# 27A DRAFT ENVIRONMENTAL MANAGEMENT PLAN (MINING)

## 27A.1 INTRODUCTION

### 27A.1.1 PURPOSE OF THIS EM PLAN

This Environmental Management Plan (EM Plan) has been prepared to support an application by the Wandoan Joint Venture (WJV) for an Environmental Authority (Mining Activities) in relation to Mining Lease Application (MLA) areas 50229, 50230, and 50231 in accordance with sections 202 and 203 of the *Environmental Protection Act 1994* (EP Act). It aims to identify the proposed Environmental Authority conditions that should be applied to this application and to guide preparation of Plans of Operations over the period in which mining activities are undertaken.

This EM Plan is part of the EIS prepared for the Project under Part 4 of the *State Development Public Works Organisation Act 1971* (SDPWO Act).

Environmental Authority (EA) conditions are determined after considering the application documents, including the EIS of which this EM Plan is part, and any relevant regulatory requirement. For example, those contained in relevant Environmental Protection Policies and the standard criteria as outlined in Schedule 3 of the EP Act.

The Environmental Protection Agency's (EPA) guideline "Preparing an environmental management overview strategy (EMOS) for non-standard mining projects" was consulted during the preparation of this EM Plan. However, as explained in Section 27.1.2, aspects discussed in detail elsewhere in the EIS are not repeated in this chapter. In meeting the requirements of section 202 and 203 of the EP Act, this EM Plan will meet the substantive requirements of the Terms of Reference for an environmental management plan for the mining activities to be undertaken on the MLA areas.

### 27A.1.2 THE PROJECT

The Wandoan Coal Project (the Project), its location, the tenure description of land on which the mining activities are to be carried out, all mining activities proposed, the environmental values likely to be impacted by the mining activities and the assessed potential adverse or beneficial impacts of the mining activities on those environmental values, have been comprehensively described in earlier chapters of this EIS and are not repeated in this chapter. Where relevant, references are included in this chapter to earlier chapters of this EIS where relevant matters are described.

## 27A.1.3 THE PROPONENT

The proponent for the Project, and the applicant for the Environmental Authority, is the Wandoan Joint Venture (WJV), which includes Xstrata Coal Queensland Pty Ltd (XCQ) (75%), ICRA Wandoan Pty Ltd (12.5%), and Sumisho Coal Australia Pty Ltd (12.5%).

## 27A.1.4 PROJECT MINING ACTIVITIES

Key elements of the Project associated with the MLA areas and immediate surrounds are shown on Figure 27-1-V1.3. Note that figures with numbering ending in V1.3 refer to figures contained in Volume 1, Book 3 of the EIS.

The mining activities proposed include:

- construction activities and services
- exploration geotechnical assessment and bulk sampling
- site preparation including vegetation clearing, topsoil stripping with storage or spreading and overburden removal
- blasting of overburden and coal
- excavation of run of mine (ROM) coal
- mine pits
- water supply and storage
- electricity supply which may include gas-fired power generation
- light vehicle roads and heavy vehicle haul access roads
- water management system (WMS)
- mine infrastructure area (MIA) including:
  - chemical fuel and oil storage facilities
  - maintenance workshops and vehicle washdown facilities
  - dragline construction area
  - waste transfer stations
  - administration offices and associated amenities
  - telecommunication infrastructure
- coal handling and preparation plant (CHPP)
- coal (ROM and product) stockpiles
- storage areas for rejects and topsoil
- dump stations and overland conveyor systems
- tailings disposal
- rail spur

- explosives storage and magazines
- site rehabilitation and stabilisation
- all other activities not described separately, but which are directly associated with or facilitate or support the described activities
- rehabilitating or remediating environmental harm because of any of the described mining activities
- actions to prevent environmental harm because of any of the described activities.

Offsite elements related to the Project (which are dependent on agreements being concluded with other parties) include:

- upgrade to the Wandoan waste management facility or the establishment of a new waste management facility
- upgrade to the Wandoan waste water treatment plant
- upgrade to the Wandoan potable water treatment plant
- gas pipeline connection to Peat-Scotia lateral gas line
- accommodation facilities
- upgrade to a nearby airport or a new airport
- water supply pipelines.

If agreements are not concluded for these related elements, it is likely that some or all of these elements will be undertaken on the MLA areas.

### 27A.1.5 MINING LEASE APPLICATION AREAS AND REAL PROPERTY DESCRIPTIONS

There are three mining lease applications (refer Figure 27-1-V1.3):

- MLA 50229 (17,211ha)
- MLA 50230 (11,101ha)
- MLA 50231 (3,795ha).

The MLA areas are comprised of allotments with the following tenures (refer Figure 27-2-V1.3):

MLA 50229:

- Freehold tenure: 36 allotments.
- Leasehold tenure: 18 allotments (typically comprising grazing homestead freehold leases and perpetual leases).
- Reserves: 2 allotments.
- Unallocated State land: 1 allotment.

MLA 50230:

- Freehold tenure: 34 allotments.
- Leasehold tenure: 6 allotments (typically comprising agricultural farm leases)
- Reserves: 2 allotments.

MLA 50231:

- Freehold tenure: 11 allotments
- Leasehold tenure: 4 allotments
- Reserves: 1 allotment.

Land tenure details for properties included in the MLA areas are summarised in Chapter 8 Land Use.

### 27A.1.6 PROJECT STAKEHOLDERS

The EIS consultation process commenced in 2007 and is ongoing.

A program of community and stakeholder consultation was developed to seek feedback about the Project from the local communities of Wandoan, Taroom, Miles and the broader Dalby Regional Council area. A range of consultation activities have been undertaken throughout the Project's prefeasibility and EIS phases. This was to ensure that all issues and concerns raised by the community and stakeholders were incorporated into technical studies and further planning for the Project. Consultation was undertaken with:

- potentially affected property owners
- Federal, State and local government authorities, agencies and local elected representatives
- local utility and service providers
- environmental organisations
- local community organisations
- local industry groups
- indigenous groups/organisations
- the broader community.

## 27A.2 ENVIRONMENTAL PROTECTION COMMITMENTS, CONTROL STRATEGIES AND PROPOSED EA CONDITIONS

The broad environmental protection and other commitments which the Proponent has adopted for the Project have been summarised in Chapter 28 Mitigation Measures. Those commitments reflect the policies of the Proponent in undertaking the Project. This chapter identifies the environmental protection commitments required by section 203 of the EP Act which will assist to determine both the EA conditions and the levels of impact from the Project's mining activities on key environmental values to be authorised by the Environmental Authority.

The commitments in this chapter will guide the preparation of Plans of Operations during the life of the Project as well as action programs included in all Plans of Operations as required under s 234 of the EP Act which are expected to include a number of the operational and design measures identified in Chapter 28. It is anticipated that other control strategies, which achieve a similar level of mitigation, will be developed over the life of the Project.

In this EM Plan, measures considered to be of key significance have been included in the draft EA conditions.

### 27A.2.1 GENERAL CONDITIONS

There is a number of Environmental Authority conditions which may be required under The EP Act or which are of general application to the management of the environmental impacts for the Project. The proposed general conditions are set out below.

**Schedule A – General**

**Financial assurance**

(A-1) Provide a financial assurance to the Administering Authority as security for compliance with this environmental authority in the amount and form determined in accordance with the *Environmental Protection Act 1994* prior to the commencement of activities proposed under this Environmental Authority.

(A-2) The financial assurance is to remain in force until the administering authority is satisfied that no claim on the assurance is likely.

### *Maintenance of measures, plant and equipment*

(A-3) The environmental authority holder must ensure:

- that all measures, plant and equipment necessary to ensure compliance with the conditions of this environmental authority are installed
- that such measures, plant and equipment are maintained in a proper condition
- that such measures, plant and equipment are operated in a proper manner.

### *Monitoring*

(A-4) Record, compile and keep for a minimum of five years all monitoring results required by this Environmental Authority and make available for inspection all or any of these records upon request by the administering authority.

(A-5) Where monitoring is a requirement of this Environmental Authority, ensure that a competent person(s) conducts all monitoring.

### *Storage of flammable and combustible liquids*

(A-6) All flammable and combustible liquids stored prior to use, must be contained within an on-site containment system constructed and maintained in accordance with relevant sections of AS 1940 - Storage and Handling of Flammable and Combustible Liquids of 2004, or the latest version thereof applying when the particular containment system is constructed.

