appropriate to limit the potential for windblown dust	3.4.2
13	Temporary revegetation of inactive mining areas (in place for greater than two years) where there is potential for adverse dust generation to occur.	3.4.2
14	The Ravensworth Complex will investigate any reported exceedances of dust criteria at private residences on a case by case basis.	3.5.1
15	Any new mitigation measures that are implemented as a result of these investigations will be reported in the Annual Review.	3.5.1
16	The results of TEOM monitoring will be reported through the submission of the Ravensworth Complex Annual Review and will be reported on the Ravensworth Complex website	3.7.1.3

Commitment No.	Management Plan Commitment	Location in Document
17	In the event of an exceedance of the impact assessment criteria provided in Tables 2.1 and 2.2, the Ravensworth Complex will investigate and report the exceedance in accordance with Section 3.84.	3.7.3
18	The Ravensworth Complex ECM or delegate will report to the Operations Managers the results of investigations of any complaints and any exceedances of the air quality impact assessment or land acquisition criteria (refer to Section 3.3).	3.9.1
19	Air quality monitoring results will also be included in the Annual Review prepared each year for the Ravensworth Complex. The Annual Review will include an assessment of the air quality monitoring results against the air quality impact assessment criteria, a comparison with EA data background levels and any trends in monitored dust levels over the period. In addition, any complaints relating to dust emissions from the Ravensworth Complex and the response actions taken will be reported in the Annual Review.	3.9.2
20	A summary of air quality monitoring results will also be presented in the Ravensworth Complex CCC meetings. Performance monitoring, which includes an assessment of the effectiveness of dust controls and compliance with the relevant Project Approval and EPL conditions, may be discussed at CCC meetings where air quality related complaints occur.	3.9.2
21	In accordance with the Environmental Management Strategy, Ravensworth will maintain a centralised location to record communication details of relevant external stakeholders and procedures for stakeholder contact including a Complaints Procedure. The Complaints Procedure will utilise the Community Contact Line; a 1800 telephone number that will be regularly advertised in a local newspaper. The Contact Line will be in operation 24 hours per day, seven days a week. Complaints will be recorded and investigated, all other complaints, via letter, email in person or by fax, will also be recorded and investigated. Initial response to the complainant will be made as soon as practicable. In the event that a complaint is received in relation to air quality impacts from the operation, an investigation will be undertaken in accordance with the relevant GCAA reporting guideline. Follow up correspondence with the complainant will be made explaining the outcome of complaint investigations.	3.9.3
22	Ravensworth Complex personnel and contractors will be advised of air quality management requirements via the Ravensworth Complex training system. Additional air quality management training, including toolbox talks as necessary, will be provided to personnel and contractors who require specific skills or knowledge relating to air quality impacts and mitigation measures. Training will be undertaken in accordance with Training Management System conducted for the Ravensworth Complex.	3.9.4
23	Ravensworth through GCAA uses an online reporting tool known as AQS, which calculates energy consumption and GHG emissions for every site in accordance with the technical guidelines	4.3.1
24	The Ravensworth Complex will utilise relevant GCAA Protocols when monitoring greenhouse emissions and activity data.	4.5.1
25	The Ravensworth Complex will prepare an energy management system to identify all energy inputs and emission sources. Statement of Commitment 6.13.1) and GCAA HSEC Standards both require Ravensworth to map energy use and emission sources to help identify GHG data sources. Process maps will be updated regularly and the review process will highlight new or redundant data sources.	4.5.2

Commitment No.	Management Plan Commitment	Location in Document
26	The Ravensworth Complex has developed procedures for the collection and retention of data to ensure the site complies with the legislative requirements of appropriate legislation.	4.5.4
27	The Ravensworth Complex will report GHG activity data internally via GCP according to the schedule outlined in Table 4.4.	4.6.1
28	The Ravensworth Complex will report its annual GHG emissions in accordance with legislative and GCAA requirements.	4.6.2

3. Part 1 – Air Quality

3.1 Objectives

The objectives of this Plan relating to air quality are:

- Establish an air quality monitoring system to assess the air quality impact on surrounding sensitive receivers and performance against the specific air quality impact assessment criteria;
- Detail the controls to be implemented to minimise dust generation from the site recognising that cumulative air quality is a key issue for the local community;
- Provide a mechanism to assess monitoring results against air quality impact assessment criteria and land acquisition criteria to evaluate compliance;
- Manage air quality related community complaints in a timely and effective manner;
- Detail the requirement for reporting air quality criteria exceedances to the relevant stakeholders;
- Provide management commitments and strategies for dealing with air quality related issues; and
- Detail the independent review process to be followed, if requested by a landowner(s), where Ravensworth Complex is determined to be exceeding the specific air quality acquisition criteria.

3.2 Baseline Data – Air Quality

As detailed within the Ravensworth Operations Environmental Assessment (EA) (Umwelt, 2010), prior to the commencement of operations in accordance with the Project Approval, Ravensworth Operations maintained a network of dust deposition gauges, directional gauges and High Volume Air Samplers (HVASs) to monitor dust levels surrounding their existing operations. Ravensworth Operations also operates a continuous dust monitor (TEOM). This array of monitors measure dust deposition, TSP and PM_{10} concentration levels in the air from all sources, including emissions from agricultural activities, mining, power generation, vehicle exhausts and natural emissions. Whilst these monitors provided data indicating general air quality within the area, the current system for the Ravensworth Complex, and a number of surrounding mining operations, is focussed on the receiver areas to the south east of the Ravensworth Complex (refer to Section 3.6).

In addition to the Ravensworth Operations monitoring system, the following air quality monitoring networks and data were considered in the Air Quality Assessment (Appendix 4 of the EA):

- The Mt Owen Complex network dust deposition gauges, HVAS (measuring TSP) and HVAS (measuring PM_{10}) associated with Glendell, Mt Owen and Ravensworth East mine monitoring networks; and
- The Ashton Coal Operations Limited (ACOL) network dust deposition gauges, HVAS (measuring TSP and PM_{10}) and TEOM monitors (measuring PM_{10}), which are located within Camberwell Village.

3.2.1 Dust Concentration

Baseline dust concentration data for Ravensworth Operations was obtained from HVAS utilised to monitor TSP in the local area. TSP monitors were also operated near Ravensworth Complex. HVASs were also operated by the Mt Owen Complex. These monitors have found that annual average TSP concentrations at the three monitors closest to the Ravensworth Complex are consistently below the EPA's annual average target of 90 µg/m^3.

The air quality monitoring network utilised by ACOL included TEOM monitors, measuring PM_{10}, located within Camberwell Village. Data for these monitoring sites is publicly available and shows that annual average PM_{10} concentrations are below the EPA criteria of 30µg/m^3. Aside from publicly available data, the Ravensworth Complex does not have access to ACOL managed monitoring results. The annual average PM_{10} measured within Camberwell Village is similar to a heavily built up area such as Sydney, which experienced annual average PM_{10} levels of approximately 24µg/m^3 between 1988 and 1996 (EPA 2008). Surrounding mining operations contributed to the elevated levels of PM_{10} occurring within Camberwell Village. As discussed above, current mining operations within the Project area are unlikely to significantly contribute to dust concentrations at these locations.

Data was also available from the monitoring network adjacent to the Ravensworth Complex. In July 2010, ACOL, Integra Coal Operations Pty Limited (Integra) and Ravensworth Operations commissioned an independent study into cumulative air quality impacts within Camberwell Village (PAE Holmes, 2010). The assessment focused on 12 representative receptors as selected by the then Department of Planning and Infrastructure (now DPIE)). The residences were selected by DPIE as being representative receptors that are potentially impacted by cumulative air quality impacts from the existing and proposed operations at individual mines. The study provided individual results per receptor regarding predicted future air quality impacts in the region.

3.2.2 Dust Deposition

Baseline dust deposition monitoring undertaken by Ravensworth Operations and surrounding mining operations indicated that the EPA's annual average target of 4 g/m^2/month is generally achieved at the monitors that are considered to be representative of private residences located near the Ravensworth Complex. Monitoring at one of these sites within Camberwell Village (Camberwell Church), located approximately five kilometres south east of the Ravensworth Complex has indicated exceedances of the maximum total dust deposition criteria in 2007 and 2008, which may be attributed to cumulative dust impacts from a number of mining operations in the surrounding area.

Dust deposition monitoring was also undertaken by ACOL at four locations within and surrounding Camberwell Village, with the results for two of these sites, located in the north and the south of the village, being publicly available. Monitoring data taken in 2008 and 2009 (with data for December 2008 missing) shows the EPA's annual average target of 4 g/m^2/month was being exceeded at the northern monitor and was being met at the southern monitor. These sites recorded results of 4.8 and 4 g/m^2/month respectively.

As detailed within the Ravensworth Operations EA (Umwelt, 2010) the mining activities undertaken by the Ravensworth Complex are unlikely to contribute substantially to dust levels at any of these locations, due to the distance of the operations from the village, their location in relation to prevailing north east/north west winds that affect Camberwell Village and the close proximity of the sites to other mining operations.

3.3 Impact Assessment Criteria

The EPA guidelines, Approved Methods and Guidance for the Modelling and Assessment of Air Pollutants in NSW, January 2017 specify air quality assessment criteria relevant for assessing impacts from dust generating activities. The air quality goals relate both to dust concentration and dust deposition which are discussed further in Sections 3.31 and 3.32.

3.3.1 Dust Concentration

Goals for dust concentration are referred to as long term (annual average) and short term (24 hour maximum) goals. Relevant goals for TSP and PM_{10} are outlined in Table 3.1 in relation to both Project-specific and cumulative goals applied at a regional level. The TSP and PM_{10} annual average goals relate to the total dust in the air and not just the dust from the Project. Condition 20,Schedule 3 of the Project Approval specifies the air quality criteria for the Project. The information provided in Condition 20, Schedule 3 is outlined in Tables 3.1 and 3.2.

Table 3.1 – Project Approval Air Quality Criteria for Particulate Matter Concentrations

Pollutant	Averaging Period	[b]Criteria
Total suspended particulate (TSP) matter	Annual	[a]90 µg/m^3
Particulate matter < 10 µm (PM_{10})	Annual	[a]30 µg/m^3
	24 hour maximum	[a]50 µg/m^3

Notes to Table 2.1:

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

b) Excludes extraordinary events such as bushfires, prescribed burning, dust storm, sea fog, fire incidents, illegal activities or any other activity agreed by the Secretary in consultation with the EPA.

3.3.2 Dust Deposition

In addition to health impacts, airborne dust also has the potential to cause nuisance impacts by depositing on surfaces and possibly on vegetation and/or crops. 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/m^2/month) at a particular location.

Project Approval Condition 20 of Schedule 3 (refer to Table 3.2) expresses maximum allowable limits 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/m^2/month an increase of up to 2 g/m^2/month would be permitted before it would be considered that a significant degradation of air quality had occurred. The Project Approval criterion for dust deposition is included in Table 3.2.

Table 3.2 – Project Approval Air Quality Criteria for Dust Deposition

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 Table 2.2:

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

b) Incremental impact (i.e. incremental increase in concentrations due to the Ravensworth Complex on its own);

c) Deposited dust is 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.

3.3.3 Cumulative Emissions

Cumulative air quality is a key issue for the local community. The Air Quality Assessment prepared for the EA **(Appendix 4)** provided an assessment of the cumulative dust emissions associated with the Project, surrounding mining operations and other sources of dust generation within the surrounding area. The cumulative emissions associated with these sources have been predicted in relation to TSP, annual average PM_{10} and dust deposition.

Although the Project was not identified as the primary contributor to dust at Camberwell Village, further management outcomes from studies for Camberwell Village, including the need for proactive dust management and the need for meteorological assessments to be undertaken prior to blasting, have been included as Blast Management Controls to be utilised at the Ravensworth Complex (refer to the Ravensworth Complex Blast Management Plan). Modelling was also undertaken for the cumulative air quality assessment (Holmes, 2010) for ACOL, Integra and Ravensworth Operations. The study was required by the then Department of Planning to provide a further assessment of cumulative impacts of the combined operations on potentially impacted sensitive receivers in the region.

The active management of cumulative dust emissions will be undertaken in accordance with the details outlined in Section 3.3.10.

