ANGLO COAL (DRAYTON MANAGEMENT) PTY LIMITED

# DRAYTON MINE EXTENSION

# ENVIRONMENTAL ASSESSMENT

*Prepared by:*

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August 2007

*for:*

**ANGLO COAL (DRAYTON MANAGEMENT) PTY LIMITED**

PMB 9

MUSWELLBROOK NSW 2333

# ENVIRONMENTAL ASSESSMENT STATEMENT

**Submission of Environmental Assessment (EA)**

Under Section 75H of the *Environmental Planning and Assessment Act 1979*

| | |
|---|---|
| **EA Prepared by** | |
| Name: | James Bailey |
| Qualifications: | B. Natural Resources, MBA |
| Address: | Hansen Bailey<br>PO Box 473<br>SINGLETON NSW 2330 |
| In Respect Of: | Drayton Mine Extension |
| Applicant Name: | Anglo Coal (Drayton Management) Pty Limited |
| Applicant Address: | Thomas Mitchell Drive<br>MUSWELLBROOK NSW 2333 |
| Land to be Developed: | See **Appendix A** of Environmental Assessment |
| Proposed Development: | Proposed extension to mining operations and development of minor associated infrastructure as outlined in **Section 4.0** of the EA. |
| Environmental Assessment: | An Environmental Assessment for the Project is attached. |
| Certification: | I certify that I have prepared the contents of this EA, and to the best of my knowledge:<br>• it is in accordance with Sections 75E and 75F of the *Environmental Planning and Assessment Act 1979*;<br>• it contains all available information that is relevant to the environmental assessment of the activity to which the statement relates; and<br>• the information contained in the statement is neither false nor misleading. |
| Signature: |  |
| Name: | James Bailey<br>Director |
| Date: | August 2007 |

# EXECUTIVE SUMMARY

## BACKGROUND

Drayton Mine is an open cut coal mine owned and operated by Anglo Coal (Drayton Management) Pty Limited. Drayton Mine is located approximately 13 kilometres south of Muswellbrook and approximately 120 kilometres north-west of Newcastle in New South Wales.

It is located west of the New England Highway, north-west of Liddell and Bayswater Power Stations, east of Mt Arthur Coal and south-west of the rural-residential Estate of Antiene. Drayton Mine falls within the Muswellbrook Local Government Area.

Drayton Mine commenced coal production in 1983 and operates under Development Consent (DA 163/2002) providing predominantly steaming coal to export and domestic markets at a maximum of 5.5 Million tonnes per annum Run-of-Mine coal until 2012.

An overland conveyor transports domestic coal to Macquarie Generation, whilst the Antiene Rail Spur (operated under Development Consent DA 106-04-00) is utilised to transport steaming coal to the Port of Newcastle for export via the Main Northern Railway Line.

## THE PROJECT

The Drayton Mine Extension (the Project) broadly incorporates the components listed in **Table 1**.

**Table 1**
**Project Summary**

| Key Feature | Description |
|---|---|
| **Project Name** | Drayton Mine Extension |
| **Proponent** | Anglo Coal (Drayton Management) Pty Limited |
| **Local Government Area** | Muswellbrook Shire Council |
| **Project Application Area** | The area shown as the Environmental Assessment Boundary in **Figure 8** |
| **Mining Method** | Open cut mining of the Greta coal measures |
| **Production** | Up to 8 Million tonnes per annum of Run-of-Mine coal for up to 10 years in accordance with the mine plans shown on **Figures 8** to **10** |
| **Coal Handling and Preparation** | The existing Coal Handling Plant, stockpiles and reclamation system may be upgraded for the Project. A new emergency domestic stockpile will be established, solely serviced by conveyors and reclaimers |
| **Rejects Management** | A Tailings Drying Area will be established to dry reject prior to co-disposal in the pit as shown on **Figures 8** to **10** |
| **Employment** | The Project provides the continued employment for up to 329 personnel, with an additional 59 personnel ultimately required to result in a total workforce of 388 |
| **Hours of Operation** | Mining operations will occur 24 hours per day, 7 days a week |
| **Product Coal Transport** | Export coal will continue to be transported via rail to the Port of Newcastle in accordance with the approved Antiene Rail Spur Development Consent (DA 106-04-00). Domestic coal will continue to be transported via an overland conveyor to Macquarie Generation's Bayswater Power Station |
| **Mine Access** | Mine access will continue to be off Thomas Mitchell Drive, via the Drayton Mine Access Road |

## STAKEHOLDER CONSULTATION

An independent stakeholder consultation program has been undertaken for the Project which comprised the identification of stakeholders, scoping of issues and the development of appropriate responses to issues of concern. The consultation undertaken provided a two-way mechanism for ongoing communications between Drayton Mine and its neighbours.

Approximately 30 individual private land owners were identified as possibly having an interest in the Project. Numerous regulatory departments, non-government organisations and other stakeholders were also identified as interested parties.

Consultation was conducted through one-on-one meetings; presentations to regulators, Mt Arthur Coal, Macquarie Generation, the Drayton Mine Community Consultative Committee; and by the distribution of Project Newsletters.

A Planning Focus Meeting was held at Drayton Mine on 29 June 2006 which was attended by government departments, Environmental Assessment specialists and the project team.

Environmental issues of concern raised by stakeholders differed across geographic areas; however, the potential for air quality, noise, blasting impacts and spontaneous combustion were commonly noted. Other concerns raised included mine closure, final land use, water management, rail and road traffic and community contributions.

## ENVIRONMENTAL IMPACT ASSESSMENT

### Introduction

This Environmental Assessment has been completed in accordance with the requirements of Part 3A of the *Environmental Planning and Assessment Act 1979* and addresses both the Environmental Assessment Requirements for the Project and issues raised through the stakeholder consultation process. All assessments have been undertaken on a worst-case scenario, assuming the maximum proposed production levels are achieved.

A Risk Assessment approach was implemented in relation to potential environmental impacts from the Project. A summary of the key findings of the Environmental Assessment is provided below.

For further detail, please refer to the Environmental Assessment sections and the individual technical reports which are appended to this document.

### Air Quality

An Air Quality Impact Assessment has been undertaken for the Project following the Department of Environment and Climate Change's guidelines, focusing on the potential for emissions of particulate matter. The Air Quality Impact Assessment included a cumulative impact assessment and made an allowance for background emissions of particulate matter from more distant mines and non-mining sources (such as Macquarie Generation's Power Stations).

Drayton Mine maintains a comprehensive air quality monitoring network around its operations, which includes measurement of Total Suspended Particulates at three sites, Particulate Matter less than 10 microns ($PM_{10}$) at one site and dust deposition at 27 sites.

The data from this network indicates that the existing air quality surrounding Drayton Mine complies with the assessment criteria and that the rural-residential area of Antiene Estate, in particular, has a dust deposition level below half that of the Department of Environment and Climate Change's amenity criteria.

Air quality modelling indicates that all relevant air quality criteria will be met during the life of the Project and there are no predicted exceedances of any air quality criteria at any receivers.

### Spontaneous Combustion & Odour

Drayton Mine will continue to mine the Greta coal measures which are known to be susceptible to spontaneous combustion where coal and other carbonaceous materials heat up through natural causes to eventually ignite and burn.

As a result, smoke (i.e. fine particulate matter), steam and volatile organic compounds (some of which are odorous) may continue to be liberated into atmosphere.

Spontaneous combustion was first experienced at Drayton Mine in 1984, with the main incidences recorded in 1999. A general decline in spontaneous combustion at Drayton Mine has occurred since 2000, with only 0.4 hectares affected in 2006. This decline is generally attributable to an increased understanding of spontaneous combustion and the implementation of targeted management techniques.

Drayton Mine has entered into an Agreement with Mt Arthur Coal over part of the West Pit area (MAC Sub-lease area) which allows the emplacement of inert overburden from the Whittingham coal measures in the MAC Sub-lease area by Mt Arthur Coal. This Agreement will assist in rehabilitating the West Pit area and will assist remediating areas currently subject to spontaneous combustion.

Analysis in the Air Quality Impact Assessment suggests that it is unlikely that the Department of Environment and Climate Change's ambient air quality criteria for odour will be exceeded in Antiene Estate due to the Project.

While some spontaneous combustion emissions and odour impacts may continue to occur sporadically, the monitoring data indicates that the levels of particulate matter and hydrocarbons, coupled with ongoing management, will comply with health-based air quality standards at the closest adjoining private receivers.

It is envisaged that the occurrence of spontaneous combustion will decrease and the effects of spontaneous combustion will be effectively reduced to zero by the end of the life of the Project.

## Greenhouse Gas

The Air Quality Impact Assessment also included an estimate of greenhouse gas emissions.

The likely effects of these emissions (including consideration of the effects of burning of the coal by Drayton Mine's customers) has also been included.

There are both direct and indirect sources of greenhouse gas emissions from Drayton Mine's activities.

The direct emissions are from diesel combustion on-site, fugitive emissions resulting from the uncovering of coal and spontaneous combustion. Indirect emissions are related to the direct consumption of electricity at the site. These types of emissions are known as Scope 1 and Scope 2 emissions respectively.

Indirect emissions from the downstream burning of the product coal in the electricity generation process are known as Scope 3 emissions. The Environmental Assessment Requirements for this Project require "a quantitative analysis of greenhouse gas emissions associated with the combustion of product coal and a qualitative assessment of the impacts of their emissions".

Some of the Product coal from the Project will be burnt locally but much of the Product coal will be exported to presently unknown jurisdictions where the methods to be used and the timing for burning the coal is not known.

Thus, an accurate analysis can only be done when the actual method of burning of the coal is known as this will affect both the volume of gas and its relativity to the energy produced by the burning.

Assessing the Scope 3 greenhouse gas emissions of the Project can now only be done on a worst-case basis and provides a risk of double counting and over estimation of greenhouse emissions and any consequent climate change.

The annual average emissions from Scope 1 and 2 sources for the Project are predicted to be 355,627 tonnes $CO_2$ equivalent emissions, whilst the approximate worst-case annual average emission rate for spontaneous combustion is predicted to be 30,280 tonnes $CO_2$ equivalent emissions.

The approximate worst-case annual average emissions from Scope 3 sources (downstream burning of Product coal) for the Project is predicted to be 12.1 Million tonnes $CO_2$ equivalent emissions.

Thus, with an approximate global annual greenhouse gas emission rate of 40 Giga tonnes $CO_2$ equivalent emissions, the worst-case greenhouse gas emissions resulting from the Project therefore equate to approximately 0.03% of global greenhouse gas emissions in an average production year.

By comparing against predictions of the Intergovernmental Panel on Climate Change, it has been estimated that the emissions from the Project at maximum production could result in an increase in the global temperature of 0.000011˚C.

These levels of potential worst-case predictions are effectively immeasurable and of no material effect on global climate change.

## Noise

A Noise and Vibration Impact Assessment has been undertaken for the Project, which included a consideration of mining noise, low frequency noise and road and rail traffic noise. The noise criteria developed for this assessment considered potential cumulative noise impacts from adjacent mines and industries.

Noise levels predicted for the Project were found likely to remain within the appropriate noise criteria at all receivers during neutral and noise reducing weather conditions, which occur for a significant proportion of the time.

23 receivers are expected to receive noise levels over the adopted intrusive noise criteria in at least one assessed year and time period under prevailing weather conditions. In a worst-case modelling scenario, two receivers may incur noise levels 5 dBA above the criteria. A further two receivers may incur noise levels slightly below this.

A variety of noise management measures have been identified by Drayton Mine as part of the Project and were incorporated into the noise model and conceptual mine plan. The implementation of noise controls such as these, in conjunction with continued management in accordance with the Safety, Health, Environment and Community Management System, will ensure noise from the Project is sufficiently managed.

## Blasting & Vibration

The Project will generally result in additional, rather than larger blasts, using similar blast hole diameters and charge weights as currently utilised. The increase in the average number of blasts per week for the Project is unlikely to result in any damage to receivers.

The Project will result in blasts occurring up to approximately 500 metres closer to the nearest Antiene Estate receivers than is currently the case.

With careful ongoing management, the Department of Environment and Climate Change's amenity criteria will continue to be achieved for all blasts.

## Groundwater

A Groundwater Impact Assessment has been undertaken to assess the potential impacts of the Project on the groundwater resources in the vicinity of the Environmental Assessment Boundary. The assessment took into consideration the current groundwater condition (as a result of previous mining in the area) as well as providing predictions on Project impacts and a cumulative impact assessment.

The assessment concluded that the simulated groundwater inflow into the Environmental Assessment Boundary will remain unchanged as a result of the Project from current conditions with a predicted peak inflow of 2.7 Megalitres per day.

This is due to current and past mining activities stabilising the depressurisation of the aquifer system.

The Project will increase the cone of depression around the Environmental Assessment Boundary, which will extend to the north by more than 2 kilometres and up to 4.5 kilometres to the south.

However, the cone of depression to the west is constrained by the Muswellbrook Anticline and overprinted by the impact of the Bayswater No. 2 Mine, where the water levels are assumed to be recovering since mine closure in 1998. To the east, the Liddell Ash Dam and Lake Liddell constrain the extent of the cone of depression on the groundwater system.

A search of the Department of Water and Energy database indicates that there are three private groundwater bores within 10 kilometres of the Environmental Assessment Boundary, which may be affected by the Project. A census of these bores will be undertaken to manage any impacts.

Three voids will remain at the cessation of mining as a result of the Project. If these voids are left as open water bodies, they will act as groundwater sinks and the final steady state void water level will be reached after more than 200 years. It is also proposed that Drayton Mine will accept fly ash from Macquarie Generation for emplacement in the East Pit void pursuant to an existing agreement. The cone of depression created by mining will ensure that any fly ash will be well contained.

## Flora & Fauna

A Flora and Fauna Impact Assessment has been conducted for the Project to identify the flora and fauna present within the Environmental Assessment Boundary and to determine if any species or vegetation communities will be impacted by the Project.

The Survey Area for the flora and fauna assessment was designed to cover areas that will be potentially impacted by the Project. The ecological values of a 114 hectare area north of the Survey Area in the 'Natural Zone' of the Drayton Wildlife Refuge were also assessed.

Three natural woodland communities and five rehabilitation and grassland communities were identified within the Survey Area. Of these vegetation communities, the Forest Red Gum Open Forest & Woodland (consisting of two separate regrowth woodlands totalling 8 hectares) contains a species composition consistent with the definition of Hunter Lowland Redgum Forest.

The Hunter Lowland Redgum Forest is an Endangered Ecological Community listed under the *Threatened Species Conservation Act 1995*. This Endangered Ecological Community was also found in a protected area of the 'Natural Zone' of the Drayton Wildlife Refuge.

An Assessment of Significance conducted for the Forest Red Gum Open Forest & Woodland determined that the Project is not expected to have a significant impact on this community.

No other threatened vegetation communities were identified within the Survey Area. A total of 96 fauna species were detected in the Survey Area, including 67 bird, 27 mammal and two reptile species. The field survey identified 10 threatened fauna species listed under the *Threatened Species Conservation Act 1995* and the *Environmental Protection and Biodiversity Conservation Act 1999*.

Assessments of Significance conducted for each of these species concluded that the Project will not have a significant impact on any of these species.

The 'Natural Zone' of the Drayton Wildlife Refuge will not be impacted by the Project and will continue to be managed to enhance its flora and fauna values. The management of this area will compensate for the impacts of the Project on flora and fauna.

## Rehabilitation, Final Landform & Void

A key component of the Project will be the development of an integrated, free-draining final landform consistent with the principles of the *Synoptic Plan: Integrated Landscapes for Coal Mine Rehabilitation in the Hunter Valley of New South Wales* and land use objectives presented in the Muswellbrook Local Environment Plan.

Rehabilitation of land disturbance will continue to occur progressively, aiming to link rehabilitation and remnant vegetation through the establishment of woodland corridors. Rehabilitation will aim to establish as much of the pre-mining floristic diversity as possible.

It is anticipated the North Pit void may be used for coarse reject emplacement from adjacent mining operations, whilst the South Pit void is expected to retain water. An agreement is in place between Drayton Mine and Macquarie Generation for Macquarie Generation to place fly ash in the East Pit void. The placement of fly ash in this void and its rehabilitation will be the responsibility of Macquarie Generation.

Drayton Mine has entered into an Agreement and are progressing a part Mining Lease transfer over the MAC Sub-lease area with Mt Arthur Coal, which facilitates the emplacement of overburden in the area by Mt Arthur Coal.

This will result in rehabilitation obligations of the MAC Sub-lease area passing from Drayton to Mt Arthur Coal. Rehabilitation of the MAC Sub-lease area will be enhanced by the emplacement of overburden from both Drayton Mine and Mt Arthur Coal in the MAC Sub-lease area.

As a result of the above two agreements with Macquarie Generation and Mt Arthur Coal, there will be two less voids at Drayton Mine than would otherwise be the case.

## Surface Water

A Surface Water Impact Assessment has been undertaken for the Project which included the preparation of a site water balance. The existing mine water management system will be expanded for the Project and while the volume of water managed through the system will generally increase, the water balance will remain substantially unchanged.

The upgrade to the Coal Handling Plant will allow the continued reuse and recirculation of water through the water management system.

## Soil Survey & Land Capability

The two major soil units identified were dark clays (which dominated southern parts of the Survey Area) and yellow duplex soils (which dominated northern parts of the Survey Area).

Small areas of undisturbed land in the North, South and East Pits were classified as suitable for grazing with occasional cultivation in respect to land capability (i.e. Class IV and V) whilst all remaining areas were identified as unsuitable for rural production (i.e. Classes VII, VIII and M). Undisturbed land in the North, South and East Pits were classified as land suitable for grazing (i.e. Class 4) in respect to Agricultural Land Suitability, whilst all other areas were identified as land unsuitable for agriculture (i.e. Class 5).

## Visual

A Visual Impact Assessment has been undertaken to address the visual impacts of the Project (including cumulative impacts).

A number of viewing locations surrounding the Environmental Assessment Boundary were selected as representative to provide an overall assessment of the Project and display worst-case views. These locations were then evaluated using photomontages.

This assessment concluded that some viewing Sectors surrounding the Project may experience moderate to low visual impacts for short periods until shaping and rehabilitation is completed. No long-term significant visual impact was identified at any of the viewing Sectors throughout the life of the Project. The visual effect of lighting associated with the Project will be at a similar level to that currently approved and experienced.

The Project extends the timeframe to which direct and diffuse lighting effects will be experienced; however, the level of impact from both direct and diffuse light effects is not considered significant.

## Aboriginal Archaeology

An Aboriginal Archaeology Impact Assessment has been undertaken to assess the potential Aboriginal artefacts in the Environmental Assessment Boundary which may be impacted by the Project.

The assessment was conducted in accordance with the Department of Environment and Climate Change's *Draft Guidelines for Aboriginal Cultural Heritage Impact Assessment and Community Consultation*.

A field assessment of the Environmental Assessment Boundary was conducted over a seven day period with representatives of the local Wonnarua Aboriginal community.

The survey identified a total of 480 Aboriginal objects within the Environmental Assessment Boundary, which consisted of 39 sites (22 open stone artefact scatters of varying densities and 17 individual stone artefact isolated finds).

The majority of material consisted of exposed stone artefacts located within gully features on sloping ground. The Project is likely to impact on a total of 29 of these Aboriginal sites.

The Aboriginal Archaeology and Cultural Heritage Plan will be revised for the Project to facilitate the salvage of the 29 sites identified to be impacted and ensure the continued management and protection of the remaining Aboriginal sites.

## Aboriginal Cultural Heritage

An Aboriginal Cultural Heritage Assessment has been undertaken to assess the potential impacts of the Project on Aboriginal Cultural Heritage within the Environmental Assessment Boundary.

The requirements of the Department of Environment and Climate Change's *Draft Guidelines for Aboriginal Cultural Heritage Impact Assessment and Community Consultation* have been applied to the Project to ensure an appropriate level of stakeholder consultation over the Aboriginal Cultural Heritage assessment. No issues were identified in relation to Cultural Heritage knowledge in regards to the Project.

The local Aboriginal community expressed an interest in archaeological sites and their protection. No objections were raised to the Project on Cultural assessment grounds.

## Non-Aboriginal Heritage

A Non-Aboriginal Heritage Assessment has been undertaken to identify and assess the potential impacts of the Project on Non-Aboriginal heritage within the Environmental Assessment Boundary.

The field survey identified five Non-Aboriginal heritage sites within the Environmental Assessment Boundary, none of which were statutorily listed.

One of these sites was of high local significance and although this site will not be impacted by the Project, a physical barrier will be established around it to prevent accidental damage and maintain its heritage value.

## Traffic & Transport

A Traffic and Transport Impact Assessment has been undertaken for the Project to evaluate the impact (including cumulative impacts) of the Project on the surrounding road network.

The assessment found that Thomas Mitchell Drive is predicted to experience a traffic increase of 3.9%, while the New England Highway and Denman Road will experience a traffic increase in the order of 0.4% or less. These roads and intersections have been assessed as having adequate capacity to convey the predicted increases in traffic volumes without a discernible change in the level of service. The Project is therefore considered to have no significant impacts on the surrounding road network and thus, no significant cumulative impacts are anticipated.

Domestic coal from Drayton Mine will continue to be transported via an overland conveyor to Macquarie Generation's Bayswater Power Station. Up to 7 Million tonnes per annum of export coal will continue to be railed to the Port of Newcastle from the Antiene Rail Spur as approved in the Antiene Rail Spur Development Consent (DA 106-04-00). No change to rail transport is therefore required for the Project.

## Waste

Drayton has an existing waste management system which incorporates waste reuse and recycling and addresses all issues relevant to the management of waste.

The current waste management system and sewage treatment plant will continue to be utilised for the Project. There will be no significant change or additional demand for these waste services as the respective number of employees of each shift will not significantly increase.

## Hazard Analysis

A Preliminary Hazard Analysis has been undertaken to qualitatively assess all hazards associated with the Project and review the risk related to mining in closer proximity to three prescribed dams (listed under the *Dams Safety Act 1978*) either in or adjacent to the Environmental Assessment Boundary.

The qualitative risk assessment found a medium to low risk associated with the Project and identified existing hazardous material storages to be sufficient for the Project.

The risk review in relation to the two remaining prescribed dams (Delpah Dam will be removed by the progression of mining) found that as the closest mining activity from the Project is 200 metres, no impact to the walls of these dams is anticipated.

### Socio-Economics

The Project will deliver significant socio-economic benefits to the Hunter region and the State of New South Wales through additional employment, income and financial contributions.

The Project will result in the following approximate economic benefits:

- The continued employment of 329 employees, whilst potentially providing an additional 59 full time positions;
- $374 million in wages and salaries with a predicted flow-on effect to the regional economy of $354 million;
- $2,327 million in sales revenue;
- $135 million in State Government royalties;
- $110 million in Commonwealth Government taxes; and
- $2.3 million in contributions to the Australian Coal Association Research Program.

A Voluntary Planning Agreement has been agreed in principle between Drayton Mine and Muswellbrook Shire Council.

This Agreement will allow Drayton Mine to contribute monies to Muswellbrook Shire Council to assist with community infrastructure projects and is commensurate with saleable production levels from the Project.

The provision of the East Pit void for fly ash disposal from Macquarie Generation's Power Stations provides economic benefits by removing the need to create additional fly ash disposal areas.

Further environmental benefits are created by the reduction of voids following mining and an improved final landform at Drayton Mine.

## PROJECT JUSTIFICATION

Drayton Mine is an existing open cut coal mining operation, which has successfully operated for over 26 years under a variety of planning approvals within several Mining Leases.

The Project involves the extension of mining operations at Drayton Mine beyond that currently approved in the existing Drayton approvals, via a mine plan which has been specifically designed to minimise environmental impacts and optimise the final landform and mine closure outcome. The Project will provide Drayton Mine with the flexibility to extract coal up to a maximum of 8 Million tonnes per annum of Run-of-Mine coal and will ensure the orderly conclusion of open cut coal mining within Drayton's current Mining Leases.

The Project will result in the increased recovery of a coal resource which under the current approval would not be realised.

Due to the long history of mining in the area and a commitment to best practice environmental management during the mining process, the extraction of coal for the Project will not greatly extend Drayton Mine's current environmental footprint. The Project is a natural progression of the intended land use which will utilise the existing employee resource, infrastructure and equipment fleet currently in operation at Drayton Mine.

The Project will ensure that sufficient inert overburden material is made available to extinguish any remaining spontaneous combustion within the Environmental Assessment Boundary.

The Project is consistent with the Drayton Wildlife Refuge offset strategy implemented in 1987.

In particular, the Drayton Wildlife Refuge has been managed to a stage where it will compensate for any ecological impacts associated with the Project.

The Project will deliver significant socio-economic benefits to both the Hunter region and the State of New South Wales through the generation of additional employment, export revenue, taxes and royalties.

Drayton Mine has offered and Muswellbrook Shire Council has agreed in principle to enter into a Voluntary Planning Agreement which provides community contributions for the Project and ongoing socio-economic benefits to the local community.

All environmental impacts from the Project have been assessed on a worst-case scenario, assuming the Project will reach the proposed maximum production rate of 8 Million tonnes per annum of Run-of-Mine coal. Nonetheless, despite the application of a stringent, contemporary environmental assessment, this Environmental Assessment has not identified any significant adverse environmental impacts associated with the Project.

The Project, in conjunction with the arrangements for overburden emplacement by Mt Arthur Coal in the West Pit and fly ash disposal by Macquarie Generation in the East Pit void, results in an improved final landform with less voids than would otherwise result from currently approved Drayton mining operations.

Significant economic, social and environmental benefits will be foregone if the Project does not proceed. The Project is consistent with the principles of Ecologically Sustainable Development required to be considered under the *Environmental Planning and Assessment Act 1979*.

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**VOLUME 1**



**VOLUME 2**

# 1.0 BACKGROUND

## 1.1 INTRODUCTION

Drayton Mine (Drayton) is an open cut coal mine operated by Anglo Coal (Drayton Management) Pty Limited. Drayton is located approximately 13 kilometres (km) south of Muswellbrook and approximately 120 km north-west of Newcastle in New South Wales (NSW). Drayton is located west of the New England Highway, north-west of Liddell and Bayswater Power Stations and south-west of the rural-residential Estate of Antiene (Antiene). Drayton is located immediately to the east of Mt Arthur Coal (MAC), which encompasses Mount Arthur North Mine, Bayswater No. 2 Mine, Bayswater No. 3 Mine, the South Pit Extension Project and its Underground Project. Drayton is within the Muswellbrook Local Government Area (LGA) (see **Figure 1**).

Drayton commenced production in 1983 and has Development Consent to provide predominantly steaming coal to export and domestic markets at a maximum of 5.5 Million tonnes per annum (Mtpa) of Run-of-Mine (ROM) coal to 2012. An overland conveyor transports domestic coal to Macquarie Generation for electricity production, whilst the Antiene Rail Spur (approved under Development Consent 106-04-00) (Antiene Rail Spur DA) is utilised to transport export steaming coal to the Port of Newcastle via the Main Northern Railway Line.

## 1.2 THE PROPONENT

Drayton is operated by Anglo Coal Australia Pty Ltd (ACA), which is the management company for the Drayton Joint Venture Partnership. This consists of:

- Anglo Coal Australia Pty Ltd (88.17%);
- Mitsui Coal Development (Australia) Pty Limited (3.83%);
- Mitsui Mining Australia Pty Limited (3.0%);
- Hyundai Australia Pty Limited (2.5%); and
- Daesung Australia Limited (2.5%).

ACA is one of Australia's largest coal producers and has extensive coal mining interests and development prospects in both Queensland and NSW.

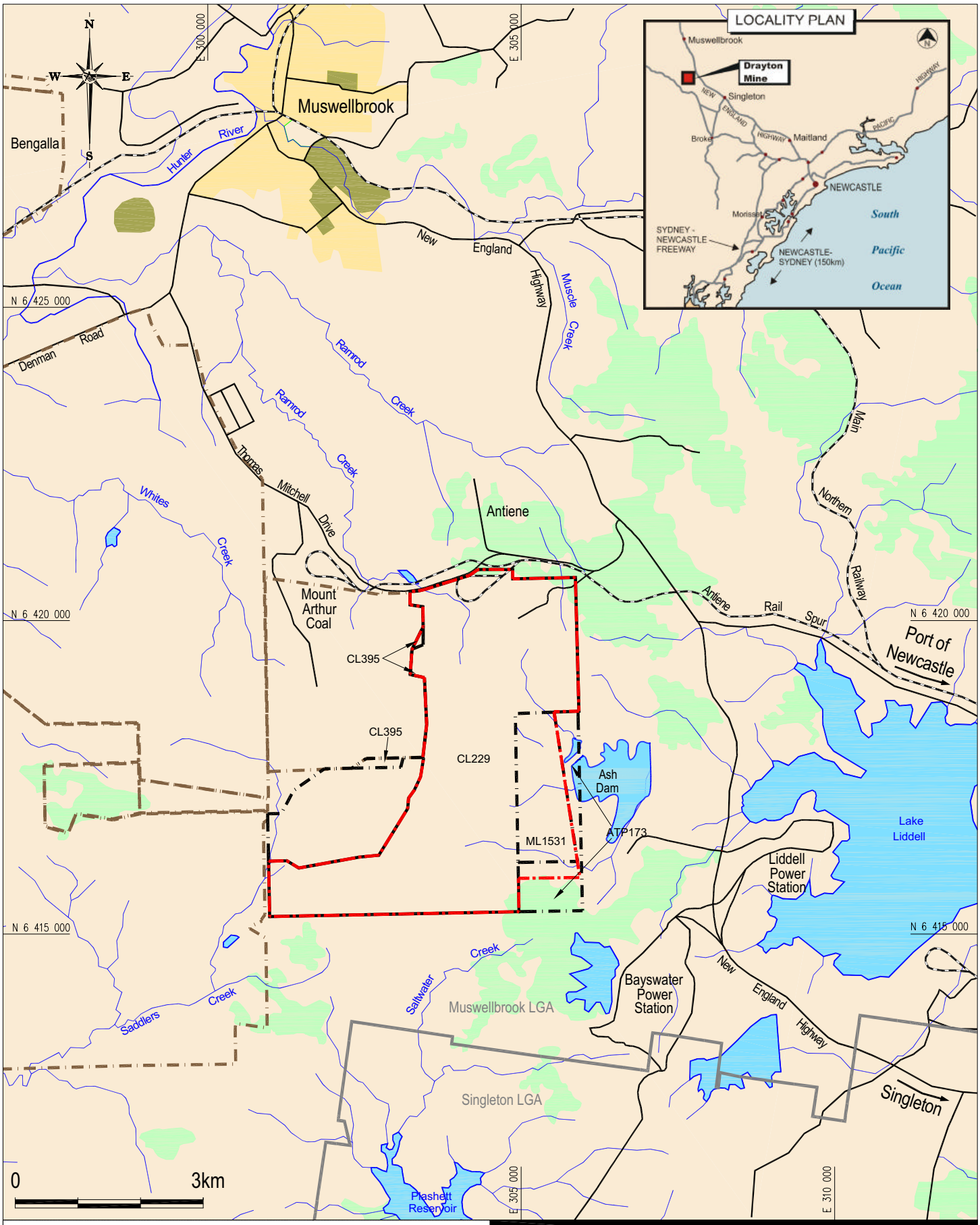
## 1.3 DOCUMENT PURPOSE

Drayton seeks Project Approval under Part 3A of the *Environmental Planning and Assessment Act 1979* (EP&A Act) to continue mining operations to 2017 at a coal extraction rate of up to 8 Mtpa of ROM coal and for other associated activities (the Project).

A Major Projects Application and supporting Project Description Document (PDD) were submitted to the Department of Planning (DoP) on 4 July 2006 under Section 75E of Part 3A of the EP&A Act. Subsequently, the Director-General's Environmental Assessment Requirements (EARs) were issued by DoP for the Project on 25 August 2006 and re-issued with a variation related to greenhouse gas assessment methodology on 25 January 2007.

This Environmental Assessment (EA) fulfils the requirements of the EARs and assesses environmental impacts and socio-economic benefits of the Project to enable the Minister for Planning to grant Project Approval. A checklist of each EAR and where it is addressed in this EA is presented in **Section 6.4**.

This EA applies to the EA Boundary as shown on **Figure 1**. It supports the Application for Project Approval.