### *Plans of Operation*

(A-7) Each Plan of Operations will describe:

- how each activity to which the Plan of Operations relates is to be undertaken in order to meet both the conditions of this environmental authority and the environmental protection objectives contained in the environmental management plan on which this authority was based and which are listed in Schedule H
- the additional items relevant to that Plan of Operations referred to in each of Schedules B, C, D, E, and F.

### *Complaint response*

(A-8) All complaints received relating to carrying out the mining activities shall be investigated with the following details to be recorded (and this may be done electronically):

- time and date of complaint
- type of communication (telephone, letter, personal etc.)
- name, contact address and contact number of the complainant if provided
- response and investigation undertaken as a result of the complaint
- name of person responsible for investigating complaint and
- action taken as a result of the complaint investigation.

### *Notice to Administering Authority*

(A-9) As soon as is reasonably practicable after becoming aware of an emergency or incident which results in the release of contaminants not in accordance with the conditions of this authority notice shall be given to the administering authority of such release by telephone, facsimile or email.

### *Definitions*

(A-10) Words or phrases used in this environmental authority have the same meanings as the same words or phrases when used in the *Environmental Protection Act 1994*, its Regulations or Environmental Protection Policies but otherwise have the meanings stated in Schedule G.

## 27A.2.2 AIR

### EIS Conclusions

The EIS has determined that air quality indicators (under the EPP (Air) potentially adversely affected by the Project's mining activities are:

- Carbon monoxide
- Nitrogen dioxide
- Dust particles (as $PM_{10}$)
- Dust particles (as total suspended particulates).

The EIS has also determined that environmental nuisance may be contributed to by dust and odour generated in carrying out the mining activities.

Modelling undertaken for the EIS has indicated that the Air Quality Goals in the EPP (Air) for those indicators will generally be met although in certain limited circumstances the goals will not be met at some sensitive places outside the MLA areas (refer to technical paper TR 27-3-V1.3). A plan showing sensitive receptors in the vicinity of the MLA areas is shown in Figure 27-3-V1.4.

The relevant chapter of the EIS is Chapter 13 Air Quality.

## Environmental protection objectives

If the EPP (Air) goals for the air quality indicators and the nominated goal for dust deposition rate shown in Table 27A-1 have been exceeded at a sensitive place outside the MLA areas existing at the date of granting this environmental authority, and dust generated in carrying out the mining activities has significantly contributed to such exceedance, implement a dust management plan which describes reasonable and practicable measures to minimise the impact of dust generated in carrying out the mining activities, at that sensitive place.

**Table 27A-1: Air quality goals for sensitive places outside the MLA Areas**

| Pollutant | Averaging period | Concentration | Units |
|---|---|---|---|
| Nitrogen dioxide | 1-hour | 320 | µg/m$^3$ |
| | Annual | 30 | µg/m$^3$ |
| Carbon monoxide | 8-hour | 10 | mg/m$^3$ |
| Particulate matter (diameter <10 µm) ($PM_{10}$) | 24-hour | 150 | µg/m$^3$ |
| | Annual | 50 | µg/m$^3$ |
| Dust deposition rate | Annual | 120 | mg/m$^2$/day |

## Proposed Environmental Authority conditions

## Schedule B - AIR

(B1-1) This authority authorises the release to the environment (air) of the contaminants generated in carrying out the mining activities only in accordance with the conditions of this Schedule B

(B1-2) The contaminants that may be released are those resulting from the operation of the sources or the activities listed in Schedule B Table 1

(B1-3) Such contaminants may only be released from the points or areas described in Schedule B Table 1

(B1-4) Monitoring of the receiving environment (air) shall be conducted (subject to obtaining consent from the relevant owner) for the contaminants, the parameter characteristics with the frequencies

and in accordance with the standards described in Schedule B Table 2 at the locations described in Schedule B, Table 2 or subsequently described in any Plan of Operations prepared in accordance with Condition (A-7).

(B1-5) Where monitoring undertaken in accordance with condition B1-4, indicates that the concentration of particulate matter with an aerodynamic diameter of less than 10 micrometers (PM10 suspended) in the atmosphere exceeds 120 micrograms per cubic meter over a 24 hour averaging time at any of the receptors, management of relevant mining activities shall include the implementation of measures to reduce the potential impact of fugitive dust emissions.

(B1-6) The administering authority may, by written notice, require the undertaking of, and the provision of a written report on, a reasonable and practicable monitoring program for dust and particulates (by way of investigation) where the administering authority has received a complaint, which is neither frivolous nor vexatious nor based on mistaken belief (in the reasonable opinion of an authorised officer), of unlawful environmental nuisance at any sensitive place (outside the mining tenements for this environmental authority and which existed at the time of granting this environmental authority) caused by dust generated by the mining activities.

(B1-7) If the monitoring report prepared after request by the Administering Authority pursuant to Condition B1-6 indicates that the parameters described in Schedule B Table 3 have been exceeded at the sensitive place, and that dust generated in carrying out the mining activities has significantly contributed to the exceedance, a dust management plan which describes reasonable and practicable measures to minimise the impact of dust generated in carrying out the mining activities, at that sensitive place shall be prepared, implemented and updated on a regular basis but not less frequently than every 5 years.

(B1-8) The Administering Authority may, by written notice, require the undertaking of, and the provision of a written report on, a reasonable and practicable monitoring program for odour (by way of investigation) where the Administering Authority has received a complaint, which is neither frivolous nor vexatious nor based on mistaken belief (in the reasonable opinion of an authorised officer), of unlawful environmental nuisance at any sensitive place (outside the mining tenements for this Environmental Authority and which existed at the time of granting this Environmental Authority) caused by odour generated by the mining activities.

(B1-9) If the monitoring report prepared after request by the administering authority pursuant to Condition B1-8 indicates that an unlawful environmental nuisance at the sensitive place has been caused by odour generated in carrying out the mining activities a odour management plan which describes reasonable and practicable measures to minimise the impact of odour generated in carrying out the mining activities, at that sensitive place shall be prepared, implemented and updated on a regular basis but not less frequently than every 5 years.

**Schedule B Table 1: Contaminant sources and activities – Release points or areas**

| Sources / Activities | Release points or areas |
|---|---|
| Power Station | Stack (4) |
| All Other Mining activities | The areas in which the various activities are undertaken from time to time as described in Plans of Operation prepared in accordance with condition (A-7). |

**Schedule B Table 2: Dust Monitoring**

| Lot / plan | Receptor | $PM_{10}$ | Dust deposition |
|---|---|---|---|
| 47 FT466 | MLA-239 | Y | Y |
| 4 FT758 | MLA-526 | Y | Y |
| 132 SP121742 | MLA721 or MLA725 | Y | Y |
| Short Street | Town Centre | Y | Y |
| 6 FT788 | MLA-505 | Y | Y |
| 28 FT563 | MLA-687 | Y | Y |
| 1 RP204781 | MLA-402 | Y | Y |

PM10 monitored over a 24 hour averaging period in accordance with Particulate Matter – determination of suspended particulate, PM10, high volume sampler with size selected inlet – gravimetric method of 1990 when monitored in accordance with AS 3580.9.6 methods for sampling an analysis of ambient air OR any alternative method of monitoring PM10 which may be permitted by the Air Quality Sampling Manual as published from time to time by the administering authority. Monitoring of PM10 shall be continuous.

Dust measurements will be in accordance with AS3580.10.1 methods for sampling and analysis for ambient air – determination of particulates – deposited matter – gravimetric method of 1991 and shall be measured in milligrams per square meter per day. Monitoring of dust deposition shall occur at least once in each month.

Meteorological variables will be measured at a meteorological station located on the MLA areas and will include atmospheric conditions including wind speed and direction.

**Schedule B Table 3: Investigation parameters**

| No. | Where measured | Contaminants | Parameters |
|---|---|---|---|
| 1 | Measured at any sensitive place outside the mining tenements existing as at the date of granting of this Environmental Authority | Dust | Dust deposition of 120 milligrams per square metre per day, averaged over one year |
| | | | |
| 2 | Measured at any sensitive place outside the mining tenements existing as at the date of granting of this Environmental Authority | Dust (<10 µm) | A concentration of particulate matter with an aerodynamic diameter of less than 10 micrometre (µm) ($PM_{10}$) suspended in the atmosphere of 150 micrograms per cubic metre over a 24 hour averaging time, at the sensitive place when downwind of the operational land. |

## 27A.2.3 WATER

### EIS Conclusions

The EIS has determined that waters potentially adversely affected by the Project's mining activities are:

- Surface waters
- Groundwater in shallow aquifers.