3.3.4 Air Quality Acquisition Criteria

As outlined in Condition 21 of Schedule 3 of the Project Approval, long and short term air quality acquisition criteria apply to the Ravensworth Complex. Tables 3.3 to 3.5 outline the acquisition criteria for the Ravensworth Complex.

If particulate matter emissions generated by the Ravensworth Complex exceed the criteria in Tables 3.3 to 3.5 at any residence on privately owned land, or on more than 25 % of any privately owned land, then upon receiving a written request for acquisition from the landowner, the Ravensworth Complex shall acquire the land in accordance with the procedures outlined in Section 3.7 and Conditions 6 and 7 of Schedule 4 of the Project Approval.

Table 3.3 – Long Term Acquisition Criteria for Particulate Matter

Pollutant	Averaging Period	[d]Criteria
Total Suspended Particulate Matter	Annual	[a]90 µg/m^3
Particulate Matter < 10 µm (PM_{10})	Annual	[a]30 µg/m^3

Table 3.4 – Short Term Acquisition Criteria for Particulate Matter

Pollutant	Averaging Period	d Criteria
Total Suspended Particulate Matter	24 hour	[a]150 µg/m^3
Particulate Matter < 10 µm (PM_{10})	24 hour	[b]50 µg/m^3

Table 3.5 – Long Term 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 3.3 to 3.5:

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

b) Incremental impact (i.e. incremental increase in concentrations due to the Ravensworth Complex on its own).

c) Deposited dust is 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.

d) Excludes extraordinary events such as bushfires, prescribed burning, dust storms, sea fog, fire incidents, illegal activities or any other activity agreed by the Secretary in consultation with EPA.

3.3.5 Additional Air Quality Criteria for Specific Residences

In addition to the acquisition criteria outlined in Section 3.3.4, additional Air Quality mitigation measures are prescribed by Condition 22 of Schedule 3 of the Project Approval for specific residents in the vicinity of the project.

The additional measures in the Project Approval are as follows:

Upon receiving a written request from the owner of any residences:

a) On the air quality-affected land listed in Table 1 (reproduced as Table 3.6 in the text below);

b) On the land listed in Table 15 (reproduced as Table 3.7 in the text below); or

c) On any other privately-owned land where subsequent air quality monitoring shows the dust generated by the Ravensworth mine complex exceeds the air quality limits in Tables 9, 10 or 11 (reproduced as Tables 3.1 and 3.2 in the text) on a systematic basis,

the proponent shall implement additional reasonable and feasible dust mitigation measures (such as first-flush roof system, internal or external air filters and/or air conditioning) at the residence in consultation with the owner.

If, within 3 months of receiving this request from the owner, the Proponent and the owner cannot agree on the measures to be implemented, or there is a dispute about the implementation of these measures, then either party may refer the matter to the Secretary for resolution.

Upon receiving a written request for acquisition from an owner of the land listed in Table 3.6, the Ravensworth Complex shall acquire the land in accordance with the procedures in Conditions 6 and 7 of Schedule 4 of the Project Approval. An outline of the acquisition process is provided in Section 3.7.

Table 3.6 – Land Subject to Acquisition upon Request

Receiver Number	Receiver	Acquisition Basis
3	A Bowman	Air Quality
6A, 6B	Moxey	Air Quality
34	Stapleton [1]	Air Quality and Noise

Note 1: This property has been purchased by the Ravensworth Complex.

Additional properties are also subject to air quality mitigation measures upon request. These properties are outlined in Table 3.7.

Table 3.7 – Land Subject to Additional Air Quality Mitigation upon Request

Receiver Number	Receiver
6C	Moxey
13	A Bowman

3.4 Air Quality Management Controls

In order to mitigate any potential air quality impacts from the Ravensworth Complex, a number of air quality management controls will be implemented throughout the life of the operation. These controls are detailed in the following sections.

3.4.1 Design Controls

In addition to the air quality controls which will be implemented at the Ravensworth Complex during construction and mining operations (refer to Section 3.4.2), a number of air quality controls were also incorporated into the design of its required infrastructure. The following mine design features were incorporated into the project design:

- Overburden emplacement areas designed to minimise air quality impact on sensitive receivers to the east and south east;
- Enclosure of overland conveyors;
- Enclosure of RCHPP;
- Spray systems for permanent raw and product coal stockpiles where coal moisture content warrants dust suppression. The stacker conveyor for the raw coal stockpile also has an adjustable luff angle to minimise dust emissions due to drop height at the stockpile;
- Automatic sprays for the dump hopper to minimise dust from coal processing activities; and
- The use of dust suppression on haul roads and raw coal stockpiles, where practicable.

3.4.2 Operational Controls

The Ravensworth Complex implements a number of procedures to control dust emissions that may be generated from trafficable areas, coal preparation and handling, dragline operations, prestrip operations, blasting, drilling and stemming. As part of this system, the Ravensworth Complex has an ongoing commitment to implement the following controls to manage its dust generation:

- Watering of active mining areas and active haul roads that are subject to frequent vehicle movements;
- Monitor operations, including RCHPP areas via camera or visual inspections to alter operations particularly when forecast meteorological conditions indicate increase risk of dust generation for example wind speeds up to 10m/s;
- use of sprays to wet down areas when required to reduce the risk of dust generation including drilled areas to be loaded etc.;
- Follow site based procedures for the operation of equipment with a view to dust minimisation;
- Regular housekeeping for example of conveyors and areas where coal material can accumulate;
- Provide suitable water cart fill points within close proximity to mining activities;
- All drill rigs utilised for purposes other than exploration drilling are equipped with dust control systems and are regularly maintained for effective use, and may include a combination of dust extractors, dust curtains, water injection systems and extraction systems;
- Installation of automatic alarm system on TEOM monitors to inform mine operators when dust monitoring indicates dust levels are approaching relevant criteria to enable appropriate operational response (refer to Section 3.5.2). In conjunction with the TEOM alarming monitors, predictive software will be reviewed on a daily basis to verify any potential impacts affecting the Upper Hunter Air Quality Monitoring stations at Camberwell and Singleton North West. If necessaryoperations will be modified in accordance with this management plan;
- Modifying or ceasing dust generating activities during adverse weather conditions such as loading or dumping of material in elevated areas will be avoided based on visual observation. Operations may be modified to prevent dust generation, this includes, but is not limited to modifying equipment type, location or method of operation. Minimising the area of disturbance by restricting topsoil removal ahead of mining operations and rehabilitating mine spoil dumps as soon as practicable after mining;
- Restricting blasting in accordance with the Ravensworth Complex Blast Management Plan;

- Increased watering, where practicable, of exposed areas in the event of excessive dust generation;
- Ripping and revegetation any obsolete haul roads where required and practicable;
- Progressive site rehabilitation and revegetation, including undertaking progressive rehabilitation as close as possible to mining operations to minimise disturbed areas as appropriate to limit the potential for windblown dust; and
- Temporary revegetation of inactive mining areas (in place for greater than one year) where there is potential for adverse dust generation to occur.

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 plan and relevant site developed operational procedure, which outline specific controls and visual monitoring triggers for different operational activities. 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.

3.4.3 Offensive Odours

In accordance with Condition 18 of Schedule 3 of the Project Approval and Section 129 of the Protection of Environment Operations (POEO) Act, the Ravensworth Complex is required to ensure no offensive odours are emitted from site. Corrective actions for offensive odours will be developed as necessary, in accordance with Section 3.1.

In addition, the Ravensworth Complex has also developed a Spontaneous Combustion Principal Mining Hazard Management Plan (SCPMHMP), which details a range of operational strategies to assist with the recognition, prevention and management of spontaneous combustion. The Ravensworth Complex has implemented work practices and procedures to minimise the occurrence of self-heating, and to mitigate potential environmental, safety and economic impacts.

The objectives of the SCPMHMP are to:

- Facilitate a proactive management approach through the adoption of strategies to allow for the early recognition and prevention of spontaneous combustion, including the identification of key indicators of spontaneous combustion and the implantation of appropriate controls when working with known spontaneous combustion material, such as having a water cart on standby, increased inspections of the work area, and establishing gas monitoring;
- Successfully control spontaneous combustion both during and following the cessation of mining activities;
- Minimise adverse environmental, safety and economic impacts; and
- Provide regular information and training to site personnel regarding the recognition and management of spontaneous combustion.

The stockpiling and spreading of organic material, such as organic growth medium, also has the potential to emit offensive odours at the Ravensworth Complex. Impacts from stockpiled material will be limited by selecting suitable storage locations as far away from sensitive receivers, including the community and onsite buildings, as is possible. The spreading of organic material will be restricted during adverse weather conditions to reduce offsite odour emissions.

3.4.4 Minimising Cumulative Air Quality Impacts

Under an informal arrangement, Ravensworth Complex and surrounding sites including Hunter Valley Operations(HVO), GCAA sites and other mining operations will liaise with each other as appropriate following investigation into meteorological conditions or visual observations associated with a real time meteorological or PM_{10} alarms at the monitoring locations. To minimise the potential for cumulative air quality impacts on nearby sensitive receivers, in accordance with cumulative air quality criteria outlined in Section 3.3.3.

If informed by neighbouring mines of excessive dust, Ravensworth with act in the same manner as for the investigation of a complaint or to validate a dust alarm. Ravensworth Complex will investigate the circumstances as described by the neighbouring mine.

3.4.5 Indicators for Additional Dust Control Measures

In the event that dust generating activities are causing increased dust emissions from the Ravensworth Complex, additional control measures will be implemented and corrective actions undertaken to minimise the potential for windblown dust from the site. In order to enable an efficient response and implementation of control measures during instances where dust generation is observed, Ravensworth Complex personnel will undertake the following actions consistent with the NSW EPA Dust Assessment Handbook:

- In the event that dust emissions are visible above the drill deck height during drilling operations, the operator will cease operations and check that the dust suppression system is operational;
- In the event that road dust is visible above truck wheel height, truck operators are to call for additional wet suppression and slow down or stop;
- If dust is visible above the tray height, truck operators are to slow down pending further dust suppression being applied to the roadway; and
- If dust is visible above tray height truck operators are to notify the Open Cut Examiner (OCE). The OCE will determine whether operations are required to be modified (relocate/ cease) to assist in the suppression of dust, along with the requirement for any additional controls.

3.5 Proactive Air Quality Management

A range of proactive measures are to be implemented by the Ravensworth Complex to manage dust emissions. These proactive management measures are detailed in Section 3.5.1. The Ravensworth Complex will seek to undertake best practice and continuous improvement for active air quality management with additional continuous improvement processes detailed in Section 3.6.

3.5.1 Active Air Quality Management – Current Practices

As detailed in Section 3.7.1.3, the TEOM continuous dust monitoring undertaken by the Ravensworth Complex has the ability to notify relevant personnel when monitoring results indicate dust levels at surrounding sensitive receivers is approaching, or has exceeded, the relevant Project Approval dust criteria. TEOMs are also utilised as reference sites for air quality conditions coming onto the site and leaving the site. The TEOM locations have been designed so potential exceedances of air quality criteria are identified prior to impacting upon nearby sensitive receivers to the south and south east of the site.