Legend

- EA Boundary
- Drayton Mining Leases
- Other Mining Leases
- Roads
- Railways
- Creeks
- Local Government Boundary

Hansen Bailey

ANGLO COAL

DRAYTON

Co-ordinate System: MGA Zone 56

# DRAYTON MINE EXTENSION EA

## Regional Location

| Cad File: 01481K.dwg | Date: 16.04.2007 | Drawn: JD | Figure 1 |
|---|---|---|---|

## 1.4 DOCUMENT STRUCTURE

This EA consists of two volumes. The main report presents a description of the Project, a summary of associated environmental and social impacts and proposed mitigation and management measures, as follows:

- **Section 2.0** provides relevant information on the existing environmental setting;
- **Section 3.0** describes the existing mining operations and environmental management system;
- **Section 4.0** provides a detailed description of the Project;
- **Section 5.0** introduces the regulatory framework pertinent to the Project;
- **Section 6.0** details stakeholder consultation undertaken and discusses issues raised. Specifically, this section lists the EARs and identifies where these issues are addressed in the EA;
- **Section 7.0** provides the risk assessment process adopted to rank all identified environmental issues into Primary and Secondary issues to determine the level of assessment required;
- **Section 8.0** and **Section 9.0** assesses Primary and Secondary issues respectively and outlines management and mitigation measures for the Project;
- **Section 10.0** presents Drayton's Statement of Commitments for the Project;
- **Section 11.0** provides a detailed justification for the Project;
- **Section 12.0** lists Abbreviations used throughout the EA whilst referenced materials are listed in **Section 13.0**; and
- **Section 14.0** provides a full list of the EA Study Team.

In addition to regulatory correspondence and consultation materials, full copies of all detailed specialist technical reports are provided in Volume 1 and Volume 2 as shown in the list of Appendices.

# 2.0 EXISTING ENVIRONMENT

## 2.1 CLIMATE

### 2.1.1 Introduction

In addition to Drayton's meteorological station, the Bureau of Meteorology (BoM) monitoring stations at Jerrys Plains and Scone provide indicative climatic data for the Project. The locations and recording periods for these stations are provided in **Table 2**.

In addition to the BoM stations, data from the former Macquarie Generation meteorological station which was located north-west of the Muswellbrook Industrial Estate (as published in the Mount Arthur North Environmental Impact Statement, URS, 2000) (MAN EIS) has been utilised for the Air Quality Impact Assessment (**Section 8.2**). This station was selected as it monitors sigma-theta which is useful for dispersion modelling. For the purposes of this EA, this station is referred to as the MAC Station.

Meteorological data collected from the various stations is summarised and discussed below.

### 2.1.2 Regional Climatic Patterns

The Upper Hunter region has a warm temperate climate, influenced by seasonal variations of hot, wet summers and mild, dry winters. In winter, mid-latitude westerly winds and high pressure systems alternate with cold fronts, combining to form cool, dry winters. Winter in the Upper Hunter is generally drier than summer, with regular frosts and fogs occurring from mid-autumn to late spring.

### 2.1.3 Temperature

Summer months in the Upper Hunter are the warmest, with January reaching an average daily high temperature of 31.8°C (see **Table 3**). June and July are the coolest months, with average daily highs of 17.6°C.

Humidity levels exhibit variability and seasonal flux throughout the year. Mean morning (9 am) humidity levels range from 59%-79% and mean afternoon (3 pm) humidity levels range from 41%-53%. Spring months are generally drier than the rest of the year.

Temperature averages were investigated over the short-term for the 2005 / 2006 period and indicated that for many months of the year both maximum and minimum temperatures were higher than the historical averages, thus indicating the influence of a drought.

### 2.1.4 Rainfall

Rainfall in the Upper Hunter typically peaks in summer and declines in winter. The annual average rainfall for Jerrys Plains is 641.7 millimetres (mm), occurring over approximately 86 rain days each year. Average monthly rainfall in the Upper Hunter ranges from 42 mm per month in winter and up to 72 mm per month during summer.

In summer, most rainfall occurs due to low pressure troughs and an increased maritime influence, with onshore winds penetrating as far inland as Muswellbrook. This tends to create intense thunderstorms (BoM, 2006). Due to these storms, rainfall in the summer months is usually greater and more intense than other seasons. Consideration of the rainfall patterns in the Upper Hunter has been applied to the Groundwater and Surface Water Impact Assessments presented in **Sections 8.5** and **9.2** respectively.

**Table 2**
**Meteorological Stations & Recording Periods**

| Name | Operator | Station No | Location | Period of Record |
|---|---|---|---|---|
| Jerrys Plains | BoM | 061086 | Approximately 15 km south-east of EA Boundary | 1882-2004 |
| Scone | BoM | 061089 | Approximately 33 km north-east of EA Boundary | 1950-2004 |
| MAC Station | Macquarie Generation | N/A | Approximately 10 km north-west of EA Boundary near the Muswellbrook Industrial Estate | 1995-1996 |

**Table 3**
**Meteorological Data Summary**

| Month | Mean Daily Temperature (°C) | | | | Mean Rainfall (mm) | | Mean Rain Days | | Mean Relative Humidity (%)* | | Mean Monthly Evaporation (mm)* |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Jerrys Plains | | Drayton | | Jerrys Plains | Drayton | Jerrys Plains | Drayton | | | |
| | Min | Max | Min | Max | | | | | 9am | 3pm | |
| January | 17.1 | 31.8 | 17.3 | 30.3 | 78.2 | 71.6 | 7.9 | 9.6 | 67.0 | 46.0 | 218.9 |
| February | 17.1 | 30.9 | 17.5 | 29.2 | 71.7 | 76.4 | 7.3 | 7.9 | 72.0 | 50.0 | 176.6 |
| March | 15.0 | 29.0 | 15.8 | 26.8 | 58.2 | 48.2 | 7.3 | 7.7 | 71.0 | 50.0 | 155.8 |
| April | 10.8 | 25.3 | 12.6 | 23.3 | 44.7 | 31.3 | 6.3 | 7.1 | 71.0 | 47.0 | 107.5 |
| May | 7.4 | 21.2 | 8.0 | 18.3 | 41.3 | 39.9 | 6.6 | 8.9 | 77.0 | 51.0 | 68.8 |
| June | 5.2 | 17.9 | 6.7 | 17.3 | 45.3 | 35.4 | 7.3 | 7.9 | 79.0 | 53.0 | 49.3 |
| July | 3.7 | 17.3 | 5.7 | 16.2 | 44.3 | 28.2 | 7.0 | 7.7 | 78.0 | 50.0 | 57.2 |
| August | 4.4 | 19.4 | 6.0 | 18.0 | 36.6 | 36.5 | 7.0 | 6.4 | 72.0 | 45.0 | 84.1 |
| September | 6.9 | 22.8 | 8.7 | 21.3 | 41.3 | 36.9 | 6.6 | 6.7 | 65.0 | 43.0 | 116 |
| October | 10.2 | 26.2 | 11.6 | 24.5 | 51.9 | 70.3 | 7.5 | 7.1 | 60.0 | 43.0 | 154.8 |
| November | 13.1 | 29.3 | 13.7 | 26.3 | 58.2 | 55.8 | 7.6 | 8.4 | 59.0 | 41.0 | 183.1 |
| December | 15.7 | 31.4 | 15.7 | 29.1 | 67.3 | 77.6 | 7.5 | 8.1 | 60.0 | 42.0 | 221.8 |
| **Annual Mean** | **10.5** | **25.2** | **11.6** | **23.4** | **641.7** | **592.1** | **86.0** | **94.0** | **69.0** | **47.0** | **1,601.1** |

** Scone Meteorological Station*
*Source: BoM, 2006*

### 2.1.5 Evaporation

The BoM Scone Meteorological Station was utilised to assess representative evaporation trends in the Upper Hunter (**Table 3**) as the Jerrys Plains station does not record evaporation data.

Daily evaporation is highest in the summer months, highlighting a direct correlation between increased temperatures and afternoon winds in the Upper Hunter. The mean daily pan evaporation rates vary seasonally, from 7.3 mm during December to 1.7 mm in June, while an average of 4.4 mm evaporates daily in the Upper Hunter. Consideration of the evaporation trends in the Upper Hunter has been applied to the Groundwater and Surface Water Impact Assessments presented in **Sections 8.5** and **9.2** respectively.

### 2.1.6 Wind Speed & Direction

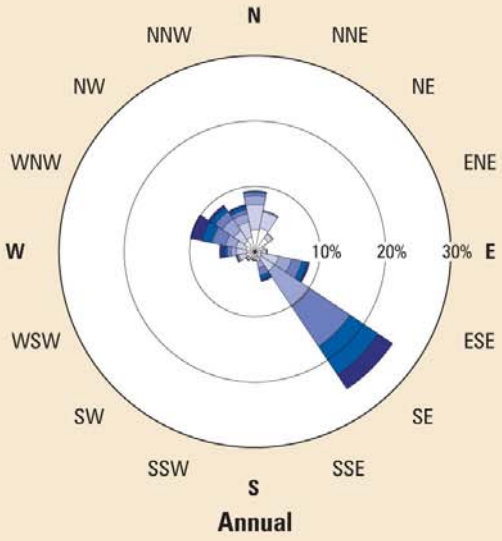
**Figure 2** provides the annual and seasonal windroses for the MAC Station (representative of the EA Boundary) which illustrates that south-east winds dominate over the Upper Hunter during the summer months and north-west winds characterise winter months.

Consideration and analysis of wind speed and direction has been included as relevant in the Air Quality and Noise and Vibration Impact Assessments (see **Sections 8.2** and **8.3** respectively).

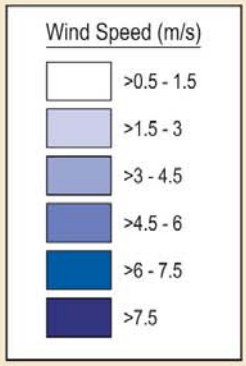
### 2.1.7 Temperature Inversions

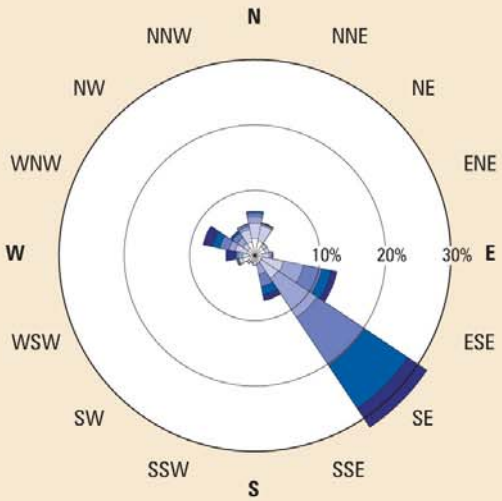
A temperature inversion occurs when relatively dense, cool air is trapped below an air mass which is warmer and lighter. Typically, such inversions tend to occur in the winter months, during the night and early morning periods. Under temperature inversion conditions, the diffusion of noise, gases and dust particulates is inhibited and can increase their concentrations and effects at ground level.

For this reason, consideration and analysis of temperature inversions and their implications in the Upper Hunter has been included as relevant in the Air Quality and Noise and Vibration Impact Assessments (see **Sections 8.2** and **8.3** respectively).

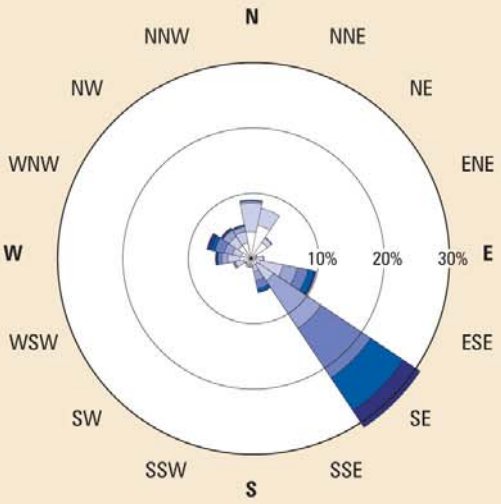



**Annual**

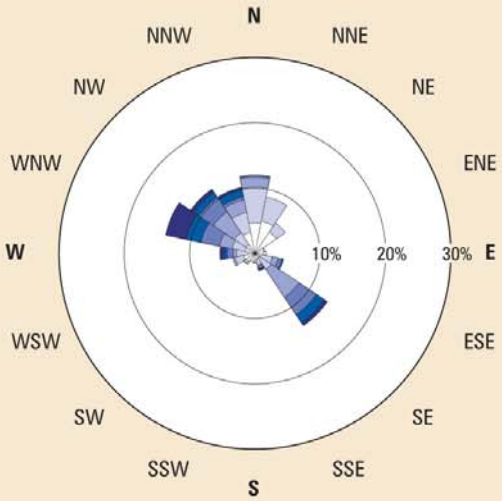


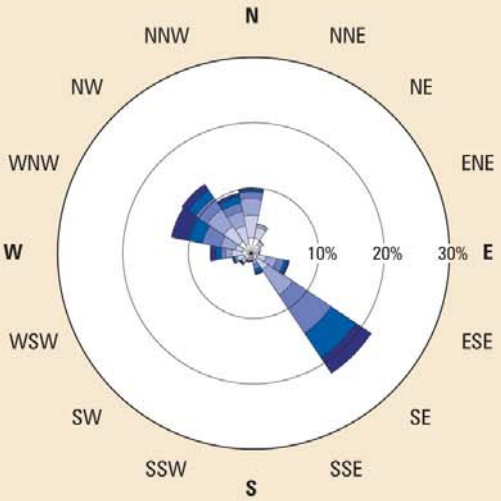

**Summer**




**Autumn**




**Winter**




**Spring**

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Source: Holmes Air Sciences (2007)

# DRAYTON MINE EXTENSION EA

## Annual and Seasonal Windroses for the MAC Station

Figure **2**

Filename: DR 0614 - Windroses.ai | Date: 27.04.07

## 2.2 GEOLOGY

### 2.2.1 Exploration

Exploration drilling commenced at Drayton in 1951, with a total of 450 boreholes drilled up to 1982. Extensive folding, faulting and dipping make up the complex geological structure at Drayton. Since 2004, a total of 114 non-cored exploration holes have been drilled outside of current mining operations to assess the feasibility of the Project.

### 2.2.2 Stratigraphy

Drayton is situated in the north-east of the Permian-Triassic Sydney Basin, with the coal seams contained within the Greta coal measures (Rowan Formation).

Four major fault groups and the Muswellbrook Anticline traverse Drayton, geologically dividing the EA Boundary into two distinct mining areas - the East and West Pits. The EA Boundary encompasses a multi-seam coal deposit of five major coal groups up to 110 metres (m) below the surface. A stratigraphic column showing the target seams for the Project and typical seam thicknesses is presented in **Figure 3**.

### 2.2.3 Reserves & Resource Utilisation

Drayton has mined 89.8 Million tonnes (Mt) of ROM coal since commencing operations in 1983 to the end of 2006. Exploration drilling and feasibility studies within the EA Boundary have indicated that approximately 52.7 Mt of ROM coal reserves exist. The Project stripping ratio averages one tonne of ROM coal to be extracted for every 6.8 bank cubic metres (bcm) of overburden.

## 2.3 TOPOGRAPHY & LAND USE

### 2.3.1 Topography & Natural Features

The topography surrounding the EA Boundary generally ranges from gently undulating to hilly landscapes, with Mount Arthur (483 m Australian Height Datum (AHD)) located to the south-west of Drayton.

The EA Boundary is located at the headwaters of a group of first and second order ephemeral creeks. These drain away from the Project as follows (**Figure 1)**:

- Ramrod Creek flows north-east and north-west to the Hunter River in two separate tributaries;
- Saddlers Creek flows south-west to the Hunter River;
- Bayswater Creek flows south-east to Lake Liddell and the Liddell Ash Dam; and
- Saltwater Creek flows south to Plashett Reservoir.

### 2.3.2 Land Use

The dominant land uses within and adjacent to the EA Boundary include mining, power generation buffer land and freehold grazing.

MAC occupies land to the west of the EA Boundary, whilst land to the south and south-east is Macquarie Generation buffer land. Privately owned property exists to the immediate north of the EA Boundary in Antiene.

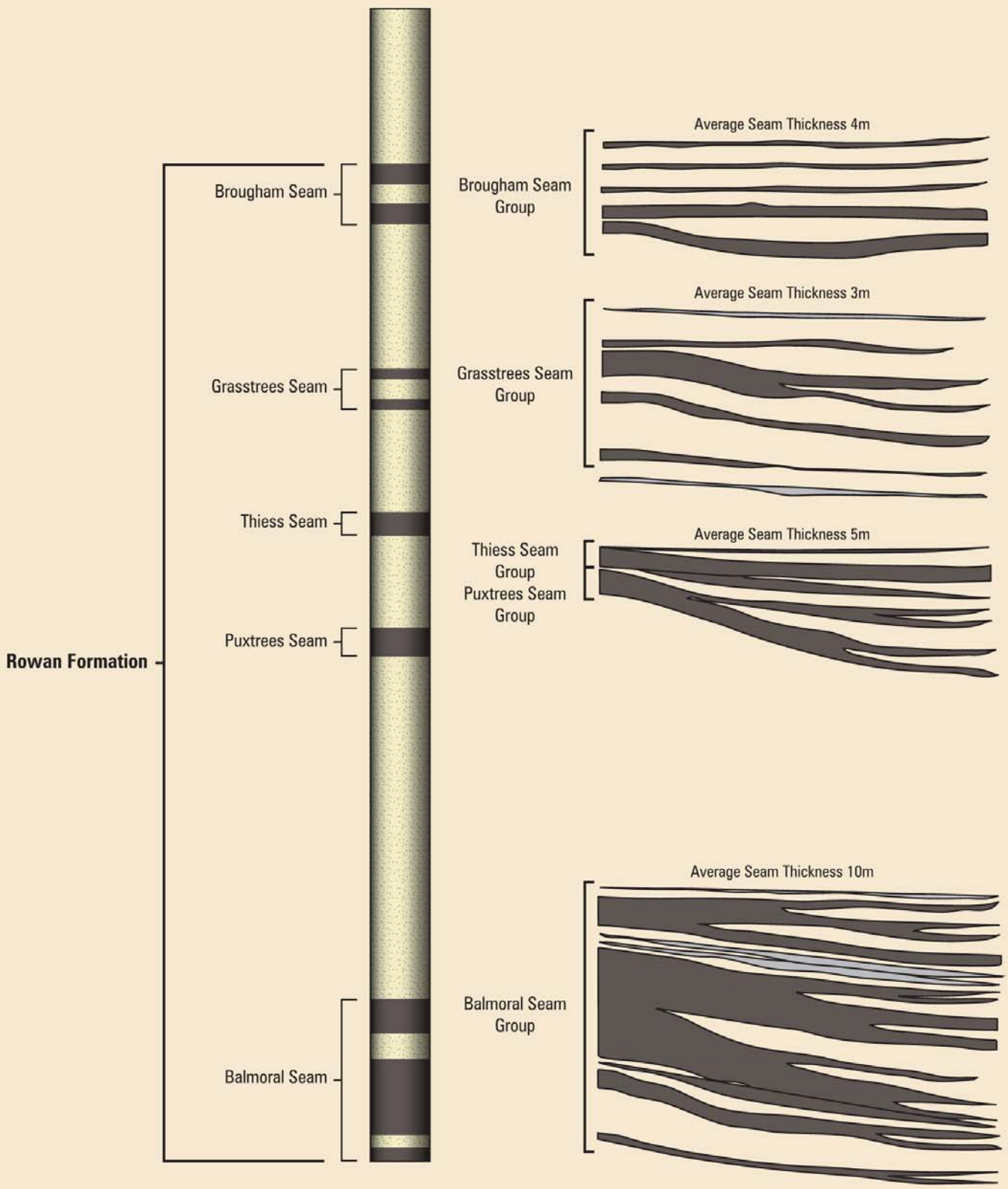
Approximately 4 km north-west of the EA Boundary is the Muswellbrook Industrial Estate, which houses a variety of businesses predominantly providing services to the mining industry. The urban area of Muswellbrook is located approximately 13 km north-east of Drayton.

### 2.3.3 Land Ownership

**Table 4** lists property ownership surrounding the EA Boundary and indicates if a receiver (residence) is located on the property with a square. **Table 4** should be read in conjunction with **Figure 4** which illustrates land ownership and receivers adjacent to the EA Boundary.

The majority of land within the EA Boundary is owned by ACA (and its subsidiaries). A small area of land in the south-east of the EA Boundary is owned by Macquarie Generation. A lease exists with Macquarie Generation to facilitate the proposed mining in the EA Boundary, as discussed further in **Section 8.7.1**.

A schedule of land to which the EA applies is presented in **Appendix A**.




Legend:

Coal

Interburden

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DRAYTON MINE EXTENSION EA

Typical Stratigraphic Column

Filename: DR 0614 - Typ Strat Column.ai

Date: 27.04.07

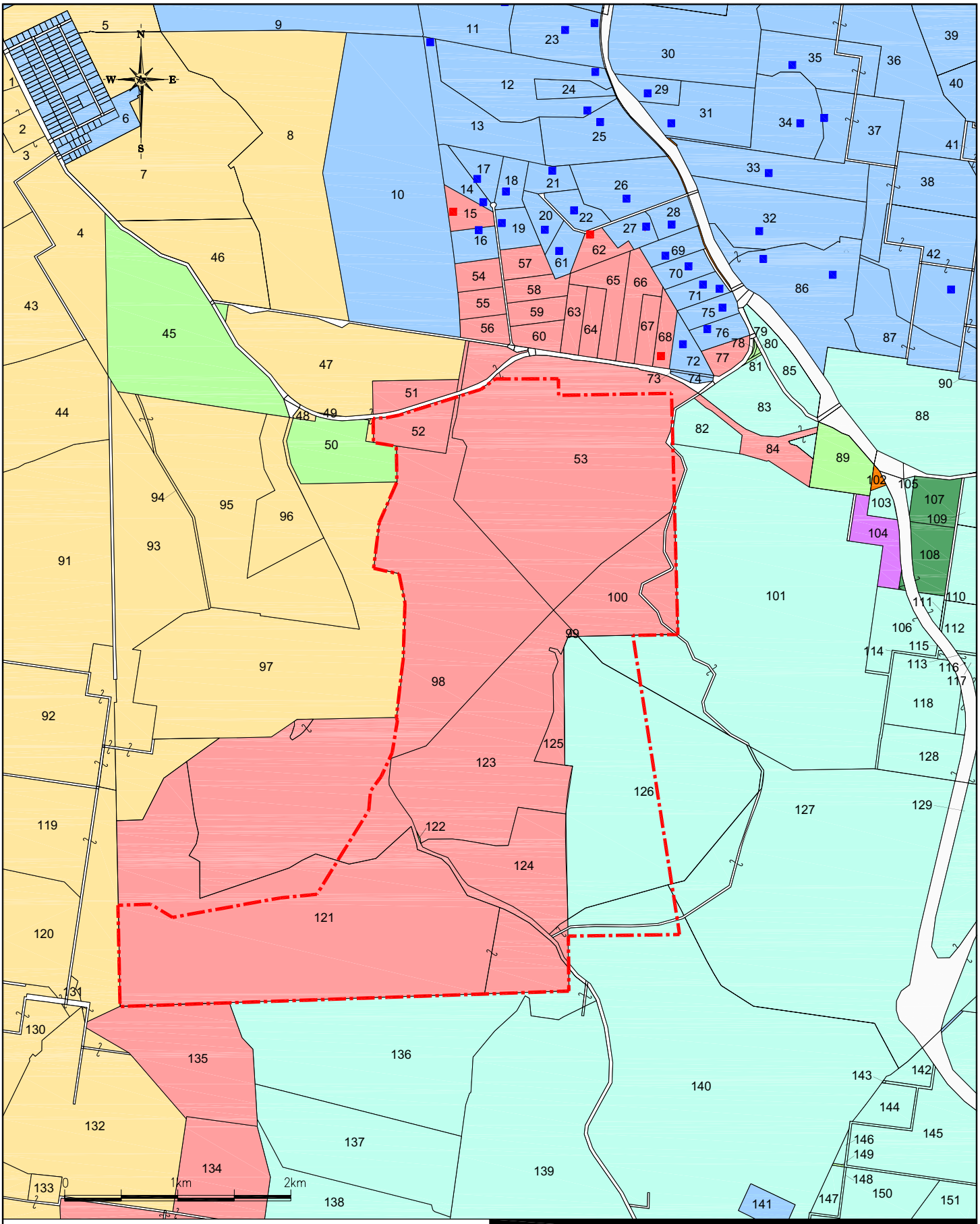
Figure 3

## Table 4
## Land Ownership

| ID | Name | Receiver | ID | Name | Receiver | ID | Name | Receiver |
|---|---|---|---|---|---|---|---|---|
| 1 | Coal Operations Australia | | 54 | Drayton Coal | | 106 | Macquarie Generation | |
| 2 | Coal Operations Australia | | 55 | Drayton Coal | | 107 | Electricity Commission of NSW | |
| 3 | Coal Operations Australia | | 56 | Drayton Coal | | 108 | Electricity Commission of NSW | |
| 4 | Coal Operations Australia | | 57 | Drayton Coal | | 109 | Macquarie Generation | |
| 5 | Coal Operations Australia | | 58 | Drayton Coal | | 110 | Macquarie Generation | |
| 6 | Muswellbrook Shire Council | | 59 | Drayton Coal | | 111 | Macquarie Generation | |
| 7 | Coal Operations Australia | | 60 | Drayton Coal | | 112 | Macquarie Generation | |
| 8 | Coal Operations Australia | | 61 | RC & LT Skinner | ■ | 113 | Macquarie Generation | |
| 9 | F & I Webber | | 62 | Anglo Coal (Drayton Management) Pty Limited | ■ | 114 | Macquarie Generation | |
| 10 | EM Casben | | 63 | Drayton Coal | | 115 | Macquarie Generation | |
| 11 | Yarramalong Stud Pty Ltd | | 64 | Drayton Coal | | 116 | Macquarie Generation | |
| 12 | K Newton | ■ ■ | 65 | Drayton Coal | | 117 | Macquarie Generation | |
| 13 | CS Jacobsen | ■ | 66 | Drayton Coal | | 118 | Macquarie Generation | |
| 14 | CH Budd | ■ | 67 | Drayton Coal & Anglo Coal | | 119 | Hunter Valley Energy Coal Ltd | |
| 15 | Drayton Coal | ■ | 68 | Drayton Coal | ■ | 120 | Hunter Valley Energy Coal Ltd | |
| 16 | MF & AV Doherty | ■ | 69 | P & K Clifton | ■ | 121 | Drayton Coal & Anglo Coal | |
| 17 | BC & SR Page | ■ | 70 | BD & B Jones | ■ | 122 | Drayton Coal | |
| 18 | SR Page | ■ | 71 | DW & LM Hunter | ■ ■ | 123 | Drayton Coal & Anglo Coal | |
| 19 | CJ & LE Duck | ■ | 72 | BJ & NH Robertson | ■ | 124 | Drayton Coal | |
| 20 | RD & DA Osborn | ■ | 73 | Muswellbrook Shire Council | | 125 | Drayton Coal | |
| 21 | WJ Reynolds | ■ | 74 | Muswellbrook Shire Council | | 126 | Macquarie Generation | |
| 22 | RB & LJ Halloran | ■ | 75 | EJ & MC Sharman | ■ | 127 | Macquarie Generation | |
| 23 | SJ & J Jackson | ■ ■ | 76 | PG Horder | ■ | 128 | Macquarie Generation | |
| 24 | J Newton | | 77 | Drayton Coal | | 129 | Macquarie Generation | |
| 25 | PJ & KJ Collins | ■ | 78 | The State of NSW | | 130 | Hunter Valley Energy Coal Ltd | |
| 26 | RE & ID Baxter | ■ | 79 | The State of NSW | | 131 | Hunter Valley Energy Coal Ltd | |
| 27 | GJ & PH De Boer | ■ | 80 | The State of NSW | | 132 | Hunter Valley Energy Coal Ltd | |
| 28 | MJ Bird | ■ | 81 | The State of NSW | | 133 | Hunter Valley Energy Coal Ltd | |
| 29 | MJ & EJ Wallman | ■ | 82 | Macquarie Generation | | 134 | Anglo Coal Australia Pty Ltd | |
| 30 | JM & BB & PS Mitchelhill & HB Rivett & IB Vineburg | | 83 | Macquarie Generation | | 135 | Anglo Coal Australia Pty Ltd | |
| 31 | RJ & IA Summerville | ■ | 84 | Drayton Coal | | 136 | Macquarie Generation | |
| 32 | K & KI Cross | ■ | 85 | Macquarie Generation | | 137 | Macquarie Generation | |
| 33 | CL & JA Fisher & CI Dennis | ■ | 86 | Wild Group Pty Ltd | ■ | 138 | Macquarie Generation | |
| 34 | BT & JE Davis | ■ | 87 | P Wild | | 139 | Macquarie Generation | |
| 35 | GM Wilson | ■ | 88 | Macquarie Generation | | 140 | Macquarie Generation | |
| 36 | JM Mitchelhill & HB Rivett & IB Vineburg | | 89 | The State of NSW | | 141 | TransGrid | |
| 37 | BJ & TL King | ■ | 90 | NA & HM Burling | | 136 | Macquarie Generation | |
| 38 | NP & CJ O'Brien | | 91 | Coal Operations Australia | | 137 | Macquarie Generation | |
| 39 | CR & CP Stewart | | 92 | Coal Operations Australia | | 138 | Macquarie Generation | |
| 40 | PS & TG Adams | | 93 | Hunter Valley Energy Coal Ltd | | 139 | Macquarie Generation | |
| 41 | M & P Clifton | | 94 | Bayswater Colliery Company | | 140 | Macquarie Generation | |
| 42 | CJ & TL Smith | ■ | 95 | Bayswater Colliery Company | | 141 | TransGrid | |
| 43 | Coal Operations Australia | | 96 | Bayswater Colliery Company | | 142 | Macquarie Generation | |
| 44 | Coal Operations Australia | | 97 | Bayswater Colliery Company | | 143 | Macquarie Generation | |
| 45 | The State of NSW | | 98 | Drayton Coal & Anglo Coal | | 144 | Macquarie Generation | |
| 46 | Coal Operations Australia | | 99 | Drayton Coal | | 145 | Macquarie Generation | |
| 47 | Hunter Valley Energy Coal Ltd. | | 100 | Drayton Coal | | 146 | Macquarie Generation | |
| 48 | Hunter Valley Energy Coal Ltd. | | 101 | Macquarie Generation | | 147 | Macquarie Generation | |
| 49 | Hunter Valley Energy Coal Ltd. | | 102 | The Commissioner for Main Roads | | 148 | Macquarie Generation | |
| 50 | The State of NSW | | 103 | Macquarie Generation | | 149 | Macquarie Generation | |
| 51 | Drayton Coal | | 104 | RTA NSW | | 150 | Macquarie Generation | |
| 52 | Drayton Coal | | 105 | Macquarie Generation | | 151 | Macquarie Generation | |
| 53 | Drayton Coal & Anglo Coal | | | | | | | |

** A coloured square denotes a receiver on the property.*

*Each colour correlates to the shading used on **Figure 4**.*




Legend

- EA Boundary
- Macquarie Generation
- Drayton
- Drayton-owned Residence
- Mt Arthur Coal
- Crown Land
- Electricity Commision of NSW
- Freehold Property
- Freehold Property with Residence
- Public Roads
- RTA NSW
- Commissioner for Main roads

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DRAYTON

Co-ordinate System: MGA Zone 56

# DRAYTON MINE EXTENSION EA

## Land Ownership

| Cad File: 01393P.dwg | Date:16.04.2007 | Drawn: JD | Figure 4 |
|---|---|---|---|

# 3.0 EXISTING MINING OPERATIONS

## 3.1 COAL MINING

Drayton was granted Development Consent (DA-799) in September 1980 to commence operations, with first coal produced in July 1983.

Drayton has approval to mine up to 5.5 Mtpa of ROM coal until 2012; however, the current mine plan is scheduled to exhaust all approved coal mining reserves by 2010. Drayton has three mining tenements relevant to the operation; Mining Lease (ML) 1531, ML 229 and Coal Lease (CL) 395 as shown on **Figure 1**.

Drayton is an open cut mining operation where mining advances based on dragline strips. Pre-stripped overburden is removed by loader and/or excavator and trucks in advance of the dragline operation. Loaders and/or excavators are utilised for subsequent coaling. Mining is conducted 24 hours per day, 7 days a week.

Drayton produced 5.0 Mt of ROM coal in 2006 and employed approximately 329 personnel, including contractors. Notably, 80% of all current employees reside within the Muswellbrook or immediately adjacent Shires.

The integration of the Project with the existing approved mining operations is discussed in detail in **Section 4.0**.

## 3.2 INFRASTRUCTURE & COAL HANDLING

Drayton is serviced by surface facilities as shown on **Figure 5A** and **Figure 5B** including (at least) an administration office, bathhouse, workshop, warehouse facilities, Coal Handling Plant (CHP), stacker, stockpile reclaimers, rail facilities and an overland conveyor to Bayswater Power Station.

### 3.2.1 Coal Processing

The Drayton CHP has the capacity to process up to 2,000 tonnes per hour (tph) of ROM coal via a three stage crushing and screening process. Trucks deliver coal into the ROM Hopper which feeds the primary sizer.

Primary crushed coal is then screened with large material passing directly to a rotary breaker for further reduction. A low capacity secondary crusher is used in parallel with the rotary breaker if coal quality and hardness dictate. ROM coal is crushed further by a tertiary crusher, ensuring that 100% of the coal is crushed to 50 mm.