### *Surface waters*

The EIS found surface waters of the area to be a 'slightly to moderately disturbed system' under ANZECC (2000), relating to the ephemeral nature of surface watercourses and agricultural nature of the region.

The EIS has identified the potential risks for off-site impacts on water, and appropriate receiving water concentrations conducive to the environmental values of the area. The ANZECC guidelines for 'slightly to moderately disturbed' 'upland' streams have been considered in conjunction with background monitoring data which indicates parameters are significantly varied from the guidelines ie pH, electrical conductivity, turbidity and dissolved oxygen. The goals in Table 27-2 are considered to represent a

reasonable range of values for receiving waters which should not be impacted by mining activities.

Further discussion of surface water quality is provided in Chapter 11 Water Supply and Management.

### *Groundwater*

The EIS found effects on groundwater resources are expected to be confined to the Juandah Coal Measures and the other overlying or near surface aquifers such as the alluvium.

Environmental values associated with groundwater in the Surat Basin are considered low due to low yields and poor water quality. Typical electrical conductivity (EC) values are up to 23,000 µS/cm in the shallow water bearing seams (up to 50 m depth) of the Kogan seam and typically between 8,000 and 18,000 µS/cm for the deeper seams (of 50 to 100 m depth) of the Macalister and Wambo seams. pH increases with depth, typically neutral in the shallower water bearing zones to slightly alkaline (up to nine) in the deeper zones.

About twenty bores have the potential to be impacted by groundwater drawdown. These bores are used for stock, domestic and/or community use. Monitoring will be undertaken to determine whether they will be affected by mining.

The EIS has concluded that the environmental values of groundwater in the Great Artesian Basin are unlikely to be affected by mining activities.

Further discussion of groundwater is provided in Chapter 10 Groundwater and Chapter 11 Water Supply and Management.

## Environmental protection objectives

(1) During flows in receiving surface waters not cause the goals for the water quality indicators shown in Table 27A-2 to be exceeded at monitoring points outside the initial mixing zone

(2) Reduce the risk of contamination of surface and ground waters caused by an escape of fuels or chemicals used in carrying out the mining activities by the storage of such fuels and chemicals in bunded areas.

(3) Implement baseline and operational monitoring programs for groundwater quality where groundwater may be impacted by mining activities.

**Table 27A-2: Goals for water quality indicators**

| Sources / Activities | Contaminants | Goals |
|---|---|---|
| All | pH | 6.5 to 9.7 range |
| All | Electrical conductivity | maximum 996 µS/cm |
| All | Dissolved oxygen | greater than 6 mg/L |
| All | Turbidity | 1000 NTU (observed 90$^{th}$ percentile) |

## Control strategies

Incorporate in successive Plans of Operations, water management systems consisting of reasonable and practicable measures to achieve the nominated environmental protection objectives for:

- pit water, process water and mine infrastructure area runoff; to capture and store rainwater, groundwater seepage and surface water runoff in environmental dams to facilitate the reuse of captured water for mining activities
- overburden stockpile runoff; to pass surface water runoff through sediment dams
- diverted watercourses; to reduce the circumstances in which runoff or flood waters from undisturbed areas flow across areas disturbed by mining activities.

## Proposed Environmental Authority conditions

## Schedule C - WATER

(C1-1) This authority authorises the release to the environment (Water) of the contaminants generated in carrying out the mining activities only in accordance with the conditions of this Schedule C.

(C1-2) The contaminants that may be released are those resulting from the operation of the sources or the activities listed in Schedule C Table 1 or described in any Plan of Operations prepared in accordance with Condition (A-7).

(C1-3) Such contaminants may only be released from the points or areas described in Schedule C Table 1 or from those described in any Plan of Operations prepared in accordance with Condition (A-7).

(C1-4) The release of contaminants must comply with the requirements described in Schedule C Table 3 and not cause the receiving water contaminant limits described in Schedule C, Table 6 to be exceeded at any of the receiving water monitoring locations described in Schedule C Table 7.

(C1-5) In the circumstances described in Schedule C Table 4, or in any Plan of Operations prepared in accordance with Condition (A-7) the release of contaminants need not comply with Schedule C Table 3

(C1-6) The measures for environmental management described in Schedule C Table 5 or in any Plan of Operations prepared in accordance with Condition (A-7) must be implemented in carrying out the activities.

(C1-7) Monitoring of the receiving environment (water), by automated sampling stations, shall be conducted for the contaminants and characteristics described in Schedule C Table 6, at the monitoring locations and with the frequencies described in Schedule C Table 7 and Figure 27A-4-V1.3 or in any Plan of Operations prepared in accordance with Condition (A-7).

(C1–8) Monitoring of the existing ground water environment shall be conducted for the contaminants and characteristics at the locations and with the frequencies described in Schedule C Table 8 and a written report identifying the results of that monitoring shall be provided to the administering authority within two years after the granting of this environmental authority.

(C1–9) After commencement of mining, ground water shall be monitored at least once per year for the contaminants and characteristics at the locations described in Schedule C Table 8.

(C1-10) During major flow events at the monitoring locations described in Schedule C, Table 7 monitoring of the following parameters shall be conducted:

- EC
- pH
- Total suspended solids (TSS)
- Turbidity
- Total nitrogen (TN)
- Total phosphorus (TP)
- Biological oxygen demand (BOD)
- Chlorophyll a
- Aluminium
- Arsenic (As)
- Cadmium (Cd)
- Copper (Cu)
- Chromium (Cr)

- Lead (Pb)
- Nickel (Ni)
- Zinc (Zn)
- Mercury (Hg)
- Iron (Fe)
- Manganese (Mn)
- Chlorobenzene
- 1,2-dichlorobenzene
- 1,4- dichlorobenzene
- Ethylbenzene
- Benzo-(a)-pyrene
- Toluene
- Organochlorine (OC) and organophosphorus (OP) pesticides
- Sulfate.

(C1-11) Monitoring of the physical environment and ecological communities shall be undertaken:

(a) at not less than 5 sites in waterways within the MLA areas, not less than 5 sites downstream of the MLA areas and not less than 5 reference sites not impacted by the mining activities;

(b) once during the early wet season and once during the late wet season;

(c) will include water quality, aquatic habitat, macrophytes and aquatic fauna.

**Schedule C Table 1: Contaminant Sources and Activities**

| No. | Sources / Activities | Release points or areas |
|---|---|---|
| 1 | Environmental Dams, as part of pit water and MIA process water portions of the site water management system | The Spillways or outlet works of Environmental Dams located upstream of the discharge points shown on Figure 27A-4-V1.3 and described in Schedule C Table 2 or as generally described in Plans of Operations prepared in accordance with Condition (A-7) |
| 2 | Sediment Dams, as part of the overburden runoff portion of the site water management system | The Spillways or outlet works of Sediment Dams located upstream of the discharge points shown on Figure 27A-4-V1.3 and described in Schedule C Table 2 or as generally described in Plans of Operations prepared in accordance with Condition (A-7) |

**Schedule C Table 2: Discharge Points**

| No. | Sources | Easting | Northing |
|---|---|---|---|
| 1 | Unnamed creek | 787349 | 7116471 |
| 2 | Unnamed creek | 790394 | 7113941 |
| 3 | Spring Creek | 772423 | 7123394 |
| 4 | Unnamed creek | 770711 | 7123638 |
| 5 | Mud Creek | 782102 | 7121134 |
| 6 | Log Hut Gully | 783158 | 7120442 |
| 7 | Woleebee Creek | 787905 | 7115667 |
| 8 | Juandah Creek | 791319 | 7113747 |
| 9 | Frank Creek | 792855 | 7112787 |
| 10 | Duck Creek | 767005 | 7119634 |

**Schedule C Table 3: Contaminant release requirements**

| No. | Sources / Activities | Requirements |
|---|---|---|
| 1 | Environmental Dams | Release only when receiving waters are flowing |
| 2 | Sediment Dams | Release only when receiving waters are flowing or up to 10 days after flow ceases upstream of the release point |