The Ravensworth Complex has developed an Air Quality Management Trigger Action Response Plan (TARP) that is used to respond to high dust levels. The TARP is a key management tool used by site to determine actions and responses. The TARP is informed by visual monitoring, air quality and meteorological monitoring and by a meteorological and dust risk forecasting system. The TARP makes provision for the following Trigger Level classifications:

TRIGGER	ACTION	RESPONSE	WHO
Mining Operations conducted efficiently with no or negligible environmental impact.	Continue to monitor environmental conditions and dust emissions from the operations throughout the shift.	Continue mining operations.	Mining Supervisors • Mining 3 • Mining 4 • Mining 5 Mine Dispatch Officer
Minor visible dust being emitted at low levels from mining operations	Mining Supervisor /MDO to monitor closely, ensuring water trucks are applied appropriately. Hot seat change-out water trucks over crib where required. Mining Supervisor to notify operators, of requirement to minimise dust emissions by operating to the conditions and to report if conditions deteriorate.	Visually monitor wind and dust level. Consider options if situation deteriorates. This may include examining the immediate weather forecast, time required to relocate versus production time lost due to environmental considerations. Consult with superintendent to determine proactive options available.	Mining Supervisors • Mining 3 • Mining 4 • Mining 5 Mine Dispatch Officer Superintendents • Tier 1 • Tier 2 • Drill & Blast
Localised dust plumes being created by mining activities. High demand levels for water trucks. Loading units clearly exacerbating airborne dust levels.	Mining Supervisor to adopt proactive measures to reduce dust emissions. This may involve relocating machines to lower levels of the mine. Cease operations on a case by case basis Determine medium term weather forecast in expectation of lost production time. Communicate with other Mining Supervisors on options available to maintain mining activities	Mining Supervisor / MDO to consult with Superintendent on possible options available to reduce dust emissions. Mining Supervisor is to notify Superintendent if delay is expected to be greater than 1 hr. (If Mining Superintendent cannot reached contact the Production Manager) Relocate alternate loading face if extended periods of environmental delays are likely.(consult with Superintendent and 24hr plan) Contact Mining Superintendent to assess the use of available resources to maximise other fleet efficiency.	Mine Dispatch Officer Mining Supervisors • Mining 3 • Mining 4 • Mining 5 Mining Superintendents • Tier 1 • Tier 2 • Drill & Blast
High wind creating airborne dust plumes. Particulates being airborne without mining ocuring. General site wide impact by airborne dust.	Cease ground engaging activities. Maintain water truck application in extreme areas. Remove exposed equipment from elevated positions eg lighting sets etc.	Mining Supervisor to notify Mining Superintendent. Production Manager to be notified if delay is expected to be greater than 4 hrs. Consider all return to work requirements for when weather has passed.	Mine Dispatch Officer Mining Supervisors • Mining 3 • Mining 4 • Mining 5 Mining Superintendents • Tier 1 • Tier 2 • Drill & Blast Production Manager

Table 3.8 Air Quality Trigger Action Response Plan

The following trigger types and monitoring methods are used to determine the trigger levels shown above:

Trigger:	Monitoring Method:
Visual triggers	Visual monitoring of dust levels by Ravensworth Complex personnel, enhanced through the dust management camera network.
Adverse meteorological conditions (conducive to dust events)	Real time meteorological monitoring and dust management cameras.
Peaks in PM_{10} concentrations(a)	Real time PM_{10} monitoring.
Forecast dust risk	Hunter Valley Meteorological Modelling System.

Table 3.9 Trigger Types and Monitoring Methods

A key focus of the TARP is responding to PM_{10} concentration triggers. Ravensworth has detailed site based procedures and documents that indicate the actual levels that are triggered and the intervals and periods they occur. The actual trigger levels can be found in the procedure RAVOC-1536591325-4929 – Real Time Environmental Monitoring Alarms on the Ravensworth Intranet (this procedure has not been reviewed or approved by the DPIE and is used for internal management purposes only). The TARP defines the Trigger Levels for each trigger type, and the management actions that are to be implemented by Ravensworth Complex, including conducting a review of the current mining operation (e.g. machinery locations and activities, meteorological conditions.) and determining whether any modification to the operation is required to reduce the potential for dust related impacts, including the potential shutting down of operations in extreme conditions.

The Ravensworth Complex will investigate any reported exceedances of dust criteria at private residences on a case by case basis. Should site specific monitoring or real time monitors indicate adverse dust impacts from the operation or adjoining mines, the Ravensworth Complex will, in cooperation with the relevant mining operations, investigate reasonable and feasible measures to mitigate dust at the affected receiver, in consideration of the attributable dust sources.

The Ravensworth Complex utilises meteorological forecasting to predict and proactively manage air quality in the community. A daily forecast is received each morning by key operational and site personnel, which forecasts wind speed and direction throughout the day, and determines potential dust impacts at sensitive receivers. This information can be used to modify operations to limit reduce dust emissions (i.e. changing blasting times to avoid adverse wind conditions and inversions).

To facilitate the development of an extensive air quality monitoring network in the vicinity of the Ravensworth area, the Ravensworth Complex has an informal agreement with other Glencore operations in the region to enable all operations to have access to air quality monitoring results via the Environmental Monitoring Database (EMD). The Ravensworth Complex has also installed a network of dust monitoring cameras. The cameras are focussed on key operational areas within the Ravensworth Complex, and are continuously displayed on a monitor in the main office building. The cameras are regularly inspected by key operational and Environment & Community (EC) staff members, and if high levels of dust are visible then reasonable operational controls will be implemented.

3.6 Continuous Improvement

3.6.1 Best Practice Air Quality Mitigation Measures

Where possible, the Ravensworth Complex will attempt to implement reasonable and feasible best practice air quality mitigation measures. The basis for continuous improvement of air quality mitigation measures will be through the ongoing monitoring of dust impacts and the corrective or preventative action process outlined in the Ravensworth Complex Environmental Management Strategy. Through the development of corrective or preventative actions, the Ravensworth Complex will investigate ways to reduce the air quality impacts generated by the operation. Any new mitigation measures that are implemented as a result of these investigations will be reported in the Annual Review.

The Ravensworth Complex will also maintain awareness of new technologies for air quality mitigation through participation in relevant industry groups.

3.6.2 Change Management

All changes to operations, facilities, plant equipment and production processes are required to be assessed in accordance with the change management process. Change management will be undertaken at the Ravensworth Complex in accordance with the GCAA Risk and Change Management guideline, which provides the following process for managing the risks associated with change.

When change is considered to have an impact on the objectives of this Plan, the process below must be followed:

- Identify the change;
- Assess the potential risks associated with the change and develop a risk management plan;
- Approve the change subject to the risk management plan;
- Communicate and implement the change and risk management actions;
- Monitor and evaluate the change and risk management plan; and
- Document the change management process.

3.7 Air Quality Monitoring

3.7.1 Air Quality Monitoring Program

To assess compliance against dust deposition and dust concentration criteria for the Ravensworth Complex, directional dust, depositional dust, TSP and PM_{10} are routinely monitored at the locations shown on Figure 2.1. In addition, the Ravensworth Complex also operates TEOMs to measure and assess compliance of PM_{10}. The frequency of air quality monitoring undertaken is detailed in Table 3.8 below.

Table 3.8 – Air Quality Monitoring Frequency

Type of Monitoring	Frequency
Depositional Dust Gauges	Monthly
Directional Depositional Dust Gauges	Monthly
PM_{10} – TSP	Every six days
TEOM	Continuous
Meteorological	Continuous

Figure 2.1 Air Quality Monitoring Locations

Air quality monitoring locations will be reviewed and where necessary, modified in consultation with DPIE and EPA over the life of operations according to progressive monitoring results, physical changes in mining operations, or following the acquisition of private property by the Ravensworth Complex.

Monitoring is undertaken in accordance with EPL and Project Approval conditions, which specify required methods of sampling, analysis and frequency of monitoring (refer to Tables 2.1 and 2.2). Specific details of each type of monitoring to be undertaken are provided in the following sections.

3.7.1.1 Dust Concentration

As shown in Figure 2.1, in order to measure dust concentrations in areas surrounding the Ravensworth Complex three high volume air samplers (HVAS) are in place, with one measuring PM_{10} concentrations and two measuring TSP concentrations (refer to Table 3.9).

The units will be operated in accordance with EPA's Approved methods for the sampling and analysis of air pollutants in NSW' (2007), which refers to Australian Standards AS2724.3-1984 (TSP) and AS3580.9.6-1990 (PM10) (these Standards are now superseded by As/NZS 3580.9.3:2003 and AS/NZS 3580.9.6-2015 respectively).

The monitoring units listed in Table 3.9 are used to assess compliance with PA 09_0176 Schedule 3, Condition 20 for Table 9 only.

Table 3.9 – High Volume Air Sampler Locations

Operation	Monitor	Parameter Sampled	Easting	Northing
Ravensworth Operations	HVAS 2	TSP	319974	6405612
Ravensworth Operations	HVAS 5	TSP	315744	6403153
Ravensworth Operations	HVAS 19	PM_{10}	319786	6405650

3.7.1.2 Dust Deposition

As shown in Figure 2.1, a network of dust deposition gauges has been installed around the project area. This network comprises 4 dust deposition gauges located at various locations in areas surrounding the Ravensworth Complex. The number of monitoring locations may increase or decrease as determined through site reviews and external requests. Monitoring will be undertaken in accordance with Australian Standard AS3580.10.1-2016.

The directional dust gauges will be sampled monthly for insoluble solids in accordance with AS 2724.5 (1987) Determination of impinged matter expressed as directional dirtiness, background dirtiness and/or area dirtiness.

The dust gauges listed in Table 3.10 are used to assess compliance with PA 09_0176 Schedule 3, Condition 20 for Table 11 only.

Table 3.10 – Dust Deposition Gauge Locations

Operation	Monitor	Easting	Northing
Ravensworth Operations	D9	320231	6405570
Ravensworth Operations	D12	315466	6403150
Ravensworth Operations	D13	318519	6403370
Ravensworth Operations	D27	320637	6405230

3.7.1.3 Continuous Dust Monitoring

Two TEOMs have been installed at the Ravensworth Complex (SX45-G1 and SX45-G2), as shown in **Figure 2.1** and **Table 3.11.** The Ravensworth Complex also has access to data from a TEOM installed by a neighbouring GCAA site (SX14). The TEOMs are continuous, real time monitors that measure PM_{10} and PM2.5. The TEOMs are fitted with an automatic alarm system, which provides a message to key mining personnel, including the Mining Supervisor and EC staff. This informs them that measured dust levels are approaching the air quality criteria, enabling key mining personnel to undertake a review of the mining operations in order to minimise potential contributions from mining activities. As discussed in Section 3.5.1, the Ravensworth Complex has developed a TARP, which will be used to respond to alarms and high dust levels. The Ravensworth Complex has a network of monitors that it can access data to assess potential impacts at sensitive receptors.

The results of TEOM monitoring will be reported through the submission of the Ravensworth Complex Annual Review and will be reported on the Ravensworth Complex website (refer to Section 3.9). The data collected by the Ravensworth Complex TEOMs will be complemented by the Ravensworth Complex HVAS data and TEOM information provided by neighbouring sites, when required. This will assist by:

- Providing an understanding of regional episodic dust events;
- Providing an understanding of local episodic dust events;
- Providing an understanding of potential dust episodes resulting from mining activities; and
- Alerting operations when dust levels are approaching the relevant criteria so the operation can be adjusted accordingly (if required).

The TEOM SX45-G1 is used to assess compliance with both the EPL (continuous monitoring requirement) and the PA 09_0176 Schedule 3 Condition 20 Table 9 and Table 10. In relation to the Project Approval, The TEOM SX45-G2 is only used for management purposes and is maintained on mine owned land. The unit SX45-G2 will be used to assess compliance with EPL requirements of continuous monitoring only.

Table 3.11 – TEOM Locations

Unit	Location	Easting	Northing
SX45-G1	South east of Ravensworth Complex (downwind)	318706	6403417
SX45-G2	North west of Ravensworth Complex (upwind)	313094	6412121

The Ravensworth Complex will continue to investigate the use of modern technologies for monitoring dust levels upwind and downwind of high risk areas, such as coal stockpiles. The value of these technologies for dust management will be assessed and trialled if deemed effective.

3.7.1.4 Meteorological Monitoring

The Ravensworth Complex utilises continuous weather recording stations to record real time meteorological data (refer to Figure 2.1). The location of the weather stations facilitates the capture of data that is representative of the area subject to potential dust emissions. The meteorological data recorded by the weather stations include:

- Wind speed, wind direction and sigma-theta;
- Temperature;
- Humidity; and
- Rainfall.

The weather station will be maintained and operated in accordance with the EPA's Approved methods for the sampling and analysis of air pollutants in NSW (2007), which refers to Australian Standard AS2923 -1987 (Guide for measurement of horizontal wind for air quality applications (superseded by AS3580.14-2011)).