Crushed coal can be directed to the Coal Treatment Unit (CTU) at a rate of 1,200 tph or by-passed direct to the coal stockpiles. The processing rate of the CTU determines the overall processing rate of the CHP. The CTU washes coal to remove reject material prior to the coal being conveyed to the coal stockpiles. Reject material is returned to the pit for co-disposal with overburden by trucks.

### 3.2.2 Product Stacking

Product coal is stacked using the chevron pattern (where the stockpile is built in layers) (see **Figure 6**) to one of four longitudinal stockpiles with 80,000 tonne (t) capacity each (numbered from 1 to 4, west to east). Stockpiles 1, 2 and 3 nominally contain export coal while Stockpile 4 is utilised for either domestic or export coal.

### 3.2.3 Product Reclaiming

Product coal is reclaimed by two bridge bucket-wheel type reclaimers, which have a reclaim capacity of up to 2,000 tph. Reclaimer 1 generally services Stockpiles 1, 2 and 3 and Reclaimer 2 generally services Stockpile 4.

### 3.2.4 Product Transport

Product coal is diverted to either an overland conveyor to Bayswater Power Station or to the Train Load Out (TLO), where export coal is railed to the Port of Newcastle via the Antiene Rail Spur and the Main Northern Railway. The TLO system comprises two 1,700 t capacity bins and loads trains at 3,500 tph.


Legend

EA Boundary

MAC Sub-lease

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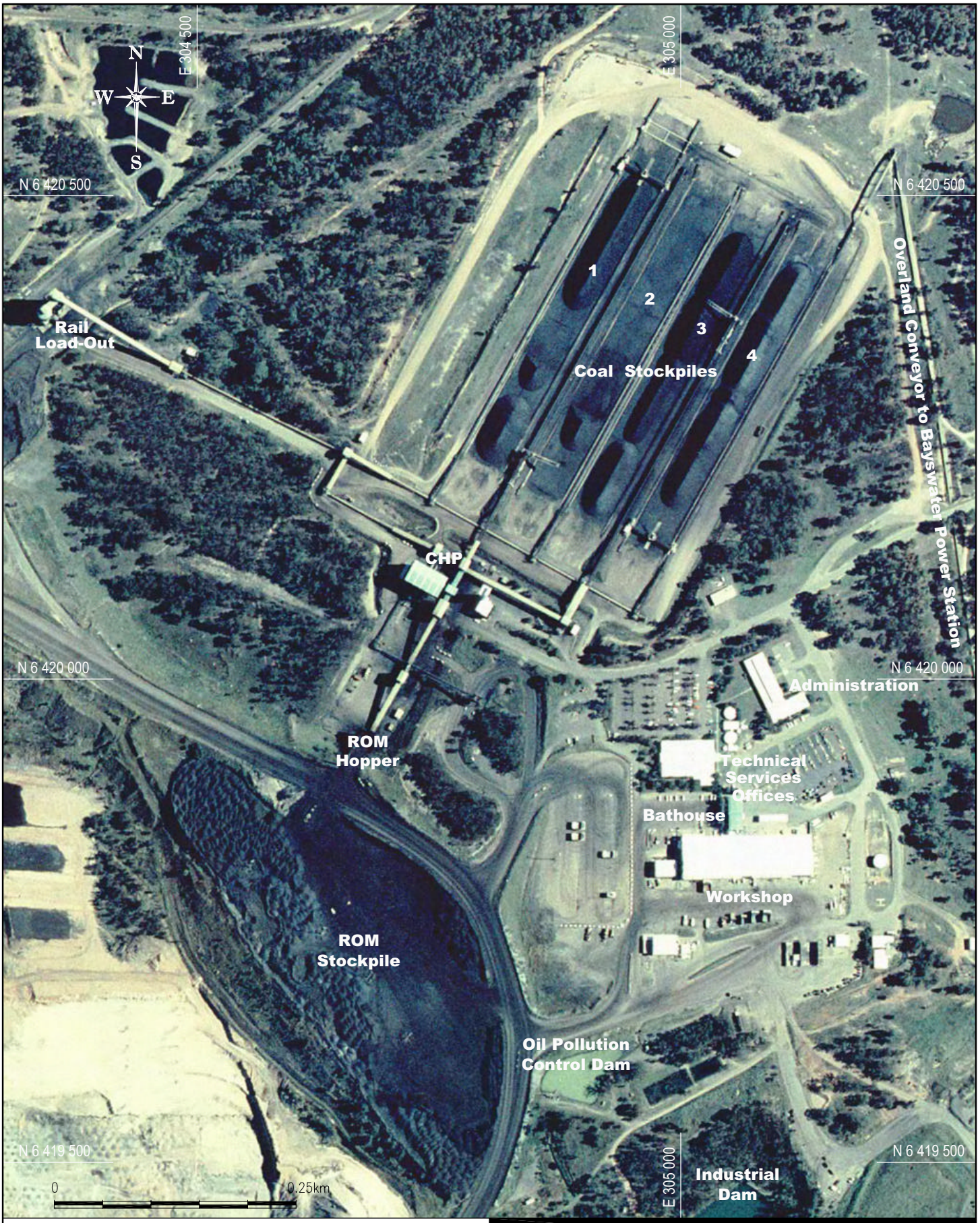
Co-ordinate system: MGA Zone 56 Aerial: Dec2005

# DRAYTON MINE EXTENSION EA

## Existing Mine Layout

| Cad File: 01733F.dwg | Date: 16.04.2007 | Drawn: JD | Figure 5A |
|---|---|---|---|

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DRAYTON

Co-ordinate System: MGA Zone 56 Aerial: Dec 2005

# DRAYTON MINE EXTENSION EA

## Existing CHP & Infrastructure Layout

| Cad File: 01733F.dwg | Date: 16.04.2007 | Drawn: JD | Figure 5B |
|---|---|---|---|

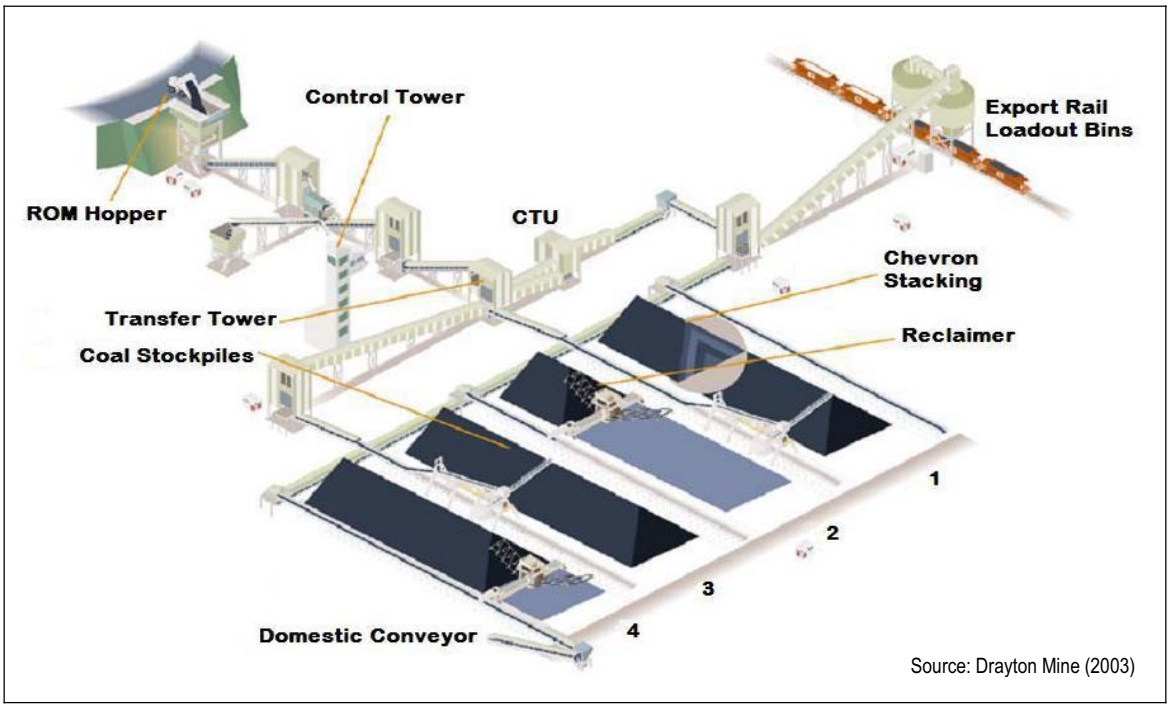



**Figure 6**
**Schematic Layout of CHP**

## 3.3 ENVIRONMENTAL MANAGEMENT SYSTEM

### 3.3.1 Introduction

Drayton operates under a Safety, Health, Environment and Community Management System (SHECMS) accredited to International Standards Organisation (ISO) 14001 standards. The SHECMS is designed to enable Drayton to:

- Effectively manage its environmental issues;
- Ensure compliance with regulatory requirements;
- Continually improve its environmental performance; and
- Satisfy the expectations of stakeholders.

Drayton's SHECMS is founded on the ACA Safety and Sustainable Development (S&SD) policy, the ACA SHECMS, regulatory required management plans and external and internal environmental Standards and Procedures. A description of the SHECMS is provided below.

### 3.3.2 Policy

Drayton has an S&SD Policy which forms the basis of the SHECMS. The Policy is signed by Drayton's General Manager and is displayed throughout the mine.

### 3.3.3 Standards

Standards are encompassing statements of Drayton's expectations with regard to environmental management and are listed in **Table 5**. The site's performance against each Standard is measured by regular auditing, reporting and review.

### 3.3.4 Procedures

Drayton conducts day-to-day operations in accordance with Procedures to ensure minimal environmental impact and that the requirements of the Standards are met. Regulatory required management plans are utilised as Procedures in the SHECMS as shown in **Table 5**.

**Table 5**
**Drayton SHECMS**

| ISO 14001 Objectives | Standard | | Procedure |
|---|---|---|---|
| | Ref | Title | |
| General Requirements | | | • Environmental Management System Overview<br>• Environmental Management Strategy (ARS)* |
| Environmental Policy | 2.1 | S&SD Policy and Explanatory Notes | |
| Environmental Aspects | 3.2 | Development of a SHEC Risk Register | • Drayton Risk Register |
| Legal and Other Requirements | 3.1 | Identification of Legal and Other Requirements | • Statutory Approvals |
| | 3.1 | Legal Compliance Protocols – Environmental | • Joint Acquisition Plan |
| Objectives and Targets | 3.3 | Developing Objectives, Targets and Plans | • Setting Objectives and Targets |
| Competency, Training and Awareness | 4.3 | Awareness, Training and Competency | • Environmental Training |
| Communication | 4.2 | SHEC Communication | • Environmental Enquiries<br>• Environmental Communication<br>• Community Consultative Committee (ARS)*<br>• Environmental Enquires (ARS)* |
| | 4.2 | Reporting and Management of SHEC Incidents and Performance | |
| Control of Documents | 4.5 | Document and Data Control | |
| Operational Control | 4.4 | Contractor Management | • Blasting on Weekends<br>• Spontaneous Combustion Management Plan^<br>• Water Management Plan^<br>• Air Quality Management Plan^<br>• Land Management Plan^<br>• Site Rehabilitation Management Plan^<br>• Flora & Fauna Management Plan^<br>• Waste, Hazardous Materials & Overburden Management Plan^<br>• Bushfire Management Plan^<br>• Blasting & Vibration Management Plan^<br>• Groundwater Management Plan^<br>• Archaeology & Cultural Heritage Management Plan^<br>• Visual Amenity & Landscaping Management Plan^<br>• Void Management Plan^<br>• Noise Management Plan^<br>• Lighting Management Plan^<br>• Dust Management Plan (ARS)*<br>• Noise Management Plan (ARS)*<br>• Water Management Plan (ARS)*<br>• Waste Management Plan (ARS)*<br>• Lighting Management Plan (ARS)* |
| | 5.1 | Management of SHEC Risk | |
| Emergency Preparedness and Response | 5.2 | Emergency Preparedness and Response | • Emergency Response |

| ISO 14001 Objectives | Standard | | Procedure |
|---|---|---|---|
| | Ref | Title | |
| Monitoring and Measurement | 6.1 | Monitoring and Measurement | • Automatic Blast Monitoring<br>• Manual Blast Monitoring<br>• Environmental Monitoring<br>• SHEC Calibration |
| Non-conformity, Corrective Action and Preventative Action | 6.2 | Non conformance, Corrective and Preventative Action | • Environmental Non-Conformance<br>• Environmental Non-Conformance (ARS)* |
| Control of Records | | | • Environmental Reporting<br>• Environmental Database Management<br>• Environmental Records<br>• Environmental Reporting(ARS)* |
| Internal Audit | 7.1 | Audit and Review | • Audit and Review<br>• Environmental Auditing<br>• Environmental Auditing (ARS)* |
| Management Review | 8.1 | Management Review | • Environmental Management Committee<br>• Community Consultative Committee |

** Required by the Antiene Rail Spur Development Consent (DA 106-04-00).*

*^ Required by the current Drayton Development Consent (DA 163/2002).*

### 3.3.5 Accountabilities

All employees and contractors are accountable for individual environmental performance in accordance with the SHECMS. The SHECMS identifies positions and personnel whose work may have a significant environmental impact and provides additional training in their respective area.

### 3.3.6 Approvals & Licences

The SHECMS ensures that all applicable legal and statutory requirements are considered when developing environmental objectives and targets. Drayton's regulatory approvals are listed and discussed further in **Section 5.6**.

### 3.3.7 Environmental Aspects & Impacts

The systematic identification and risk rating of all activities with potential environmental impacts is an integral component of the SHECMS. The Safety, Health, Environment and Community (SHEC) Risk Register is used to identify activities with a high environmental risk to ensure a higher level of active management.

### 3.3.8 Objectives & Targets

Objectives and targets are established annually and enable Drayton to meet its Environmental Policy and ensure continual improvement in environmental performance.

### 3.3.9 Environmental Audits

Environmental audits are conducted periodically to meet regulatory requirements, the SHECMS and include:

- Internal environmental audits to ensure ongoing conformity with relevant environmental legislation and regulations;
- Biennual certification audits of the SHECMS to confirm compliance with ISO 14001; and
- Three yearly DoP audits against the conditions of Development Consent are undertaken in conjunction with the internal compliance audits.

### 3.3.10 Corrective Action Register

Non-conformances arising from environmental audits, incidents, observations and other sources are placed on a Corrective Action Register (CAR).

Progress against each item is monitored through internal audits and internal reporting.

### 3.3.11 Management Reviews

The SHECMS is reviewed every three years to ensure the appropriateness of Standards and Procedures, risk assessments, objectives and targets, audit results, responsibilities and resources.

### 3.3.12 Environmental Reporting

Drayton is actively involved in communicating its environmental performance to its employees, regulatory authorities, near neighbours, visitors and interested groups through:

- Drayton Community Consultative Committee (CCC);
- Community Information Newsletters;
- Annual Environmental Management Report (AEMR);
- Visits to neighbours by mine personnel;
- Mine open days; and
- Mine tours for local schools and through the NSW Minerals Council teacher awareness training program, as required.

### 3.3.13 Training Resources

Mine personnel receive ongoing specific training in environmental issues relevant to their respective positions and as part of the mine induction process.

### 3.3.14 Environmental Monitoring

Drayton undertakes a comprehensive Environmental Monitoring Program (EMP) as shown in **Figure 7**. This EMP ensures Drayton meets regulatory expectations and allows identification and management of environmental risks. The EMP incorporates requirements of Drayton's Environmental Protection Licence (EPL) 1323 and SHECMS Procedures.

**Meteorological**

Monitoring of wind speed and direction, rainfall and temperature is relayed to a central recording database (**Figure 7**).

Meteorological data plays an important role in the authorisation of blasting and general mining activities at Drayton and assists in the minimisation of impacts on the local community.

**Air Quality**

Drayton manages air quality via the SHECMS, which incorporates management activities including:

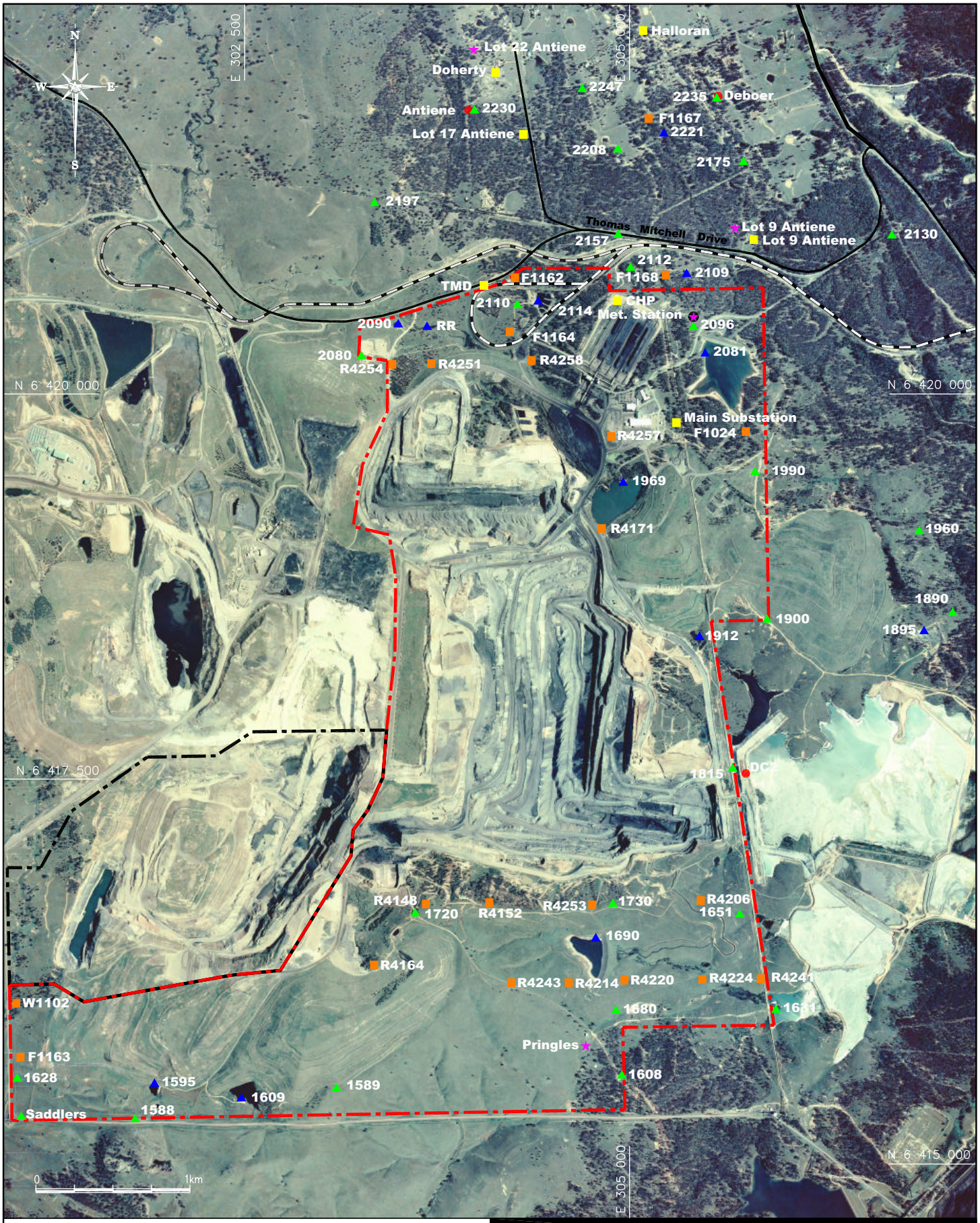
- Spraying recycled mine water using a fleet of water trucks on trafficked haul roads;
- Operation of dust suppression equipment on drills;
- Rehabilitation of disturbed areas as soon as practicable to minimise generation of wind eroded dust; and
- Utilising dust suppression sprays at the ROM Hopper and transfer points, as well as coal stockpiles.

Air quality monitoring is undertaken at the locations shown in **Figure 7** and includes:

- Four High Volume Air Samplers (HVAS), consisting of three Total Suspended Particulate (TSP) matter samplers and one Particulate Matter less than 10 microns ($\mu$m) ($PM_{10}$) monitor; and
- 27 depositional dust gauges.

**Spontaneous Combustion**

Spontaneous combustion is actively managed via the SHECMS, resulting in significant reductions in outbreaks over the last eight years. Drayton monitors and reports occurrences of spontaneous combustion in accordance with the approved Spontaneous Combustion Management Plan (SCMP) and EPL 1323.




Legend

- EA Boundary
- MAC Sub-lease
- Background Noise Monitor
- Blast Monitor
- Monthly Water Sampling Site
- Dust Deposition Gauge
- High Volume Air Sampling Site
- Meteorological Station
- Ground Water Monitor

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DRAYTON

Co-ordinate System: MGA Zone 56 Aerial: Dec 2005

# DRAYTON MINE EXTENSION EA

## Environmental Monitoring Network

| Cad File: 01748J.dwg | Date: 07.05.2007 | Drawn: JD | Figure 7 |
|---|---|---|---|

**Noise**

Noise is managed via the SHECMS which incorporates a variety of noise management techniques such as:

- Regular maintenance of equipment to ensure it is operating in a proper and efficient manner;
- Undertaking regular and proactive noise monitoring; and
- Ongoing noise awareness training.

Long-term unattended noise monitoring is undertaken on a quarterly basis at the locations shown in **Figure 7**. Short-term attended noise measurements are also undertaken by Drayton staff, as required.

**Blasting**

Blast monitoring is currently undertaken at three locations surrounding Drayton (as shown in **Figure 7**). Drayton currently conducts blasting between 8:30 am and 5:00 pm, Monday to Saturday, in accordance with the SHECMS. Drayton utilises a number of blasting control measures including:

- Loading blasts according to a specific design;
- Consideration of meteorological conditions prior to blasting;
- Ensuring blast designs are below Maximum Instantaneous Charge (MIC) designs;
- Consideration of reducing off-site impacts during blast design;
- Planning blasts in liaison with MAC to ensure blasting does not occur concurrently;
- Regular review of blasting results (see **Plate 1**); and
- Notifying residents of pending blasting events as requested.

**Surface Water**

Surface water management is conducted in accordance with the SHECMS, incorporating monitoring at 12 locations (see **Figure 7**). Samples are analysed for standard parameters such as pH, Electrical Conductivity (EC), and Total Dissolved Solids (TDS). Additional sampling is also conducted following extreme rainfall events.

**Groundwater**

Groundwater is managed in accordance with the SHECMS. Standing groundwater levels are monitored at 22 locations (**Figure 7**), and samples are analysed for standard parameters such as pH, EC and TDS.


**Plate 1:**
**Review of Blast Monitoring Results**

# 4.0 THE PROJECT

## 4.1 INTRODUCTION

Drayton seeks Project Approval from the Minister for Planning to continue coal mining operations to 2017 at a maximum extraction rate of 8 Mtpa ROM coal. The Project also involves the gaining of a contemporary, consolidated Planning Approval for Drayton's operations (see **Section 5.6** for further detail). The Project broadly incorporates:

- An extension of approval to mine to 2017;
- An extension of the mine footprint to uncover additional coal reserves within the current Mining Leases;
- An increase in maximum ROM coal production of up to 8 Mtpa;
- Continued provision of up to approximately 25 million bcm of overburden material to the MAC Sub-lease area (West Pit area) (**Figure 8** to **Figure 10**);
- Continued provision of up to 250,000 bcm of overburden to Macquarie Generation per annum;
- Upgrade of the existing stockpile reclamation system and existing CHP (including construction of a new emergency domestic stockpile, relocation of the ROM coal stockpile and the construction of a Tailings Drying Area (TDA)); and
- Other surface infrastructure modifications including additional items of plant and equipment and modifications to Drayton's power reticulation, workshop and water management systems (utilising a new services corridor).

Export coal will continue to be transported to the Port of Newcastle under the approved Antiene Rail Spur DA, whilst domestic coal will be transported to Macquarie Generation via a dedicated overland conveyor.

The conceptual mine plan has been specifically designed to minimise environmental impacts and incorporate all reasonable and feasible mitigation measures (see **Section 8.3.4** for further details).

Assessment of impacts in the EA incorporate consideration of all existing and additionally proposed activities associated with the Project.

## 4.2 PROJECT NEED

The Project will realise the recovery of additionally identified reserves of ROM coal by the continuation of existing open cut mining operations integrated with an effective long-term rehabilitation strategy and final landform outcome for the mine.

The Project will provide Drayton with the flexibility to extract coal up to a maximum rate of 8 Mtpa whilst utilising the existing infrastructure, equipment fleet and highly skilled workforce of 329 personnel. An additional 59 personnel will be required for the Project if the maximum proposed production level is realised.

To ensure the orderly conclusion of open cut mining within Drayton's Mining Leases and to most effectively rehabilitate the mine site, the Project must proceed.

## 4.3 MINE PLAN

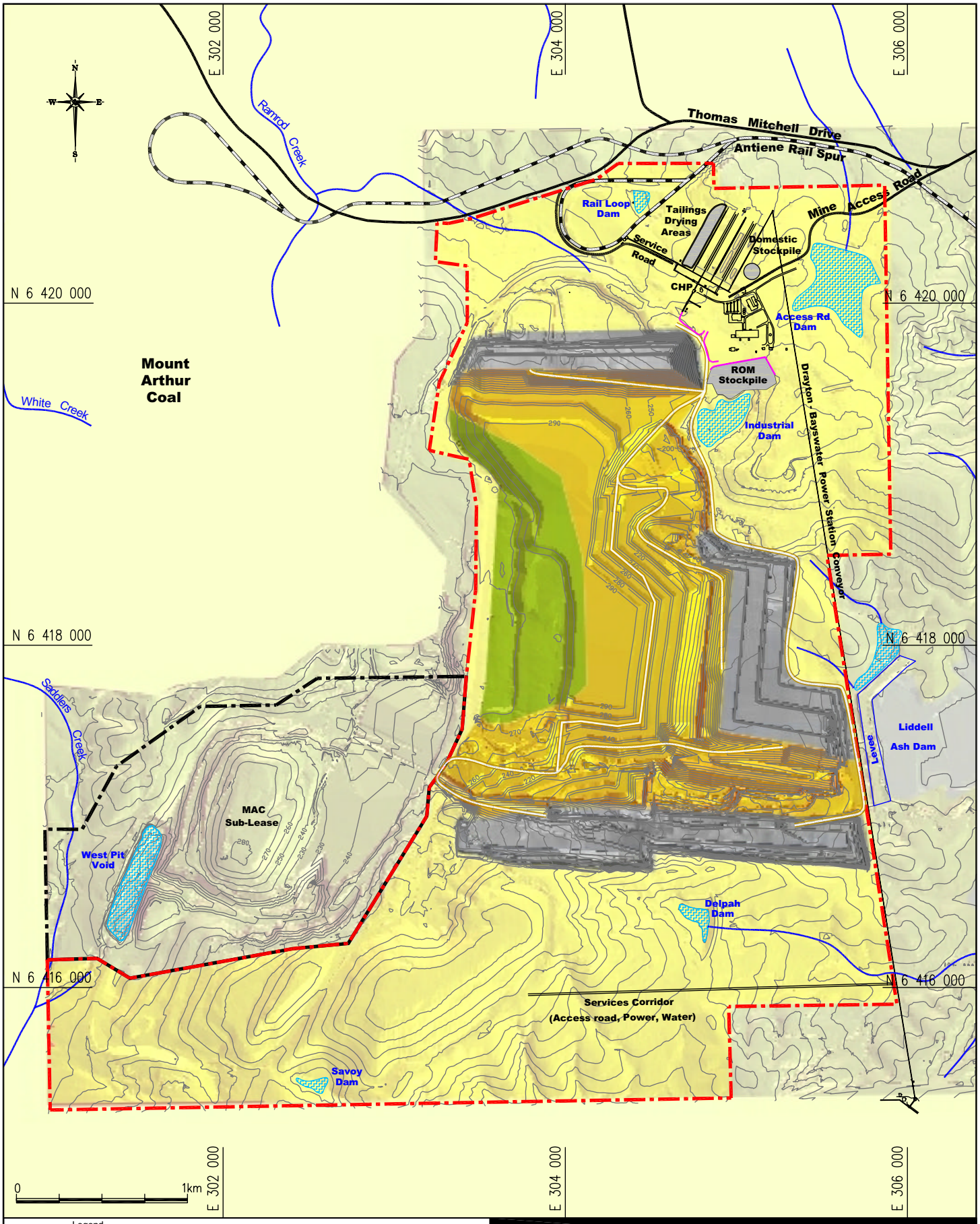
### 4.3.1 Mine Layout

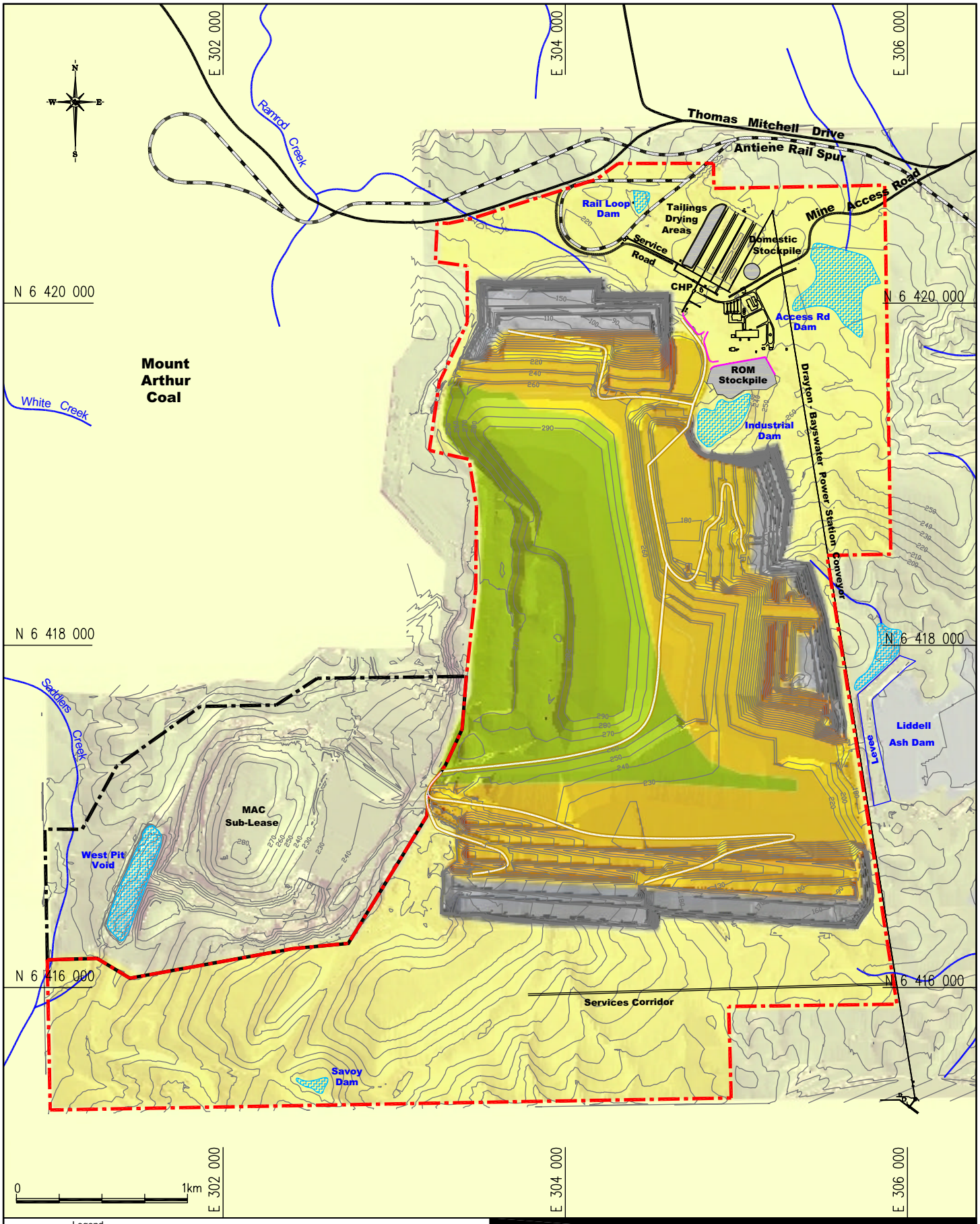
The conceptual stages of the continuation of mining associated with the Project are shown in **Figure 8**, **Figure 9** and **Figure 10** for Years 1, 5, and 10 respectively. Year 1 is anticipated to commence in 2008.

Drayton will operate up to three pits (the North, South and East Pits) 24 hours a day, 7 days a week to enable maximum operational flexibility, whilst meeting all environmental criteria as described in **Section 8.0** and **9.0**.

Drayton has considered all reasonable and feasible noise mitigation measures when developing the conceptual mine plan, including a reduction in intensity of mining the North Pit at night and fitting noise attenuation to operating trucks (**Section 8.3.4**).