**Schedule C Table 4: Operational circumstances**

| Item | Sources / Activities | Circumstances in which Requirements and Parameters need not be met |
|---|---|---|
| 1 | Environmental Dams | Rainfall events which exceed the design capacity of the dam |
| 2 | Sediment Dams | Rainfall events which exceed the design capacity of the dam |

**Schedule C Table 5: Measures for environmental management**

<table>
<tr><th>Item</th><th>Measures</th></tr>
<tr><td>1</td><td>The site water management system will:<br>(a) be designed, constructed operated and maintained in accordance with generally accepted engineering standards;<br>(b) be designed to incorporate reasonable and practicable measures to capture and store within the relevant catchments, rainwater, groundwater seepage and surface water runoff so as to minimise the discharge of contaminated water to surface waters outside the mining tenements for this environmental authority and also to facilitate the reuse of captured water for mining activities.</td></tr>
<tr><td>2</td><td>All components of the clean water management system will:<br>(a) be designed, constructed operated and maintained in accordance with generally accepted engineering standards;<br>(b) be designed to incorporate reasonable and practicable measures to divert existing watercourses which will not otherwise be disturbed by mining activities away from areas disturbed by mining activities and which minimises the circumstances in which runoff or flood waters from undisturbed areas flow across areas disturbed by mining activities.</td></tr>
<tr><td>3</td><td>Dams and levees will be designed and constructed in accordance with the following hydraulic specifications (with design storage allowances being calculated using a full hydrological analysis of the relevant water management system):
<table>
<tr><th></th><th>Environmental Dam</th><th>Sediment Dam</th><th>Levees</th></tr>
<tr><td>Design Storage Allowance(Dams other than levees) AEP</td><td>1%</td><td>Not applicable</td><td>Not applicable</td></tr>
<tr><td>Spillway capacity AEP:</td><td>1%</td><td>1%</td><td>Not applicable</td></tr>
<tr><td>Diversion capacity AEP</td><td>Not applicable</td><td>Not applicable</td><td>0.1%</td></tr>
</table></td></tr>
<tr><td>4</td><td>Sediment dams will be designed as "dry basins" to contain runoff from the 10% Annual Exceedance Probability (AEP) time of concentration rainfall event and will incorporate outlet works sized to ensure the sediment dams may be emptied within 10 days of filling.</td></tr>
<tr><td>5</td><td>All design works will be undertaken by either a registered professional engineer of Queensland (under the Professional Engineers Act 1988) or a corporate member of the Institute of Engineers Australia who has experience in the design of the particular works.</td></tr>
</table>

**Schedule C Table 6: Receiving water contaminant limits**

| Item | Contaminants | Parameters |
|---|---|---|
| 1 | pH | 6.5 to 9.7 range |
| 2 | Electrical conductivity | maximum 996 µS/cm |
| 3 | Dissolved oxygen | greater than 6 mg/L |
| 4 | Turbidity | 1,000 NTU (observed 90$^{th}$ percentile) |

**Schedule C Table 7: Receiving water monitoring location and frequency**

| Monitoring point | Easting | Northing | Monitoring frequency | Installed | Cease operation |
|---|---|---|---|---|---|
| J-UJ (US Upper Juandah Creek) | 797875 | 7106452 | At least daily, and more frequently when flow is detected. | Existing | — |
| J-UF (US Frank Creek Dam) | 792990 | 7105336 | At least daily, and more frequently when flow is detected. | One year prior to commencement of mining in Frank Creek Pit | — |
| J-DF (Frank Creek Downstream) | 790589 | 7115068 | At least daily, and more frequently when flow is detected. | Existing | — |
| J-DJ (DS Juandah Creek) | 790733 | 7114761 | At least daily, and more frequently when flow is detected. | Existing | — |
| AltW-UW (Alternative US Woleebee Creek) | 783585 | 7102081 | At least daily, and more frequently when flow is detected. | One year prior to construction of the creek diversion in Woleebee Creek | — |
| AltW-UWa (Alternate US Wandoan Creek) | 781114 | 7101390 | At least daily, and more frequently when flow is detected. | One year prior to construction of the creek diversion in Wandoan Creek | — |
| W-UW (US Woleebee Creek) | 785187 | 7104135 | At least daily, and more frequently when flow is detected. | Existing | — |
| W-DW (DS Woleebee Creek) | 788199 | 7116168 | At least daily, and more frequently when flow is detected. | One year prior to commencement of mine construction | — |
| Woleebee Creek Downstream | 786786 | 7111009 | At least daily, and more frequently when flow is | existing | following installation of W-DW |

| Monitoring point | Easting | Northing | Monitoring frequency | Installed | Cease operation |
|---|---|---|---|---|---|
| | | | detected. | | |
| M-UM (US Mount Organ Creek) | 773829 | 7111479 | At least daily, and more frequently when flow is detected. | existing | — |
| M-Umu (US Mud Creek) | 776940 | 7109591 | At least daily, and more frequently when flow is detected. | existing | — |
| M-DMu (DS Mud Creek) | 783948 | 7122555 | At least daily, and more frequently when flow is detected. | One year prior to construction of infrastructure related to Mud Creek Pit | — |
| Mud Creek downstream | 777014 | 7109600 | At least daily, and more frequently when flow is detected. | existing | Year 5 and following installation of M-DMu |
| Spring Creek Downstream | 772325 | 7120213 | At least daily, and more frequently when flow is detected. | existing | Year 9 and following installation of S-DS |
| S-DS (DS Spring Creek) | 771710 | 7125959 | At least daily, and more frequently when flow is detected. | One year prior to construction of infrastructure related to Summer Hill and Turkey Hill pits | — |
| D-DS (DS Duck Creek) | 767160 | 7125353 | At least daily, and more frequently when flow is detected. | One year prior to construction of infrastructure related Turkey Hill Pit | — |

**Schedule C Table 8 – Initial Groundwater Monitoring**

| Location | Contaminants/Characteristics | Frequency |
|---|---|---|
| Those locations shown in Figure 10-4-V1.3 and no fewer than 10 additional monitoring locations within the MLA areas determined to be representative locations for groundwater monitoring. | Metals<br>pH<br>Electrical conductivity<br>Major cations<br>Sulphates<br>Chlorides | Quarterly |

## 27A.2.4 NOISE AND VIBRATION

### EIS Conclusions (Noise)

The EIS has determined, at representative sites, the existing noise environment described in Table 27A-3 and that noise from the Project's mining activities potentially adversely affects that environment.

**Table 27A-3: Summary of background noise data logging results**

| Time | N1 Nathan Road | | N2 Wodonga | | N3 Town | |
|---|---|---|---|---|---|---|
| | Average $L_{eq}$ (dBA) | RBL* (dBA) | Average $L_{eq}$ (dBA) | RBL* (dBA) | Average $L_{eq}$ (dBA) | RBL* (dBA) |
| Day | 48 | 26 | 45 | 25 | 39 | 26 |
| Evening | 49 | 30 | 47 | 35 | 36 | 27 |
| Night | 38 | 18 | 38 | 19 | 32 | 24 |

* Rating background level. RBL is defined as the median value of the measured Assessment Background Levels (ABL) for each period (day/evening/night). ABL is the tenth percentile measured background noise level ($L_{A90,T}$) during each measurement period (day/evening/night) for each 24 hours.

The EIS has determined noise assessment criteria for operational noise generated in carrying out the Project's mining activities in accordance with Ecoaccess Guideline "Planning for Noise Control (July 2004). These criteria are described in Table 27A-4.

**Table 27A-4: Operations noise assessment criteria**

| Location | Receptor type | Time of day | Assessment criteria $L_{Aeq,1hr}$ (dBA) |
|---|---|---|---|
| N1 Nathan Road | Very Rural; Residential | Day | 34 |
| | | Evening | 28 |
| | | Night | 28 |
| N2 Wodonga | Very Rural; Residential | Day | 33 |
| | | Evening | 28 |

| Location | Receptor type | Time of day | Assessment criteria $L_{Aeq,1hr}$ (dBA) |
|---|---|---|---|
| | | Night | 28 |
| N3 Town | Very Rural; Residential | Day | 34 |
| | | Evening | 30 |
| | | Night | 28 |
| | Rural; Residential; Church; Hospital | Day | 34 |
| | | Evening | 35 |
| | | Night | 31 |
| | Shop or Commercial Office | Day | 34 |
| | | Evening | 35 |
| | | Night | 32 |
| | Light Industry | Day | 50 |
| | | Evening | 45 |
| | | Night | 40 |

Modelling of noise impacts during Years 1, 5, 10, 20 and 30 were conducted as part of the EIS, as discussed in Chapter 15 Noise, and concluded that, with the use of noise attenuated mining equipment, the noise assessment criteria would regularly be met at existing sensitive places located off the mining lease areas. However, the EIS also concluded that the criteria would not be met at some sensitive places under certain operational and meteorological conditions or circumstances.