3.7.2 Monitoring Standards

Air quality monitoring will be undertaken in accordance with the relevant Australian Standards, site specific standards and EPA approved methods for sampling including:

- EPA's Approved methods for the sampling and analysis of air pollutants in NSW (2017), which refers to Australian Standards AS2724.3-1984 (TSP) and AS3580.9.6-1990 (PM10) these Standards are now superseded by AS/NZS 3580.9.3:2003 and AS/NZS 3580.9.6-2015 respectively);
- The dust deposition gauges will be operated in accordance with EPA's Approved methods for the sampling and analysis of air pollutants in NSW (2001), which refers to Australian Standard AS3580.10.1-2016; and
- The use of TEOM systems with a dichotomous sampler to measure and analyse continuous PM_{10}, coarse PM and $PM_{2.5}$ in accordance with the guidelines specified in AS/NZS 6580.9.7 (2009) Methods for sampling and analysis of ambient air – Determination of suspended particulate matter – dichotomous sampler (PM_{10}, coarse PM and $PM_{2.5}$) – Gravimetric method.

The weather stations will be maintained and operated in accordance with the EPA's Approved methods for the sampling and analysis of air pollutants in NSW (2001), which refers to Australian Standard AS2923 -1987 (Guide for measurement of horizontal wind for air quality applications (superseded by AS3580.14-2011)).

3.7.3 Compliance Assessment Protocol

In the event of an exceedance of the impact assessment criteria provided in Tables 2.1 and 2.2, the Ravensworth Complex will investigate and report the exceedance in accordance with Section 3.7.4.

In the event of an exceedance of the land acquisition assessment criteria provided in Tables 3.3, 3.4 and 3.5, the Ravensworth Complex will, upon written request for acquisition from the landowner, acquire the land in accordance with Conditions 6 and 7 of Schedule 4 of the Project Approval.

If an exceedance of any criteria is detected, the Ravensworth Complex will conduct an investigation to determine whether it is responsible for exceedance. The investigation will determine the Ravensworth Complex's contribution to recorded dust events and will include assessing wind conditions (direction and speed), reviewing the type and location of operations occurring during the time of the dust event, and reviewing other monitoring data taken during the same period to identify any trends. If it is determined that the Ravensworth Complex was responsible for the exceedance of the criteria, then mitigation measures will be implemented for future air quality impacting activities as necessary and future activities will be monitored for effectiveness and improvement opportunities.

3.7.4 Incident Reporting

Within seven 7 days of detecting an exceedance or identifying an incident relating to an air quality exceedance, the Ravensworth Complex will provide a written report regarding the exceedance to the DPIE..

The written report to DPIE, and any other relevant government agencies will include the following details:

- The date, time and nature of the exceedance/incident;
- The likely cause of the exceedance/incident;
- Description of the response action that has been undertaken to date; and
- Description of the proposed measures to address the exceedance/incident.

In accordance with Condition 2 of Schedule 4 of the Project Approval, within two weeks of obtaining monitoring results showing:

- An exceedance of the air quality criteria in Schedule 3 of the Project Approval, the Ravensworth Complex will notify the affected landowner and/or tenants in writing of the exceedance and provide quarterly monitoring results to each of these parties until the project is complying with the relevant criteria;

- An exceedance of the relevant criteria in Conditions 20 or 21 of Schedule 3, the Ravensworth Complex will 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 tenants of any mine owned land); and
- An exceedance of the relevant criteria in Condition 22(c) of Schedule 3 (reproduced in the text as Table 3.6), the Ravensworth Complex shall notify the applicable owner of the residences on the land that they are entitled to ask for additional air quality mitigation measures to be installed at their residence.

3.8 Independent Review & Land Acquisition Process

In the event that a landowner considers the Ravensworth Complex to be exceeding air quality criteria at his or her property, the landowner may ask the Secretary in writing for an independent review of the air quality impacts at the property. If the Secretary is satisfied that an independent review is warranted, then the independent review will be conducted in accordance with the procedure described in Schedule 4 of the Project Approval. The procedure is summarised as follows:

1. Ravensworth Complex receives a request from the Secretary for an independent review of the air quality impacts on privately-owned land;
2. Ravensworth Complex, in consultation with the Secreatry, will appoint a suitably qualified person to undertake an independent review;
3. The independent review would include air quality monitoring over a suitable period of time and over a suitable range of meteorological conditions;
4. A copy of the results of the independent review would be provided to the landowner and Secreatry by the Ravensworth Complex; and
5. Depending on the results of the independent review, a number of actions could be pursued in accordance with the Project Approval conditions. These actions are summarised as follows:
    - If the independent review finds exceedances of air quality criteria due to operations at the Ravensworth Complex, the Ravensworth Complex will take all reasonable and feasible measures to reduce air quality impacts in consultation with the landowner and independent person and conduct further monitoring until the project complies with the relevant criteria;
    - Secure a written agreement with the landowner to allow exceedances of the relevant criteria to the satisfaction of the Secretary;
    - If further monitoring determines that the project is not complying with the relevant criteria the upon receiving a written request from the landowner, Ravensworth Complex will acquire all or part of the landowners land in accordance with Condition 6 and 7, Schedule 4 of the Project Approval.
    - If the independent review finds that exceedances of air quality criteria are in part due to the Ravensworth Complex and in part due to a source other than the Ravensworth Complex then actions by the Ravensworth Complex and the other mine(s) shall be as directed by the Secretary; and
    - If the independent review finds that exceedances of air quality criteria are due in whole to a source other than the Ravensworth Complex then no further action is required by the Ravensworth Complex.

3.9 Reporting and Reviewing

3.9.1 Internal Reporting

The Ravensworth Complex ECM or their delegate will report to the Operations Managers the results of investigations of any complaints and any exceedances of the air quality impact assessment or land acquisition criteria (refer to Section 3.3).

If a non-compliance with the air quality impact assessment criteria is identified (refer to Section 3.3) an internal report detailing the circumstances of the non-compliance and resulting actions will be developed and submitted to GCAA in accordance with GCAA Annexures.

3.9.2 External Reporting

Air quality monitoring results will be made publicly available on the Ravensworth Complex website in accordance with Conditions 7 and 10 of Schedule 5 of PA 09_0176. In accordance with Protection of the Environment Legislation Amendment Act 2011 (Amendment Act), the Ravensworth Complex will also provide monitoring data on its website within 14 days of obtaining the data.

Additionally, if monitoring results exceed any of the criteria as stipulated in Condition 2 of Schedule 4 of PA 09_0176 notifications will be undertaken in accordance with the same condition.

Air quality monitoring results will also be included in the Annual Review prepared each year for the Ravensworth Complex.The Annual Review will include an assessment of the air quality monitoring results against the air quality impact assessment criteria, a comparison with EA data background levels and any trends in monitored dust levels over the period. In addition, any complaints relating to dust emissions from the Ravensworth Complex and the response actions taken will be reported in the Annual Review.

A summary of air quality monitoring results will also be presented in the Ravensworth Complex CCC meetings. Performance monitoring, which includes an assessment of the effectiveness of dust controls and compliance with the relevant Project Approval and EPL conditions, may be discussed at CCC meetings where air quality related complaints occur.

3.9.3 Community Complaints

In accordance with the Environmental Management Strategy, Ravensworth will maintain a centralised location to record communication details of relevant external stakeholders and procedures for stakeholder contact including a Complaints Procedure.

The Complaints Procedure will utilise the Community Contact Line; a free call telephone number that will be regularly advertised in a local newspaper. The Contact Line will be in operation 24 hours per day, seven days a week. Complaints will be recorded and investigated, all other complaints, via letter, email in person or by fax, will also be recorded and investigated. Initial response to the complainant will be made as soon as practicable.

In the event that a complaint is received in relation to air quality impacts from the operation, an investigation will be undertaken in accordance with the relevant GCAA reporting guideline.

Follow up correspondence with the complainant will be made to detail the outcome of the complaint investigations.

3.9.4 Training

Ravensworth Complex personnel and contractors will be advised of air quality management requirements via the Ravensworth Complex training system. Additional air quality management training, including toolbox talks as necessary, will be provided to personnel and contractors who require specific skills or knowledge relating to air quality impacts and mitigation measures. Training will be undertaken in accordance with Training Management System conducted for the Ravensworth Complex.

3.9.5 Corrective Actions

Table 3.9 summarises the potential air quality related issues that may arise and the appropriate corrective action to be taken.

Table 3.9 - Corrective Actions

Issue	Corrective Action
Exceedance of Project Approval Air Quality Conditions	• Investigation of exceedance and undertaking air quality mitigation measures for future operations where applicable. • Report exceedance to DPIE and senior management (refer to **Section 3.9**).
Exceedance of Project Approval Air Quality Land Acquisition Criteria	• Investigation of exceedance and undertaking air quality mitigation measures for future operations where applicable. • Report exceedance to DPIE and senior management, as required. Initiation of land acquisition process detailed in **Section 3.9**.
Community complaints	• Investigation of complaint undertaking mitigating measures where applicable and providing feedback to the complainant. • Report complaint to senior management. • Provide feedback to mine planning and production personnel, where relevant. • Assessment of impacts at the residence against air quality impact assessment criteria and land acquisition criteria, if required (refer to **Section 3.9**).

3.9.6 Monitoring Records

In accordance with EPL conditions and as per the Ravensworth Complex document control procedures, monitoring records will be maintained on site for at least four years.

4. Part 2 – Greenhouse Gas Emissions

4.1 GHG Objectives

The objectives of the Plan for the management of GHG emissions are to ensure appropriate procedures and programs of work are in place at the Ravensworth Complex to:

- Establish a monitoring system to assess GHG and energy use performance;
- Detail all reasonable and feasible measures to minimise GHG emissions from the site;
- Provide a mechanism to assess monitoring results against GHG and energy use reporting criteria; and
- Manage GHG related community complaints in a timely and effective manner.

4.2 Baseline Data – GHG Emissions and Energy Use

GHG emissions associated with the Ravensworth Complex have been categorised into Scope 1, 2 and 3 emissions as per The Greenhouse Gas Protocol. The three 'scope' categories can be defined as:

- Scope 1 covers direct emissions from the combustion of fuels (e.g. diesel) and industrial processes within the boundary of the operation;
- Scope 2 covers indirect emissions from the operation's consumption of purchased electricity produced by another organization; and
- Scope 3 includes other indirect emissions as a result of the operation's activities that are not from sources owned or controlled by the organisation (e.g. product transport by rail).

Direct emissions are produced from sources within the boundary of an operation as a direct result of its activities (e.g. combustion of diesel fuels in coal production).

Indirect emissions are produced outside the boundary of the operation by other organisations but are directly linked to the operation's onsite activities. Indirect emissions mainly result from the generation of electricity consumed by the operation.

This Plan will focus on Scope 1 and 2 emissions, consistent with requirements of PA 09_0176 Condition 19, Schedule 3, which states:

> *The Proponent shall implement all reasonable and feasible measures to minimise the release of greenhouse gas emissions from the site to the satisfaction of the Secretary.*
>
> *Note: This condition does not extend to Scope 3 emissions, as defined in the National Greenhouse Energy Reporting Guidelines.*

The broader contribution by GCAA to the management of Scope 3 emissions is also briefly outlined in this Plan.

Forecast emissions indicate that 97.2 % of GHG emissions will be beyond the scope of this Plan as they are indirect emissions associated with the transportation and combustion of coal products (Scope 3 emissions). Scope 3 emissions are forecast to average 30,336,479 TCO2-e per annum over the life of the mine (SEE Sustainability Consulting (SEE), 2010).

Direct emissions (Scope 1) and emissions associated with electricity use (Scope 2) provide an appropriate basis for benchmarking the Ravensworth Complex performance, as Scope 1 and 2 emissions can be directly influenced by onsite management actions. Scope 1 and 2 emissions are forecast to average 869,681 TCO2-e per annum over the life of the mine (SEE, 2010).

Continued operations are forecast to consume an average of 3,605,502 GJ of energy per annum over the life of the Ravensworth Complex. On average, the continued operations are forecast to consume 576,292 GJ of electricity and 3,029,210 GJ of diesel annually.

SEE (2010) advised that the predicted maximum greenhouse index for onsite activities is 0.113 TCO2-e/tonne of product coal, which is higher than the Australian open cut black coal mining industry average of 0.050 TCO2-e/tonne. The relatively high GHG index associated with the Project is caused by the following:

- The default open cut fugitive emission factor is much higher in NSW than the Australian average; and
- The large mining fleet required for the project.