The landform design (upon the completion of mining) is shown in **Figure 11** and indicates the presence of three voids – one in each of the North, South and East Pits. The surface catchment of the voids will be reduced (as practical) by the use of diversion drains and contour banks. The anticipated use and management of the voids is discussed further in **Section 8.7**.

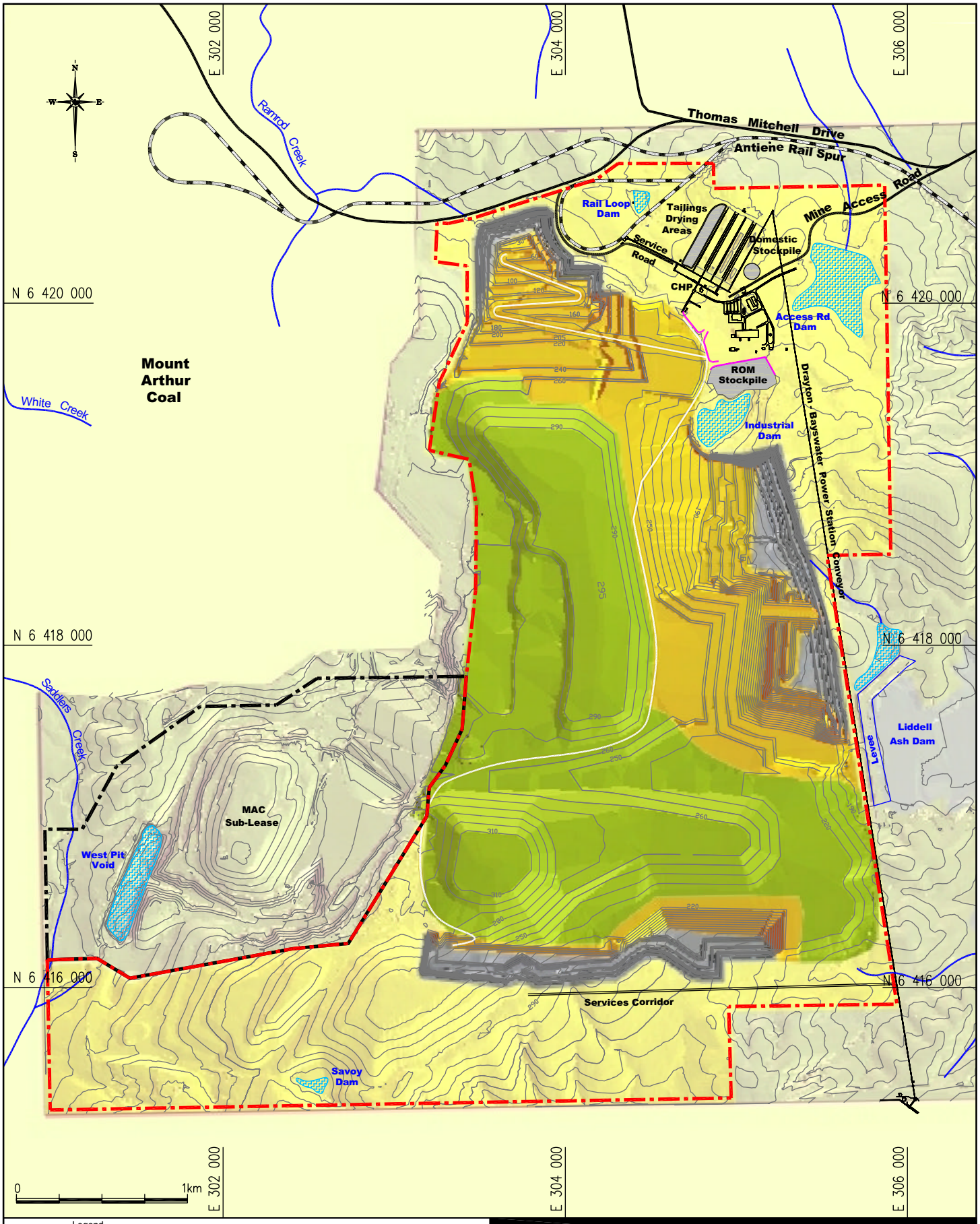

E 302 000
E 304 000
E 306 000
N 6 420 000
N 6 418 000
N 6 416 000
Ramrod Creek
Thomas Mitchell Drive
Antiene Rail Spur
Mine Access Road
Rail Loop Dam
Tailings Drying Areas
Service Road
Domestic Stockpile
CHP
Access Rd Dam
ROM Stockpile
Industrial Dam
Drayton / Bayswater Power Station Conveyor
Mount Arthur Coal
White Creek
Saddlers Creek
MAC Sub-Lease
West Pit Void
Liddell Ash Dam
Levee
Delpah Dam
Services Corridor
(Access road, Power, Water)
Savoy Dam
0
1km
Legend
Active Pit
Unshaped Overburden
Proposed Rehabilitation
EA Boundary
MAC Sub-lease
Rail
Roads
Creeks
Haul Roads
ROM Stockpile Wall & Berm
Water bodies
Hansen Bailey
ANGLO COAL
DRAYTON
Co-ordinate System: MGA Zone 56
Source: Pegasus Technical (2007)
DRAYTON MINE EXTENSION EA
Year 1 Mine Plan
Cad File: 01984D.dwg
Date: 10.05.2007
Drawn: JD
Figure 8




# DRAYTON MINE EXTENSION EA

## Year 5 Mine Plan

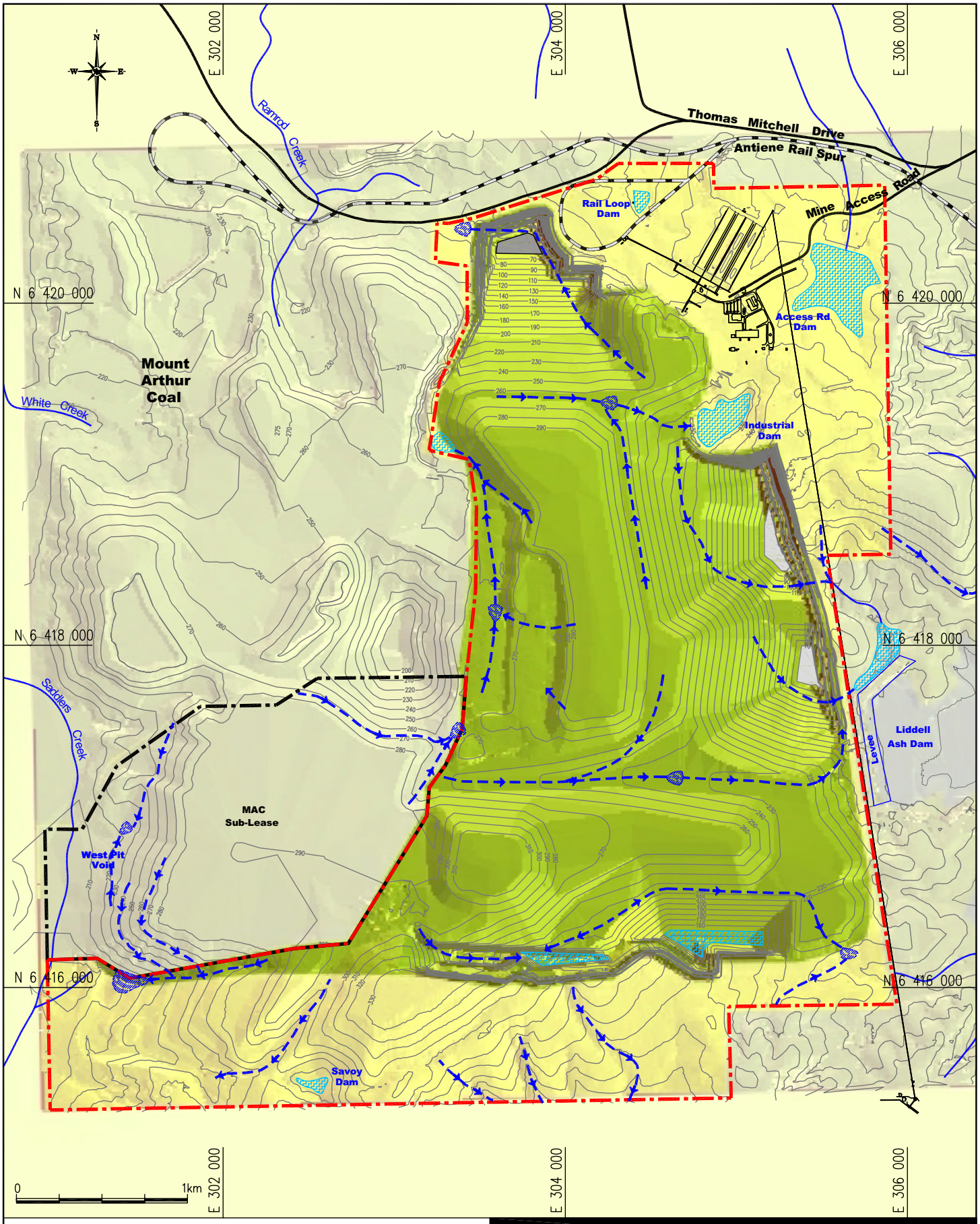
| Cad File: 01985D.dwg | Date: 10.05.2007 | Drawn: JD | Figure 9 |
|---|---|---|---|




# DRAYTON MINE EXTENSION EA

## Year 10 Mine Plan

| Cad File: 01986D.dwg | Date: 10.05.2007 | Drawn: JD | Figure 10 |
|---|---|---|---|




Legend

- Rehabilitation
- EA Boundary
- MAC Sub-lease
- Rail
- Roads
- Creeks
- Water bodies
- Fly ash emplacement
- Coarse Reject
- Drainage
- Proposed Dams

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Co-ordinate System: MGA Zone 56
Source: Pegasus Technical (2007), Mount Arthur Coal (2006)

# DRAYTON MINE EXTENSION EA

## Conceptual Final Void Uses

| Cad File:01987D.dwg | Date: 10.05.2007 | Drawn: JD | Figure 11 |
|---|---|---|---|

### 4.3.2 Mining Schedule & Method

The conceptual mining schedule for the Project is shown in **Table 6**. Drayton will continue to utilise a dragline, excavators, loaders and trucks to both uncover and transport coal to on-site processing and TLO facilities. ROM coal will be transported internally by trucks to a ROM coal stockpile which will be relocated adjacent to the Industrial Dam as mining progresses (**Figure 8** to **Figure 10**). Blasting will continue to be required to assist with overburden and coal extraction.

Drayton intends to place up to approximately 25 million bcm of overburden material in the MAC Sub-lease area, as required, consistent with the Agreement described in **Section 8.7.1**.

Drayton will continue to provide up to approximately 250,000 bcm of overburden to Macquarie Generation per annum as required to assist with earthworks and capping associated with the Liddell Ash Dam.

## 4.4 INFRASTRUCTURE MODIFICATIONS

Drayton will continue to utilise existing infrastructure facilities; however, some will be required to be upgraded to facilitate the proposed extension of the mine plan.

### 4.4.1 ROM Coal Stockpile

As the Project seeks to extend the mining footprint, this has necessitated the relocation of the ROM coal stockpile (see **Figure 8** to **Figure 10**). The existing Pollution Control Dam and Sewage Treatment Plant will not be relocated or impacted by the ROM coal stockpile relocation. The ROM coal stockpile has been designed to capture all dirty water run-off within the mine water management system. In order to minimise noise emissions, a 5 m high acoustical barrier will be constructed along the full length of the ROM coal stockpile's northern limit (**Figure 8** to **Figure 10**).

### 4.4.2 CHP

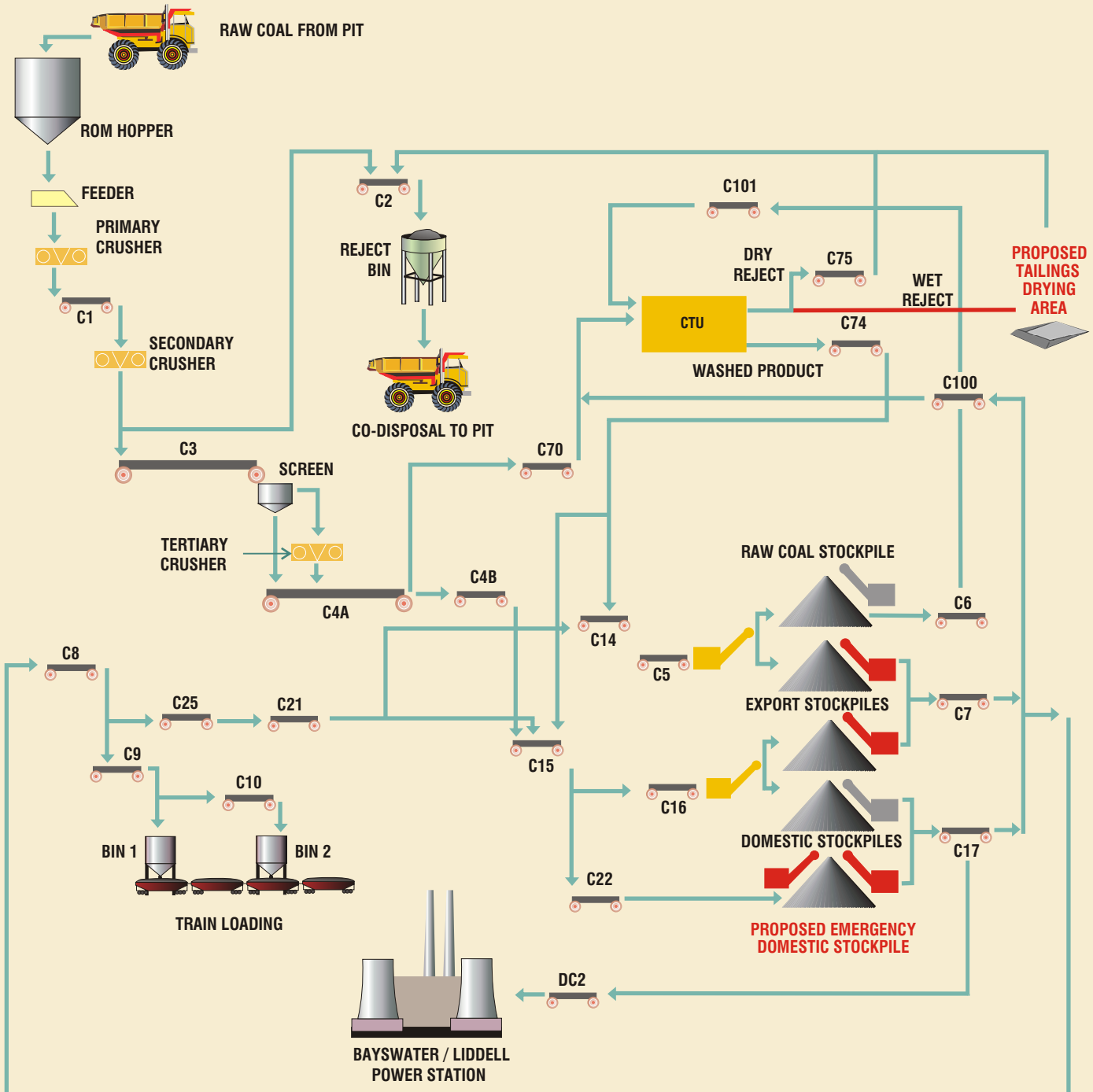
It is proposed to upgrade the CHP to facilitate the potential increase in production as conceptually shown on **Figure 12**. The CHP may be upgraded by:

- Refurbishing the existing primary feeder;
- Replacing the existing primary sizer to crush the hardest of Balmoral coals at 2,000 tph;
- Removing the rotary breaker and replacing the scalping screen with a low speed secondary sizer unit; and
- Replacing the existing tertiary sizers with a single low-speed tertiary sizer.

**Table 6**
**Conceptual Mine Schedule**

| Project Year | Total Prime (Mbcm/annum) | ROM Coal (Mtpa) | Product Coal (Mtpa) | Coarse Reject (tpa) | Reject (tpa) | Strip Ratio |
|---|---|---|---|---|---|---|
| 1 | 48.09 | 7.21 | 7.00 | 97,861 | 112,139 | 6.7 |
| 2 | 46.56 | 7.28 | 7.01 | 184,403 | 85,597 | 6.4 |
| 3 | 45.69 | 7.28 | 6.98 | 101,703 | 198,297 | 6.3 |
| 4 | 47.82 | 7.16 | 6.76 | 235,442 | 164,558 | 6.7 |
| 5 | 49.42 | 8.00 | 7.05 | 752,673 | 197,327 | 6.2 |
| 6 | 48.03 | 6.50 | 6.04 | 262,673 | 197,327 | 7.4 |
| 7 | 36.03 | 4.63 | 4.47 | 53,476 | 106,524 | 7.8 |
| 8 | 11.73 | 2.33 | 2.06 | 206,146 | 63,853 | 5.0 |
| 9 | 7.82 | 1.55 | 1.37 | 137,431 | 42,569 | 5.0 |
| 10 | 3.91 | 0.78 | 0.69 | 68,715 | 21,285 | 5.0 |

*tpa - tonnes per annum*




Legend

- C — Conveyor
- Existing Reclaimer
- Existing Stacker
- Proposed Stacker
- Proposed Reclaimer
- Proposed Pipeline

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ANGLO COAL

DRAYTON

# DRAYTON MINE EXTENSION EA

## Proposed CHP Upgrade

| Cad File: CHP Flowchart | Date: 16.04.2007 | Drawn: JD | Figure 12 |
|---|---|---|---|

Other components of the CHP which may be modified include:

- Modifying the CTU;
- Construction of a TDA;
- Upgrading the Product Coal Reclaiming System;
- Upgrading the Product Coal Stockpiling System; and
- Construction of a new Emergency Domestic Coal Stockpile.

Each of these aspects is discussed further below.

**CTU**

The CTU may be upgraded by:

- Modifying the existing raw coal sizing screen to act as a de-sliming screen;
- The implementation of a new fines coal processing circuit (centrifuge and reject screen) to replace the current fines handling system and directly control the product ash;
- The addition of a full capability tailings thickener to handle the increase in solids and volume loading; and
- The addition of belt press filters for tailings treatment to produce a cake discharge and upgrade the flocculant dosing system.

**Tailings Drying Area**

Drayton proposes to construct a TDA adjacent to the current Product coal stockpiles (see **Figure 8** to **Figure 10**).

Tailings will be pumped via pipeline from the CHP into the TDA. Once dry, tailings will be relocated to the pit for co-disposal with overburden, as currently undertaken.

Saline water collected in the TDA will be decanted and returned to Drayton's water management system for reuse in the CHP. The TDA will be constructed of impervious materials so that no impact on groundwater resources will occur.

**Product Stockpiling**

The existing Stockpile 1 is proposed to be converted to a raw coal stockpile, storing raw coal to feed the CTU. This will require the installation of two new feed conveyors to receive reclaimed ROM coal. Existing Stockpiles 2 and 3 (see **Figure 5B**) may continue to be utilised as export product coal stockpiles, while Stockpile 4 may continue to supply domestic coal.

**Product Reclaiming**

The existing bridge bucket-wheel Reclaimer 1 is proposed to be dedicated to Stockpile 1 to feed raw coal to the CTU.

A new portal reclaimer rated at 2,500 tph will be applied to both Stockpiles 2 and 3, each reclaiming to a common conveyor. The benefit of using two reclaimers discharging to the one reclaim conveyor includes the ability to blend coal reclaimed from Stockpiles 2 and 3 and reclaim up to 5,000 tph (assuming upgraded conveyors are used) if necessitated by future requirements.

Domestic coal Stockpile 4 will continue to be handled as per current operations via existing Reclaimer 2.

**Emergency Domestic Stockpile**

To compliment the proposed changes in the CTU, an emergency domestic coal stockpile with a capacity of approximately 40,000 t may be constructed adjacent to the existing coal stockpiles (see **Figure 8** to **Figure 10**). The emergency domestic coal stockpile will be serviced solely by conveyors, a stacker and reclaimer.

All run-off will be captured within Drayton's water management system for reuse, whilst stockpile sprays will be fitted to the emergency domestic stockpile to minimise adverse air quality impacts.

### 4.4.3 Workshop & Warehouse Modifications

As a result of the utilisation of new larger trucks (see **Section 4.5**), the existing workshop is required to be modified. This will be achieved primarily by converting six of the existing service bays in the workshop into four larger service bays, whilst increasing the workshop width and concrete apron. The lube bay will be expanded by one bay to house the larger trucks, whilst a tyre change out pad will also be created to cater for the larger tyres.

The new truck fleet has also necessitated the need to construct an extension to the existing warehouse to store parts and maintenance equipment.

### 4.4.4 Other Surface Infrastructure

The Project will require the construction of minor infrastructure to service the mining operations including various light vehicle access roads and services corridors, as required.

## 4.5 EQUIPMENT FLEET

The Project will require some additional items of equipment to the currently approved fleet, to assist in improving efficiency as shown in **Table 7**. The primary difference in the equipment fleet will be the replacement of some existing Cat 789 trucks with new 240-300 t trucks.

## 4.6 HOURS OF OPERATION & MANNING

Drayton will continue to operate 24 hours per day, 7 days a week.

A workforce of approximately 388 persons (including contractors) will be required for the operation of the Project at maximum production.

It is anticipated that an additional workforce of 38 will be required during construction and upgrade of the CHP, raw coal crushing facilities and product stockpiles during Year 1 of the Project.

**Table 7**
**Current & Conceptual Mining Fleet**

| Category | Plant Equivalent To | Current | Year 10 |
|---|---|---|---|
| Excavators & Loaders | BE 1370W Dragline | 1 | 1 |
| | Cat 992C Front End Loader | 1 | 1 |
| | Le Tourneau L1400 Front End Loader | 1 | 1 |
| | Le Tourneau L1100 Front End Loader | 1 | 1 |
| | Hitachi EX5500 Excavator (500 t) | 2 | 3 |
| | Hitachi EX3500 Excavator (300 t) | 1 | 1 |
| Dozers | Tiger 690/Cat 854 Rubber Tyre Dozer | 2 | 3 |
| | Cat 834 Rubber Tyre Dozer | 1 | 0 |
| | D11 Dozer | 8 | 11 |
| | D10 Dozer | 1 | 1 |
| Trucks | Trucks (280 t or equivalent) | 0 | 14 |
| | Cat 789C Trucks | 13 | 11 |
| | Cat 789B Trucks | 10 | 0 |
| Water Trucks | Cat 785 Water Truck | 0 | 1 |
| | Cat 777D Water Truck | 2 | 2 |
| | Cat 773B Water Truck | 1 | 0 |
| Grader | Cat 16H Grader | 3 | 4 |
| Scraper | Cat 637D Scraper | 1 | 1 |
| Drills | Ingersoll Rand DM25 Coal Drill | 1 | 0 |
| | Svedala SKF50 Medium Drill | 1 | 2 |
| | Drilltech 90KS/SK60 Overburden Drills | 1 | 2 |

## 4.7 TRANSPORT

No change to coal transport at Drayton is required as a result of this Project.

Domestic coal from Drayton will continue to be transported via overland conveyor to Macquarie Generation's Bayswater Power Station.

Up to 7 Mtpa of export coal will be railed to the Port of Newcastle, from the Antiene Rail Spur via the Main Northern Railway, as approved in the Antiene Rail Spur DA. No increase in the approved tonnage on the Antiene Rail Spur is required as a result of the Project. Further detail on the previously assessed and approved impacts of the Antiene Rail Spur is provided in **Section 8.3.3** and **Appendix F**.

Site access to the EA Boundary will continue to be from Thomas Mitchell Drive, via the Drayton Mine Access Road.

## 4.8 PROJECT ALTERNATIVES

Several alternatives were considered during the development of the Project in recognition of the principles of Ecologically Sustainable Development (ESD) which included:

- *Option 1*: Extension of open cut mining operations from 2012 to 2017, at a maximum of 8 Mtpa utilising the existing infrastructure, equipment fleet and workforce with an additional 59 employees (the Project);
- *Option 2*: Continuation of open cut mining at the existing approved maximum tonnage (5.5 Mtpa) until 2017 utilising the existing workforce, infrastructure and equipment fleet; or
- *Option 3*: Continue operations under existing approvals.

Option 1 is the preferred option as it enables the logical progression of mining whilst providing Drayton the flexibility to mine up to 8 Mtpa of ROM coal. The Project ensures the security of approximately 329 jobs for up to seven years with the prospect of up to an additional 59 employees if maximum production rates are realised.

Option 1 secures the maximum recovery of the in situ coal resource while incurring only minimal additional environmental impacts.

Option 2 was rejected as it did not provide the optimal economic outcome for the mine or the flexibility to adapt production rates to meet market demands. This option would not provide the prospect of any additional employment.

Option 3 would result in the cessation of mining activities, the premature loss of approximately 329 jobs, the sterilisation of a significant non-renewable coal resource and a less than desirable rehabilitation and final landform outcome within the EA Boundary.

# 5.0 REGULATORY FRAMEWORK

## 5.1 INTRODUCTION

Drayton seeks Project Approval under Part 3A of the EP&A Act from the Minister for Planning.

Drayton operates under the Planning Approvals outlined in **Section 5.6**. If granted, Project Approval will replace those existing approvals indicated in **Section 5.6** to be surrendered. Other existing approvals for activities outside the scope of this EA, including those relating to coal transport on the Antiene Rail Spur, will continue to apply.

The Project may also require approvals under additional Acts or State Environmental Planning Policies (SEPP) not exempted under Part 3A of the EP&A Act. These are discussed in detail below as relevant to the Project. A flowchart showing the planning approvals and consultation process relevant to the Project is shown in **Figure 13**.

## 5.2 RELEVANT NSW LEGISLATION

### 5.2.1 Environmental Planning & Assessment Act 1979

**Permissibility of Mining**

The Project requires approval under Part 3A of the EP&A Act as it is a Major Project listed in Schedule 1 of *SEPP (Major Projects) 2005*. The Minister for Planning will be the consent authority.

Section 75J (1) of the EP&A Act provides that the Minister for Planning may approve or disapprove of the carrying out of a project if:

> *'(a) the proponent has duly applied to the Minister for approval under this Part to carry out a project, and*
>
> *(b) the environmental assessment requirements under this Division with respect to the project have been complied with.'*

Further, Section 75J (3) provides: *"The Minister cannot approve of the carrying out of a project that would (but for this Part) be wholly prohibited under an environmental planning instrument"*.

The Muswellbrook Local Environmental Plan (LEP) is the relevant Environmental Planning Instrument (EPI) applying to the EA Boundary. The EA Boundary is partly located within Muswellbrook LEP zoning 'Zone 1(a)-Rural' and partly within 'Zone 5(a) (Special Uses "A" Zone)' (for which the use is designated as Power Station).

Mining is permissible with Development Consent in Zone 1(a)-Rural and is prohibited in Zone 5(a)-(Special Uses). However, as a result of Section 75J(3), the Minister has the authority to grant the Project Approval as sought.

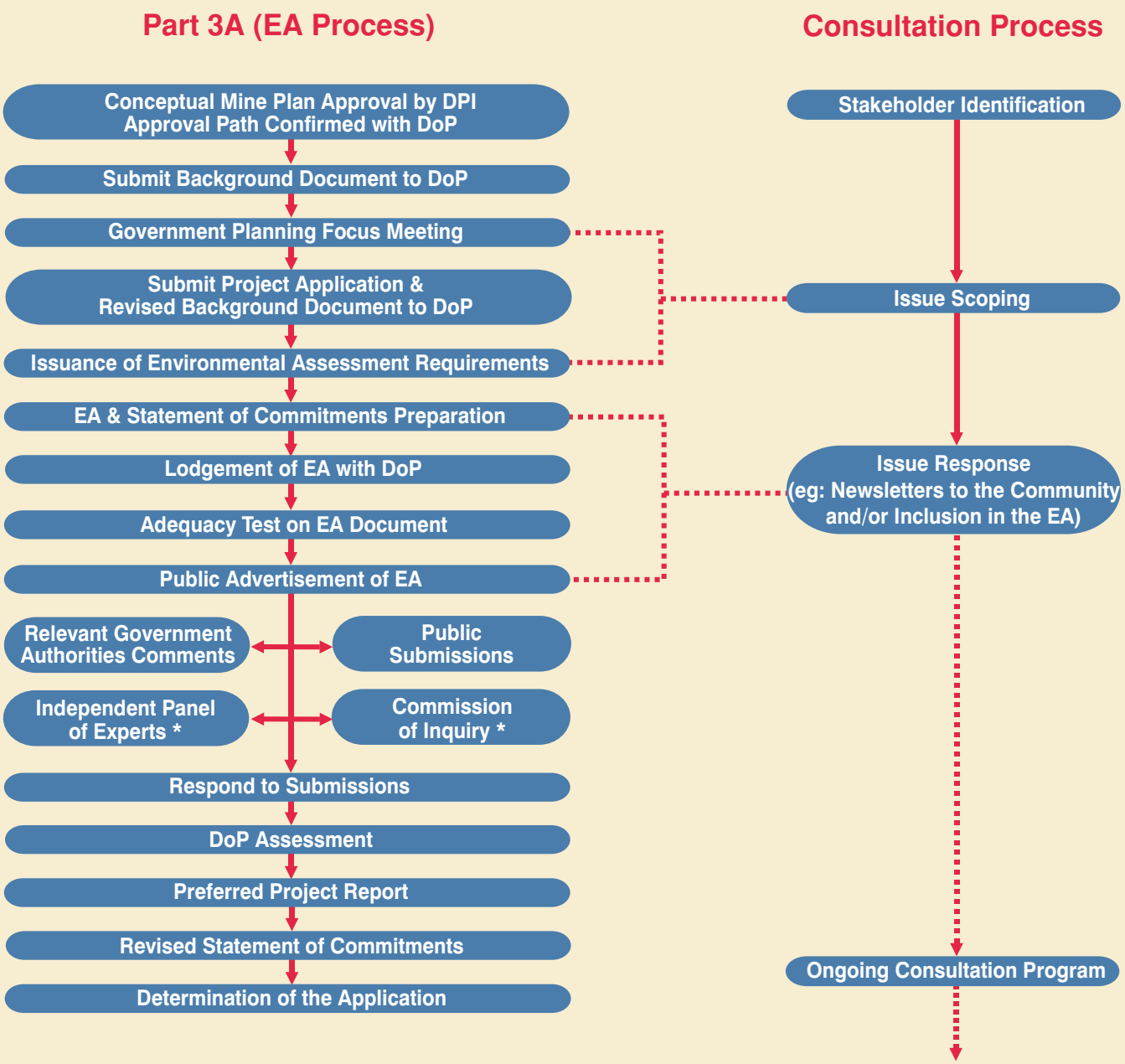
**Requirement for EA**

Section 75H of the EP&A Act requires that an EA must be prepared in accordance with any guidelines published by the Minister under Section 75F(1) and the requirements determined by the Director-General under Section 75F(2). The finalised Director-General's EARs for the Project were issued on 25 January 2007 and include a comprehensive list of matters to be addressed in the EA (see **Section 6.4.2** and **Appendix B**).

**Development Contributions**

The Minister has the power under Section 94 of the EP&A Act to impose a condition in any Project Approval requiring a payment to the local Council. The amount is identified as the cost to the local Council of providing additional services for the increased demand on existing services due to the Project.

Section 93F of the EP&A Act enables a Voluntary Planning Agreement (VPA) to be established with the proponent (Drayton) and the local council (Muswellbrook Shire Council (MSC)). The VPA is intended to exclude the power of the Minister to impose a condition requiring a contribution under Section 94 of the EP&A Act. Accordingly, the Minister will be a party to the VPA as required by Section 93F (3A) of the EP&A Act.




*Avenues available to the Minister

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ANGLO COAL

DRAYTON

DRAYTON MINE EXTENSION EA

Planning Approvals & Consultation

| Cad File: Process Flow | Date: 07.05.2007 | Drawn: JD | Figure 13 |
|---|---|---|---|

A VPA has been agreed in principle between MSC and Drayton for the payment of contributions for the Project and is discussed further in **Section 9.12**. The VPA will be available as a formal offer for the Minister, MSC and Drayton to enter into as required by Section 93F (3A) of the EP&A Act.

### 5.2.2 Environmental Planning & Assessment Regulation 2000

As indicated on **Figure 4**, Drayton is the owner of part of the land to which the Project Application is related. The remainder of the land within the EA Boundary is owned by Macquarie Generation. Macquarie Generation has entered into a lease with Drayton to facilitate mining in this area and to ultimately provide a void for fly ash disposal from their Power Stations (described further in **Section 8.7.1**). Land owner consent to the Project Application is not required due to Clause 8F of the *Environmental Planning and Assessment Regulation 2000* which provides that the consent of the land owner is not required in respect of a Project Application for mining.

### 5.2.3 Protection of the Environment Operations Act 1997

The *Protection of the Environment Operations Act 1997* (POEO Act) provides for the licensing of pollution by the Department of Environment and Climate Change (DECC) which administers the POEO Act.

Drayton holds EPL 1323 in respect to its currently approved operations and may seek a modification to authorise the Project under the POEO Act.