The EIS concluded that the noise assessment criteria were quite low and those levels, increased by 5 dBA would not result in an unreasonable impact on the qualities of the acoustic environment.

The relevant chapter of the EIS is Chapter 15 Noise.

## EIS Conclusions (Vibration)

The EIS has identified that the main source of vibration generated from mining activities will be from blasting. Other potential sources of vibration include coal trains and coal handling and preparation plant (CHPP) operations and infrequent periods of heavy lifts.

The EIS has estimated, in accordance with the *Noise and vibration from blasting* (the Blasting Guideline) (EPA 2006), for a range of blast designs, ground vibration and airblast overpressure impacts by determining the distance at which 9 out of 10 blasts should generate a Peak Particle Velocity (PPV) of 5 mm/s or less (ground vibration) and no more than 115 dB (linear) and a maximum of 120 dB (linear) (airblast overpressure). These are the level

of impacts stated to be acceptable in the Blasting Guideline but are slightly more than the level of impacts allowed by the regulation made under the EP Act which allows 4 out of 5 exceedances.

Table 27A-5 summarises inputs to the estimation of ground vibration for a range of Wandoan blast designs.

**Table 27A-5: Summary of PPV calculations for distance to 5 mm/s**

| Bench height (m) | charge per hole (kg) | Holes per delay | Distance to 5 mm/s (m) |
|---|---|---|---|
| 3 | 10 | 6 | 231 |
| 5 | 26 | 6 | 372 |
| 7.5 | 61 | 5 | 448 |
| 10 | 95 | 5 | 540 |
| 15 | 295 | 4 | 754 |
| 20 | 422 | 4 | 861 |
| 30 | 1,011 | 4 | 1131 |
| 40 | 1,455 | 4 | 1357 |
| 50 | 1,809 | 4 | 1513 |

Table 27A-6 summarises inputs to the estimation of airblast overpressure for a range of Wandoan blast designs.

**Table 27A-6: Summary of airblast overpressure calculations**

| Bench height (m) | charge per hole (kg) | Holes per delay | Distance to 115 dBl (m) | Distance to 120 dBl (m) |
|---|---|---|---|---|
| 3 | 10 | 6 | 423 | 284 |
| 5 | 26 | 6 | 582 | 391 |
| 7.5 | 61 | 5 | 727 | 489 |
| 10 | 95 | 5 | 843 | 567 |
| 15 | 295 | 4 | 1,142 | 768 |
| 20 | 422 | 4 | 1,287 | 865 |
| 30 | 1,011 | 4 | 1,722 | 1,157 |
| 40 | 1,455 | 4 | 1,944 | 1,307 |
| 50 | 1,809 | 4 | 2,090 | 1,405 |

Comparing Tables 27A-5 and 27A-6, the distance to the recommended airblast overpressure is greater than the distance to the recommended ground vibration limit. This means that if the airblast overpressure criteria are satisfied, then the ground vibration will also be within the requirements.

Unmitigated impacts from blasting are predicted to exceed the recommended Blasting Guideline limits at a number of sites, as shown in Table 27A-6 which identifies eight sensitive receptor sites lying outside the Project's MLAs that are predicted to experience airblast overpressures greater than Blasting Guideline limits. The receptors listed in this table are shown in Figure 27-3-V1.3.

**Table 27A-7: Sensitive receptors potentially affected by the Project blasting operations**

| Receptor number | Receptor type | Distance to closest Project blasting area (m) |
|---|---|---|
| MLA-374 and MLA-367 | A house and shed complex | Approximately 1,000 m north of the Austinvale North Pit |
| MLA-595 and MLA-596 | A house and shed complex | Approximately 900 m south west of the Turkey Hill Pit |
| MLA-355 | A house | 1,500 m south of the Mud Creek Pit |
| MLA-361 | A house | 2,000 m south of the Mud Creek Pit |
| MLA-309, MLA-298, MLA-301 and MLA-303 | A house and 3 shed complex | 1,500 m west of the Woleebee Creek Pit |
| MLA-552 and MLA-551 | A house and shed complex | 1,900 m south west of the Woleebee Creek Pit |
| MLA531, MLA-541, MLA-548 and MLA-554 | Four sheds (feedlot) | 900 m south west of the Woleebee South Pit |
| MLA-505 and MLA-578 | A house and shed complex | 500 m south east of the Woleebee South Pit |

Coal trains accessing and exiting the Project site along the spur line from the proposed Surat Basin Rail Project line may produce intermittent ground vibration impacts. The proposed route is close to Sensitive Receptors MLA-374 and MLA-367 (a house and shed complex).

While the Blast Guideline has been used in modelling, the Environmental Protection Regulation 1998 states specific criteria for what constitutes environmental nuisance. Therefore when setting compliance limits the criteria from the regulation have been adopted.

The relevant chapter of the EIS is Chapter 16 Vibration.

## Environmental Protection Objectives (Noise)

If the criteria shown in Table 27A-8 have been exceeded at a sensitive place outside the MLA areas existing at the date of granting this Environmental Authority, and noise generated in carrying out the mining activities has significantly contributed to such exceedance, implement a noise management plan which describes reasonable and practicable measures to minimise the

impact of noise generated in carrying out the mining activities, at that sensitive place.

**Table 27A-8: Criteria for sensitive places outside the MLA areas**

| Receptor type | Time of day | Assessment criteria $L_{Aeq,1hr}$ (dBA) |
|---|---|---|
| Very Rural; Residential (Open rural with slight traffic noise contribution) | Day | 39 |
| | Evening | 33 |
| | Night | 33 |
| Very Rural; Residential (open rural with no traffic noise contribution) | Day | 38 |
| | Evening | 33 |
| | Night | 33 |
| Very Rural; Residential (Wandoan Township) | Day | 39 |
| | Evening | 35 |
| | Night | 33 |
| Rural Residential, Church, Hospital | Day | 39 |
| | Evening | 40 |
| | Night | 36 |
| Shop or Commercial Office | Day | 39 |
| | Evening | 40 |
| | Night | 37 |
| Light Industry | Day | 55 |
| | Evening | 50 |
| | Night | 45 |

## Environmental Protection Objectives (Vibration)

If the criteria shown in Table 27A-9 have been exceeded at a sensitive place outside the MLA areas existing at the date of granting this Environmental Authority, and blasting undertaken in carrying out the mining activities has caused such exceedance implement a blast management plan which describes reasonable and practicable measures to minimise the impact of blasting undertaken in carrying out the mining activities, at that sensitive place.

**Table 27A-9: Blast criteria**

| Criteria |
|---|
| When ground vibration impacts exceed for 4 out of 5 blasts 5 mm/s PPV (Ground vibration) |
| When airblast overpressure impacts exceed for 4 out of 5 blasts 115 dB (linear) |

## Proposed Environmental Authority conditions

## Schedule D - Noise and Vibration

(D-1) This Environmental Authority authorises the release of noise generated in carrying out the mining activities only in accordance with the conditions of this Schedule D.

(D-2) The Administering Authority may require the undertaking of, and the provision of a written report on, a reasonable and practicable monitoring program for noise generated by the mining activities (by way of investigation) where the Administering Authority has received a complaint, which is neither frivolous nor vexatious nor based on mistaken belief (in the reasonable opinion of an authorised officer), of unlawful environmental nuisance at any sensitive place (outside the mining tenements for this Environmental Authority existing at the date when this Environmental Authority was granted) caused by noise. Monitoring must include:

(a) LA, max adj, T

(b) the parameter described in Schedule D Table 1

(c) The category of the receptor as described in Schedule D Table 1

(d) the level and frequency of occurrence of impulsive or tonal noise

(e) atmospheric conditions including wind speed and direction

(f) location, date and time of recording.