4.3 GHG Impact Assessment Criteria

4.3.1 National Greenhouse and Energy Reporting System (NGERS)

The National Greenhouse and Energy Reporting (Measurement) Determination 2008 (Cth) provides methods and criteria for calculating greenhouse gas (GHG) emissions and energy data under the NGER Act. Each reporting year technical guidelines based on the relevant legislation are developed; reflecting improvements in estimation methods and in response to industry feedback. Ravensworth through GCAA uses an online reporting tool known as GCP, which calculates energy consumption and GHG emissions for every site in accordance with the technical guidelines.

Roles and accountabilities for NGERS management are divided between GCAA and Ravensworth. NGERS data collection requirements for GCAA are prescribed in a series of protocol documents that outline the obligations of all facilities within GCAA. Each department's function may include energy and emissions data collection systems, carbon management assurance processes, internal and external reporting requirements and sign off responsibilities.

4.4 GHG Management Controls

The Ravensworth Complex will implement all reasonable and feasible management controls to mitigate Scope 1 and 2 GHG emissions associated with the site. The primary sources of GHG at the Ravensworth Complex are:

- Electricity consumption;
- Fuel combustion;
- Fugitive emissions;
- Waste water emissions; and
- Gas insulated switch gear (SF6 production).

GHG emissions can be managed thorough project design, procurement processes and project operation. The management controls implemented at the Ravensworth Complex will be initiated at both corporate and site levels. The following sections will include a combination of corporate and site based GHG management controls.

4.4.1 Design Controls

The preferred Ravensworth North pit design was selected based on operational efficiency and development cost, as well as environmental factors. The concept mine plan that formed the basis of the Project Approval was based on a design that reduced impact, provided the most cost effective design and shortened overburden haulage distances.

The conceptual design process included specific consideration of energy efficiency and GHG emissions. The mine planning process considered issues such as selecting fleet vehicles, truck haul routes, waste removal placement and rehandling material to optimise diesel use efficiency.

4.4.1.1 Fleet Selection

Equipment is selected according to a set of guidelines that involve being fit for task, maintainability, reliability, performance, safety and environment. GCAA has general rules governing the numbers of a particular type of equipment required for a particular project. The guidelines assist in optimising the number of ancillary equipment required.

The design process ensures that loading units are matched to truck capacity, to eliminate suboptimal loader movements (digging and moving part bucket volumes). The Ravensworth Complex mine design has been prepared based on a combination of Cat 6090 loading units with 797F trucks and Cat 6060 / 6040 loading units with 789D trucks. The design process also ensures that all trucks are capable of operating at similar speeds on grade.

4.4.1.2 Haul Routes

Out of pit dumps have been designed to optimise impacts to external parties and haul route distances. Where practical, ramp placement and ramp grades have been designed to maximise haulage efficiency.

4.4.1.3 Scheduling Material Removal and Placement

Rehandling material and energy use can be reduced by optimising removal and placement schedules. The Ravensworth Complex design has been developed to minimise the rehandling of waste and coal materials.

4.4.1.4 Energy Efficiency Review

The preferred mine design was also informed by a specific energy efficiency review, completed as part of the EA. The energy efficiency design review included the design of surface operations, synergies between neighbouring GCAA operations and the RCHPP. The Ravensworth Complex completed the following process as part of the energy efficiency design review:

- Review aim and motivating factors;
- Review design documentation of the mine area;
- Brainstorm and generate energy efficiency ideas; and
- Review energy efficiency checklists;

The Ravensworth Complex mine design includes many design aspects which will improve energy use efficiency and mitigate GHG emissions. Energy efficiency has been considered in the design of the following site infrastructure:

- Site buildings;
- Compressed air systems;
- Bathhouse;
- All electrical equipment (including motors / drives for sizers, conveyors, pumps, screens and compressors);
- Outdoor lighting;
- Water management systems;
- Coal handling lighting;
- Coal handling conveyors;
- Electrical power distribution system (switch rooms);
- ROM stockpile; and
- product stockpile.

The following design components were included in the design of the site infrastructure:

- Centralised air conditioning in office areas;
- Insulated switch rooms;
- New drive technology utilizing airflow across drive heat sinks, minimising air conditioning heat load requirements in switch rooms;
- Variable speed drives on all motors 250 kW and above to reduce starting and running currents;
- High efficiency motors on all equipment;
- Inbuilt filters to address harmonics on variable speed drives;
- Temperature monitoring on large motors and all conveyor pulleys;
- Photoelectric cell controls on lighting;
- Operator controls on lighting from central control room;
- LED low watt conveyor lighting;
- Power factor correction equipment located at the main substation; and
- Site wide monitoring and controls of all motors and drives via fibre optic network.

All tender documentation and tender evaluation processes prepared for the construction of the Ravensworth Complex include specific energy efficiency criteria.

4.4.2 Procurement

Site procurement processes require all procurements to be approved via an Application for Expenditure (AFE). An AFE specifically requires energy efficiency be considered to demonstrate how new procurement will impact environmental factors.

4.4.2.1 Operational Controls

Operational GHG management controls will be evaluated and implemented at both corporate and site levels.

4.4.2.2 Corporate Controls

GCAA has developed protocols that are regularly reviewed to ensure continuous improvement. GCAA protocols will focus on improving the greenhouse and energy reporting performance at each site. GCAA also use the GCP platform for reporting that refines measurements and estimations of fugitive emissions on an annual basis. Site controls

GCAA requires all sites to review their Life of Mine (LOM) planning on an annual basis. As part of this process, sites are required to reforecast future GHG emissions and review GHG and energy reduction opportunities.

4.4.2.3 Fugitive Emissions

The Ravensworth Complex open cut coal seams do not require pre-drainage to manage safety risks. Initial investigations into methane drainage requirements have indicated it is not feasible to flare methane and/or capture methane for energy production prior to mining the coal seams present at the Ravensworth Complex.

Ravensworth has adopted the NGERS Technical Guidelines Method 2 approach for calculating and reporting fugitive emissions.

4.4.2.4 Waste

General waste produced at the Ravensworth Complex is managed in accordance with RAVOC-1536591325-3720 Ravensworth Complex Waste Management Plan. The Waste Management Plan details measures taken to recycle paper, cardboard and timber. Recycling paper, cardboard and timber will divert organic material from being disposed of to landfill and reduce potential methane emissions. The Ravensworth Complex operates a managed aerobic waste water management treatment plant, which is the most cost effective way to manage GHG emissions from waste water.

4.4.2.5 Industrial

A very small proportion of GHG emissions are generated by gas (SF6) insulated switch gear installed at the Ravensworth Complex. Installing SF6-free switch gear is the only option for controlling SF6 emissions from switch gear. The installation of SF6-free switch gear will be considered in line with GCAA's procurement process as new switch gear is installed and/or replaced.

4.4.3 Continuous Improvement

At a site level, the Ravensworth Complex will identify initiatives for continuous improvement through an annual review of environmental performance. The Ravensworth Complex will consider incorporating all initiatives for continuous improvement in annual reviews of Management Plans, as part of the annual planning review cycle.

All GCAA sites are required to consider ways to continuously improve the NGERS reporting process. The GCAA Energy and Greenhouse Gases Standard requires the Ravensworth Complex to undertake a NGERS management review on an annual basis. The Ravensworth Complex will undertake a NGERS management review to evaluate and assess the following:

- All activities at the facility, changes to operations and implementation of new equipment, materials or processes to ensure that these changes have been captured as part of NGER's reporting;
- All GHG generating activities, fuel and non fuel types;
- All energy efficiency opportunities and GHG abatement activities;
- Impact of new legislation, changes to existing legislation and implementation of the required changes;
- Approval/signoff of all baseline, emissions and abatement calculations;

- Approval/signoff of all documentation associated with GHG; and
- Review of quality control procedures.

4.4.4 Scope 3 GHG Management Controls

The Greenhouse Gas Protocol refers to downstream greenhouse gas emissions as a result of combustion of coal products from the Ravensworth Complex as Scope 3 emissions.

The Ravensworth Complex is unable to directly manage Scope 3 emissions as it does not have operational control of its customers' facilities. While the Ravensworth Complex is not in a position to manage Scope 3 emissions directly, GCAA manages significant product stewardship and market development programs, which aim to mitigate the downstream impacts of its products.

GCAA includes a number of product stewardship and market development commitments. These commitments include:

- Contributing to the research, development and demonstration of low emissions technologies;
- Developing strategic alliances in the area of capacity building to support the long term commercial application of low emission technologies;
- Understanding the full 'lifecycle' emissions of products, including exploration, mining, processing, refining, fabricating, use and disposal;
- Incorporating lifecycle analysis into GCAA business planning, product procurement and project management processes;
- Working with government and key stakeholders to understand and adapt to the potential physical impacts of climate change;
- Developing alliances and collaborating with our customers, both domestic and international, in demonstrating the sustainable use of coal through new power generation technologies;
- Continuing to investigate the participation in other projects that encourage and promote Low Emission Technology Deployment.

4.5 GHG Monitoring

The Ravensworth Complex will monitor GHG emissions, energy use and energy production by the direct measurement of energy use and modelling emissions based on measured activity data. The GHG monitoring program will require the collation of activity data such as energy use, coal production and waste disposal.

4.5.1 Monitoring Standards

The GCAA Protocols provide specific monitoring standards for monitoring GHG emissions, energy use and energy production. GCAA Protocols are based on the monitoring standards specified in the legislative Measurement Technical Guidelines. The Ravensworth Complex will utilise relevant GCAA Protocols when monitoring greenhouse emissions and activity data.

4.5.2 Process Maps

The Ravensworth Complex will prepare an Energy Management System to identify all energy inputs and emission sources. Statement of Commitment 6.13.1 and GCAA HSEC Standards both require Ravensworth to map energy use and emission sources to help identify GHG data sources. Process maps will be updated regularly, and the review process will highlight new or redundant data sources.

4.5.3 Monitoring Program

The Ravensworth Complex GHG and energy use monitoring program will be undertaken across a number of business units at the Ravensworth Complex. All GHG emissions and activity use data are monitored for multiple purposes through established systems. Table 4.2 outlines how GHG and energy use monitoring will be achieved across multiple systems. Table 4.3 outlines how energy production will be monitored across multiple systems.

Table 4.2 - GHG and energy use monitoring systems

Emission/Energy source	Activity data/Direct measurement	Monitoring system
Fuel combustion	Diesel (Stationary) Diesel (Transport) Petrol (Stationary) Petrol (Transport)	Invoices Tank dip levels Monthly fuel reconciliation return Operating hours
	Oils and Greases (Stationary) Oils and Greases (Transport) Oils and Greases (Recycled)	Invoices PULSE report Monthly waste report
Industrial processes	SF_6 from gas insulated switch gear	Circuit breaker specifications
Waste	Solid waste to landfill	Monthly waste report
	Waste water handling	Citect Laboratory Reports
Scope 2 emissions	Electricity use	Electricity Invoices

The Ravensworth Complex uses a supervisory control and data acquisition (SCADA) system, known as Citect, to monitor the condition and status of water pumps and stream flow monitors. The real time data recorded by Citect is aggregated, analysed and reported internally. Citect data is used to inform evaluation of environmental performance and external reporting processes.

Table 4.3 - Energy Production Monitoring Systems

Energy source	Activity data/Direct measurement	Monitoring system
Fuel production	Washed coal	Weightometers

4.5.4 Monitoring records

To comply with the legislation, all sites are required to retain records of energy consumption, energy production, emissions data and estimations for a minimum of seven years from the end of the reporting period in which the activities took place.

The Ravensworth Complex has developed procedures for the collection and retention of data to ensure the site complies with the legislative requirements of the appropriate legislation.

4.6 GHG reporting and Review

The Ravensworth Complex will report GHG emissions and energy use both internally and externally. Internal reporting systems allow divisional groups to evaluate the performance of energy efficiency programs and comply with corporate greenhouse reporting requirements (NGERS is reported at a corporate level). Internal reporting also allows Glencore Plc to evaluate SD programs and report SD performance externally in programs such as the Global Reporting Index (GRI).