### 5.2.4 Mining Act 1992

The mining of coal in NSW is controlled by the *Mining Act 1992* (Mining Act), administered by the Minister for the Department of Primary Industries (DPI).

Section 5 of the Mining Act requires a Mining Lease before conducting any mining and Section 65(2) of the Mining Act requires that there be "*appropriate development consent*" as a prerequisite to the granting of a Mining Lease. Drayton holds the mining authorisations set out in **Section 5.6**.

Drayton's Mining Operations Plan (MOP) will be updated to incorporate details of the Project.

### 5.2.5 Coal Mines Health & Safety Act 2002

The *Coal Mines Health and Safety Act 2002* (CMHS Act) came into effect on 23 December 2006 with the enactment of the *Coal Mines Health and Safety Regulations 2006* (CMHSR) repealing the *Coal Mines Regulation Act 1982* and *Coal Mines Regulations 1999,* subject to transitional provisions. Division 3, Section 100 of the CMHS Act states that Ministerial approval must be obtained to establish an emplacement area where reject material is to be deposited or placed.

Drayton currently holds a Ministerial approval for an emplacement area (see **Section 5.6**) for the disposal of reject. Ministerial approval has been granted for the proposed TDA and the co-disposal of reject material in the pit.

### 5.2.6 Roads Act 1993

The *Roads Act 1993* (Roads Act) provides for the dedication of classified and unclassified roads and confers certain functions to the Roads & Traffic Authority (RTA) in relation to the management of roads. Under Section 138 of the Roads Act, consent from the RTA is required to erect a structure or carry out work in, on or over a public road.

The Project will not involve any works associated with classified or unclassified roads, and as such the Roads Act does not apply to the Project.

### 5.2.7 Dams Safety Act 1978

The *Dams Safety Act 1978* (Dams Safety Act) requires the NSW Dams Safety Committee (DSC) to "*formulate measures to ensure the safety of dams*" and to "*maintain a surveillance of prescribed dams*". A "*prescribed dam*" is one listed in Schedule 1 of the Dams Safety Act.

There are two prescribed dams within the EA Boundary (Delpah Dam and Access Road Dam) and one additional prescribed dam adjacent to the EA Boundary (Liddell Ash Dam Levee) which is listed under the Dams Safety Act.

Delpah Dam will be removed by the progression of mining associated with the Project and as such, a request will be made to de-list Delpah Dam from Schedule 1 of the Dams Safety Act.

#### 5.2.8 Threatened Species Conservation Act 1995

The *Threatened Species Conservation Act 1995* (TSC Act) defines and lists endangered species, populations, communities and critical habitat within NSW, key threatening processes, and provides a framework for their protection. It also provides a methodology for the assessment of the effects of development on threatened species in Species Impact Statements (SIS).

The TSC Act does not apply to the assessment of Projects under Part 3A of the EP&A Act; however, there is still a requirement to consider and assess the effects of the Project on any threatened species in the EA Boundary as specified in the EARs.

This EA has adopted the SIS process for the assessment of the effects on threatened species and is discussed further in **Section 8.6**.

#### 5.2.9 National Parks & Wildlife Act 1974

Section 75U of the EP&A Act provides that if the Project is granted Project Approval under Part 3A of the EP&A Act, then a permit under Section 90 of the *National Parks & Wildlife Act 1974* (NP&W Act) is not required (i.e. Section 90 Consent to Destroy Artefacts).

#### 5.2.10 Water Management Act 2000

The *Water Management Act 2000* (WM Act) regulates access to water under its licensing and approval provisions. Accordingly, Drayton will obtain an Aquifer Interference Access Licence for the Project as required under Section 31 of the WM Act.

#### 5.2.11 Water Act 1912

In accordance with Part 5 of the *Water Act 1912* (Water Act), Drayton will apply for a licence for the groundwater/surface extracted as part of the Project from the Department of Water and Energy (DWE).

### 5.3 RELEVANT NSW SEPPS

#### 5.3.1 SEPP (Mining, Petroleum Production and Extractive Industries)

*SEPP (Mining, Petroleum Production and Extractive Industries)* (SEPP Mining) was gazetted on 16 February 2007. Under SEPP (Mining) open cut mining on any land is permissible with Development Consent where:

- Development for the purpose of agriculture or industry may be carried out; or
- The land is the subject of a Mining Lease immediately prior to commencement of SEPP (Mining).

Facilities for the processing or transportation of minerals are permissible with or without Development Consent on land on which mining may be carried out if the minerals were mined from that land or adjoining land. SEPP (Mining) does not apply to an Application for Project Approval under Part 3A of the EP&A Act that had been made but not finally determined before the commencement of the policy. Therefore SEPP (Mining) does not apply to this Project.

#### 5.3.2 SEPP 33 – Hazardous & Offensive Development

*SEPP 33 – Hazardous & Offensive Development* (SEPP 33) requires the consent authority to consider whether an industrial project is a potentially hazardous industry or a potentially offensive industry.

A Preliminary Hazard Analysis has been conducted for the Project (**Section 9.11**), the findings from which have determined that the Project is neither potentially hazardous or an offensive development.

#### 5.3.3 SEPP 44 – Koala Habitat Protection

*SEPP 44 - Habitat Koala Protection* (SEPP 44) encourages the conservation and management of natural vegetation areas that provide core habitat for koalas to ensure there is ongoing protection of koalas and their habitat.

The Flora and Fauna Impact Assessment conducted for the Project did not identify the presence of any koalas or core koala habitat within the EA Boundary (**Section 8.6**).

## 5.4 RELEVANT REGIONAL PLANS

### 5.4.1 Hunter Regional Environment Plan 1989

The Hunter Regional Environment Plan 1989 (Hunter REP) applies to the land within the EA Boundary and provides objectives to ensure balanced development within the Hunter Region.

Clause 39 of the Hunter REP pertains to Mineral Resources and Extractive Industries within the Hunter Region and outlines clear objectives for coal mining with the primary objective to ensure mining is conducted where adverse impacts on the environment and community are minimised.

Clause 48 of the Hunter REP describes policies and objectives for pollution control in the Hunter Region. This includes ensuring adverse impacts associated with potential air quality, noise and water impacts of mining are minimised on the environment and community.

This EA addresses the above objectives.

## 5.5 RELEVANT COMMONWEALTH LEGISLATION

### 5.5.1 Environmental Protection & Biodiversity Conservation Act 1999

The *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act) provides a mechanism for national environment protection and biodiversity conservation for Matters of National Environmental Significance (MNES) which includes:

- Listed species and communities (e.g. listed threatened species and ecological communities and migratory species);
- Protected areas (e.g. World heritage properties, Ramsar wetlands of international significance, conservation zones); and
- National, Commonwealth and Indigenous Heritage.

Actions that are likely to have a significant impact on a MNES require approval under the EPBC Act.

A number of flora and fauna species listed under the EPBC Act were identified in the EA Boundary (see **Section 8.6** for further detail). An Assessment of Significance was completed for these species in accordance with the requirements of the EPBC Act. The Assessment concluded that the Project will not result in a significant impact on the species and therefore it is not necessary to refer the Project under the EPBC Act.

## 5.6 EXISTING REGULATORY APPROVALS

### 5.6.1 Planning Approvals

An integral component of the Project is gaining a single Planning Approval for the essential operation of Drayton, thereby replacing principal existing and applicable Development Consents granted to Drayton since original Development Approval in 1982.

However, Development Approval exists for activities outside the scope of this EA and as such, will continue to operate (see **Table 8**).

Central to the continued operation of Drayton is the separate Development Consent granted by the Minister for (then) Urban Affairs and Planning (DUAP) in November 2000 for the existing Drayton Rail Loop and Antiene Rail Spur DA (see **Table 8,** Ref 6). This Development Consent authorises the loading and transport along the Antiene Rail Spur to the Main Northern Railway of up 7 Mtpa of Drayton saleable coal. This approval will continue to be relied upon and exercised by Drayton for the haulage of its Product coal to the Port of Newcastle (see **Section 8.3.3** for a discussion on the offsite impacts associated with the previously approved Antiene Rail Spur).

The status of Drayton's Development Consents and those Development Consents Drayton intend to consolidate are shown in **Table 8**.

### 5.6.2 Other Licences & Approvals

**Table 9** outlines the status of Drayton's current licences and mining tenements.

**Table 8**
**Current Development Consents**

| Ref | DA No | Approval title | Date | Approval Authority | Status |
|---|---|---|---|---|---|
| 1 | 92/87 | Installation of Conveyor Systems and Associated Facilities for the Supply of Coal to Bayswater Power Station | 15 September 1987 | MSC | Current* |
| 2 | 9/90 | Far East tip Project - Overburden Emplacement | 26 March 1990 | MSC | Current* |
| 3 | 40/92 | Lease Boundary Adjustment between Coal Lease 744 and Coal Lease 229 (Bayswater Coal) | 10 April 1992 | MSC | Current* |
| 4 | 176/92 | Construction of Two Water Storage Dams | 24 December 1992 | MSC | Current* |
| 5 | 27/99 | Mine Water Storage Dam (Saddlers) | 8 September 1998 | MSC | Current* |
| 6 | 106 - 04 - 00 | Increased Coal Transport using the Existing Drayton Rail Loop and Antiene Rail Spur | 2 November 2000 | DUAP | Current |
| 7 | 102/2002 | Conveyor Protection Structures | 11 September 2002 | MSC | Current* |
| 8 | 163/2002 | Mining Lease Renewal/ Open Cut Coal mine Extension | 16 December 2002 | MSC | Current* |
| 9 | 163/2002 | Modification of a Coal Treatment Unit | 20 February 2004 | MSC | Current* |

** To be surrendered*

**Table 9**
**Leases & Environmental Licences**

| Ref | Approval No | Approval Title | Approval Term | Approval Authority |
|---|---|---|---|---|
| 1 | CL 395 | Coal Lease 395 | 08/03/2007 - 21/01/2029 | DPI |
| 2 | CL 229 | Coal Lease 229 | 28/05/2003 - 28/05/2024 | DPI |
| 3 | ML 1531 | Mining Lease 1531 | 26/02/2003 - 26/02/2024 | DPI |
| 4 | A 173 | Authorisation 173 | 21/06/2004 - 31/08/2008 | DPI |
| 5 | 20BL111869 | Bore Licence | 24/04/2005 - 23/04/2010 | DWE |
| 6 | 10952 | Fixed Radiation Gauge Registration | 30/06/2005 - 30/06/2007 | DECC |
| 7 | 939 | Fixed Radiation Gauge Registration | 04/01/2006 - 02/02/2008 | DECC |
| 8 | 31157 | Licence to Sell/Possess Radioactive Substances | 13/03/2007 – 10/03/2008 | DECC |
| 9 | 35/019387 | Acknowledgement of Notification of Dangerous Goods on Premises | 19/03/2008 | WorkCover NSW |
| 10 | 317541026001 | Section 100 CMHS Act, Ministerial Approval of an Emplacement Area | 23/04/2007 – N/A | DPI |
| 11 | 1024224 | Environmental Protection Licence 1323 | Anniversary Date -1 May | DECC |

## 5.7 ECOLOGICALLY SUSTAINABLE DEVELOPMENT

In 1992, the Commonwealth Government developed the *National Strategy for Ecologically Sustainable Development* (NSESD). This strategy defines ESD as:

> *"Using, conserving and enhancing the community's resources so that ecological processes, on which life depends, are maintained, and the total quality of life, now and in the future, can be increased."*

The NSESD promotes:

> *"development that improves the total quality of life, both now and in the future, in a way that maintains the ecological processes on which life depends".*

The EP&A Act adopts the requirements related to ESD contained in Part 3, Section 6(2) of the *Protection of the Environment Administration Act 1991* (POEA Act), which states that:

> *"Ecologically sustainable development requires the effective integration of economic and environmental considerations in decision-making processes."*

The POEA Act provides that ESD can be achieved through the implementation of the following principles:

1. *"The precautionary principle - if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation;*
2. *Intergenerational Equity - the present generation should ensure that the health, diversity and productivity of the environment are maintained or enhanced for the benefit of future generations;*
3. *Conservation of biological diversity and ecological integrity - conservation of biological diversity and ecological integrity should be a fundamental consideration; and*
4. *Improved valuation, pricing and incentive mechanisms - environmental factors should be included in the valuation of assets and services*."

**Table 10** lists the key principles of ESD and discusses the way in which each principle has been applied to the design of this Project and EA.

**Table 10**
**Principles of Ecologically Sustainable Development**

| ESD Principle | EA Reference |
|---|---|
| The Precautionary Principle | A risk assessment and hazard analysis was conducted to identify risks and develop appropriate mitigation and management strategies. Both risk assessments considered all potential environmental risks associated with the Project and include a consideration of short-term and long-term impacts.<br>A range of management and mitigation strategies have been incorporated into the Project design to minimise potential environmental, social and economic impacts. |
| The Intergenerational Equity Principle | This EA has assessed the social and economic impacts of the Project. Drayton will implement the mitigation and management strategies listed throughout this EA. The strategies are designed to ensure that, given the nature of the Project, the impacts on future generations will be minimised.<br>In particular, the Project will benefit current and future generations through the implementation of rehabilitation and offset strategies which will ensure the health of both diversity and productivity of the local environment. |
| Conservation of Biological Diversity and Ecological Integrity | The flora and fauna assessment provided in this EA describes the potential impacts of the Project on the biological and ecological environment. Management and mitigation measures are proposed which aim to conserve biological diversity and ecological integrity. |
| Improved Valuation, Pricing and Incentive Mechanisms | All economic, social and environmental impacts associated with the Project have been evaluated and quantified where possible (including greenhouse gas emissions). |

# 6.0 STAKEHOLDER CONSULTATION

## 6.1 INTRODUCTION

A comprehensive stakeholder consultation program was undertaken as an integral part of the EA process. It included consultation with neighbouring land owners, local and state government, industry bodies, community groups and other interested parties.

The aim of the consultation was to identify stakeholders' issues in relation to the Project and ensure that these issues were addressed as part of the EA process.

This section provides an overview of the applied consultation process, its objectives, description of the different consultation phases, the key activities undertaken and its findings.

## 6.2 STAKEHOLDER IDENTIFICATION

A comprehensive list of stakeholders was developed through background research and cadastral analysis (land title and White Pages searches) to assist in securing stakeholders and neighbouring landowner's contact details. **Table 11** identifies stakeholders relevant to the Project.

**Table 11**
**Project Stakeholders**

| Stakeholders | Consultation Method |
|---|---|
| • DoP | Briefing, Planning Focus Meeting (PFM), Newsletters |
| • DECC | Briefing, PFM, Newsletters |
| • DWE | Briefing, PFM, Newsletters |
| • DPI | Briefing, PFM, Newsletters |
| • RTA | Offer of Briefing, Newsletters |
| • ARTC | Offer of Briefing, Newsletters |
| • MSC Mayor, Councillors, Officers & Environment Committee | Briefings, Newsletters |
| • Relevant State & Commonwealth Members of Parliament | Offer of Briefing, Newsletters |
| • Macquarie Generation | Briefings, Newsletters |
| • MAC | Briefings, Newsletters |
| • Drayton CCC | Briefings, Newsletters |
| • Aboriginal Community | Briefings, Newsletters, Aboriginal Heritage Reports |
| • Individual Near Neighbours | Offer of Briefings, Newsletters |
| • Relevant Neighbouring Mines and Industry | Offer of Briefings, Newsletters |
| • Drayton Employees | Toolbox Talk, Newsletters |
| • Non-Government Organisations | Offer of Briefing, Newsletters |

## 6.3 ISSUE SCOPING

### 6.3.1 Introduction

The objectives of the issue scoping phase are discussed below and include:

- Providing an overview of the Project;
- Initiating open, two-way communication with stakeholders;
- Identifying community issues and concerns in relation to the Project;
- Identifying potential final land use options; and
- Identifying potential strategies to address the issues raised.

### 6.3.2 Project Newsletter 1

Project Newsletter 1 was developed in May 2006 and distributed either personally at meetings or via post to stakeholders during the first round of consultation. Project Newsletter 1 provided a brief introduction to Drayton, an overview of the Project and the associated approval process, as well as the EA stakeholder consultation process (**Appendix C**).

### 6.3.3 Briefings

From May 2006 to August 2006, approximately 40 issue scoping meetings were conducted with the stakeholders identified in **Table 11**. Project Newsletter 1 was provided at these meetings.

### 6.3.4 Small Group Meetings

Several small group meetings were held with representatives of DoP, DPI, DWE, DECC, MSC, Macquarie Generation, MAC and Drayton CCC during the issue scoping phase.

Ongoing consultation over the Project and the proposed mine plan has occurred with Macquarie Generation over two years via meetings, telephone discussions, electronic and written correspondence and the provision of information for inclusion in this EA.

Additionally, a meeting with MAC was held in July 2006 to discuss the Project. As a result of this meeting, MAC provided a conceptual final landform for the MAC Sub-lease area for integration with Drayton's conceptual final landform presented in this EA.

### 6.3.5 Planning Focus Meeting

A Planning Focus Meeting (PFM) was held at Drayton on 29 June 2006. The PFM was attended by DECC, DPI, DWE, EA specialists and the project team.

### 6.3.6 Project Newsletter 2

Project Newsletter 2 was developed in July 2006 and distributed via mail to all stakeholders following the first round of consultation. The Newsletter provided a summary of key issues raised throughout the consultation, appropriate responses and an update of the EA and consultation process (**Appendix C**).

### 6.3.7 Consultation Timeline

**Figure 14** illustrates the timeline for stakeholder consultation which occurred during the development of the EA.

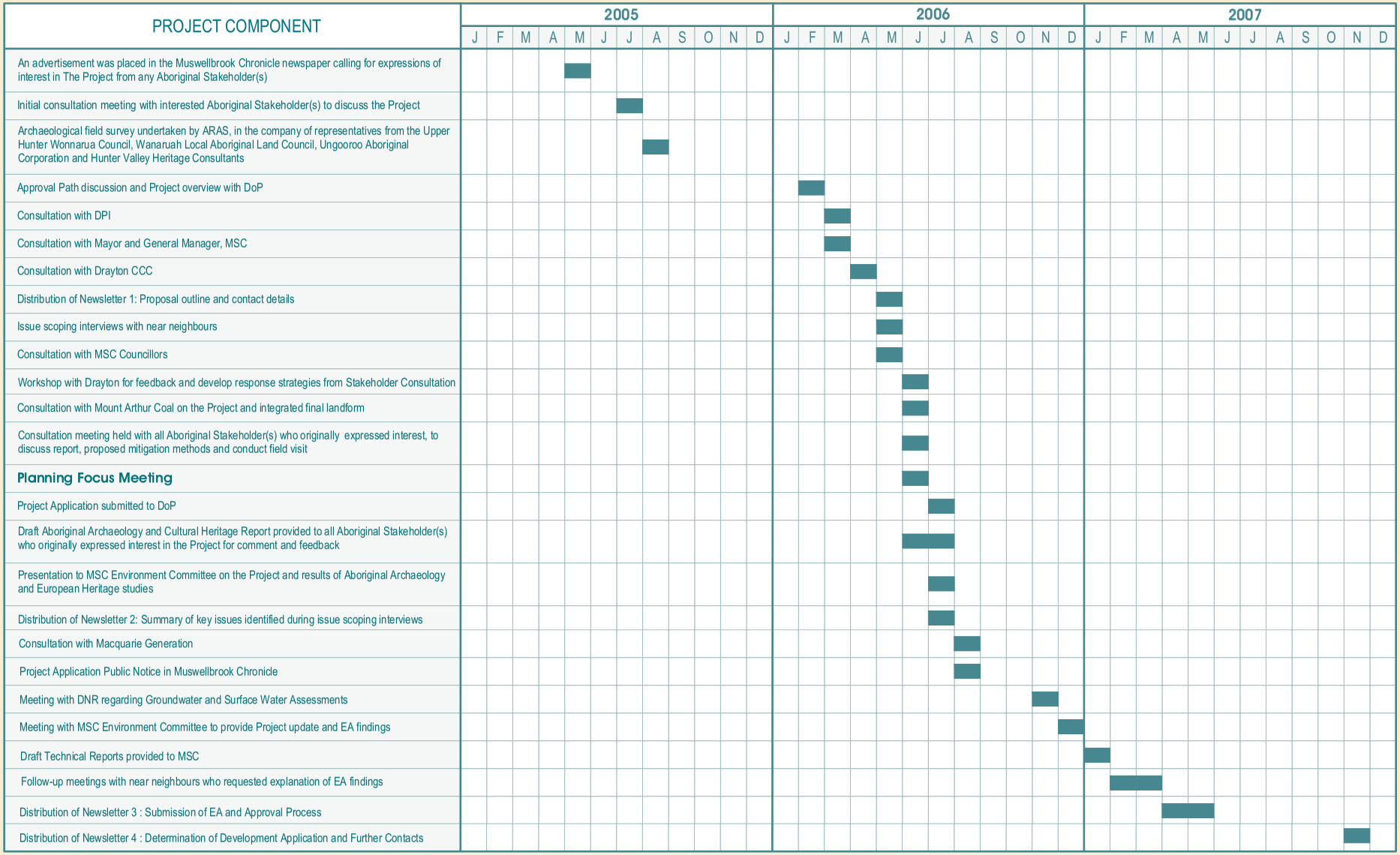
## 6.4 ISSUE RESPONSE

### 6.4.1 Introduction

The objective of this stage was to proactively respond to all issues raised and develop appropriate strategies to manage impacts associated with the Project. Where possible, any issues identified during the consultation program were addressed with stakeholders. This typically involved the provision of further information or incorporating further refinements to the mine plan. Other issues raised are addressed in this EA.

### 6.4.2 Regulatory Feedback

In response to the PFM and Major Project Application, DoP issued the EARs for the Project on 15 August 2006. These were re-issued on 25 January 2007 to incorporate a detailed greenhouse gas emissions assessment. The revised EARs are included in **Appendix B**, while **Table 12** lists the requirements and where each is addressed in the EA.

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# DRAYTON MINE EXTENSION EA

## Stakeholder Consultation Timeline

| Cad File: Timeline | Date: 07.05.2007 | Drawn: JD | Figure 14 |
|---|---|---|---|

**Table 12**
**Environmental Assessment Requirements**

| Issue | Description | EA Section |
|---|---|---|
| **General Requirements** | The Environmental Assessment must include:<br>• An executive summary; | **Executive Summary** |
| | • A detailed description of the project including the:<br>o Need for the project;<br>o Alternatives considered: and<br>o Various components and stages of the project, including the interaction between the proposed activities and existing operations. | **4.0**<br>**4.2**<br>**4.8**<br>**4.0** |
| | • Consideration of any relevant statutory provisions; | **5.0** |
| | • A general overview of the environmental impacts of the project, identifying the key issues for further assessment, and taking into consideration the issues raised during consultation; | **6.0 & 7.0** |
| | • A detailed assessment of the key issues specified below, and any other significant issues identified in the general overview of environmental impacts of the project (see above), which includes:<br>o A description of the existing environment; and<br>o An assessment of the potential impacts of the project including cumulative impacts (particularly on noise, air quality, surface water and groundwater) that may arise from the combined operation of the project, together with the other existing and approved mines in the region; | **8.0 & 9.0**<br>**2.0**<br>**8.1, 8.3, 8.4, 8.5 & 9.2** |
| | • A description of the measures that will be implemented to avoid, minimise, mitigate, offset, manage and/or monitor the impacts of the project; | **8.0 & 9.0** |
| | • A draft Statement of Commitments, outlining environmental management, mitigation and monitoring measures; | **10.0** |
| | • A conclusion justifying the project, taking into consideration the environmental impacts of the project, the suitability of the site, and any social, economic and/or environmental benefits that may arise as a result of the project. | **11.0** |
| | • A signed statement from the author of the Environmental Assessment certifying that the information contained in the report is neither false nor misleading. | **EA Statement** |
| **Key Issues** | • **Surface and Groundwater** – Including detailed modelling of potential surface and groundwater impacts; a site water balance; a salinity balance; and a detailed description of void management. | **9.2 & 8.5** |
| | • **Flora and Fauna** – Including impacts on critical habitats (including riparian habitat), threatened species, populations, ecological communities and native vegetation. | **8.6** |
| | • **Rehabilitation, Final Landform and Void Management** – Including a detailed Rehabilitation and Landscape Management Strategy that describes how the site will be progressively rehabilitated and integrated into the landscape, taking into consideration the rehabilitation plans of existing and approved mines in the | **8.7** |

| Issue | Description | EA Section |
|---|---|---|
| | Muswellbrook area, the Department of Primary Industry's Synoptic Plan, and any other relevant strategic land use objectives for the area. The strategy will also describe what measures will be put in place for the long term protection and management of the site following cessation of mining. | |
| | • **Noise** – Including operation, and off-site road and rail noise impacts. | **8.3** |
| | • **Blasting and Vibration** | **8.4** |
| | • **Air Quality** – Including spontaneous combustion. | **8.2** |
| | • **Greenhouse Gases** – A greenhouse gas assessment (including a quantitative analysis of greenhouse gas emissions associated with the combustion of product coal, and a qualitative assessment of the impacts of these emissions on the environment). | **8.2** |
| | • **Heritage** – Both Aboriginal and non-Aboriginal | **9.6, 9.7 & 9.8** |
| | • **Traffic and Transport**; | **9.9** |
| | • **Visual;** and | **9.5** |
| | • **Social and Economic**; | **9.12** |
| **References** | The Environmental Assessment must take into account relevant State Government technical and policy guidelines. While not exhaustive, guidelines which may be relevant to the project are included in the attached list. | **13.0** |
| **Consultation** | During the preparation of the Environmental Assessment, you must consult with the relevant local, State or Commonwealth government authorities, community groups or affected landholders. The consultation process and the issues raised must be described in the Environmental Assessment.<br>In particular you must consult with:<br>• Department of Environment and Climate Change;<br>• Department of Water and Energy;<br>• Department of Primary Industries;<br>• Australian Rail Track Corporation;<br>• NSW Roads and Traffic Authority; and<br>• Muswellbrook Shire Council<br>The consultation process and the issues raised must be described in the Environmental Assessment. | **6.0** |

### 6.4.3 Feedback

Following the first round of consultation, a feedback workshop was undertaken with the project team to present and discuss issues raised by stakeholders. The workshop was held to ensure that all issues were understood and would be addressed in this EA. Any issues beyond the scope of the EA, or current issues were also conveyed to Drayton.

One-on-one meetings were held and Project Newsletters provided to stakeholders to give feedback on the results of the EA studies and how issues will be addressed in the EA.

## 6.5 CONSULTATION PROGRAM FINDINGS

Environmental issues of concern raised by stakeholders differed across geographic areas; however, the potential for air quality impacts, noise, blasting impacts and spontaneous combustion were commonly raised. Other issues of concern included mine closure, final land use, water management, rail and road traffic and community contributions.

**Table 13** provides issues raised by stakeholders and describes where each is addressed in the EA.

The findings of the stakeholder consultation were also incorporated in the risk assessment discussed further in **Section 7.0**.

## 6.6 ABORIGINAL COMMUNITY CONSULTATION

The requirements of the *DECC Interim Community Consultation Requirements for Applicants* (DEC, 2004a) and the *Draft Guidelines for Aboriginal Cultural Heritage Impact Assessment and Community Consultation* (DECC Guidelines) (DEC, 2005a) have been applied to the Project to ensure an appropriate level of stakeholder consultation in relation to Aboriginal archaeology and Cultural Heritage. Further detail is provided in **Section 9.7**.

## 6.7 FUTURE CONSULTATION

Drayton has an established stakeholder consultation program, which will continue to be implemented throughout the Project, including periodic consultation with neighbouring land owners, representatives of key local and state regulatory authorities, industry bodies and the Aboriginal community.

Project Newsletters will be distributed upon the submission of the EA to provide an update on the EA process and where the EA may be viewed. Other Newsletters will continue to be distributed as required.

**Table 13**
**Stakeholder Issues**

| Ref | Issue Raised | Section Addressed in EA |
|---|---|---|
| ***1*** | ***Blasting*** | **8.4** |
| a | Additional blasts and associated impacts from increased maximum production levels. | |
| b | The potential for additional blasting practices to damage residences. | |
| c | The potential for cumulative blast impacts from the Project and other mining operations. | |
| ***2*** | ***Noise*** | **8.3** |
| a | The potential for additional noise impacts due to increased production from the CHP, Stockpiles Reclaim System and mining closer towards Antiene. | |
| b | Noise generated from additional trains as a result of increased and extended operations. | |
| c | The potential for cumulative noise impacts from the Project and other mining operations. | |

| Ref | Issue Raised | Section Addressed in EA |
|---|---|---|
| ***3*** | ***Air Quality*** | **8.2** |
| a | Potential increase in dust impacts due to close proximity of the Project to Antiene residences. | |
| b | Potential dust generation from the Project impacting on health and amenity (tank water, washing and exterior of residences). | |
| c | Increased area of disturbed land to provide additional dust source. | |
| d | The potential for cumulative dust impacts from the Project and other mining operations. | |
| ***4*** | ***Surface Water Quality*** | **9.2** |
| a | The potential for impact on regional surface water catchments and water quality. | |
| b | Potential increase in sediment loads to local surface waters due to increased disturbance areas. | |
| c | Potential for increased water usage to achieve higher production levels and possible need to withdraw water from the Hunter River. | |
| ***5*** | ***Groundwater*** | **8.5** |
| a | The potential for impacts on local and regional groundwater reserves. | |
| b | Cumulative impact of neighbouring mines altering regional groundwater resources. | |
| ***6*** | ***Proximity to Antiene*** | **8.4** |
| a | The increasing close proximity of the mining operations towards Antiene. | |
| ***7*** | ***Property Issues*** | **9.12** |
| a | The Project resulting in the devaluation of properties. | |
| b | The potential for the Project and associated mining activities to damage residences. | |
| ***8*** | ***Spontaneous Combustion*** | **9.3** |
| a | Potential for increased spontaneous combustion from additional mining areas. | |
| ***9*** | ***Traffic*** | **9.9** |
| a | Increased traffic volumes on Thomas Mitchell Drive as a result of the Project. | |
| b | Safety and adequacy of Hassall Road intersection with Thomas Mitchell Drive. | |
| ***10*** | ***Visual Impacts*** | **9.5** |
| a | Increased visual impacts from the Project on Thomas Mitchell Drive and Antiene. | |
| ***11*** | ***Rehabilitation*** | **8.7** |
| a | Post-mining rehabilitation to be returned to natural habitat. | |
| b | Undulating and free-draining landform, which integrates well with the surrounding topography. | |
| ***12*** | ***Final Land Use & Void Management*** | **8.7** |
| a | Stakeholders were interested in potential land use for the area on completion of the Project. | |
| b | Disposal of fly ash in the East Pit void by Macquarie Generation as an acceptable contributor to the final landform. | |
| c | Comprehensive air quality impact study of the potential fly ash disposal in the East Pit void. | |
| d | Rehabilitated land incorporating grazing land, native forest or possibly as a recreational area. | |

# 7.0 RISK ASSESSMENT

## 7.1 INTRODUCTION

A preliminary Environmental Risk Assessment (ERA) was undertaken for the Project as part of the PDD (which accompanied the Major Projects Application to DoP) to identify potential environmental issues.

The primary purpose of the ERA process was to prioritise and focus the required environmental assessments for the Project. Each of the environmental issues was addressed to a relevant extent and necessary management and mitigation options were developed.

Following substantial stakeholder consultation and the receipt of the EARs, a revision of the preliminary ERA was undertaken to incorporate additional requirements. The revised ERA is presented in full in **Appendix D**.

The key risks identified with the Project were analysed in accordance with the ACA risk matrix, based on probability and potential consequences (**Appendix D**). Each potential environmental issue was ranked as either being high, medium, low or very low risk to the environment. The risk rankings were then evaluated and prioritised based on individual risk rankings and findings of the stakeholder consultation program.

## 7.2 KEY ISSUE IDENTIFICATION

Findings from the revised ERA indicated some issues associated with the Project potentially posed a high environmental risk, whilst the majority of the issues were rated as medium to low risk (**Table 14**).

The issues identified throughout the ERA process as high are assessed in this EA as Primary Issues (**Section 8.0**) whilst issues which have been identified as medium to low are assessed as Secondary Issues (**Section 9.0**). Accordingly, a lesser scope of assessment has been prepared for these Secondary Issues, based on their lower risk rating.

**Table 14**
**Environmental Impacts Risk Rankings**

| High Risk | Medium Risk | Low Risk |
|---|---|---|
| Air Quality | Surface Water | Traffic & Transport |
| Noise & Blasting | Spontaneous Combustion | Waste |
| Groundwater | Soils & Land Capability | Hazard Analysis |
| Flora & Fauna | Visual | Socio-Economics |
| Rehabilitation, Final Landform & Void | Aboriginal Archaeology | |
| | Aboriginal Cultural Heritage | |
| | Non-Aboriginal Heritage | |

# 8.0 ENVIRONMENTAL ASSESSMENT - PRIMARY ISSUES

## 8.1 INTRODUCTION

The potential environmental impacts of Primary Issues identified in the ERA associated with the Project have been assessed with a summary of findings presented below. Management and mitigation measures have been developed where required.