The method of measurement and reporting of noise levels must comply with the latest edition of the environmental Protection Agency's Noise Measurement Manual.

(D-3) If the monitoring report prepared after request by the Administering Authority pursuant to clause D2 indicates that the parameters described in Schedule D Table 1 have been exceeded at the sensitive place, and that noise generated in carrying out the mining activities has significantly contributed to the exceedance, a noise management plan which describes reasonable and

practicable measures to minimise the impact of such noise at the noise sensitive place shall be prepared, implemented and updated on a regular basis but not less frequently than every 5 years.

**Schedule D Table 1: Criteria for Sensitive places outside the MLA Areas**

| Receptor type | Time of day | Assessment criteria $L_{Aeq,1hr}$ (dBA) |
|---|---|---|
| Very Rural; Residential (Open rural with slight traffic noise contribution) | Day | 39 |
| | Evening | 33 |
| | Night | 33 |
| Very Rural; Residential (open rural with no traffic noise contribution) | Day | 38 |
| | Evening | 33 |
| | Night | 33 |
| Very Rural; Residential (Wandoan Township) | Day | 39 |
| | Evening | 35 |
| | Night | 33 |
| Rural Residential, Church, Hospital | Day | 39 |
| | Evening | 40 |
| | Night | 36 |
| Shop or Commercial Office | Day | 39 |
| | Evening | 40 |
| | Night | 37 |
| Light Industry | Day | 55 |
| | Evening | 50 |
| | Night | 45 |

## Blast vibration and airblast overpressure

(D-4) This Environmental Authority authorises the release of blast vibration and airblast overpressure generated in carrying out the mining activities only in accordance with the conditions of this Schedule D.

(D-5) The Administering Authority may require the undertaking of, and the provision of a written report on, a reasonable and practicable monitoring program for blast vibration and airblast overpressure generated by the mining activities (by way of investigation) where the Administering Authority has received a complaint, which is neither frivolous nor vexatious nor based on mistaken belief (in the reasonable opinion of an authorised officer), of unlawful

environmental nuisance at any sensitive place (outside the mining tenements for this Environmental Authority existing at the date when this Environmental Authority was granted) caused by blast vibration and airblast overpressure Monitoring must address the parameters in Schedule D Table 2 and also:

(a) location of the blast/s within the mining area (including which bench level)

(b) atmospheric conditions including temperature, relative humidity and wind speed and direction

(c) location, date and time of recording.

The method of measurement and reporting must comply with the latest edition of the Environmental Protection Agency's vibration and airblast overpressure monitoring guideline.

(D-6) If the monitoring report prepared after request by the Administering Authority pursuant to clause D5 indicates that the parameters described in Schedule D Table 2 have been exceeded at the sensitive place, and that blasting undertaken generated in carrying out the mining activities has caused the exceedance, a blast management plan which describes reasonable and practicable measures to minimise the impact of blasting at the sensitive place shall be prepared, implemented and updated on a regular basis but not less frequently than every 5 years.

**Schedule D Table 2: Blast criteria**

| Criteria |
|---|
| When ground vibration impacts exceed for 4 out of 5 blasts 5 mm/s PPV (Ground vibration) |
| When airblast overpressure impacts exceed for 9 out of 10 blasts 115 dB (linear) |

## 27A.2.5 WASTE

### EIS Conclusions

The EIS has identified the range of wastes generated in carrying out the mining activities and described which wastes will be stored or disposed of on the MLA areas and those which will be transported for offsite disposal and has recognized that improper storage or disposal of waste may impact the environmental values recognized in the Environmental Protection (Waste Management) Policy 2000, namely:

- the life, health and well-being of people
- the diversity of ecological processes and associated ecosystems

- the land use capability.

The major sources of waste generated from the mining activities and their treatment are described in Table 27A-10.

**Table 27A-10: Waste streams and management strategies**

| Waste streams | Waste sources | Management strategies |
|---|---|---|
| Green waste | Clearing of vegetation | Suitable material to be used on site to provide fauna habitat. Remaining material to be chipped and mulched, and reused during progressive rehabilitation and revegetation.<br>Burning of green wastes will only occur as a last resort subject to obtaining permits and approvals. |
| Building Waste | Initial construction of mine associated infrastructure and ongoing construction works | Stored onsite in areas designated from time to time in Plans of Operations and regularly removed for disposal at the Wandoan Waste Management Facility: any asbestos encountered in demolition or construction activities will be removed and disposed of by a specialist contractor. |
| Sewage | Contractor offices, crib room, accommodation facilities | Provision of dedicated package plant facilities during construction (pump out system) until pipeline connection to Wandoan WWTP is made available. |
| General Wastes | Construction, mine site administration and management facilities | Collected in bins, stored in designated waste transfer areas and periodically removed fro disposal at the Wandoan Waste Management Facility |
| Hydrocarbons, hydrocarbon contaminated materials, other chemical wastes, batteries | Routine servicing and shutdown overhaul of vehicles and equipment in workshops and maintenance facilities, refuelling and fuel storage facilities. Construction and assembly of the draglines and other mining equipment. | Stored in bunded areas then removed by licensed contractor for reuse, reprocessing, recycling or disposal.<br>Liquid wastes will be stored in suitable containers within the bunded areas. |
| Tyres | Maintenance of vehicles | If possible, tyres will be removed by the tyre supplier for reprocessing, otherwise tyres will be stored and appropriately disposed of by burying in the mine overburden. |
| Overburden and interburden | Site preparation and excavation of ROM coal | Disposal to designated stockpile areas (as shown from time to time in Plans of Operations) and also disposal to mining pits |

| Waste streams | Waste sources | Management strategies |
|---|---|---|
| Tailings | Coal handling, preparation and processing | Fine particulates from the coal processing will be disposed to the tailings dam as a slurry. |
| Coarse rejects | Coal handling, preparation and processing | Disposal will be into Austinvale Pit, and other designated pits. If possible, some coarse rejects may be used for civil works, such as haul road construction depending on the characteristics of the coarse rejects. |

potential impacts on environmental values resulting from improper treatment of waste generated in carrying out the mining activities can be reduced. In addition waste minimisation has been considered throughout the initial planning and conceptual design stages of the Project and will continue during detailed design, construction and operations. The waste management hierarchy:

- waste avoidance
- waste re-use
- waste recycling
- energy recovery from waste
- waste disposal.

has been considered when selecting the waste management strategies for each waste stream.

The relevant chapter of the EIS is Chapter 18 Waste Management.

## Environmental protection objective

(1) In the management of waste generated in carrying out the mining activities, comply with the environmental protection objectives for air, water and noise described in this EM Plan.

(2) Minimise, so far as is practicable, the areas of land within the ML areas used for the disposal of waste.

(3) Design, construct and maintain facilities for the storage or disposal of wastes so as to reduce the risk of contamination, caused by an escape of waste from the storage or disposal areas, to both lands outside the storage and disposal areas and to surface or ground water.

## Proposed Environmental Authority conditions
## Schedule E - Waste

(E-1) This authority authorises the release to the environment:

(a) to land by the storage and disposal of waste generated in carrying out the mining activities

(b) to air and water contaminants generated in the storage and disposal of such wastes

in accordance with the conditions of this Schedule E.

(E-2) Wastes that may be stored or disposed of and the locations at which they may be stored or disposed of are contained in Schedule E Table 1.

(E-3) The measures for environmental management described in Schedule E Table 2 must be implemented in the storage and disposal of wastes generated in carrying out the mining activities.