4.6.1 Internal

Glencore Plc maintains a global internal reporting system called Glencore Corporate Practice (GCP). This is a web based system for collecting data and reporting sustainable development performance. As a subsidiary of Glencore Plc, GCAA must update GCP at prescribed intervals. The Ravensworth Complex will report GHG activity data internally via GCP according to the schedule outlined in Table 4.4.

Table 4.4 - GCP Reporting Intervals

Activity data	Reporting interval
SF_6 emissions	Annually
CO_2-e for stockpiled coal	Quarterly
Electricity purchased	Quarterly
Diesel non-transport	Quarterly
Diesel transport	Quarterly
Petrol/gasoline non-transport	Quarterly
Petrol/gasoline transport	Quarterly
Diesel for explosives	Quarterly
General waste to landfill	Quarterly

4.6.2 External

The Ravensworth Complex will report its annual GHG emissions in accordance with legislative and GCAA requirements.

The Ravensworth Complex will report its progress in identifying and implementing energy efficiency projects consistent with GCAA requirements via the Annual Review.

4.6.3 Contingency Measures

Regularly monitoring GHG emissions is an important process for identifying any necessary corrective actions, improving future emission estimates and managing community concerns.

As part of its annual business planning process, the Ravensworth Complex will conduct a review of Scope 1 and 2 emissions by reforecasting LOM GHG emissions. The focus on monitoring LOM emissions is important, as annual emissions may vary significantly due to altered scheduling and planning variances.

Once the annual LOM planning process is complete, the Ravensworth Complex will compare the EA projections with a combination of accumulated actual emissions (through NGERS) and re-forecasted LOM emissions.

As part of this process, the Ravensworth Complex will consider all reasonable and feasible opportunities to mitigate Scope 1 and 2 GHG emissions by operational changes, if a substantial divergent trend from the EA predictions is identified.

4.6.4 Management of Reporting Non-compliance

GCAA has systems and procedures in place to manage the NGERS reporting compliance risks. The GCAA Energy and Greenhouse Gases Standard (GCAA-625378177-13661) requires all sites to collect data, verify data and complete OSCAR prior to 31 October each year.

The Annual SD Plan includes actions to address ongoing operational issues and new initiatives to promote continuous improvement. GCAA will use internal systems to track the progress and accountability of the Standard.

4.6.5 Management of Project Approval Compliance

The Ravensworth Complex will undertake the GHG management controls outlined in Section 4.4, in order to satisfy the DPIE requirement for the Ravensworth Complex implement "all reasonable and feasible measures to minimise the release of GHG emissions from the site", in accordance with Condition 19 of Schedule 3 of the Project Approval.

Further mitigation options are identified and prioritised through the Continuous Improvement process, outlined in Section 4.4.3, and the GCP and NGERS monitoring platforms. The implementation of priority actions identified will be monitored annually. If, as a result of the annual review, actions are found to have not been implemented, these actions will be considered as overdue actions in the Ravensworth CMO system.

In the event that DPIE deem the Ravensworth Complex to be noncompliant with Condition 19 of Schedule 3 of the Project Approval, the Ravensworth Complex will undertake the necessary actions in accordance with DPIE requirements. This may include a review of the outcomes from the management controls listed in Section 4.4.

5. Review

This Plan and its supporting documents will be reviewed by the ECM in accordance with Condition 4, Schedule 5 of the Project Approval 09_0176 and Condition 18, Schedule 3 of Development Consent 104/96. This Plan will be reviewed with three months of:

- Submission of an annual review;
- Submission of an incident report;
- Submission of an audit;
- Any modification to the conditions of the Project Approval

If the review of the Plan indicates that revision is required, Ravensworth Complex will then provide a revised document to the Secretary for approval.

In accordance with the Project Approval, by June 2012 and every three years thereafter, the Ravensworth Complex will commission an Independent Environmental Audit to the satisfaction of DPIE. The Audit will include an assessment of the adequacy of the Plan. Where necessary, following the audit, the plan will be updated and action taken to improve Air Quality and GHG performance and management practices. Audit reports and recommendations can be viewed on the Ravensworth Complex website.

6. References

NSW Department of Environment and Conservation (DEC), 2007. *Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales*

Australian Standard AS2923 -1987. Guide for measurement of horizontal wind for air quality applications. (superseded)

Australian Standard AS3580.14-2011. Methods for Sampling and Analysis of Ambient Air – Part 12 Meteorological monitoring for ambient air quality monitoring applications.

Australian Standard AS/NZS 3580.10.1:2016: Methods for Sampling and Analysis of Ambient Air – Determination of Particulate Matter – Deposited Matter – Gravimetric Method.

Australian Standard AS/NZS 6580.9.7 (2009) Methods for sampling and analysis of ambient air – Determination of suspended particulate matter – dichotomous sampler (PM_{10}, coarse PM and $PM_{2.5}$) – Gravimetric method.

Australian Standard AS 2724.3-1984: Determination of Total suspended particulates (TSP) – High Volume Sampler Gravimetric Method. (superseded)

Australian/New Zealand Standard 3580.9.3:2003 Methods for sampling and analysis of ambient air - Part 9.3: Determination of suspended particulate matter - Total suspended particulate matter (TSP) - High volume sampler gravimetric method

NSW Environment Protection Authority, 2019 – Dust Assessment Handbook

ENVIRON Australia Pty Ltd, 2012. Ravensworth Surface Operations – Coal Mine Particulate Matter Control Best Management Practice Determination, Report prepared for Ravensworth Operations Pty Limited.

Umwelt (Australia) Pty Limited, 2010. Ravensworth Mining Complex *Environmental Assessment*, Report prepared for Ravensworth Operations Pty Limited.

7. Document Information

7.1 Change Information

Full details of the document history are recorded in the document control register, by version. A summary of the current change is provided in ***Table 7-1*** below.

Table 7-1 – Change information

Version	Date	Reviewers	Change Summary
1	30/06/2011	E&C Dept	Development of document
2	22/04/2013	E&C Dept	Review and update of document
3	24/04/2014	E&C Dept	Annual review and update of document including name changes etc.
4	24/11/2014	E&C Dept	Update plan in accordance with internal review
5	03/12/2014	E&C Dept	Update based on final comments and finalised plan for approval
6	27/04/2015	E&C Dept.	Updated based on discussion with DoPE regarding waste emplacement during adverse weather conditions.
7	01/05/2016	E&C Dept	Annual review and update of document.
8	20/06/2017	E&C Dept	Annual review and update of document
9	05/06/2018	E&C Dept	RUM DA 104/96 conditions added, removal of duplication of GHG mgt controls
10	14/06/2019	E&C Dept	Annual review and update of document
11	30/11/2021	E&C Dept	Annual review and update based on findings of Independent Environment Audit 2021

Appendix A - Regulatory Requirements

Schedule	Project Approval PA 09_0176 Conditions	Section of Document
3	**Odour** 18. The Proponent shall ensure that no offensive odours are emitted from the site, as defined under the POEO Act, unless otherwise authorised by an EPL.	2.4.5
3	**Greenhouse Gas Emissions** 19. The Proponent shall implement all reasonable and feasible measures to minimise the release of greenhouse gas emissions from the site to the satisfaction of the Secretary. *Note: This condition does not extend to Scope 3 emissions, as defined in the National Greenhouse Energy Reporting Guidelines.*	4
3	**Air Quality Criteria** 20. Except for the air quality-affected land referred to in Table 1, the Proponent shall ensure that all reasonable and feasible avoidance and mitigation measures are employed so that particulate matter emissions generated by the Ravensworth mine complex do not exceed the criteria listed in Tables 9, 10 or 11 at any residence on privately-owned land or on more than 25 percent of any privately-owned land.	2.3 and 2.4
3	**Air Quality Acquisition Criteria** 21. If particulate matter emissions generated by the Ravensworth mine complex exceed the criteria in Tables 12, 13, and 14 at any residence on privately owned land, or on more than 25 percent of any privately owned land, then upon receiving a written request for acquisition from the landowner, the Proponent shall acquire the land in accordance with the procedures in conditions 6-7 of schedule 4.	2.3.4
3	**Additional Air Quality Mitigation Measures** 22. Upon receiving a written request from the owner of any residences: (a) on the air quality-affected land listed in Table 1;(b) on the land listed in Table 15; or (c) on any other privately-owned land where subsequent air quality monitoring shows the dust generated by the Ravensworth mine complex exceeds the air quality limits in Tables 9, 10 or 11 on a systemic basis, the Proponent shall implement additional reasonable and feasible dust mitigation measures (such as a first-flush roof system, internal or external air filters and/or air conditioning) at the residence in consultation with the owner. If within 3 months of receiving this request from the owner, the Proponent and the owner cannot agree on the measures to be implemented, or there is a dispute about the implementation of these measures, then either party may refer the matter to the Secretary for resolution.	2.3.4.1

Schedule	Project Approval PA 09_0176 Conditions	Section of Document
3	**Operating Conditions** 23. The Proponent shall: (a) implement best practice air quality management, including all reasonable and feasible measures to minimise off-site odour, fume and dust emissions generated by the Ravensworth mine complex, including those generated by any spontaneous combustion;	2.4.1 and 2.4.2
	(b) minimise any visible off-site air pollution generated by the Ravensworth mine complex;	2.4.3
	(c) regularly assess the real-time air quality monitoring and meteorological forecasting data and relocate, modify and/or suspend operations to ensure compliance with the relevant conditions of this approval; and	2.5.1
	(d) co-ordinate air quality management on site with the air quality management at nearby mines to minimise the cumulative air quality impacts of the mines, to the satisfaction of the Secretary.	2.4.6
3	**Air Quality and Greenhouse Gas Management Plan** 24. The Proponent shall prepare and implement an Air Quality and Greenhouse Gas Management Plan for the Ravensworth mine complex to the satisfaction of the Secretary. This plan must:	Entire Plan
	(a) be prepared in consultation with EPA, and be submitted to the Secretary for approval by the end of June 2011;	1.4
	(b) describe the measures that would be implemented to ensure compliance with the relevant conditions of this approval, including a real-time air quality management system that employs both reactive and proactive mitigation measures;	2.4 and 2.5
	(c) include an air quality monitoring program that: • uses a combination of real-time monitors, high volume samplers and dust deposition gauges to evaluate the performance of the Ravensworth mine complex; and • includes a protocol for determining exceedances of the relevant conditions of this approval; and	2.8
	(d) include a protocol that has been prepared in consultation with the owners of nearby mines to minimise the cumulative air quality impacts of the mines. The Proponent shall implement the approved management plan as approved from time to time by the Secretary.	2.3.3
3	**METEOROLOGICAL MONITORING** 25. During the life of the project, the Proponent shall ensure that there is a suitable meteorological station in the vicinity of the site that: (a) complies with the requirements in the Approved Methods for Sampling of Air Pollutants in New South Wales guideline; and (b) is capable of continuous real-time measurement of temperature lapse rate in accordance with the NSW Industrial Noise Policy, or as otherwise approved by EPA.	2.8.1.4

Schedule	Project Approval PA 09_0176 Conditions	Section of Document
4	**NOTIFICATION OF LANDOWNERS** 2. Within 2 weeks of obtaining monitoring results showing: (a) and exceedance of the relevant criteria in schedule 3, the Proponent shall notify the affected landowner and/or tenants in writing of the exceedance, and provide monitoring results to each of these parties until the project is complying with the relevant criteria again;	3.7.4
4	2. Within 2 weeks of obtaining monitoring results showing: (c) an exceedance of the relevant criteria in conditions 20 or 21 of schedule 3, the Proponent shall send a copy of the NSW health fact sheet entitled "Mine Dust and You" (as may be updated from time to time) to the affected landowners and/or existing tenants of the land (including the tenants of any mine-owned land);	3.7.4
4	2. Within 2 weeks of obtaining monitoring results showing: an exceedance of the relevant criteria in condition 22(c) of schedule 3, the Proponent shall notify the applicable owner of any residences on the land that they are entitled to ask for additional air quality mitigation measures to be installed at their residence.	3.7.4
4	**INDEPENDENT REVIEW** 3. If an owner of privately-owned land considers the project to be exceeding the relevant criteria in schedule 3, then he/she may ask the Secretary in writing for an independent review of the impacts of the project on his/her land. If the Secretary is satisfied that an independent review is warranted, then within 2 months of the Secretary's decision the Proponent shall: (a) commission a suitably qualified, experienced and independent person, whose appointment has been approved by the Secretary, to: • consult with the landowner to determine his/her concerns; • conduct monitoring to determine whether the project is complying with the relevant criteria in schedule 3; and • if the project is not complying with these criteria then: o determine if more than one mine is responsible for the exceedance, and if so the relative share of each mine regarding the impact on the land; o identify the measures that could be implemented to ensure compliance with the relevant criteria; and (b) give the Secretary and landowner a copy of the independent review	3.8
4	4. If the independent review 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. If the independent review determines that the project is not complying with the relevant criteria in schedule 3, and that the project is primarily responsible for this non-compliance, then the Proponent shall: (a) implement all reasonable and feasible mitigation measures, in consultation with the landowner and appointed independent person, and conduct further monitoring until the project complies with the relevant criteria; or (b) secure a written agreement with the landowner to allow exceedances of the relevant criteria, to the satisfaction of the Secretary.	3.8