## 8.2 AIR QUALITY

### 8.2.1 Introduction

The Air Quality Impact Assessment for the Project has been undertaken by Holmes Air Sciences and is presented in **Appendix E** and includes:

- The potential for emissions of particulate matter above the air quality assessment criteria set by DECC;
- An estimate of greenhouse gas emissions and the effects of these emissions (including consideration of the effects of the end use of the coal by Drayton's customers); and
- Predictions of emissions from spontaneous combustion and any associated odour.

A summary of the assessment is provided below.

### 8.2.2 Methodology

***Air Quality***

The assessment was prepared following the procedures outlined in the DECC "*Approved Methods and Guidance for the Modelling and Assessment of Air Pollutants in NSW*" (DEC, 2005b).

The assessment included a review of the existing air quality environment and developed emissions inventories for particulate matter (Dust Deposition, TSP and $PM_{10}$) over three representative stages in the life of the Project (Year 1, 5 and 10).

The emissions inventories have been used in conjunction with representative meteorological data in a modified version of the United States Environmental Protection Agency's (US EPAs) Industrial Source Complex Model (ISCMOD) to predict the concentrations and deposition rates of particulate matter for representative stages of the Project.

A detailed representation of the locations where dust emissions are likely to occur for each of the modelled Project years was included. All of these sources are associated with operations within the EA Boundary with the exception of:

- The annual delivery of up to 250,000 bcm of fill to Macquarie Generation's Liddell Ash Dam located to the east of the East Pit; and
- The provision of up to 25 million bcm of overburden by Drayton to the MAC Sub-lease area by approximately Year 5.

The assessment has considered cumulative impacts by including emissions from neighbouring mining operations within the area namely MAC (including the South Pit extension which includes MAC activities in the MAC Sub-lease area) and Bengalla Mine. An allowance for background emissions of particulate matter from more distant mines and non-mining sources, such as Macquarie Generation's Bayswater and Liddell Power stations were also included.

***Greenhouse Gas***

This assessment was prepared in accordance with the Australian Greenhouse Office (AGO) *"AGO Factors and Methods Workbook"* (AGO, 2005) and the EARs.

There are both direct and indirect sources of greenhouse gas emissions from Drayton's activities. The direct emissions are from diesel combustion on-site, fugitive emissions resulting from the uncovering of the coal and from spontaneous combustion.

Indirect emissions are related to the direct consumption of electricity at the site. These types of emissions are known as Scope 1 and Scope 2 emissions, respectively.

Indirect emissions from the downstream burning of the product coal in the electricity generation process are known as Scope 3 emissions.

As Drayton is producing coal for the primary purpose of electricity generation, DoP methodology requires in its greenhouse gas emissions inventory inclusion of Scope 3 emissions. This results in the double-counting of some emissions and thus an over-estimation of total greenhouse gas emissions from the Project.

The AGO Workbook Protocol (AGO, 2005) identifies greenhouse gases including:

- Carbon dioxide ($CO_2$); and
- Methane ($CH_4$).

The impacts of greenhouse gas emissions have been assessed using information from the Intergovernmental Panel on Climate Change (IPCC) Scientific Assessment Report published in 2001 (IPCC, 2001). A conservative estimate of $CO_2$-equivalent emissions ($CO_2$-$e$) from spontaneous combustion was undertaken using research from Carras *et. al* (2000) which measured the $CH_4$ and $CO_2$ concentrations over areas of spontaneous combustion in the Upper Hunter and provided an emission rate range of the greenhouse gas emissions measures.

***Spontaneous Combustion & Odour***

As the Project will source coal from the Greta coal measures which have a propensity to spontaneously combust, smoke (i.e. fine particulate matter), steam and volatile organic compounds (some of which are odorous) may be liberated into the atmosphere.

DECC's odour assessment criteria for low density rural receivers requires that the 99$^{th}$-percentile odour level will be less than seven odour units (OU).

To assess the impacts of spontaneous combustion and odour potentially resulting from the Project, a Commonwealth Scientific and Industrial Research Organisation (CSIRO) study undertaken by *Carras et. al.* (1999) was utilised. The study characterised the emissions from spontaneous combustion to determine the concentrations which bulldozer drivers (the most exposed workers) could be exposed.

**Assessment Criteria**

The DECC Guidelines (DEC, 2005b) specify air quality assessment criteria relevant for mining. Three categories of particulate matter need to be considered, namely TSP, $PM_{10}$ and deposited dust (insoluble solids).

**Table 15** and **Table 16** summarise the air quality assessment criteria relevant to the Project.

Generally, these air quality goals relate to the total dust burden in the air and not just the dust from the Project. Consideration of background levels has been made when using these goals to assess impacts.

The suite of ambient air quality criteria used in the assessment is comprehensive and will be expected to protect against potentially harmful effects of emissions from the Project including health and nuisance effects.

There are no specific assessment criteria for either greenhouse gas emissions or spontaneous combustion emissions.

**Table 15**
**DECC Amenity Criteria for Dust Concentrations**

| Pollutant | Goal | Averaging Period | Agency |
|---|---|---|---|
| TSP | 90 μg/m$^3$ | Annual mean | National Health and Medical Research Council (NSW DECC, 2005) |
| $PM_{10}$ | 50 μg/m$^3$ | 24-hour maximum | NSW DECC (2005) (assessment criteria) |
| | 30 μg/m$^3$ | Annual mean | NSW DECC (2005) (long-term reporting goal) |

*Source: (DEC, 2005b)*

**Table 16**
**DECC Amenity Criteria for Dust Deposition**

| Pollutant | Averaging Period | Maximum Increase in Deposited Dust Level | Maximum Total Deposited Dust Level |
|---|---|---|---|
| Deposited Dust | Annual | 2 g/m$^2$/month | 4 g/m$^2$/month |

*Source: (DEC, 2005b)*

**Existing Air Quality**

As discussed in **Section 3.3.14**, Drayton conducts air quality monitoring around the mine which includes measurement of TSP at three sites, $PM_{10}$ at one site and dust deposition at 27 sites as shown on **Figure 7**.

TSP and $PM_{10}$ air quality monitoring results were analysed for the calendar year (CY) 2005 and indicated that the annual average TSP concentrations ranged from 49.5 micrograms per cubic metre ($\mu g/m^3$) to 74.7 $\mu g/m^3$, whilst the annual average $PM_{10}$ concentration was 21.3 $\mu g/m^3$. The results show that the annual average $PM_{10}$ and TSP concentrations from Drayton comply with DECC's assessment criteria.

Dust deposition air quality monitoring results were analysed for CY 2005 and indicated that the annual average dust (insoluble solids) deposition level at adjoining private receivers complied with DECC assessment criteria of 4 g/m$^2$/month. The review of current monitoring results indicates that Antiene, in particular, has a dust deposition level below half that of the DECC amenity criteria.

***Meteorological Data***

The meteorological data collected by Macquarie Generation at the former MAC Station (see **Table 2**) was used for this assessment. This station was selected over Drayton's own meteorological station as, although the Drayton meteorological station has collected data over a long period, sigma-theta is not monitored which is required for dispersion modelling. Also, using the same meteorological data as in the MAN EIS allows MAN EIS model predictions to be added directly to the Project predictions to quantify the potential for any cumulative impacts.

**Figure 2** presents the annual and seasonal windroses for the MAC station and is discussed further in **Section 2.1**.

### 8.2.3 Impact Assessment

A worst-case modelling scenario with a production rate of up to 8 Mtpa has been assumed for the assessment.

**Figure 15** to **Figure 17** show the location of receivers surrounding Drayton and selected results from the air quality assessment for Project Years 1, 5 and 10 respectively. These figures should be read in conjunction with **Table 4** which shows land ownership surrounding Drayton. Each property is allocated an individual identification number and highlights if a residence is situated on that property.

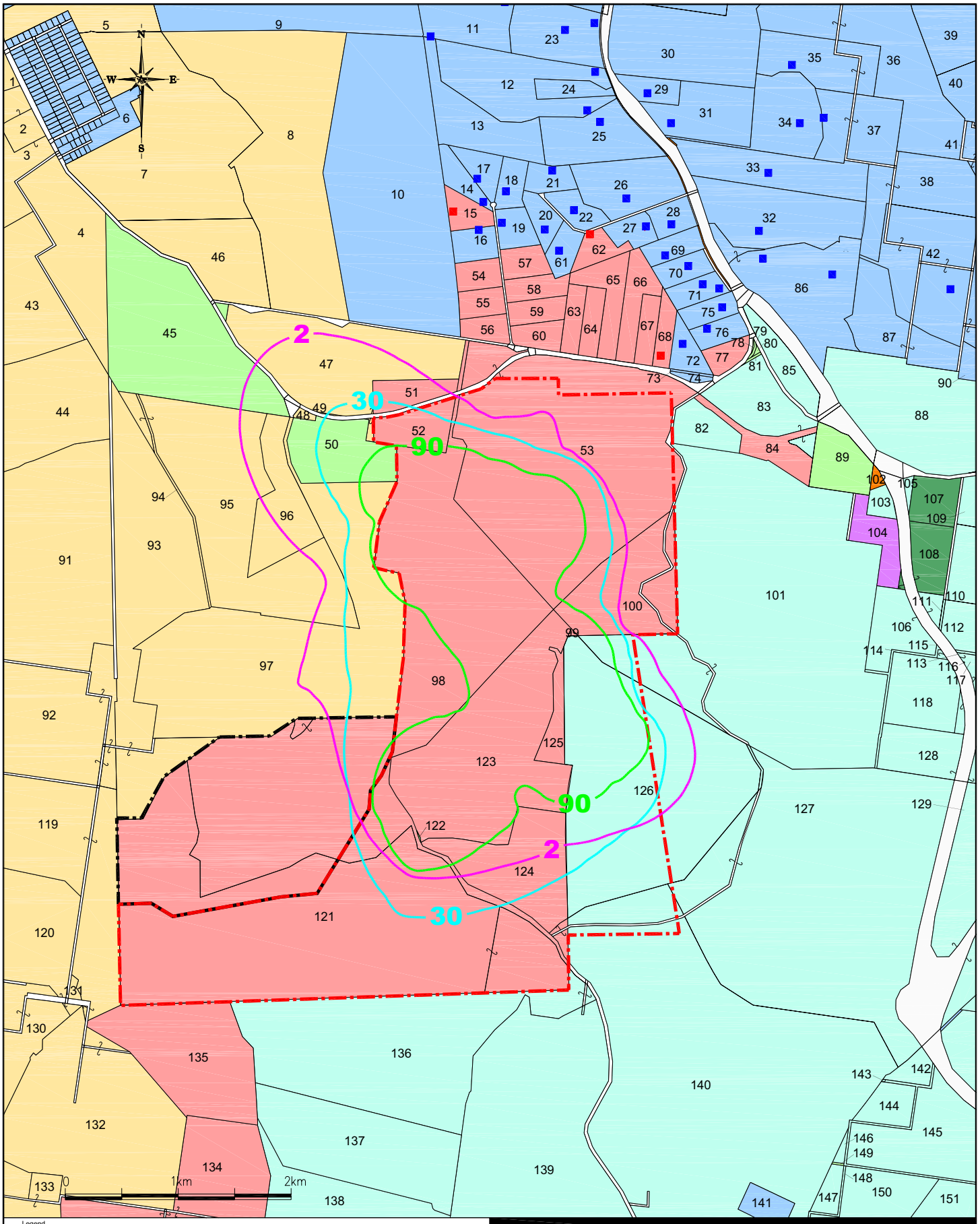
**Predicted Air Quality Impacts**

The air quality modelling indicates that the Project will meet all air quality criteria listed in **Section 8.2.2** at all receivers.

**Predicted Greenhouse Impacts**

The approximate annual average emissions from Scope 1 and 2 sources for the Project are predicted to be 355,627 t $CO_2$-e, whilst the approximate worst-case annual average emission rate for spontaneous combustion is predicted to be 30,280 t $CO_2$-e.

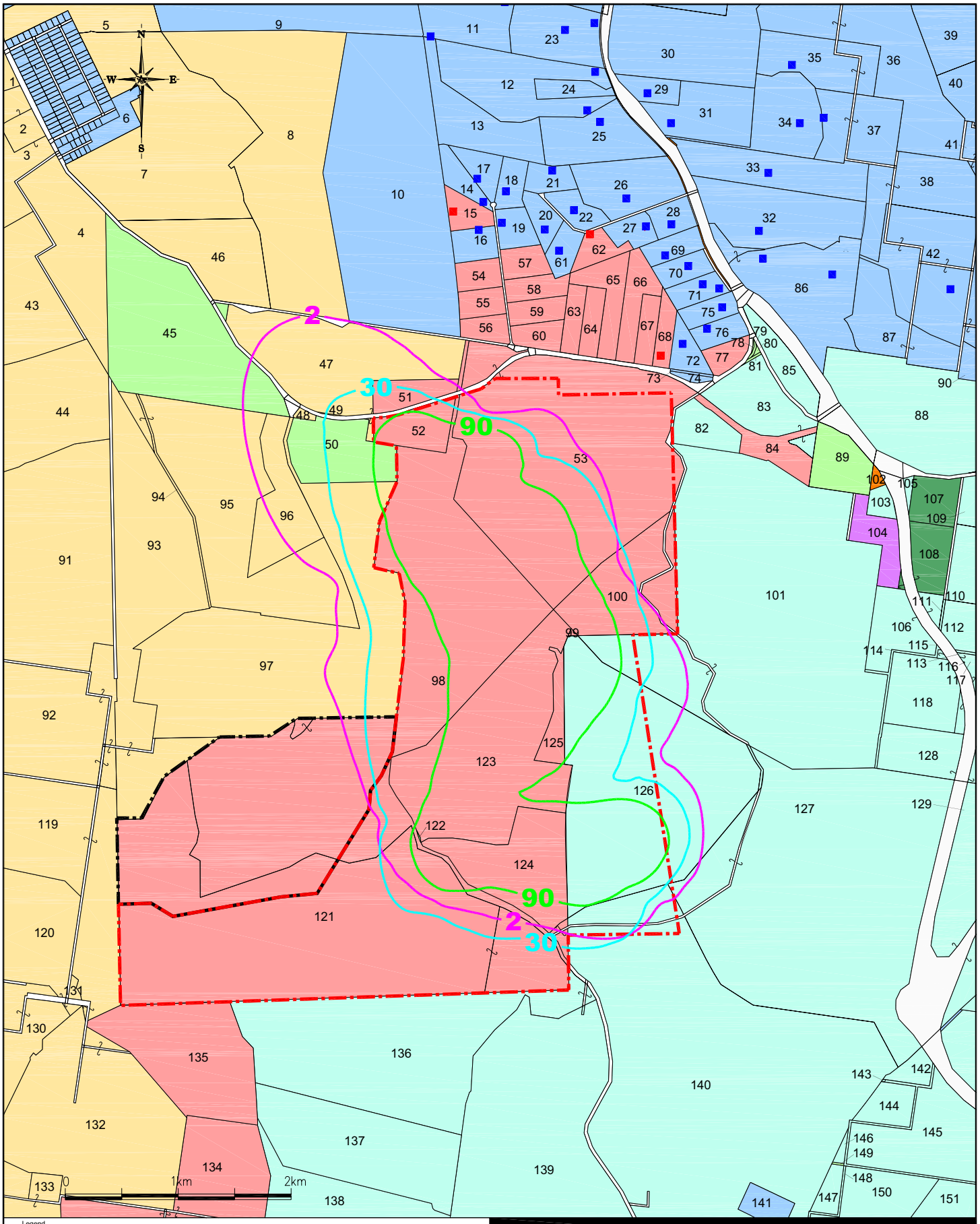
The approximate worst-case annual average emissions from Scope 3 sources (downstream burning of the product) for the Project is predicted to be 12.1 Mt $CO_2$-e.




# DRAYTON MINE EXTENSION EA

## Air Quality Contours Year 1

| Cad File: 02183B.dwg | Date:07.05.2007 | Drawn: JD | Figure 15 |
|---|---|---|---|




Legend

- Macquarie Generation
- Drayton
- Drayton-owned Residence
- Mt Arthur Coal
- Crown Land
- Public Roads
- Freehold Property
- Freehold Property with Residence
- Electricity Commission of NSW
- Commissioner for Main roads
- RTA NSW
- EA Boundary
- MAC Sub-lease
- 90 — TSP DEC Criteria (90µg/m³)
- 30 — $PM_{10}$ DEC Annual Criteria (30µg/m³)
- 2 — Dust Deposition DEC Criteria (2g/m²/month)

Hansen Bailey

ANGLO COAL

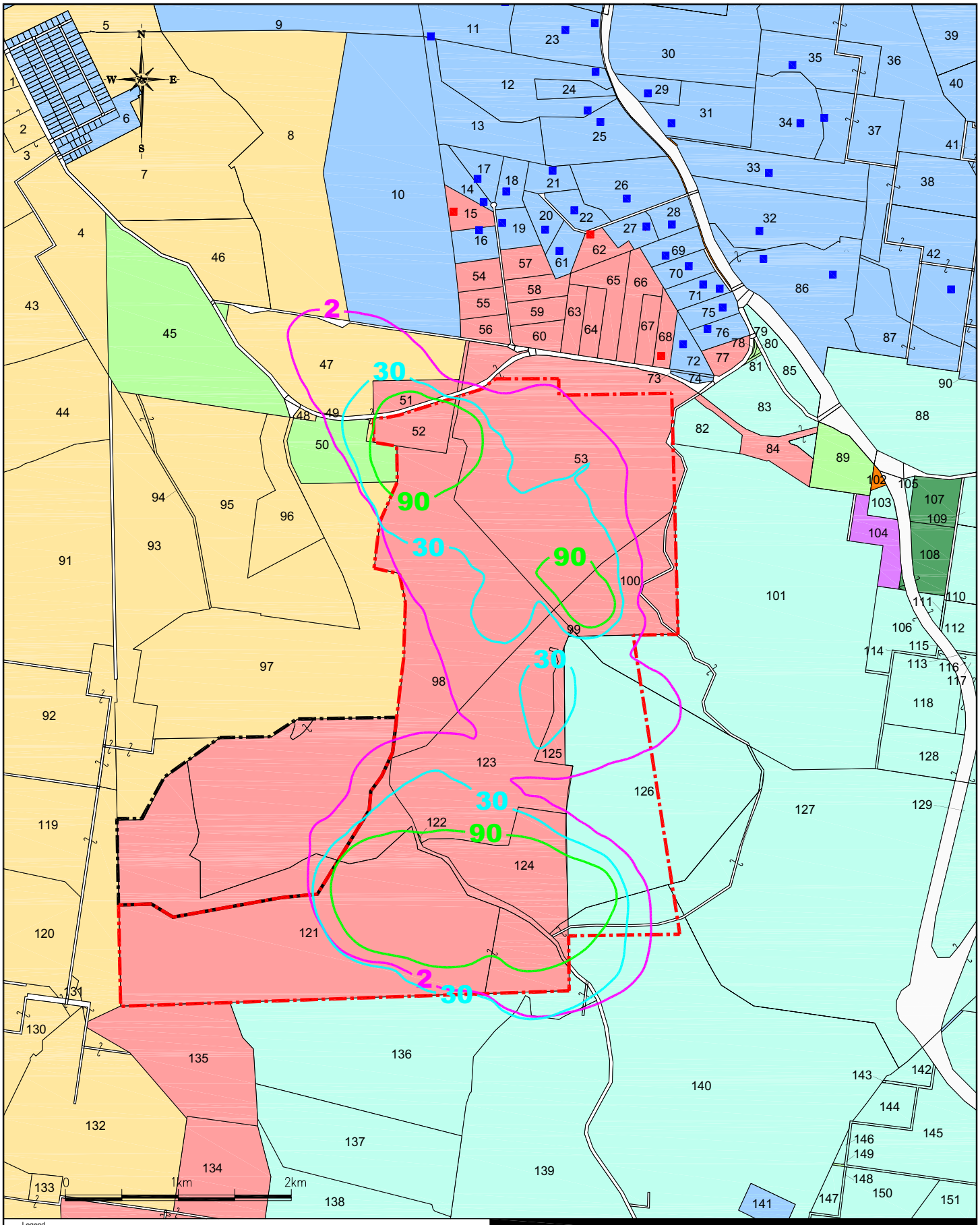
DRAYTON

Co-ordinate System: MGA Zone 56
Source: Holmes Air Sciences (2007)

# DRAYTON MINE EXTENSION EA

## Air Quality Contours Year 5

| Cad File: 02184B.dwg | Date: 07.05.2007 | Drawn: JD | Figure 16 |
|---|---|---|---|




# DRAYTON MINE EXTENSION EA

## Air Quality Contours Year 10

| Cad File: 02185B.dwg | Date:07.05.2007 | Drawn: JD | Figure 17 |
|---|---|---|---|

To provide a global perspective on the emissions of the Project, it is reasonable to compare the Project's emissions with the annual greenhouse gas global emission rate of 40 Giga tonnes (Gt) $CO_2$-e. The greenhouse gas emissions resulting from the Project therefore equate to approximately 0.03% of global greenhouse gas emissions in an average production year (IEA, 2006).

Further, the IPCC estimates suggest that a doubling of the $CO_2$-e concentration in the atmosphere will lead to a 2.5°C increase in global average temperature, and that the current global $CO_2$-e load is 2,750 Gt. To this end, it has been estimated that the emissions from the Project at maximum production will lead to an increase in the global temperature of 0.000011°C.

Applying the principles of ESD (particularly intergenerational equity) and due to the scale of the quantified impact, it is considered that there will be no material or economic effect on national or global greenhouse gas emissions from the Project and in reality the effects of the emissions from the Project will be immeasurable.

**Predicted Spontaneous Combustion & Odour Impacts**

An analysis of Carras *et. al* (1999) suggests that it is unlikely that DECC's ambient air quality criteria for Polycyclic Aromatic Hydrocarbons (PAHs) or other Volatile Organic Compounds (VOCs) will be exceeded in Antiene adjacent to the EA Boundary due to the Project.

However, it is clear that from time-to-time spontaneous combustion emissions do cause detectable odours in residential areas. It is not practical to apply the standard DECC assessment procedure to demonstrate compliance or otherwise, as the DECC's standard assessment criteria applies to odour emission rates which cannot be accurately quantified.

Some odour impacts may continue to occur sporadically, but the monitoring data of Carras *et. al* (1999) indicates that the levels of particulate matter and hydrocarbons will comply with health based air quality standards at the closest private receiver.

Further discussion on spontaneous combustion is presented in **Section 9.3**; however, the emissions from spontaneous combustion associated with the Project will effectively reduce to zero by the end of the life of the Project. While there may be some minor increases from time-to-time, the overall level of control will improve as a direct result of the Project.

### 8.2.4 Mitigation & Management

Air quality and greenhouse gas emissions will continue to be managed in accordance with the SHECMS. An EMP for the Project, incorporating air quality will be developed in consultation with relevant regulators to the approval of DoP and will include:

- Upgrading the existing meteorological station to monitor sigma-theta;
- Upgrading two of the three existing HVAS TSP monitors to monitor $PM_{10}$;
- Retaining one $PM_{10}$ monitor at its existing location; and
- Retaining 18 deposition gauges at their existing locations which will not be disturbed by mining.

Drayton will continue to monitor and manage spontaneous combustion in accordance with the approved SCMP detailed further in **Section 9.3**.

Drayton will continue to review and monitor greenhouse gas emissions, whilst aiming to limit emissions to the minimum practicable level, and maintain the ratio of greenhouse gas emissions per tonne of coal produced as low as practically possible.

ACA is committed to reducing its greenhouse gas emissions and is an active contributor to research programs to develop clean coal technologies such as clean coal combustion, the deployment of carbon capture and storage technologies, improved and extensive coal gasification and the production of liquid fuels and chemicals (Anglo American, 2005).

## 8.3 NOISE

### 8.3.1 Introduction

A Noise Impact Assessment for the Project has been completed by Bridges Acoustics and is presented in **Appendix F**. The assessment includes a consideration of mining noise, low frequency noise and road and rail traffic noise. The assessment is summarised below and has been prepared in accordance with:

- The NSW *Industrial Noise Policy* (INP) (EPA, 2000);
- The *Environmental Noise Control Manual* (ENCM) (EPA 1985); and
- The *Environmental Criteria for Road Traffic Noise* (EPA, 1999).

**Figure 4** and **Table 4** show land ownership and receivers surrounding Drayton and allocates each property an individual identification number, highlighting if a residence is situated on that property. Both should be read in conjunction with this section.

### 8.3.2 Methodology

**Background Noise Levels**

The INP requires noise criteria to be derived from background noise levels measured in the absence of the source (i.e. Drayton).

On this basis, the only practical and available strategy that satisfies the INP's core objectives is to filter background noise measurement results for periods when Drayton is unlikely to be audible.

Monitoring experience shows that Drayton is inaudible, or at worst below the background noise level, under weather conditions that include a generally northerly breeze which provides some noise reduction from Drayton.

An analysis of historical background noise monitoring data at Drayton was conducted to determine the representative background noise levels. A copy of this report is included in **Appendix F**.

A wind speed up to 3 metres per second (m/s) from the north-west to north-east quadrant was selected to exclude Drayton's contribution, yet leave sufficient data to provide representative background noise levels.

DECC recommended background noise levels which were lower and more conservative than the levels adopted in previous, similar assessments for Drayton and nearby mines. These levels were adopted in this noise assessment (**Appendix F**).

The adopted background noise levels at residential receivers near Drayton, based on DECC's conservative background noise level recommendations are shown in **Table 17**.

Background noise levels at each receiver have been determined based on the distance from a background noise monitoring location, taking into consideration vegetation cover (forested areas), and the proximity to the New England Highway, MAC and Thomas Mitchell Drive.

Properties in the vicinity of Receiver 22 (or remote from main roads in wooded areas) have been assigned a lower background noise level as shown in **Table 17** compared to those in close proximity to the New England Highway, MAC and Thomas Mitchell Drive.

**Table 17**
**Adopted Background Noise Levels (All time periods)**

| Receiver ID | Adopted Background Level ($LA_{90,15min}$) |
|---|---|
| 12, 14, 16, 17, 18, 19, 23, 25, 26, 27, 28, 29, 31, 32, 69, 70, 71, 72, 75, 76. | 32 |
| 11, 13, 20, 21, 22, 33, 34, 35, 37, 42, 61, 86. | 30 |

**Existing Industrial Noise Sources**

The adopted noise criteria discussed below depends in part on the existing level of cumulative industrial noise in each receiver area, excluding Drayton's current contribution. Other industrial developments in this area included in the cumulative noise assessment are MAC, Bayswater and Liddell Power Stations and various smaller industrial developments within the Muswellbrook Industrial Estate.

**Assessment Criteria**

***Mining Noise***

The lowest of the intrusive or amenity criteria is normally adopted as the limiting criteria for each receiver.

Intrusive noise criteria listed in **Table 18** should be considered as being the levels above which some acoustic impact may be noticed by receivers. Louder noise levels at a receiver do not necessarily imply the noise is unacceptable at that location.

***Low Frequency Noise***

Infrasound is noise at a low frequency that is typically inaudible and cannot be noticed by people. In the absence of guidance from well accepted policies, this assessment is limited to a review of the current situation and a comparison between the proposed and existing situations.

Infrasound produced by trains passing the site on the Antiene Rail Spur is not relevant to this assessment as this was assessed under the Antiene Rail Spur DA. Trains moving on the Drayton Rail Loop do not travel at sufficient speed to generate noticeable infrasound at any receiver.

***Sleep Disturbance***

Disturbance to sleep can occur when a short, sharp noise that is clearly audible over the background noise level occurs. Sleep disturbance criteria are sourced from the State Pollution Control Commission (now DECC) ENCM which recommends an $LA_{1,1min}$ limit of 15 decibels above the background noise level during the hours of 10:00 pm to 7:00 am, or to 8:00 am on Sundays and public holidays. Sleep disturbance criteria based on the adopted night background levels are listed in **Table 19**.

***Weather Conditions***

As noted in **Section 2.1** the dominant winds at Drayton tend to occur from the south-east and north-west during all time periods and seasons, with only occasional winds from other directions (**Figure 2**). An analysis of temperature inversions concluded they occurred in this area for up to 20% of the time. The INP only requires inversions to be assessed when they occur for over 30% of the time; however, this assessment includes the INP default inversion strength of 3°/100 m in order to remain conservative and consistent with previous assessments.

The prevailing weather conditions used in this assessment are shown in **Table 20**.

**Table 18**
**Adopted Mining Noise Criteria (All time periods)**

| Receiver ID | Adopted Intrusive Noise Criteria ($LA_{eq,15min}$) |
|---|---|
| 12, 14, 16, 17, 18, 19, 23, 25, 26, 27, 28, 29, 31, 32, 69, 70, 71, 72, 75, 76. | 37 |
| 11, 13, 20, 21, 22, 33, 34, 35, 37, 42, 61, 86. | 35 |

**Table 19**
**Adopted Sleep Disturbance Criteria**

| Receiver ID | Adopted Sleep Disturbance Criteria ($LA_{1,1min}$) |
|---|---|
| 12, 14, 16, 17, 18, 19, 23, 25, 26, 27, 28, 29, 31, 32, 69, 70, 71, 72, 75, 76. | 47 |
| 11, 13, 20, 21, 22, 33, 34, 35, 37, 42, 61, 86. | 45 |

**Table 20**
**Prevailing Weather Conditions**

| Period | Conditions |
|---|---|
| **Day**<br>(7:00 am – 6:00 pm) | 3 m/s winds from the south-east or north-west;<br>25° C air temperature;<br>60% relative humidity; and<br>-2.0° C/100 m lapse representing a typical sunny day. |
| **Evening**<br>(6:00 pm – 10:00 pm) | 3 m/s winds from the south-east or north-west;<br>15° C air temperature;<br>70% relative humidity; and<br>-1.0° C/100 m lapse representing adiabatic conditions. |
| **Night**<br>(10:00 pm – 7:00 am) | No wind;<br>10° C air temperature;<br>80% relative humidity; and<br>3° C/100 m temperature inversion. |

### 8.3.3 Impact Assessment

**Mining Noise Levels**

Environmental noise levels produced by the Project have been calculated using RTA Technology's Environmental Noise Model (ENM) software. ENM is a general purpose noise modelling package that combines terrain and noise source information with other input parameters such as weather conditions to predict noise levels at specific receiver locations or as contours over a specified receiver area.

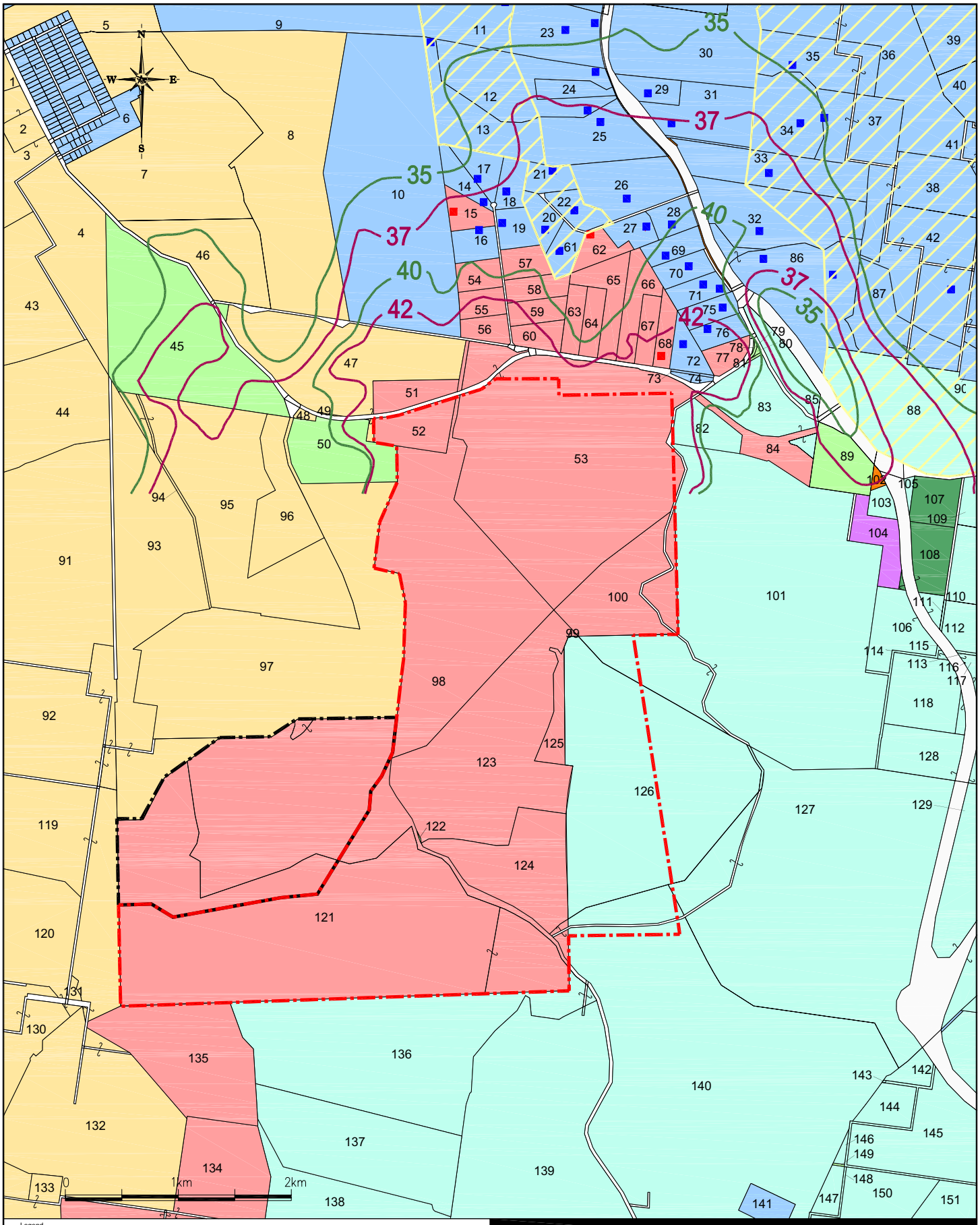
Predicted noise levels include proposed noise mitigation measures discussed further in **Section 8.3.4** and represent worst-case operation of the Project with all equipment operating under noise enhancing weather conditions. While this situation may occur occasionally, noise levels will generally be lower than the predicted levels for much of the time.