**Schedule E Table 1: Waste Storage and Disposal**

| Waste streams | Management strategies for storage or disposal |
|---|---|
| Green waste | Suitable material to be used on site to provide fauna habitat. Remaining material to be chipped and mulched, and reused during progressive rehabilitation and revegetation.<br>Burning of green wastes will only occur as a last resort subject to obtaining permits and approvals. |
| Building Waste | Stored onsite in areas designated from time to time in Plans of Operations and regularly removed for disposal at the Wandoan Waste Management Facility: any asbestos encountered in demolition or construction activities will be removed and disposed of by a specialist contractor. |
| Sewage | Provision of dedicated package plant facilities during construction (pump out system) until pipeline connection to Wandoan WWTP is made available. |
| General Wastes | Collected in bins, stored in designated waste transfer areas and periodically removed fro disposal at the Wandoan Waste Management Facility |
| Hydrocarbons, hydrocarbon contaminated materials, other chemical wastes, batteries | Stored in bunded areas then removed by licensed contractor for reuse, reprocessing, recycling or disposal.<br>Liquid wastes will be stored in suitable containers within the bunded areas. |
| Tyres | If possible, tyres will be removed by the tyre supplier for reprocessing, otherwise tyres will be stored and appropriately disposed of by burying in the mine overburden. |
| Overburden and interburden | Disposal to designated stockpile areas (as shown from time to time in Plans of Operations) and also disposal to mining pits |

| Waste streams | Management strategies for storage or disposal |
|---|---|
| Tailings | Fine particulates from the coal processing will be disposed to the tailings dam as a slurry. |
| Coarse rejects | Disposal will be into Austinvale Pit, and other designated pits. If possible, some coarse rejects may be used for civil works, such as haul road construction depending on the characteristics of the coarse rejects. |

The storage locations for relevant waste categories will be located within the mine infrastructure area or as shown in Figure 27A-1-V1.3 or as otherwise described in the plan of operations prepared in accordance with Condition (A-7)

**Schedule E Table 2: Waste Management Measures**

| Item | Measures |
|---|---|
| 1 | All facilities for waste storage including hazardous dams will:<br>(a) be designed, constructed operated and maintained in accordance with generally accepted engineering standards;<br>(b) be incorporated within the pit water, MIA and process water management system described in Schedule C Table 5. |
| 2 | All facilities for waste disposal will:<br>(a) be designed, constructed operated and maintained in accordance with generally accepted engineering standards;<br>(b) be incorporated within the site water management system described in Schedule C Table 5. |
| 3 | Tyres stored pending disposal or transport off site shall be stockpiled in volumes less than 3m in height and 200m$^2$ in area with each tyre storage area separated by at least 10m from other storage areas. |
| 4 | An area, located as to be described in plans of operation from time to time, will be set aside for the segregation of economically viable, recyclable solid and liquid waste. |

## 27A.2.6 LAND REHABILITATION

### EIS Conclusions

The EIS has determined that all land within the MLA areas can be classed as Land Suitability Class 2 for beef cattle grazing or Land Suitability Class 3 or 4 for dryland cropping. Classes 2, 3 and 4 are defined as follows:

- Class 2 – suitable land with minor limitations which either reduce production or require more than simple management practices to sustain the use
- Class 3 – suitable land with moderate limitations – land which is moderately suited to a proposed use but which requires significant inputs to ensure sustainable use

- Class 4 – marginal land with severe limitations which make it doubtful whether the inputs required to achieve and maintain production outweigh the benefits in the long-term.

The currently dominant land use in the area, beef cattle grazing with some cropping, correlates well with the land suitability assessment.

The potential impacts on land resources from disturbances by mining activities identified in the EIS include:

- land suitability changes
- possible land use changes
- changes to or redistribution of existing landforms (for example by creek diversions and the addition of final voids)
- possible land contamination.

The EIS has estimated that the areas of land under each suitability class pre-mining and at year 30 as shown in Table 27A-11.

**Table 27A-11: Estimated pre-mine and 30 year land suitability areas**

| Land suitability class | Estimated area of land | | | |
|---|---|---|---|---|
| | Pre-mining dry land cropping (ha) | Year 30 dry land cropping (ha) | Pre-mining beef cattle grazing (ha) | Year 30 beef cattle grazing (ha) |
| 1 | 0 | 0 | 0 | 0 |
| 2 | 0 | 0 | 32,191 | 19,793 |
| 3 | 12,564 | 4,833 | 0 | 10,946 |
| 4 | 19,627 | 25,906 | 0 | 0 |
| 5 | 0 | 1,452 | 0 | 1,452 |

Post-mine land uses proposed in the EIS for the areas on which the mining activities were undertaken are shown in Table 27A-12.

**Table 27A-12: Post-mine land use**

| Mining activity | Post mining land use |
|---|---|
| Infrastructure including roads | Improved pasture grazing land, dry land cropping land or retained as infrastructure. |
| Low gradient over burden stockpiles and tailings dam sites | Beef cattle grazing at low stock rates or native bushland. |
| Steeper gradient over burden stockpiles and tailing dam sites | Native bushland. |
| Creek diversions | Creeks with riparian native bushland. |
| Water storage dams | Retained or improved pasture grazing land or dry land cropping land |

| Mining activity | Post mining land use |
|---|---|
| Tailings dams | Beef cattle grazing at low stock rates or native bushland. |
| Final voids | Artificial wetland. |
| Any lands contaminated by mining activities so as not to be able to be used for the post mining land uses nominated in this table | A use which is consistent with a contaminated site management plan prepared in relation to the land. |

The relevant chapter of the EIS is Chapter 25 Rehabiltation and Decommissioning.

## Environmental protection objective

To progressively rehabilitate the land to post mining land uses generally in accordance with Table 27A-12.

## Proposed Environmental Authority conditions

## Schedule F – Land Rehabilitation

(F-1) Progressively rehabilitate the land to post mining land uses generally in accordance with Schedule F Table 1 by undertaking reasonable and practicable measures to:

(a) remove all infrastructure not consistent with the post mining land uses

(b) ensure land is stable so as to be suitable for the relevant post mining use

(c) minimise soil erosion, release of dust, and seepage of waters

(d) revegetate the land with species appropriate for the relevant post mining land use.

(F-2) Areas to be rehabilitated shall be rehabilitated progressively as soon as is reasonably practicable after the relevant areas are not required for mining activities.

(F-3) Prior to undertaking the rehabilitation of any areas, carry out an investigation to determine the acceptance criteria for the land to be rehabilitated and submit a written report to the administering authority.

(F-4) For land contaminated by mining activities, prior to undertaking the rehabilitation of such land, a site management plan including a statement about the post mining use for the land will be prepared and submitted to the administering authority.

(F-5) All measures to be undertaken in the rehabilitation of lands will be described in successive Plans of Operations for the periods in which rehabilitation will occur.

(F-6) All rehabilitation works will be undertaken in accordance with generally accepted engineering standards and in particular, rehabilitation of the land forms described in Schedule F Table 2, shall be designed to incorporate the principles described in Schedule F Table 2.

**Schedule F – Table 1: Final land use schedule**

| Mining activity | Post mining land use |
|---|---|
| Infrastructure including roads | Improved pasture grazing land, dry land cropping land or retained as infrastructure. |
| Low gradient over burden stockpiles and tailings dam sites | Beef cattle grazing at low stock rates or native bushland. |
| Steeper gradient over burden stockpiles and tailing dam sites | Native bushland. |
| Creek diversions | Creeks with riparian native bushland. |
| Water storage dams | Retained or improved pasture grazing land or dry land cropping land |
| Tailings dam | Beef cattle grazing at low stock rates or native bushland. |
| Final voids | Artificial wetland. |
| Any lands contaminated by mining activities so as not to be able to be used for the post mining land uses nominated in this table | A use which is consistent with a contaminated site management plan prepared in relation to the land. |

**Schedule F – Table 2: Landform design**

| Formation | Overall angle |
|---|---|
| Weathered overburden (low wall) | 45 degrees |
| Unweathered overburden or interburden | 76 degrees for a 24 m wall height in unweathered material<br>70 degrees for a 24 to 36 m wall height in unweathered material<br>63 degrees for a wall height above 36 m in unweathered material |
| Dragline overburden stockpile | 35 degrees for dump height up to 30 m<br>30 degrees for dump height greater then 30 m |

## 27A.2.7 DEFINITIONS

### Schedule G – Definitions.

**"acceptance criteria"** means the standards to indicate the success of the rehabilitation outcome of areas which have been significantly been disturbed by the mining activities and which criteria may include information regarding:

- vegetation establishment, survival and succession
- vegetation productivity, sustained growth and structure development
- fauna colonisation and habitat development
- ecosystem processes such as soil development and nutrient cycling, and the recolonisation of specific fauna groups such as collembola, mites and termites which are involved in these processes
- microbiological studies including recolonisation by mycorrhizal fungi, microbial biomass and respiration
- effects of various establishment treatments such as deep ripping, topsoil handling, seeding and fertiliser application on vegetation growth and development
- resilience of vegetation to disease, insect attack, drought and fire
- vegetation water use and effects on ground water levels and catchment yields
- for land contaminated by mining activities, a statement about the use for which the land is suitable.