Schedule	Project Approval PA 09_0176 Conditions	Section of Document
	If the independent review and further monitoring determines that the project is not complying with the relevant acquisition criteria in schedule 3, and that the project is primarily responsible for this non-compliance, then upon receiving a written request from the landowner, the Proponent shall acquire all or part of the landowner's land in accordance with the procedures in conditions 6-7 below.	
4	5. 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 together with the relevant mine/s, the Proponent shall: (a) implement all reasonable and feasible mitigation measures, in consultation with the landowner and appointed independent person, and conduct further monitoring until there is compliance with the relevant criteria; or (b) secure a written agreement with the landowner and other relevant mines to allow exceedances of the relevant criteria, to the satisfaction of the Secretary. If the independent review determines that the project is not complying with the relevant acquisition criteria in schedule 3, but that more than one mine is responsible for this non-compliance, then upon receiving a written request from the landowner, the Proponent shall acquire all or part of the landowner's land on as equitable a basis as possible with the relevant mine/s, in accordance with the procedures in conditions 6-7 below.	3.8
4	**LAND ACQUISITION** . Within 3 months of receiving a written request from a landowner with acquisition rights, the Proponent shall make a binding written offer to the landowner based on: (a) the current market value of the landowner's interest in the property at the date of this written request, as if the property was unaffected by the project, having regard to the: • existing and permissible use of the land, in accordance with the applicable planning instruments at the date of the written request; and • presence of improvements on the 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 any additional mitigation measures required under condition 6, 7 or 22 of schedule 3; (b) the reasonable costs associated with: • relocating within the Singleton or Muswellbrook local government areas, or to any other local government area determined by the Secretary; and • obtaining legal advice and expert advice for determining the acquisition price of the land, and the terms upon which it is to be acquired; and (c) reasonable compensation for any disturbance caused by the land acquisition process. 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.	3.8

Schedule	Project Approval PA 09_0176 Conditions	Section of Document
	Upon receiving such a request, the Secretary will request the President of the NSW Division of the Australian Property Institute to appoint a qualified independent valuer to: • consider submissions from both parties; • determine a fair and reasonable acquisition price for the land and/or the terms upon which the land is to be acquired, having regard to the matters referred to in paragraphs (a)-(c) above; • prepare a detailed report setting out the reasons for any determination; and • provide a copy of the report to both parties. Within 14 days of receiving the independent valuer's report, the Proponent shall make a binding written offer to the landowner to purchase the land at a price not less than the independent valuer's determination. However, if either party disputes the independent valuer's determination, then within 14 days of receiving the independent valuer's report, they may refer the matter to the 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 will determine a fair and reasonable acquisition price for the land, having regard to the matters referred to in paragraphs (a)-(c) above, the independent valuer's report, the detailed report disputing the independent valuer's determination, and any other relevant submissions. Within 14 days of this determination, the Proponent shall make a binding written offer to the landowner to purchase the land at a price not less than the Secretary's determination. If the landowner refuses to accept the Proponent's binding written offer under this condition within 6 months of the offer being made, then the Proponent's obligations to acquire the land shall cease, unless the Secretary determines otherwise	
4	7. The Proponent shall pay all reasonable costs associated with the land acquisition process described in condition 6 above, including the costs associated with obtaining Council approval for any plan of subdivision (where permissible), and registration of this plan at the Office of the Registrar-General.	3.8
5	**Management Plan Requirements** 2. The Proponent shall ensure that the management plans required under this approval are prepared in accordance with any relevant guidelines, and include: (a) detailed baseline data;	3.2
5	(b) a description of: • the relevant statutory requirements (including any relevant approval, licence or lease conditions); • any relevant limits or performance measures/criteria; • the specific performance indicators that are proposed to be used to judge the performance of, or guide the implementation of, the project or any management measures;	Appendix A

Schedule	Project Approval PA 09_0176 Conditions	Section of Document
5	(c) a description of the measures that would be implemented to comply with the relevant statutory requirements, limits, or performance measures/criteria;	This Plan
5	(d) a program to monitor and report on the: • impacts and environmental performance of the project; • effectiveness of any management measures (see (c) above);	3.7 & 4.5
5	(e) a contingency plan to manage any unpredicted impacts and their consequences;	3.45 & 4.6.3
5	(f) a program to investigate and implement ways to improve the environmental performance of the project over time;	3.6 & 4.4.3
5	(g) a protocol for managing and reporting any: • incidents; • complaints; • non-compliances with the conditions of this approval and statutory requirements; and • exceedances of the impact assessment criteria and/or performance criteria; and	3.9 & 4.6
5	(h) a protocol for periodic review of the plan. Note: The Secretary may waive some of these requirements if they are unnecessary or unwarranted for particular management plans.	5
5	**Revision of Strategies, Plans and Programs** 4. Within 3 months of: (a) the submission of an annual review under condition 3 above; (b) the submission of an incident report under condition 6 below; (c) the submission of an audit under condition 8 below; and (d) any modification to the conditions of this approval, the Proponent shall review, and if necessary revise, the strategies, plans, and programs required under this approval to the satisfaction of the Secretary. Note: This is to ensure the strategies, plans and programs are updated on a regular basis, and incorporate any recommended measures to improve the environmental performance of the project.	5
5	**REPORTING** **Incident Reporting** 6. The Proponent shall notify the Secretary and any other relevant agencies of any incident associated with the project as soon as practicable after the Proponent becomes aware of the incident. Within 7 days of becoming aware of the incident, the Proponent shall provide the Secretary and any relevant agencies with a detailed report on the incident.	3.9 & 4.6
5	**Regular Reporting** 7. The Proponent shall provide regular reporting on the environmental performance of the project on its website, in accordance with the reporting arrangements in any approved plans of the conditions of this approval.	3.9 & 4.6

	PA 09_0176 Statements of Commitments	Section of Document
6.5.1	**Air Quality** Measures to minimise dust emissions from the Project such as enclosures on top of overland conveyors, spray systems for permanent coal stockpiles, progressive site rehabilitation and revegetation, and haul road dust suppression will be included in the project design.	2.4
6.5.2	The Project will progressively rehabilitate disturbed areas, including the use of temporary rehabilitation on disturbed areas as appropriate to limit the potential for wind-blown dust.	2.4, 2.4.2
6.5.3	The Proponent will implement a range of dust controls as part of the Project (included in text of plan as management controls).	2.4
6.5.4	The existing air quality monitoring program, including the ongoing use of continuous air quality monitor/s, will be maintained (or as otherwise agreed with EPA and the Department). Monitoring results will be compiled and reviewed at least monthly to determine the need for any operational or management change to minimise air quality impacts. Results will also be compiled and analysed annually and reported in the Annual Review.	2.7, 2.8 and 2.13
6.13.1	**Greenhouse Gas and Energy** The Proponent will develop and implement an Energy Management System that will address all aspects of energy management for the Project.	4
6.13.2	At an operational level, the Proponent will aim to improve energy efficiency and reduce greenhouse emissions from the Project via: • the use of energy management systems;• seeking continuous improvement in energy efficiency in the mining fleet, stationary equipment, mining processes and coal preparation; • investigation of energy efficiency opportunities for mobile and fixed plant and equipment through the detailed design of the Project.	4.4
6.13.3	The Proponent will continue to monitor and seek to improve its energy and greenhouse gas performance against performance targets.	4.5
6.13.4	The Proponent will report its greenhouse and energy performance via legislative reporting requirements.	4.6

Schedule	Project Approval DA104/96 (RUM) Conditions	Section of Document
3	**Odour** 15. The Applicant shall ensure that no offensive odours are emitted from the site, as defined under the POEO Act, unless otherwise authorised by an EPL.	3.4.3
3	**Greenhouse Gas Emissions** 16. The Applicant shall implement all reasonable and feasible measures to minimise the release of greenhouse gas emissions from the site to the satisfaction of the Director-General. Note: This condition does not extend to Scope 3 emissions, as defined in the National Greenhouse Energy Reporting Guidelines.	4
3.	**Operating Conditions** 17. The Applicant shall: (a) implement best practice air quality management, including all reasonable and feasible measures to minimise off-site odour, fume and dust emissions generated by the development, including those generated by any spontaneous combustion; (b) minimise any visible off-site air pollution generated by the development; (c) regularly assess meteorological forecasting data and relocate, modify and/or suspend operations to ensure compliance with the relevant conditions of this approval; and (d) co-ordinate air quality management on site with the air quality management at nearby mines, including the Ravensworth Operations Project to minimise the cumulative air quality impacts of the mines, to the satisfaction of the Director-General.	This Plan
3	**Air Quality and Greenhouse Gas Management Plan** 18. The Applicant shall prepare and implement an Air Quality and Greenhouse Gas Management Plan for the development to the satisfaction of the Director-General. This plan must: (a) be prepared in consultation with EPA, and be submitted to the Director-General for approval by the end of October 2013; (b) describe the measures that would be implemented to ensure compliance with the relevant conditions of this approval; (c) include an air quality monitoring program that includes a protocol for determining exceedances of the relevant conditions of this approval; and (d) include a protocol that has been prepared in consultation with the owners of nearby mines to minimise the cumulative air quality impacts of the mines.	This Plan
3	**METEOROLOGICAL MONITORING** 19. During the life of the project, the Applicant shall ensure that there is a suitable meteorological station in the vicinity of the site that: (a) complies with the requirements in the Approved Methods for Sampling of Air Pollutants in New South Wales guideline; and (b) is capable of continuous real-time measurement of temperature lapse rate in accordance with the NSW Industrial Noise Policy, or as otherwise approved by EPA.	3.7.1.4

Schedule	Project Approval DA104/96 (RUM) Conditions	Section of Document
4	**ENVIRONMENTAL MANAGEMENT** **Adaptive Management** 1. The Applicant must assess and manage development-related risks to ensure that there are no exceedances of the performance measures or associated performance indicators and impact assessment criteria in schedule 3. Any exceedance of these performance measures constitutes a breach of this consent and may be subject to penalty or offence provisions under the EP&A Act or EP&A Regulation. Where any exceedance of these performance measures has occurred, the Applicant must, at the earliest opportunity: (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 Director-General, to the satisfaction of the Director-General.	3.4.5 & 4.4.3
4	Revision of Strategies, Plans and Programs 3. Within 3 months of: (a) the submission of an annual review under condition 2 above; (b) the submission of an incident report under condition 5 below; (c) the submission of an audit under condition 7 below; and (d) any modification to the conditions of this consent, the Applicant shall review, and if necessary revise, the strategies, plans, and programs required under this consent to the satisfaction of the Director-General. Note: This is to ensure the strategies, plans and programs are updated on a regular basis, and incorporate any recommended measures to improve the environmental performance of the development.	5
5	**REPORTING** **Incident Reporting** 5. The Applicant shall notify, at the earliest opportunity, the Director-General and any other relevant agencies of any incident that has caused, or threatens to cause, material harm to the environment. For any other incident associated with the development, the Applicant shall notify the Director-General and any other relevant agencies as soon as practicable after the Applicant becomes aware of the incident. Within 7 days of the date of the incident, the Applicant shall provide the Director-General and any relevant agencies with a detailed report on the incident, and such further reports as may be requested.	3.9 & 4.6
5	**Regular Reporting** 6. The Applicant shall provide regular reporting on the environmental performance of the development on its website, in accordance with the reporting arrangements in any plans or programs approved under the conditions of this consent. Note: This website may be integrated with any similar website established for the Ravensworth mine complex.	3.9 & 4.6