A summary of the predicted received noise levels at private receivers under prevailing weather conditions (i.e. worst-case) is shown in **Table 21** with calculated exceedances of the intrusive noise criteria shown in **bold** font. **Figure 18** to **Figure 20** illustrate selected predicted received noise levels as noise contours for Project Years 1, 5, and 10 respectively under prevailing weather conditions at night.

**Table 21**
**Predicted Received Noise Levels – Prevailing Weather Conditions ($LA_{eq,15min}$)**

| Receiver ID | Year 1 | | | Year 5 | | | Year 10 | | | Adopted Intrusive Criteria* |
|---|---|---|---|---|---|---|---|---|---|---|
| | Day | Evening | Night | Day | Evening | Night | Day | Evening | Night | |
| 11 | 34 | 34 | 33 | 34 | 33 | 32 | 32 | 32 | 32 | 35 |
| 12 | 35 | 36 | 36 | 36 | 35 | 35 | 34 | 35 | 35 | 37 |
| 13 | 35 | **36** | 34 | **36** | **36** | 34 | 35 | 34 | 33 | 35 |
| 14 | **38** | **39** | **38** | **40** | **39** | 37 | **38** | **39** | **38** | 37 |
| 16 | **40** | **41** | **39** | **41** | **41** | **39** | **40** | **41** | **39** | 37 |
| 17 | 37 | **38** | 36 | 37 | 37 | 36 | 36 | 37 | 36 | 37 |
| 18 | **38** | **39** | **38** | **38** | **39** | 37 | 37 | **38** | 37 | 37 |
| 19 | **40** | **40** | **39** | **40** | **40** | **39** | **39** | **40** | **39** | 37 |
| 20 | **39** | **40** | **39** | **39** | **39** | **39** | **38** | **39** | **39** | 35 |
| 21 | **37** | **38** | **38** | **38** | **38** | **37** | **36** | **37** | **37** | 35 |
| 22 | **37** | **38** | **38** | **38** | **38** | **38** | **36** | **37** | **37** | 35 |
| 23 | 34 | 34 | 34 | 34 | 34 | 33 | 32 | 33 | 33 | 37 |
| 25 | 35 | 37 | 37 | 36 | 36 | 36 | 34 | 35 | 35 | 37 |
| 26 | 35 | 37 | **38** | 36 | 36 | **38** | 34 | 36 | 37 | 37 |
| 27 | 35 | 37 | **39** | 36 | 36 | **39** | 34 | 36 | **38** | 37 |
| 28 | 34 | 37 | **40** | 35 | 36 | **39** | 33 | 36 | **39** | 37 |
| 29 | 34 | 35 | 36 | 34 | 34 | 35 | 32 | 33 | 34 | 37 |
| 31 | 33 | 35 | 37 | 34 | 34 | 36 | 32 | 34 | 35 | 37 |
| 32 | 31 | 34 | **40** | 32 | 33 | **39** | 30 | 33 | **39** | 37 |
| 33 | 30 | 33 | **38** | 31 | 32 | **37** | <30 | 32 | **36** | 35 |
| 34 | <30 | 31 | **36** | <30 | 30 | 35 | <30 | <30 | 34 | 35 |
| 35 | <30 | 31 | 35 | 30 | 30 | 35 | <30 | 30 | 34 | 35 |
| 37 | <30 | 30 | 35 | <30 | <30 | 34 | <30 | <30 | 33 | 35 |
| 42 | <30 | <30 | 31 | <30 | <30 | 32 | <30 | <30 | 31 | 35 |
| 61 | **38** | **40** | **39** | **39** | **39** | **39** | **37** | **39** | **39** | 35 |
| 69 | 35 | 37 | **41** | 35 | 37 | **41** | 34 | 36 | **40** | 37 |
| 70 | 34 | 36 | **41** | 35 | 36 | **41** | 33 | 36 | **40** | 37 |
| 71 | 33 | 35 | **41** | 34 | 35 | **40** | 32 | 35 | **40** | 37 |
| 72 | 35 | 37 | **42** | 36 | 37 | **42** | 34 | 36 | **42** | 37 |
| 75 | 33 | 35 | **41** | 34 | 35 | **40** | 32 | 34 | **40** | 37 |
| 76 | 34 | 36 | **42** | 35 | 36 | **41** | 33 | 35 | **42** | 37 |
| 86 | 30 | 31 | **38** | 31 | 31 | **38** | 30 | 31 | **38** | 35 |

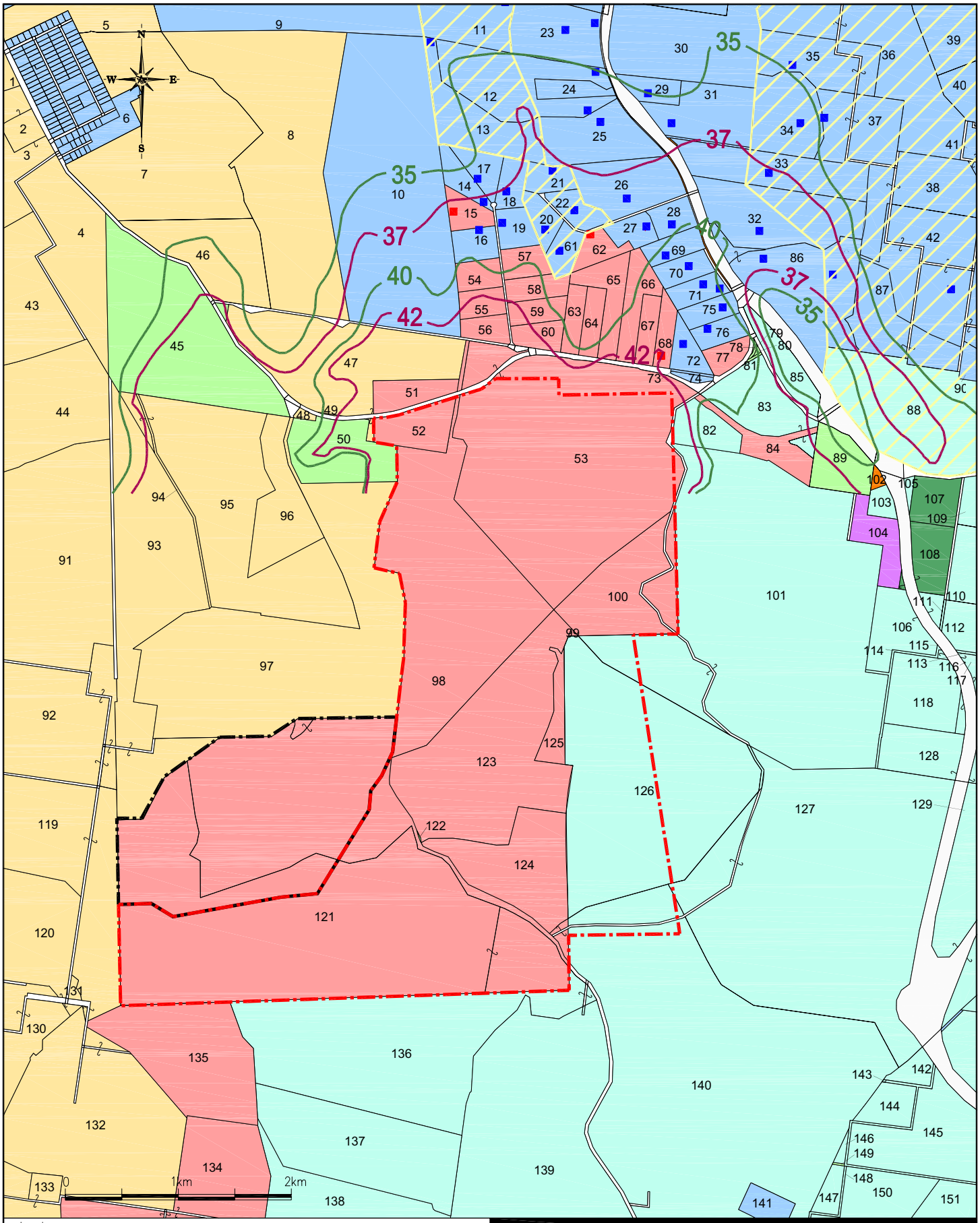
** Applicable to all time periods.*




# DRAYTON MINE EXTENSION EA

## Noise Contours Year 1, Night Prevailing Weather Conditions

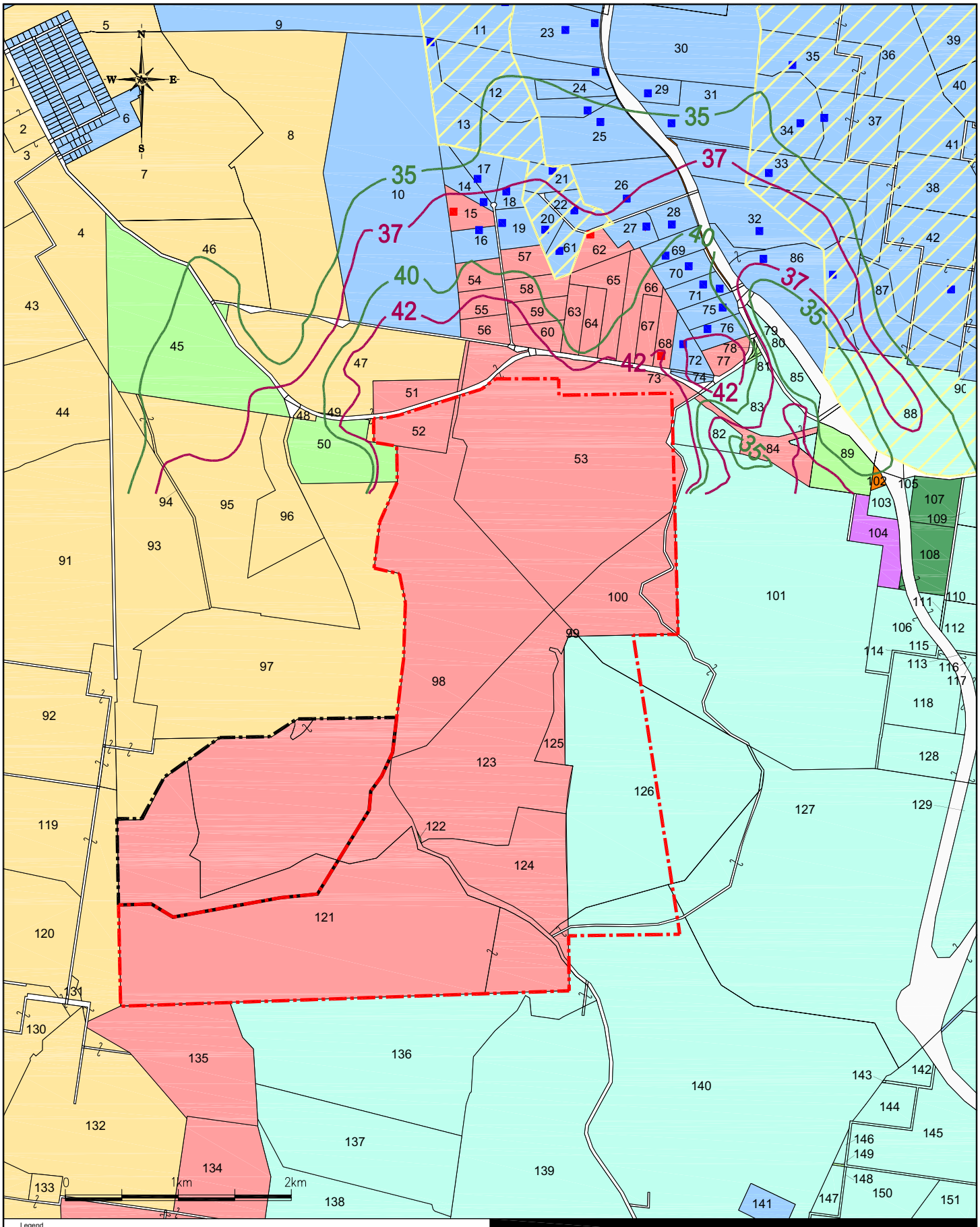
| Cad File: 02238C.dwg | Date:30.05.2007 | Drawn: JD | Figure 18 |
|---|---|---|---|




# DRAYTON MINE EXTENSION EA

## Noise Contours Year 5, Night Prevailing Weather Conditions

| Cad File: 02239C.dwg | Date:30.05.2007 | Drawn: JD | Figure 19 |
|---|---|---|---|




Legend

- Macquarie Generation
- Drayton
- Drayton-owned Residence
- Mt Arthur Coal
- Crown Land
- Public Roads
- Freehold Property
- Freehold Property with Residence
- Electricity Commission of NSW
- Commissioner for Main roads
- RTA NSW
- EA Boundary
- MAC Sub-lease
- 35 Noise Contours LAeq (15min) (30 dBa Background)
- 37 Noise Contours LAeq (15min) (32 dBa Background)
- Background Noise Level 30 dBa

Hansen Bailey

ANGLO COAL

DRAYTON

Co-ordinate System: MGA Zone 56
Source: Bridges Acoustics (2007)

# DRAYTON MINE EXTENSION EA

## Noise Contours Year 10, Night Prevailing Weather Conditions

| Cad File: 02240C.dwg | Date:30.05.2007 | Drawn: JD | Figure 20 |
|---|---|---|---|

The mining noise assessment demonstrates that noise levels are likely to remain within the appropriate noise criteria at all residential properties during neutral and noise reducing weather conditions, which occur for a significant proportion of the time.

**Table 21** shows that 23 receivers are expected to receive noise levels over the adopted intrusive noise criteria in at least one assessed year and time period under prevailing weather conditions. In a worst-case modelling scenario two receivers may incur noise levels 5 dBA above the intrusive criteria. A further two receivers may incur noise levels slightly below this.

**Table 22** indicates two receivers are expected to receive a significant noise impact of 5 dBA above the intrusive noise criteria during the night, with no predicted exceedances during the day and evening at these receivers.

A total of 13 receivers are predicted to receive a moderate noise impact of 3 to 4 dBA above the intrusive criteria, while a further six receivers are expected to receive a minor noise impact of up to 2 dBA above the intrusive criteria. Receivers that are not listed in **Table 22** are expected to receive noise levels within the adopted noise criteria during all time periods.

**Low Frequency Noise**

Available evidence suggests low frequency noise from Drayton is not currently perceptible at any receiver. No complaints have been received and no community members raised low frequency noise as an issue when consulted on the Project.

With existing acceptable levels and no expected increase in low frequency noise levels due to the Project, future low frequency noise levels are expected to remain imperceptible at all receivers and no specific mitigation measures are required.

**Sleep Disturbance**

The following noise sources have been identified at Drayton as having the potential to disturb sleep:

- Dragline bucket impacts;
- Track noise from a dozer operating in reverse;
- Reverse alarms on mobile machines;
- Start alarms on 'fixed' equipment including conveyors, stackers and reclaimers; and
- Impact sounds from material dropping into the ROM Hopper.

**Table 22**
**Intrusive Noise Criteria Exceedances Summary**

| Receiver ID | Predicted Exceedance ($LA_{eq,15min}$) (dBA) | | | Maximum Exceedance (dBA) |
|---|---|---|---|---|
| | Day | Evening | Night | |
| 72, 76 | - | - | 5 | 5 |
| 20, 61 | Up to 4 | Up to 5 | Up to 4 | |
| 69, 70, 71, 75 | - | - | Up to 4 | 4 |
| 16, | Up to 4 | Up to 4 | Up to 2 | |
| 22, 21 | Up to 3 | Up to 3 | Up to 3 | 3 |
| 28, 32, 33, 86 | - | - | Up to 3 | |
| 19 | Up to 3 | Up to 3 | Up to 2 | |
| 14 | Up to 3 | Up to 2 | Up to 1 | |
| 27 | - | - | Up to 2 | 2 |
| 18 | Up to 1 | Up to 2 | Up to 1 | |
| 26, 34 | - | - | Up to 1 | 1 |
| 13 | Up to 1 | Up to 1 | - | |
| 17 | - | Up to 1 | - | |

These sources currently occur occasionally and do not appreciably affect average (or $LA_{eq}$) noise levels due to their short duration.

Noise management measures further described in **Section 8.3.4** will also reduce maximum noise levels from extraction, loading and haulage units. Maximum noise levels from start alarms and other sources within the CHP, including dumping coal into the ROM Hopper, will not change as a result of the Project. ROM Hopper impact noise will reduce with increased annual coal production, as the Hopper is less likely to be empty when a truck deposits coal into the Hopper.

Based on existing noise levels and the comments above, minor exceedances of the sleep disturbance criteria may occur occasionally but the situation is unlikely to change as a result of the Project.

**Rail Traffic**

All export coal is transported to the Port of Newcastle via the Antiene Rail Spur and the Main Northern Rail Line. As noted in **Section 5.0**, the separate Antiene Rail Spur DA allows Drayton to transport up to 7 Mtpa of export coal via the Drayton Rail Loop and Antiene Rail Spur. This approved limit is not proposed to be exceeded as a result of the Project, and therefore no detailed assessment of rail noise is required for this Project.

As required by the EARs, a brief discussion on the rail traffic noise assessment from the Antiene Rail Spur Environmental Impact Statement (EIS) is provided below. Further detail in the Antiene Rail Spur Noise Assessment is included in **Appendix F**.

The Noise Impact Assessment undertaken by Wilkinson Murray in 2000 as part of the Antiene Rail Spur EIS found that "the operation of additional trains on the Antiene Rail Spur will not result in noise levels exceeding the recommended criterion at any residence. Additional operations on the Main Northern Line will increase existing $L_{Aeq}$ noise levels by approximately 0.7 dBA which is considered acceptable."

The mitigation measures proposed in the Antiene Rail Spur EIS to minimise rail noise impacts included:

- "Construction of enclosures around the Bayswater rail loadout bin, conveyor loading bin, conveyor drive house and Bayswater conveyor;
- Construction of an acoustic screen along a portion of the northern section of the Bayswater Rail Loop;
- Use of concrete in construction of the rail-over-road bridges; and
- Enclosure to the northern side of the Drayton rail load out bin."

The preparation of a Noise Management Plan for the Antiene Rail Spur was also recommended which remains in place to the approval of DoP.

These mitigation measures have been successfully implemented and certified to be operating to their full capacity as provided in the Antiene Rail Spur development consent compliance audit conducted in November 2006 by Sinclair Knight Mertz.

**Road Traffic**

Traffic accessing Drayton travels via Thomas Mitchell Drive and either the New England Highway or Denman Road, all of which are arterial roads and carry significant industrial traffic. The Project will result in approximately 59 additional staff being required to achieve the proposed maximum increase in annual production, which will result in approximately 88 additional vehicle movements per day at maximum production along roads serving Drayton (see **Section 9.9** for further detail).

As the majority of these vehicles will be cars, additional traffic from the Project will result in a noise level increase of less than 0.1 dBA. This increase is insignificant and will not be noticed by receivers and therefore, a more detailed traffic noise assessment is not required.

### 8.3.4 Mitigation & Management

The conceptual mine plan modelled is based on the maximum production case utilising a worst-case combination of dragline and truck/excavator operations in the North, South and East Pits as discussed in **Section 4.3.1**.

With the incorporation of all reasonable and feasible mitigation measures into this mine plan, an acceptable acoustic climate will result surrounding Drayton, without compromising the viability of the Project.

Drayton is committed to ensuring that the modelled acoustic climate is not exceeded and as such, when production does increase towards the maximum production levels sought, the specified or other mitigation measures will be put in place to ensure that the modelled outcomes listed in **Table 21** are achieved.

Drayton is a brownfield mine site and is therefore limited in the way that it implements various noise mitigation measures. Drayton has exhausted all available 'reasonable and feasible' mitigation measures for the Project whilst still retaining productive efficiency, in accordance with 'Best Management Practice' as provided in the INP.

A contemporary real time noise monitoring system with audio link will be installed to determine the acoustic climate at the closest non-mine owned receiver in Antiene. This will assist in the proactive management of mining activities so that the acoustic climate resulting from Drayton does not exceed the modelled outcome.

Some of the mitigation and management strategies which may be implemented by Drayton in order to ensure compliance with the modelled outcomes are listed below:

- One loading unit (excavator or front end loader) working in the North Pit during the evening or night, primarily to minimise exposed truck movements associated with overburden or coal haulage from the North Pit;
- The North and East Pit overburden trucks dumping in shielded locations during the evening and night;
- The North Pit pre-strip haul roads being shielded by the pit walls or a berm in the direction of receivers, at least during the evening and night (once the existing northern ring road wall is removed);
- Loading units within the North Pit pre-strip area being located in a shielded area below the natural surface during the evening and night (once the existing northern ring road wall is removed);
- The coal haul road from the South Pit being re-aligned in the mine plan to the lowest possible elevation, with minimal long straight sections of road directly in line with a receiver, and effective shielding with earth berms along the sides of the road, where practical;
- The new ROM coal stockpile south of the workshop having a 5 m wall on the northern side and return along part of the eastern and western sides to minimise noise from the loader and trucks working on the stockpile (**Figure 8** to **Figure 10**);
- A 4 m berm or wall being constructed along the eastern side of the coal haul road from the relocated ROM coal stockpile to the existing ROM Hopper wall, including returns alongside roads to minimise the effect of gaps in the barrier (**Figure 8** to **Figure 10**);
- A sound power limit no greater than 103 dBA being applied to each of the three new reclaimers and one raw coal stacker;
- Steel sheeting being installed on the northern face of the secondary crusher building after removal of the rotary breaker and installation of the new screen and crusher; and
- Upgraded exhaust mufflers (to achieve a Sound Power Level of 118 dBL) being fitted to some overburden and all coal haulage trucks.

Noise will continue to be managed in accordance with the SHECMS. An EMP for the Project, incorporating noise will be developed in consultation with relevant regulators to the approval of DoP.

## 8.4 BLASTING OVERPRESSURE & VIBRATION

A Vibration Impact Assessment for the Project has been undertaken by Bridges Acoustics (**Appendix F**). The assessment is summarised below and has been prepared in accordance with *Technical Basis for Guidelines to Minimise Annoyance due to Blasting Overpressure and Ground Vibration* (ANZECC, 1990).

### 8.4.1 Methodology

The Australian and New Zealand Environment Conservation Council (ANZECC) Guidelines recommend blasting criteria as listed in **Table 23**.

### 8.4.2 Impact Assessment

The proposed increase in mine production will result in additional rather than larger blasts. Similar blast designs to those currently utilised will be relied upon going forward.

Where blasting is proposed to occur in closer proximity to private receivers, monitoring data will be regularly reviewed and blast designs changed appropriately to ensure that overpressure and vibration levels remain well below DECC amenity criteria.

Based on the review of CY 2005 blast monitoring data, ground vibration levels may reach 2.9 millimetres per second (mm/s) in Year 10 when blasting is at the closest proximity to receivers. No exceedances of the 5 mm/s and 10 mm/s criteria are expected to occur.

Blast noise and vibration criteria are designed to provide an acceptable level of personal comfort for receivers and other sensitive receivers and to minimise the chance of residential building damage. An increase in the average number of blasts per week will not result in any damage to receivers.

The Project will require blasting to be conducted between 7:00 am and 5:00 pm, Monday to Saturday. These flexible blasting hours allow Drayton to take advantage of suitable wind conditions in order to minimise potential off-site impacts on the local community.

As a result of the mine advancing towards the Liddell Ash Dam, the increasing blasting proximity to the Liddell Ash Dam Levee was assessed and the risk was found to be minimal (Boyd Mining, 2003). This is discussed further in **Section 9.11**.

### 8.4.3 Mitigation & Management

Blasting will continue to be managed in accordance with the SHECMS.

An EMP for the Project, incorporating blasting will be developed in consultation with relevant regulators (including the DSC) to the approval of DoP.

Drayton will continue to notify residents of pending blasting events as requested. Drayton will also continue to plan blasting activities in liaison with MAC to minimise cumulative impacts on their neighbours.

**Table 23**
**ANZECC Blasting Criteria**

| **Criteria** (in 12 month period) | **Overpressure (dBL)** | **Ground Vibration (mm/s)** |
|---|---|---|
| Less than 5% of total blasts to exceed | 115 | 5 |
| No blasts to exceed | 120 | 10 |

## 8.5 GROUNDWATER

### 8.5.1 Background

A Groundwater Impact Assessment has been undertaken by Australasian Groundwater and Environmental Consultants (AGE) (**Appendix G**) which assessed the potential impacts of the Project on groundwater resources in accordance with the EARs.

The assessment included:

- A review of the existing groundwater environment;
- An assessment of cumulative impacts that may arise from the operation of the Project, together with the other existing and approved mines in the area;
- Detailed modelling of potential groundwater impacts from the Project against pre-mining groundwater conditions (i.e. 1994);
- A site groundwater balance;
- A description of the measures that will be implemented to avoid, minimise, mitigate, offset, manage, and/or monitor the impacts of the Project; and
- A detailed description of void management.

The Groundwater Impact Assessment is based on a three-dimensional, transient, groundwater flow model of the EA Boundary that was developed to provide predictive simulations of the impact of the Project on the groundwater regime.

**Regional Groundwater System**

The regional groundwater system at Drayton consists of three aquifer systems including:

- Colluvial sediments in creeks and alluvium along the Hunter River and Muscle Creek;
- Weathered bedrock near the natural surface; and
- Permian coal seam aquifers (Greta coal measures).

The Permian coal seam aquifers include five coal seams (Broughams, Grasstrees, Thiess, Puxtrees, and Balmoral seams). These coal seam aquifers are located within interburden that consists of hydrogeologically "tight" hard rock displaying varying degrees of fracturing.

The Muswellbrook Anticline runs in a north-south direction through the EA Boundary and essentially divides the groundwater system into separate east and west sections by lifting the coal measures locally above the groundwater table. Intensive thrust faulting interrupts the coal seam aquifers and forms practically impermeable hydrogeological boundaries towards the west and east of the EA Boundary.

Natural groundwater recharge in the EA Boundary is caused by seepage from rainfall. The natural groundwater flow discharges in the lower reaches of numerous creeks and the Hunter River. The groundwater in the EA Boundary is mostly of poor quality with a salinity of up to 3500 micrograms per litre (µg/L) and a neutral pH.

**Groundwater Dependent Ecosystems**

A Groundwater Dependent Ecosystem (GDE) has its species composition and natural ecological processes determined by groundwater. Five broad types of groundwater systems are located in NSW, each with a dependent ecosystem. There are no GDEs located within the EA Boundary.

**Existing Groundwater Users**

A search of the DWE database indicates that there are three private groundwater bores within 10 km of the EA Boundary. The absence of a high-quality aquifer in the vicinity of the EA Boundary is the primary reason for the limited reliance on groundwater resources.

### 8.5.2 Impact Assessment

**Existing Mines & Industry Impacts**

The past and ongoing mining operations in the EA Boundary have lead to dewatering and depressurisation of the aquifers resulting in a cone of depression of the aquifer potentiometric surface.

Predictive modelling indicates that a current total groundwater inflow of 2.7 Megalitres per day (ML/day) occurs in the East and West Pits, however a proportion of this inflow is lost by evaporation from the coal face and pit floor.

The adjacent Bayswater No. 2 Mine (owned by MAC) was operational until 1998, and thus has also contributed to a cumulative impact on the cone of depression in the West Pit area of the EA Boundary. A further cumulative groundwater impact is contributed from the nearby Liddell Ash Dam and the Bayswater Power Station Freshwater Dam, which recharge the groundwater system.

Lake Liddell (east of the EA Boundary) and Plashett Reservoir (south of the EA Boundary) both act as receiving water bodies to the groundwater flow.

**Predicted Project Impact**

As noted in the Project mine plans discussed in **Section 4.0**, the North, South and East Pits are proposed to be actively mined, whilst extractive mining activities have ceased in the West Pit.

As the mine plan progress and thus the area mined by the Project increases, the cone of depression will extend further towards the north and south (**Appendix G**). The impact of the Project in an easterly direction is constrained by the Liddell Ash Dam and Lake Liddell, whilst the impact of Bayswater No. 2 Mine overprints any influence from the Project in the west.

The cone of depression of the Project extends slowly laterally but deepens significantly with time. The elevation of the water table in the cone of depression is less than 30 m AHD in the North Pit at Year 10 of the Project.

The northern extent of the cone of depression remains 1.5 km south of Muscle Creek and more than 4.5 km south-east of the Hunter River.

In regards to the South Pit, the 5 m drawdown contour of the cone of depression extends a further 500 m towards the south, while the 2 m drawdown stabilises at Plashett Reservoir.

The groundwater model developed for the Project indicates that the Project will not result in substantially higher groundwater inflow than that resulting from current mining activities. This will be the case as the current and past mining activities have already led to a depressurisation of the surrounding aquifer system.

**Table 24** outlines the predicted average groundwater inflow to the mining area as a result of the Project. The simulated groundwater inflows into mining areas remains unchanged from current conditions with a predicted peak inflow of approximately 2.7 ML/day (985 ML/year). Some of this water will collect in sumps for disposal, while some water loss can be expected by evaporation from the pit floor and from the coal face. The Project site water balance is discussed further in **Section 9.2**.

**Impact on Regional Groundwater System**

As the area mined progresses, the cone of depression around the EA Boundary will increase. At Project completion this will extend the cone of depression by more than 2 km to the north and up to 4.5 km towards the south of the EA Boundary.

The cone of depression to the west is constrained by the Muswellbrook Anticline and overprinted by the impact of the Bayswater No. 2 Mine, where the water levels are assumed to be recovering since mining ceased in 1998.

**Table 24**
**Predicted Average Pit Inflows**

| Project Years | North Pit (ML/day) | East Pit (ML/day) | South Pit (ML/day) | Average Inflows (ML/day) |
|---|---|---|---|---|
| Year 1 | 0.55 | 1.10 | 0.45 | 2.1 |
| Year 5 | 0.66 | 1.18 | 0.39 | 2.2 |
| Year 10 | 1.07 | 1.27 | 0.35 | 2.7 |

To the east, the Liddell Ash Dam and Lake Liddell constrain the extent of cone of depression on the groundwater system.

MAC extracts coal from the Whittingham coal measures which are separated from the Greta coal measures by the White Creek thrust fault.

The fault hydraulically separates the regional aquifer systems associated with the coal measures and therefore, a cumulative impact on the Greta coal measures is not expected from MAC mining operations.

As noted in **Table 24**, the Project will result in a predicted peak inflow of 2.7 ML/day from the surrounding aquifer. This will not capture or impact on flow to the Hunter River or creeks and associated alluvial and colluvial aquifers.

Infiltration from the Bayswater Power Station fresh water dam to the water table will double with respect to pre-mining conditions to 0.2 ML/day. An additional 0.3 ML/day of groundwater infiltration from Liddell Ash Dam is predicted to occur towards the end of the Project life with respect to current conditions.

During the Project, the coal seams and fractured hardrock aquifers will undergo further depressurisation. However, the shallow bedrock aquifer will develop a perched water table where it overlies areas of extensive groundwater depressurisation in the hardrock aquifers. Therefore the shallow aquifer system will not be affected to the same degree as that simulated for the hardrock aquifer and the coal seams by the Project.

**Impacts on Creeks and the Hunter River**

**Table 25** outlines the simulated groundwater discharge to the major surface water features around the EA Boundary as a result of the Project. As noted in **Table 25**, simulated groundwater discharge to Muscle Creek, Ramrod Creek, Maidswater Creek, Saltwater Creek and the Hunter River is not reduced as a result of the Project.

Lake Liddell receives 0.1 ML/day additional groundwater inflow as a result of the Project than for pre-mining conditions which may be caused by infiltration from Liddell Ash Dam, as it has increased in height.