**"airblast overpressure"** means energy transmitted from the blast site within the atmosphere in the form of pressure waves. The maximum excess pressure in this wave, above ambient pressure is the peak airblast overpressure measured in decibels linear (dB).

**"ambient (or total) noise"** at a place, means the level of noise at the place from all sources (near and far), measured as the Leq for an appropriate time interval.

**"blasting"** means the use of explosive materials to fracture:

a) rock, coal and other minerals for later recovery; or

b) structural components or other items to facilitate removal from a site or for reuse.

**"dam"** means a containment or proposed containment whether permanent or temporary, which is designed to contain, divert or control flowable substances but does not include a fabricated or manufactured tank or container designed to a recognised standard.

**"flowable substance"** means matter or a mixture of materials which can flow under any conditions potentially affecting that substance. Constituents of a flowable substance can include water, other liquids fluids or solids, or a mixture that includes water and any other liquids fluids or solids either in solution or suspension.

**"$L_{A\ 10,\ adj,\ 10\ mins}$"** means the A-weighted sound pressure level, *(adjusted for tonal character and impulsiveness of the sound)* exceeded for 10% of any 10-minute measurement period, using Fast response.

**"$L_{A\ 1,\ adj,\ 10\ mins}$"** means the A-weighted sound pressure level, *(adjusted for tonal character and impulsiveness of the sound)* exceeded for 1% of any 10-minute measurement period, using Fast response

**"$L_{A,\ max\ adj,\ T}$"** means the average maximum A-weighted sound pressure level, adjusted for noise character and measured over any 10 minute period, using Fast response.

**"land capability"** as defined in the DME 1995 Technical Guidelines for the Environmental Management of Exploration and Mining in Queensland.

**"land suitability"** as defined in the DME 1995 Technical Guidelines for the Environmental Management of Exploration and Mining in Queensland.

**"noxious"** means harmful or injurious to health or physical well being.

**"offensive"** means causing reasonable offence or displeasure; is disagreeable to the sense; disgusting, nauseous or repulsive.

**"peak particle velocity (ppv)"** means a measure of ground vibration magnitude which is the maximum rate of change of ground displacement with time, usually measured in millimetres/second ($mms^{-1}$).

**"rehabilitation"** the process of reshaping and revegetating land to restore it to a stable landform in accordance with the acceptance criteria and, where relevant, includes remediation or management of contaminated land.

**"residual void"** means an open pit resulting from the removal of ore and/or waste rock which will remain following the cessation of all mining activities and completion of rehabilitation processes.

**"sensitive place"** has the same meaning as "noise sensitive place" in the Environmental Protection (Noise) Policy.

**"stable"** means geotechnical stability of the rehabilitated landform where instability related to the excessive settlement and subsidence caused by consolidation/settlement of the wastes deposited, and sliding/slumping instability has ceased.

## 27A.2.8 ENVIRONMENTAL PROTECTION OBJECTIVES

### Schedule H – Environmental Protection Objectives

**(a) General** – none applicable.

**(b) Air**

If the EPP (Air) goals for the air quality indicators and the nominated goals for dust deposition rate shown in Table 27A-13 have been exceeded at a sensitive place outside the MLA areas existing at the date of granting this environmental authority, and dust generated in carrying out the mining activities has significantly contributed to such exceedance implement a dust management plan which describes reasonable and practicable measures to minimise the impact of dust generated in carrying out the mining activities, at that sensitive place.

**Table 27A-13: Air quality goals for sensitive places outside the MLA areas**

| Pollutant | Averaging period | Concentration | Units |
|---|---|---|---|
| Nitrogen dioxide | 1-hour | 320 | µg/m$^3$ |
| | Annual | 30 | µg/m$^3$ |
| Carbon monoxide | 8-hour | 10 | mg/m$^3$ |
| Particulate matter (diameter <10 µm) ($PM_{10}$) | 24-hour | 150 | µg/m$^3$ |
| | Annual | 50 | µg/m$^3$ |
| Dust deposition rate | Annual | 120 | mg/m$^2$/day |

**(c) Water**

(1) During flows in receiving surface waters not cause the goals for the water quality indicators shown in Table 27-14 to be exceeded at monitoring points outside the initial mixing zone

(2) Reduce the risk of contamination of surface and ground waters caused by an escape of fuels or chemicals used in carrying out the mining activities by the storage of such fuels and chemicals in bunded areas.

(3) (3) Implement baseline and operational monitoring programs for groundwater quality where groundwater may be impacted by mining activities.

**Table 27A-14: Goals for water quality indicators**

| Sources / Activities | Contaminants | Goals |
|---|---|---|
| All | pH | 6.5 to 9.7 range |
| All | Electrical conductivity | maximum 996 µS/cm |
| All | Dissolved oxygen | greater than 6 mg/L |
| All | Turbidity | 1000 NTU (observed 90$^{th}$ percentile) |

**(d) Noise and Vibration**

(1) If the criteria shown in Table 27A-15 have been exceeded at a sensitive place outside the MLA areas existing at the date of granting this environmental authority, and noise generated in carrying out the mining activities has significantly contributed to such exceedance implement a noise management plan which describes reasonable and practicable measures to minimise the impact of noise generated in carrying out the mining activities, at that sensitive place.

**Table 27A-15: Criteria for sensitive places outside the MLA areas**

| Receptor type | Time of day | Assessment criteria $L_{Aeq,1hr}$ (dBA) |
|---|---|---|
| Very Rural; Residential (Open rural with slight traffic noise contribution) | Day | 39 |
| | Evening | 33 |
| | Night | 33 |
| Very Rural; Residential (open rural with no traffic noise contribution) | Day | 38 |
| | Evening | 33 |
| | Night | 33 |
| Very Rural; Residential (Wandoan Township) | Day | 39 |
| | Evening | 35 |
| | Night | 33 |
| Rural Residential, Church, Hospital | Day | 39 |
| | Evening | 40 |
| | Night | 36 |
| Shop or Commercial Office | Day | 39 |
| | Evening | 40 |
| | Night | 37 |

| Receptor type | Time of day | Assessment criteria $L_{Aeq,1hr}$ (dBA) |
|---|---|---|
| Light Industry | Day | 55 |
| | Evening | 50 |
| | Night | 45 |

(2) If the criteria shown in Table 27A-16 have been exceeded at a sensitive place outside the MLA areas existing at the date of granting this environmental authority, and blasting undertaken in carrying out the mining activities has caused such exceedances implement a blast management plan which describes reasonable and practicable measures to minimise the impact of blasting undertaken in carrying out the mining activities, at that sensitive place.

**Table 27A-16: Blast criteria**

| Criteria |
|---|
| When ground vibration impacts exceed for 9 out of 10 blasts 5 mm/s PPV (Ground vibration) |
| When airblast overpressure impacts exceed for 9 out of 10 blasts 115 dB (linear) and 120 dB (linear) (Airblast overpressure) |

### (e) Waste

(1) In the management of waste generated in carrying out the mining activities comply with the environmental protection objectives for air, water and noise described in this EM Plan.

(2) Minimise, so far as is practicable, the areas of land within the ML areas used for the disposal of waste.

(3) Design, construct and maintain facilities for the storage or disposal of wastes so as to reduce the risk of contamination, caused by an escape of waste from the storage or disposal areas, to both lands outside the storage and disposal areas and to surface or ground water.

### (f) Land rehabilitation

To progressively rehabilitate the land to post mining land uses generally in accordance with Table 27A-17.

**Table 27A-17: Post-mine land use**

| Mining activity | Post mining land use |
|---|---|
| Infrastructure including roads | Improved pasture grazing land, dry land cropping land or retained as infrastructure. |
| Low gradient over burden stockpiles and tailings dam sites | Beef cattle grazing at low stock rates or native bushland. |
| Steeper gradient over burden stockpiles and tailing dam sites | Native bushland. |
| Creek diversions | Creeks with riparian native bushland. |
| Water storage dams | Retained or improved pasture grazing land or dry land cropping land |
| Tailings dams | Beef cattle grazing at low stock rates or native bushland. |
| Final voids | Artificial wetland. |
| Any lands contaminated by mining activities so as not to be able to be used for the post mining land uses nominated in this table | A use which is consistent with a contaminated site management plan prepared in relation to the land. |

**(g) Definitions** – none applicable.

**(h) Objectives** – none applicable.