<table>
<tr><th>Condition</th><th>Environment Protection Licence 2652</th><th>Section of Document</th></tr>
<tr><td>P1.1</td><td>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.
Air<table><tr><th>EPA identification no.</th><th>Type of Monitoring Point</th><th>Type of Discharge Point</th><th>Location Description</th></tr><tr><td>9</td><td>Particulate Matter Monitoring</td><td></td><td>Monitor SX45 G1 at coordinates 318706, 6403417 (Easting Northing) identified as 9 on Figure 1.</td></tr><tr><td>10</td><td>Particulate Matter Monitoring</td><td></td><td>Monitor SX45 G2 at coordinates 313094, 6412121 (Easting Northing) identified as 10 on Figure 1.</td></tr></table></td><td>3.7.1.3</td></tr>
<tr><td>L6.6</td><td>Offensive blast fume must not be emitted from the premises.
Definition:
Offensive blast fume means post-blast gases from the detonation of explosives at the premises that by reason of their nature, duration, character or quality, or the time at which they are emitted, or any other circumstances:
1. are harmful to (or likely to be harmful to) a person that is outside the premises from which it is emitted, or
2. interferes unreasonably with (or is likely to interfere unreasonably with) the comfort or repose of a person who is outside the premises from which it is emitted.</td><td>3.4.3</td></tr>
<tr><td>O1.1</td><td>Licensed activities must be carried out in a competent manner. This includes:
a) the processing, handling, movement and storage of materials and substances used to carry out the activity;</td><td>This Plan</td></tr>
<tr><td>O3.1</td><td>The premises must be maintained in a condition which minimises or prevents the emission of dust from the premises.</td><td>This Plan</td></tr>
<tr><td>O3.2</td><td>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 emission from the premises, of wind-blown or traffic generated dust.</td><td>3</td></tr>
<tr><td>O3.3</td><td>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.</td><td>3</td></tr>
<tr><td>M1.1</td><td>The results of any monitoring required to be conducted by this licence or a load calculation protocol must be recorded and retained as set out in this condition.</td><td>3.9 & 4.6</td></tr>
<tr><td>M1.2</td><td>All records required to be kept by this licence must be:
a) in a legible form, or in a form that can readily be reduced to a legible form;
b) kept for at least 4 years after the monitoring or event to which they relate took place; and
c) produced in a legible form to any authorised officer of the EPA who asks to see them.</td><td>3.9 & 4.6</td></tr>
</table>

<table>
<tr><th>Condition</th><th>Environment Protection Licence 2652</th><th>Section of Document</th></tr>
<tr><td>M1.3</td><td>The following records must be kept in respect of any samples required to be collected for the purposes of this licence:
a) the date(s) on which the sample was taken;
b) the time(s) at which the sample was collected;
c) the point at which the sample was taken; and d) the name of the person who collected the sample.</td><td>3.9.6</td></tr>
<tr><td>M2.1 / M2.2</td><td>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:
M2.2 Air Monitoring Requirements
POINT 9,10
<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>AM-22</td></tr></table></td><td>3.7.1.3</td></tr>
<tr><td>M3.1</td><td>Monitoring for the concentration of a pollutant emitted to the air required to be conducted by this licence must be done in accordance with:
a) any methodology which is required by or under the Act to be used for the testing of the concentration of the pollutant; or
b) if no such requirement is imposed by or under the Act, any methodology which a condition of this licence requires to be used for that testing; or
c) if no such requirement is imposed by or under the Act or by a condition of this licence, any methodology approved in writing by the EPA for the purposes of that testing prior to the testing taking place.</td><td>3.7.1.3</td></tr>
<tr><td>M5.1</td><td>At the point(s) identified below, the licensee must monitor (by sampling and obtaining results by analysis) the parameters specified in Column 1 of the table below, using the corresponding sampling method, units of measure, averaging period and sampling frequency, specified opposite in the Columns 2, 3, 4 and 5 respectively.
POINT 13
<table><tr><th>Parameter</th><th>Sampling method</th><th>Units of measure</th><th>Averaging period</th><th>Frequency</th></tr><tr><td>Rainfall</td><td>AM-4</td><td>millimetres per hour</td><td>15 minutes</td><td>Continuous</td></tr><tr><td>Temperature at 10 metres</td><td>AM-4</td><td>degrees Celsius</td><td>15 minutes</td><td>Continuous</td></tr><tr><td>Wind Speed at 10 metres</td><td>AM-2 & AM-4</td><td>metres per second</td><td>15 minutes</td><td>Continuous</td></tr><tr><td>Wind Direction at 10 metres</td><td>AM-2 & AM-4</td><td>Degrees</td><td>15 minutes</td><td>Continuous</td></tr><tr><td>Sigma Theta</td><td>AM-2 & AM-4</td><td>Degrees</td><td>15 minutes</td><td>Continuous</td></tr><tr><td>Relative humidity</td><td>AM-4</td><td>percent</td><td>15 minutes</td><td>Continuous</td></tr></table></td><td>3.7.1.4</td></tr>
<tr><td>M6.1</td><td>The licensee must keep a legible record of all complaints made to the licensee or any employee or agent of the licensee in relation to pollution arising from any activity to which this licence applies.</td><td>3.9.3</td></tr>
</table>

Condition	Environment Protection Licence 2652	Section of Document
M6.2	The record must include details of the following: a) the date and time of the complaint; b) the method by which the complaint was made; c) any personal details of the complainant which were provided by the complainant or, if no such details were provided, a note to that effect; d) the nature of the complaint; e) the action taken by the licensee in relation to the complaint, including any follow-up contact with the complainant; and f) if no action was taken by the licensee, the reasons why no action was taken.	3.9.3
M6.3	The record of a complaint must be kept for at least 4 years after the complaint was made.	3.9.3
M6.4	The record must be produced to any authorised officer of the EPA who asks to see them.	3.9.3
M7.1	The licensee must operate during its operating hours a telephone complaints line for the purpose of receiving any complaints from members of the public in relation to activities conducted at the premises or by the vehicle or mobile plant, unless otherwise specified in the licence.	3.9.3
M7.2	The licensee must notify the public of the complaints line telephone number and the fact that it is a complaints line so that the impacted community knows how to make a complaint.	3.9.3
M7.3	The preceding two conditions do not apply until 3 months after: the date of the issue of this licence.	3.9.3
M10.5	The Licensee must record the average PM10 concentration at monitoring points 9 and 10 at intervals of 10 minutes. This data must be made available upon request by any Authorised Officer of the EPA who requests to see them.	3.7.1.3
R2.1	Notifications must be made by telephoning the Environment Line service on 131 555.	3.9
R2.2	The licensee must provide written details of the notification to the EPA within 7 days of the date on which the incident occurred. Note: The licensee or its employees must notify all relevant authorities of incidents causing or threatening material harm to the environment immediately after the person becomes aware of the incident in accordance with the requirements of Part 5.7 of the Act.	3.9

Appendix B - Correspondence and Consultation

Date	Stakeholder	Summary of Consultation	Ravensworth Contact
15/01/2014	Environment Protection Authority (EPA) Bill George	Draft copy of the AQGHGMP sent via letter	Andrew Kelly (Ravensworth Complex)
02/04/2014	Environment Protection Authority (EPA) Bill George	Letter received from EPA stating that the EPA does not review these documents	Greg Newton (Ravensworth Open Cut)
07/04/2014	Environment Protection Authority (EPA) Bill George	Email sent to EPA confirming which Management plans were being referred to in the letter dated 02/04/2014	Greg Newton (Ravensworth Open Cut)
09/04/2014	Environment Protection Authority (EPA) Bill George	Email received from EPA confirming that the letter dated 02/04/2014 referred to all the management plans submitted to EPA	Greg Newton (Ravensworth Open Cut)

DOC16/473236, EF13/3485

Mr Clint Weatherall
Environment & Community Officer
Ravensworth Operations Pty Ltd
PO Box 294
MUSWELLBROOK NSW 2333

Dear Mr Weatherall

RAVENSWORTH MINE COMPLEX NOISE, WATER AND AIR QUALITY AND GREENHOUSE MANAGEMENT PLANS

Thank you for forwarding the subject plan for our records.

The Environment Protection Authority (EPA) encourages the development of such plan to ensure that proponents have determined how they will meet their statutory obligations and designated environmental objectives. However, the EPA does not review these documents as our role is to set environmental objectives for environmental management, not to be directly involved in the development of strategies to achieve those objectives.

Should you have any questions please phone me on 02 4908 6819 or by email to hunter.region@epa.nsw.gov.au

Yours sincerely

MICHAEL HOWAT
Acting Head Regional Operations Unit - Hunter
ENVIRONMENT PROTECTION AUTHORITY

PO Box 488G Newcastle NSW 2300
117 Bull Street, Newcastle West NSW 2302
Tel: (02) 4908 6800 Fax: (02) 4908 6810
ABN 43 692 285 758
www.epa.nsw.gov.au

Newton, Greg (Ravensworth - Coal)

From: Bill George <Bill.George@epa.nsw.gov.au>
Sent: Wednesday, 9 April 2014 12:12 PM
To: Newton, Greg (Ravensworth - Coal)
Cc: EPA Hunter Region
Subject: RE: Ravensworth Complex Management Plan

Hi Greg

Our letter of 2.4.14 (DOC13/94631-01) refers to all of the management plans submitted.

Regards

Bill George

A/Unit Head - Hunter | NSW Environment Protection Authority |

☎: (02) 49 086821 | 🖷: (02) 49 086810 | 🖄:Bill.George@epa.nsw.gov.au

Formal electronic correspondence to the EPA should be sent to hunter.region@epa.nsw.gov.au

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From: Greg.Newton@glencore.com.au [mailto:Greg.Newton@glencore.com.au]
Sent: Monday, 7 April 2014 11:23 AM
To: EPA Hunter Region Mailbox
Cc: Andrew.Kelly@glencore.com.au
Subject: Ravensworth Complex Management Plan

Attention: Bill George

Bill
I refer to your letter received by Ravensworth Complex dated 02/04/2014 (attached). Ravensworth has submitted several management plans to the EPA, as required by our Project Approval for comment, including water, blast, air quality and greenhouse gas management and noise.
The letter received doesn't identify which plan the EPA is referring too? Can you please specify which plans the letter refers to.

Regards

Greg Newton
Environment and Community Coordinator
Ravensworth Open Cut

Direct: +61 2 6570 0746
Fax: +61 2 6570 0747
Mobile: +61 (0) 439 462 416

Email:Greg.Newton@glencore.com.au
www.glencore.com

1

Planning Services
Resource Assessments
Contact: Genevieve Seed
Phone: 9274 6489
Email: genevieve.seed@planning.nsw.gov.au

Mr Sam Palmer
Environment and Community Coordinator
Ravensworth Open Cut
PO Box 294
Muswellbrook NSW 2333

Dear Mr Palmer

Ravensworth Complex Management Plans

The Department has reviewed the below management plans for the Ravensworth Complex, which have been prepared in accordance with the Ravensworth Operations Project (MP 09_0176):

- Noise Management Plan, dated August 2018 (condition 9, Schedule 3);
- Air Quality and Greenhouse Gas Management Plan, dated August 2018 (condition 24 of Schedule 3);
- Biodiversity Management Plan, dated August 2018 (condition 38 of Schedule 3);
- Heritage Management Plan, dated August 2018 (condition 42 of Schedule 3); and
- Environmental Management Strategy, dated August 2018 (condition 1 of Schedule 5).

The Department considers that the above management plans adequately address the relevant requirements of MP 09_0176 and consequently the Secretary has approved these plans.

Should you have any enquiries in relation to this matter, please contact Genevieve Seed on the details above.

Yours sincerely

Howard Reed

Howard Reed 10·9·18
Director
Resource Assessments
as nominee of the Secretary

Department of Planning & Environment
320 Pitt Street Sydney NSW 2000 | GPO Box 39 Sydney NSW 2001 | T 1300 305 695 | www.planning.nsw.gov.au