By the end of the Project, Plashett Reservoir will receive 0.1 ML/day less groundwater inflow than it received in pre-mining conditions. There is also a 0.4 ML/day reduction in groundwater discharge to Bayswater No. 2 Mine.

Simulation of the pre-mining groundwater table (i.e. pre-1994) indicates that the upper part of Saddlers Creek colluvium, which lies within the area of influence of the Project, did not receive groundwater discharge from the fractured rock aquifer prior to mining within the EA Boundary.

Groundwater modelling indicates that throughout the Project, Saddlers Creek colluvium will continue to receive direct recharge from rainfall and surface run-off and possibly minor groundwater discharge from the shallow bedrock aquifer. Saddlers Creek will therefore not be impacted by the Project.

**Table 25**
**Simulated Groundwater Discharge to Surface Water**

| Creek / River | Pre-Mining Discharge (ML/day) | End of Mining Discharge (ML/day) | Difference (ML/day) |
|---|---|---|---|
| Muscle Creek | 0.9 | 0.9 | 0 |
| Plashett Reservoir | 0.4 | 0.3 | -0.1 |
| Bayswater No. 2 Mine | 0.6 | 0.2 | -0.4 |
| Lake Liddell | 0.5 | 0.6 | +0.1 |
| Hunter River | 0.4 | 0.4 | 0 |
| Ramrod Creek | 0.15 | 0.15 | 0 |
| Maidswater Creek | 0.2 | 0.2 | 0 |
| Saltwater Creek | 0.1 | 0.1 | 0 |

### Impact on Other Groundwater Users

The cone of depression in the potentiometric surface of the coal seam aquifer will extend outside the EA Boundary as a result of the Project. Three privately registered bores summarised in **Table 26** occur within the cone of depression, and hence may potentially be impacted.

The cone of depression at Year 10 indicates that substantial drawdown may occur at each bore location, but the amount of drawdown in the bore water level, if any, will depend on the degree of hydraulic connection between the coal seam that is depressurised by the Project, and the overlying fractured rock aquifer (overburden), in which the bores are located.

It is likely that there will be no impact on these bores; however, Drayton will liaise with land owners of the bores cited in **Table 26** to establish the current status and usage of the bores.

If the registered bores are identified to be actively utilised, Drayton will implement a monitoring program of water levels and quality in these bores so that potential impacts can be monitored.

### Final Void Management

On the completion of mining associated with the Project, three voids will remain in the North, South and East Pits. These voids (if left for water storage) will gradually fill with water until an equilibrium water table level establishes within the spoil material and the open void.

Both the rate of groundwater recovery in each void and the final extent of the cone of depression will depend on the recharge rates and the size, location, rate of rise and the equilibrium elevation of the water level.

Surface contouring and bunding will be undertaken to minimise surface run-off to the void. Numerical modelling has shown that, similar to most mines in the Hunter Valley, the voids at Drayton will act as sinks to groundwater seepage. That is, modelling has demonstrated that sufficient surface area is generated within the void to allow evaporative losses to balance overall void influxes of rainfall, groundwater inflow and minimal surface run-off.

Two scenarios have been simulated to assess the impact of the voids. The scenarios are based on the potential usage of the voids (see **Section 8.7** for further detail) and include:

- *Scenario 1* describes the recovery of the water table under the assumption that all voids remain open voids and develop void lakes; and
- *Scenario 2* assesses the long-term impact of the usage of the East Pit void for fly ash emplacement from Macquarie Generation and the use of the North Pit void for coarse reject emplacement from adjacent mining operations.

In respect to Scenario 1, the final steady state water levels are expected to be approximately:

- 160 m AHD for the North Pit Void;
- 149 m AHD for the East Pit Void; and
- 157 m AHD for the South Pit Void.

**Table 26**
**Privately Registered Bores Impacted by Mining**

| Bore | Location | | Depth (m) | SWL (mbns) | Yield (L/s) | Salinity (µS/cm) | Aquifer |
|---|---|---|---|---|---|---|---|
| | mE | mN | | | | | |
| GW047690 | 306440 | 6421915 | 6.70 | 2.4 | 0.02 | 3000 - 7000 | fractured rock |
| GW055028 | 306620 | 6422340 | 53.0 | 13.0 | 1.32 | N/A | fractured rock |
| GW080972 | 305328 | 6423975 | 24.0 | 15.0 | 1.0 | N/A | fractured rock |

*SWL - static water level*
*mbns - metres below natural surface*

Accordingly, the final steady state void water level is reached after more than 200 years and lies well below the pre-mining groundwater levels which are around 170-180 m AHD. Thus, the voids will act as groundwater sinks and contamination of the surrounding aquifer is not anticipated.

Surface contouring and bunding will minimise surface inflow to the void negating the potential for the voids to fill and overflow. Rather, evaporative losses from the void surface area will reach a balance with the overall influxes from rainfall, groundwater inflow and surface runoff at an equilibrium level that is well below the pre-mining groundwater level. The evaporative sink of the void will result in a continuing hydraulic grade to the void, which will ensure that there will be no outflow of water from the void.

In respect to Scenario 2, the emplacement of fly ash in the East Pit void was assessed. To simulate a worst-case scenario, it was assumed the North Pit void will be filled with inert material of low hydraulic conductivity, namely coarse reject.

The simulation results for this scenario indicate that ash leachate from the East Pit void discharges into small creeks running towards the Liddell Ash Dam and Lake Liddell.

It is estimated the ash leachate emplaced in the East Pit void will take around 50 to 100 years to reach Lake Liddell after diverting around the groundwater mound developed beneath Liddell Ash Dam. This estimation of travel time is based on the assumption that the cone of depression caused by the Project has totally recovered. Assuming the cone of depression has not recovered around the EA Boundary and the water table remains below the surrounding groundwater level, no contamination is expected.

The impacts of Scenario 2 (i.e. emplacement of fly ash in the East Pit void) commence at a time that may be more than 100 years after mine closure. Outflow of ash leachate from the East Pit void or the leachate from coarse reject in the North Pit void is not expected if the cone of depression has not recovered around the EA Boundary and the water table remains below the surrounding groundwater level.

### 8.5.3 Mitigation & Management

Groundwater will continue to be managed in accordance with the SHECMS. A Water Management Plan will be prepared for the Project, in consultation with relevant regulators to the approval of DoP. The groundwater monitoring network will be enhanced to incorporate the:

- Progressive replacement of mined-out bores;
- Construction of a new monitoring bore between the East Pit and Liddell Ash Dam ; and
- Construction of a new monitoring bore in the North Pit and two new monitoring bores in the South Pit, south of existing bores R4164 and R4243.

Drayton will obtain all relevant Water Access Licences for the Project required under the Water Act.

A census of bores listed in **Table 26** (within the simulated cone of depression) will be undertaken to ascertain the status of privately owned bores, namely current use, depth, yield, and water quality to provide baseline data against which potential impacts of the Project can be monitored.

Land owners will be provided alternative comparable water supply if water levels decline due to the Project and prevent the ongoing use of the bore (for the purpose for which it was utilised as at Project determination).

Regular groundwater monitoring and sampling will continue to be undertaken during the emplacement of fly ash in the East Pit void, to monitor the outflow of ash leachate and rises in the groundwater table.

A Void Management Plan will be developed in consultation with relevant regulatory authorities to the approval of DoP and will include:

- Justification of options for the future use of the voids;
- Validation of groundwater modelling and predicted effects;
- Details of the strategy for the long-term management of the voids; and

- Actions and measures to minimise any potential impacts of the voids in the local and regional surface and groundwater regime.

## 8.6 FLORA & FAUNA

### 8.6.1 Introduction

A Flora and Fauna Impact Assessment has been undertaken for the Project (see **Appendix H**) by Hansen Bailey in accordance with the EARs and the following technical guidelines and policies:

- Draft *Guidelines for Threatened Species Assessment* (DEC, 2005c);
- *Threatened Biodiversity Survey and Assessment: Guidelines for Development and Activities* (DEC, 2004b); and
- *NSW State Groundwater Dependent Ecosystem Policy* (DLWC, 2002).

### 8.6.2 Background

The Survey Area for the flora and fauna assessment covered all remnant areas within the EA Boundary and the Drayton Wildlife Refuge (**Figure 21**).

The Survey Area is approximately 900 hectares (ha) and is a highly disturbed environment consisting of grazing land, rehabilitated grassland and small tracts of regrowth and rehabilitated woodlands.

An additional 114 ha area of the Drayton Wildlife Refuge, north of the Survey Area was also surveyed. This section of the Drayton Wildlife Refuge (discussed further in **Section 8.6.5**) is termed the 'Drayton Wildlife Refuge containing Hunter Lowland Redgum Forest (HLRF)' for the purposes of this report (**Figure 21**).

This area contains HLRF vegetation and was included in the Flora and Fauna Impact Assessment as its long-term protection and management will provide mitigation for a number of impacts associated with the Project. Further detail on the Drayton Wildlife Refuge Strategy is provided in **Section 8.6.5**.

**Methodology**

A desktop study included a review of previous flora and fauna studies undertaken in the vicinity of the Survey Area, searches of relevant State and Commonwealth flora and fauna databases and a review of aerial photography (**Appendix H**).

A series of field surveys were completed for the Project. Vegetation mapping, targeted flora searches, bird sampling, spotlighting and incidental fauna sightings were carried out in summer and spring 2006, followed by targeted field searches for threatened fauna species in summer 2007.

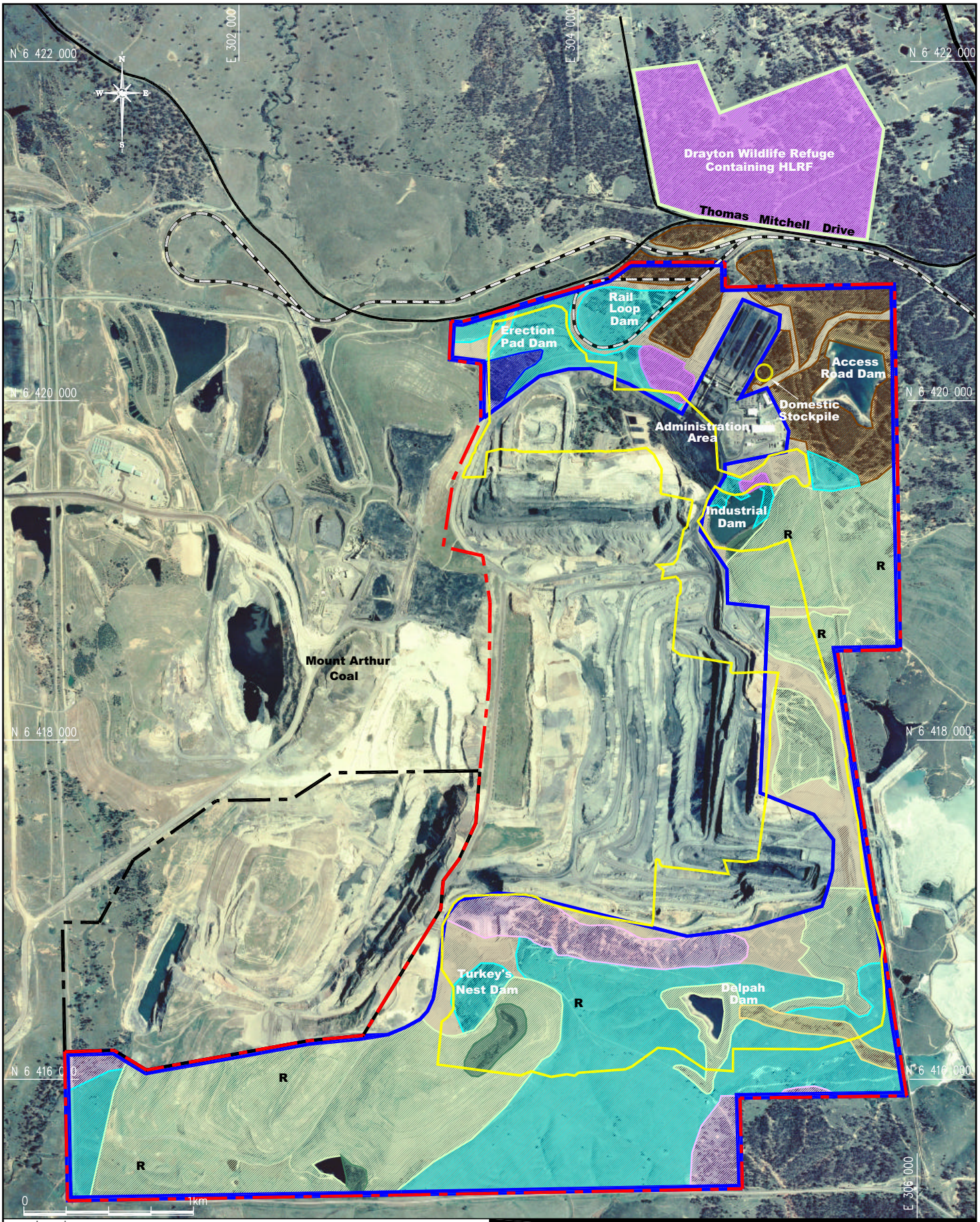
Targeted fauna searches included hair tubes, arboreal Elliot traps, ultrasonic echolocation detection with bat detectors, call playback and spotlighting. A comprehensive description of flora and fauna methodologies is presented in **Appendix H**.

### 8.6.3 Flora & Fauna Description

**Flora**

The Survey Area contains three natural woodland communities and five rehabilitation and grassland communities as shown on **Figure 21**. These communities include:

- Forest Red Gum Open Forest & Woodland (8 ha);
- Spotted Gum-Grey Box open forest & woodland community (83 ha);
- Narrow-leaved Ironbark woodland community (57 ha);
- Yellow Box & Grey Gum Woodland revegetation area (planted from tube stock rehabilitation) (6 ha);
- Open grasslands (Three-awned Grass) (287 ha);
- Exotic Rhodes Grass-Couch-Kikuyu Open Grassland Community (344 ha);
- Grasslands rehabilitated to pasture (Spiky Rush-Kikuyu mixed sedgeland-grassland) (9 ha); and
- Exotic grassland with a band of trees grown from seeds (Acacias) as a part of mine rehabilitation (11 ha).




Legend

- EA Boundary
- MAC Sub-lease
- Survey Area
- Drayton Wildlife Refuge Containing HLRF
- Project Mining Area
- R Rehabilitation
- Rehabilitation Area (Rhodes Grass-Couch-Kikuyu Open Grassland)
- Revegetation Area (Yellow Box & Grey Gum Woodland)
- Revegetation Area (Acacias)
- Spotted Gum - Grey Box Open Forest & Woodland
- Forest Red Gum Open Forest & Woodland (HLRF)
- Three - Awned Grass Open Grassland
- Spiky Rush - Kikuyu Mixed Sedgeland - Grassland
- Narrow Leaved Ironbark Woodland
- Mining Disturbance

Hansen Bailey

ANGLO COAL

DRAYTON

Co-ordinate System: MGA Zone 56 Aerial Date: Dec 2005
Source: Dames and Moore (1980)

# DRAYTON MINE EXTENSION EA

## Vegetation Communities

| Cad File: 01477L.dwg | Date:16.04.2007 | Drawn:JD | Figure 21 |
|---|---|---|---|

The Forest Red Gum Open Forest & Woodland community consists of two, separate regrowth woodlands with a species composition consistent with the definition of HLRF, which is an Endangered Ecological Community (EEC) listed under the TSC Act. This EEC is also found within the Drayton Wildlife Refuge containing HLRF (**Figure 21**). No other threatened vegetation communities were found within the Survey Area.

Database searches within a 10 km radius of the Survey Area indicated that a number of threatened flora species, not recorded from the field surveys, may potentially be present within the Survey Area.

These species were assessed as being unlikely to occur in the Survey Area due to a lack of suitable habitat. The only exception is Lobed Blue Grass (*Bothriochloa biloba*), which has the potential to occur in rehabilitation areas within the Survey Area, despite not being located during targeted searches.

**Table 27** summarises the threatened flora species and communities that occur and potentially occur in the Survey Area.

**Habitat Assessment**

The vegetation in the Survey Area is highly fragmented by roads and mining related infrastructure. The vegetation is dominated by open grasslands and a few patches of regrowth or rehabilitated woodlands with a limited number of large, old hollow-bearing trees. Understorey and fallen timber are absent in most areas, although a few areas contain significant amounts of shrubby understorey.

These factors significantly limit the habitat amenity of the woodland vegetation in the Survey Area for species that depend on these habitat structures for foraging resources and shelter.

The grasslands present within the Survey Area contain native grass species which have regenerated following the exclusion of grazing. These areas still contain occasional exotic species, and the impacts of erosion, exploration and dams are present.

The grasslands may still exist as foraging areas for macropods and generalist bird species, but their proximity to an operating coal mine, combined with the relatively low species diversity present, suggests they do not provide optimal roosting and/or foraging habitat for most listed species under the TSC and EPBC Acts.

**Fauna**

A total of 96 fauna species were detected in the Survey Area, including 67 bird, 27 mammal and two reptile species (**Appendix H**). The low diversity of animals reflects the poor quality of fauna habitats within the Survey Area.

Introduced (feral) fauna species were relatively common throughout the Survey Area. Rabbit warrens were common and European rabbits, hares and one Red Fox were recorded in the Survey Area and the Drayton Wildlife Refuge containing HLRF.

The most abundant fauna were birds, macropods and introduced rabbits and hares, which rely on open woodland, pasture land and dams.

The field survey identified 10 threatened fauna species listed under either the TSC Act and/or the EPBC Act (**Table 28** and **Figure 22**).

Database searches, coupled with habitat assessment, indicated that there is the potential for an additional two threatened species to occur in the Survey Area (shown in **Table 28**).

**Table 27**
**Threatened Flora within the Survey Area**

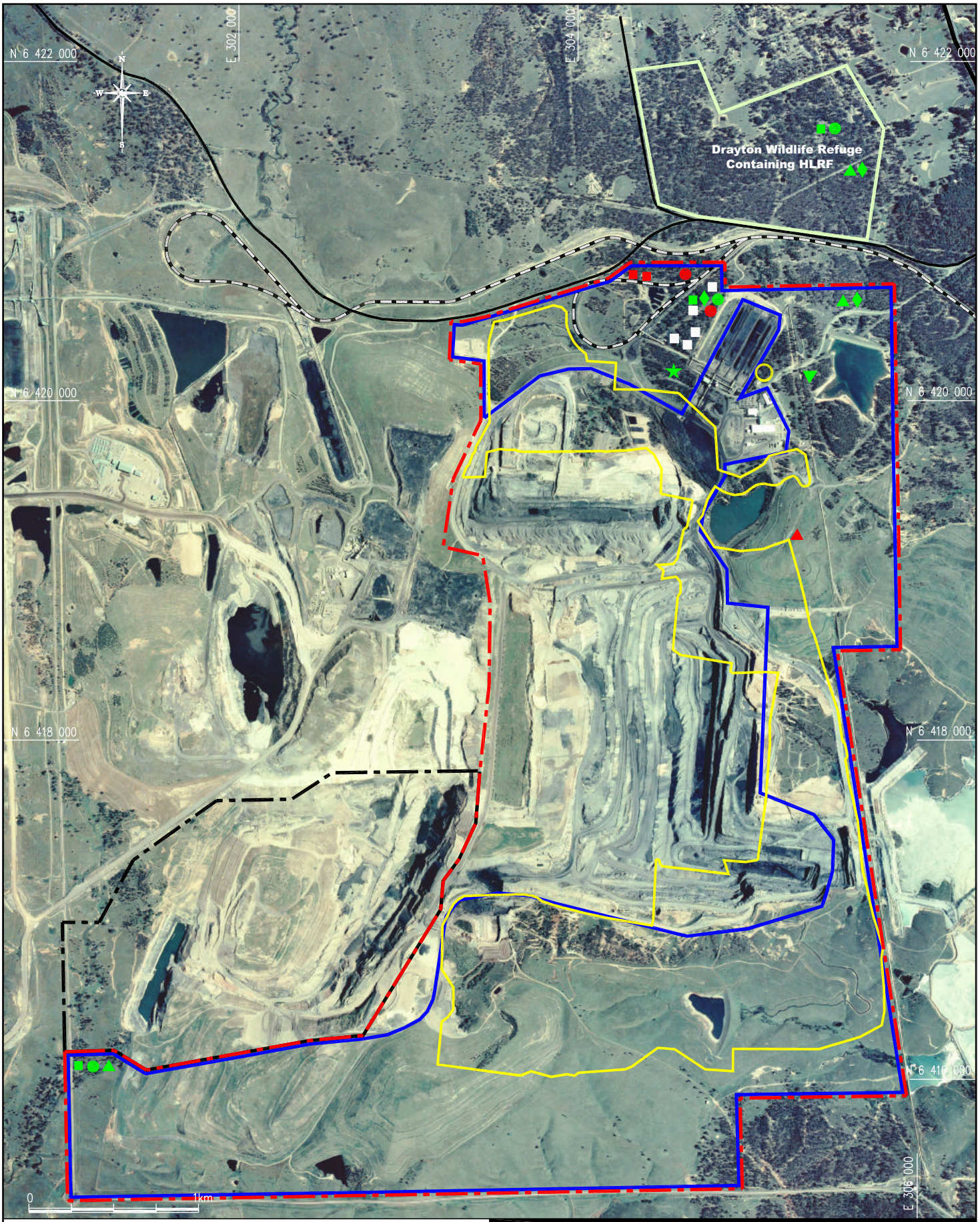
| Species/Community | TSC Act Status | EPBC Act Status | Recorded from Field Survey |
|---|---|---|---|
| HLRF | EEC | N/A | Yes |
| Lobed Blue Grass (*Bothriochloa biloba*) | N/A | Vulnerable | No - Species was not recorded from field survey. However, it has been recorded from database searches of the wider area and the Survey Area contains suitable habitat for it |

*N/A - Not Listed under this Act*

**Table 28**
**Threatened/Migratory Fauna Species within the Survey Area**

| Species | TSC Act Status | EPBC Act Status | Recorded from Field Survey |
|---|---|---|---|
| Diamond Firetail *(Stagonopleura guttata)* | Vulnerable | N/A | Yes |
| White-throated Needletail *(Hirundapus caudacutus)* | N/A | Migratory/ Marine | Yes |
| Rainbow Bee-eater *(Merops ornatus)* | N/A | Migratory/ Marine | Yes |
| Brown Treecreeper *(Climacteris picumnus victoriae)* | Vulnerable | N/A | No - species was not recorded from field survey. It has, however, been recorded from database searches of the wider area and the Survey Area contains suitable habitat for it |
| Squirrel Glider *(Petaurus norfolcensis)* | Vulnerable | N/A | Yes |
| Grey-headed Flying Fox *(Pteropus poliocephalus)* | Vulnerable | Vulnerable | Yes |
| Yellow-bellied Sheath-tailed Bat *(Saccolaimus flaviventris)* | Vulnerable | N/A | Yes |
| East-coast Free-tailed Bat *(Mormopterus norfolkensis)* | Vulnerable | N/A | Yes |
| Eastern Bent-winged Bat *(Miniopterus schreibersii oceanensis)* | Vulnerable | N/A | Yes |
| Greater Broad-nosed Bat *(Scoteanax rueppellii)* | Vulnerable | N/A | Yes |
| Eastern Cave Bat *(Vespadelus troughtoni)* | Vulnerable | N/A | Yes |
| Eastern Long-eared Bat *(Nyctophilus timoriensis)* | Vulnerable | Vulnerable | No - species was not recorded from field survey. It has, however, been recorded from database searches of the wider area and the Survey Area contains suitable habitat for it |

*N/A - Not Listed under this Act*




Legend

- EA Boundary
- MAC Sub-lease
- Survey Area
- Drayton Wildlife Refuge Containing HLRF
- Project Mining Area
- Squirrel Gliders
- Eastern Cave Bat
- Grey-headed Flying Fox
- Yellow-bellied Sheath-tailed Bat
- East-coast Free-tailed Bat
- Eastern Bent-winged Bat
- Greater Broad-nosed Bat
- Diamond Firetail
- Rainbow Bee-eater
- White-throated Needletail

Hansen Bailey

ANGLO COAL

DRAYTON

Co-ordinate System: MGA Zone 56 Aerial Date: Dec 2005

# DRAYTON MINE EXTENSION EA

## Threatened Fauna

| Cad File: 02180B.dwg | Date:25.05.2007 | Drawn:JD | Figure 22 |
|---|---|---|---|

### 8.6.4 Impact Assessment

The areas to be disturbed by the Project which may impact threatened flora and fauna are shown in **Figure 21** and include:

- Areas which will be cleared as part of open cut mining operations; and
- An area to be cleared to enable the construction of the emergency domestic stockpile.

The majority of the area to be cleared as part of the Project consists of rehabilitation and currently or previously grazed grasslands. Approximately 38 ha or 15% of the area to be cleared is woodland.

**Endangered Ecological Community**

The Project will result in the clearance of approximately 1.3 ha of the HLRF vegetation community, which is listed as an EEC under the TSC Act. The significance of this impact has been assessed in accordance with the requirements of the TSC Act and the Assessment of Significance is presented in **Appendix H**.

This Assessment of Significance determined that the Project is not expected to have a significant impact on the EEC for the following reasons:

- Only a relatively small area (1.3 ha) of HLRF vegetation will be cleared;
- The HLRF vegetation to be cleared is largely regrowth and is already highly disturbed due to its proximity to mining operations. It is intersected by tracks and roads and contains infrastructure such as run-off drains and cleared areas for pipelines. Its habitat values are therefore considered to be low; and
- There is a large stand of HLRF located in the Drayton Wildlife Refuge as shown on **Figure 21**. As described in **Section 8.6.5**, Drayton will continue to manage this area allowing effective mitigation for the loss of 1.3 ha of regrowth HLRF.

**Habitat Loss**

The woodlands in the Survey Area exist as fragments of regrowth vegetation that are isolated from each other to varying degrees by roads, railways or clearings. These areas contain only a small number of mature, hollow-bearing trees. The understorey consists of grasses with few fallen trees or logs present.

Of the total of 259 ha of vegetation to be cleared; 38 ha of woodland vegetation would be disturbed as part of the Project, with the remainder of clearance being grassland and previously rehabilitated areas. Given the poor condition of the woodland areas, their fragmented nature and high level of existing disturbance, vegetation clearance associated with the Project is not expected to significantly impact habitat values.

It should be reiterated that all of the native woodland and grassland to be cleared as part of the Project falls within the 'Mining' and 'Grazing' zones of the Drayton Wildlife Refuge which was proclaimed under Section 68 of the NPW Act in 1987 by the National Parks and Wildlife Service (now DECC). As detailed further in **Section 8.6.5**, both of these zones (i.e. 'Mining' and 'Grazing') were specifically gazetted for the purpose to allow mining operations to occur within these zones. When the 'Mining Zone' and 'Grazing Zone' was gazetted, it was envisioned that the majority of these areas (including the Project open cut mining areas) would eventually be cleared for mining purposes. The 'Natural Zone' was created under the Drayton Wildlife Refuge to offset these impacts (see **Section 8.6.5** for further detail).

The grassland vegetation in the Survey Area has limited habitat value and is dominated by exotic species.

**Mining Impacts on Vegetation**

Concerns were raised by a stakeholder over the impact of dust on native vegetation (and native fauna utilising these communities), with particular concern to the area of Spotted Gum – Grey Box Open Forest and Woodland located to the east of the Rail loop dam. This community was found to support a limited number of Squirrel Gliders during the flora and fauna surveys.

The community of concern (Spotted Gum – Grey Box Open Forest and Woodland) is located adjacent to the existing CHP and rail load out facility and is not proposed to be disturbed by the Project. The area will be delineated and managed to enhance its flora and fauna values.

The impact of dust resulting primarily from mining operations in the North Pit and the emplacement of material in the TDA on the Spotted Gum - Grey Box Open Forest and Woodland and Squirrel Glider was assessed based on findings from the Bengalla Mine Commission of Inquiry (COI). A brief discussion is provided below.

The effects of dust on vegetation were reviewed in the Bengalla COI which focused on the effects of dust on grape growing and pastures (Cleland, 1994). The evidence presented to the COI concluded that damage from coal dust to vegetation could potentially commence at concentrations of 2.0 g/m$^2$/month.

The majority of dust emissions from the Project will be in the form of inert dust derived from the overburden materials that also form the basis of the local soils. Some coal dust will be liberated but this is unlikely to reach 10% of the total dust emissions from the Project.

The predicted dust deposition level for the area of concern (the Spotted Gum – Grey Box Open Forest and Woodland near the Rail loop dam) from the Project is shown in the Air Quality Impact Assessment (**Appendix E**). The assessment indicates that the predicted cumulative dust deposition level for this area is between 2.0 and 3.5 g/m$^2$/month (annual average) in the period when operations are occurring in the North pit. It is predicted that Drayton would contribute between 1.0 and just over 2.0 g/m$^2$/month to the annual average deposition rate in this period, with the remainder contributed by external sources.

Therefore, assuming that 10% of the cumulative 3.5 g/m$^2$/month is coal dust, then this would equate to 0.35 g/m$^2$/month of coal dust being exposed to the Spotted Gum – Grey Box Open Forest and Woodland community and fauna roosting within this community. This is less than the 2.0 g/m$^2$/month at which effects on flora and fauna from coal dust have been predicted to occur.

Further, there does not appear to be any research that relates specifically to the effects of dust on Spotted Gum - Grey Box Open Forest and Woodland, but a paper by Chaston and Doley (2006) examined the effects of mineral dusts on the leaf temperatures and intensity of light reaching the surface for *Eucalyptus Tereticornis* (waxy surface), *Harpullia pendula* (shiny surface) and *Metrosideros* (hairy surface). The authors concluded that "the experimental evidence shows that dusts generated by mining activities will only have adverse effects on plant leaves when high dust loads are applied, in the immediate vicinity of the source." While the authors do not specify precisely what is meant by "high" and "immediate vicinity", it is anticipated that the predicted contribution of 0.35 g/m$^2$/month would not adversely affect the Spotted Gum-Grey Box Open Forest and Woodland or the Squirrel Glider due to the Project. Therefore, no further assessment or mitigation measures are required.

**Threatened & Migratory Species**

As noted in **Table 27** and **Table 28**, several threatened and/or migratory flora and fauna species were found within the Survey Area, or have the potential to occur based on database searches and habitat availability. Vegetation clearing associated with the Project has the potential to impact these species and Assessments of Significance under the EPBC Act and TSC Act have been prepared for these species. The complete assessments can be found in **Appendix H**. These assessments concluded that the Project will not have a significant impact on any of these species as discussed further below.

The majority of threatened species were found in parts of the Survey Area not affected by the Project (**Figure 22**). The areas of woodland vegetation that will be cleared as part of the Project are largely regrowth vegetation, adjacent to mining operations and already subject to high levels of disturbance. These areas tend to not have hollow bearing trees, as required by many of the threatened species for roosting and/or nesting.

Consequently, the areas to be cleared do not represent critical habitat for any of the threatened species considered in the assessment.

In addition, there is ample woodland habitat available for these species beyond the area disturbed by the Project, particularly in the Drayton Wildlife Refuge containing HLRF. This woodland includes important habitat features, such as hollow bearing trees and fallen timber.

### 8.6.5 Mitigation & Management

**Introduction**

A range of mitigation measures have been developed to minimise the potential impacts of the Project, specifically the loss of woodland vegetation, including 1.3 ha of HLRF. Mitigation measures include:

- Rehabilitation of mined areas to open forest habitat, specifically HLRF where possible (discussed further in **Section 8.7**);
- Compensation for loss of habitat through active management of the remaining woodland habitat within the Survey Area and the continued maintenance of the 114 Ha Drayton Wildlife Refuge containing HLRF; and
- Revision of the Flora and Fauna Management Plan (FFMP).

Habitat compensation and the management plan are discussed below.

**Habitat Compensation**

The original 1982 EIS for Drayton recognised the potential for mining and related activities to adversely impact the native flora and fauna in the area. As a proactive initiative to offset these impacts, Drayton applied for the Drayton Wildlife Refuge to be established under Section 68 of the NPW Act. The Drayton Wildlife Refuge was proclaimed in 1987 and covers the entire Drayton property as shown on **Figure 23**.

The Drayton Wildlife Refuge is divided into the three zones as shown in **Figure 23** and includes:

- Mining Zone;
- Grazing Zone; and
- Natural Zone.

The Project is located within zones designated as Mining or Grazing. All zones are discussed below.

***Mining Zone***

The removal of coal reserves and overburden is the key objective for this zone. When the Mining Zone was gazetted, it was envisioned that the majority of the area (including the Project open cut mining areas) would eventually be cleared for mining purposes. The Natural Zone was created to offset these impacts. In addition, a number of management measures have been established to limit the impacts of the Mining Zone on flora and fauna, where possible. These include rehabilitation of open cut mining areas to establish floristic diversity, and implementation of a clearing procedure to ensure that clearing is restricted to the smallest area necessary.

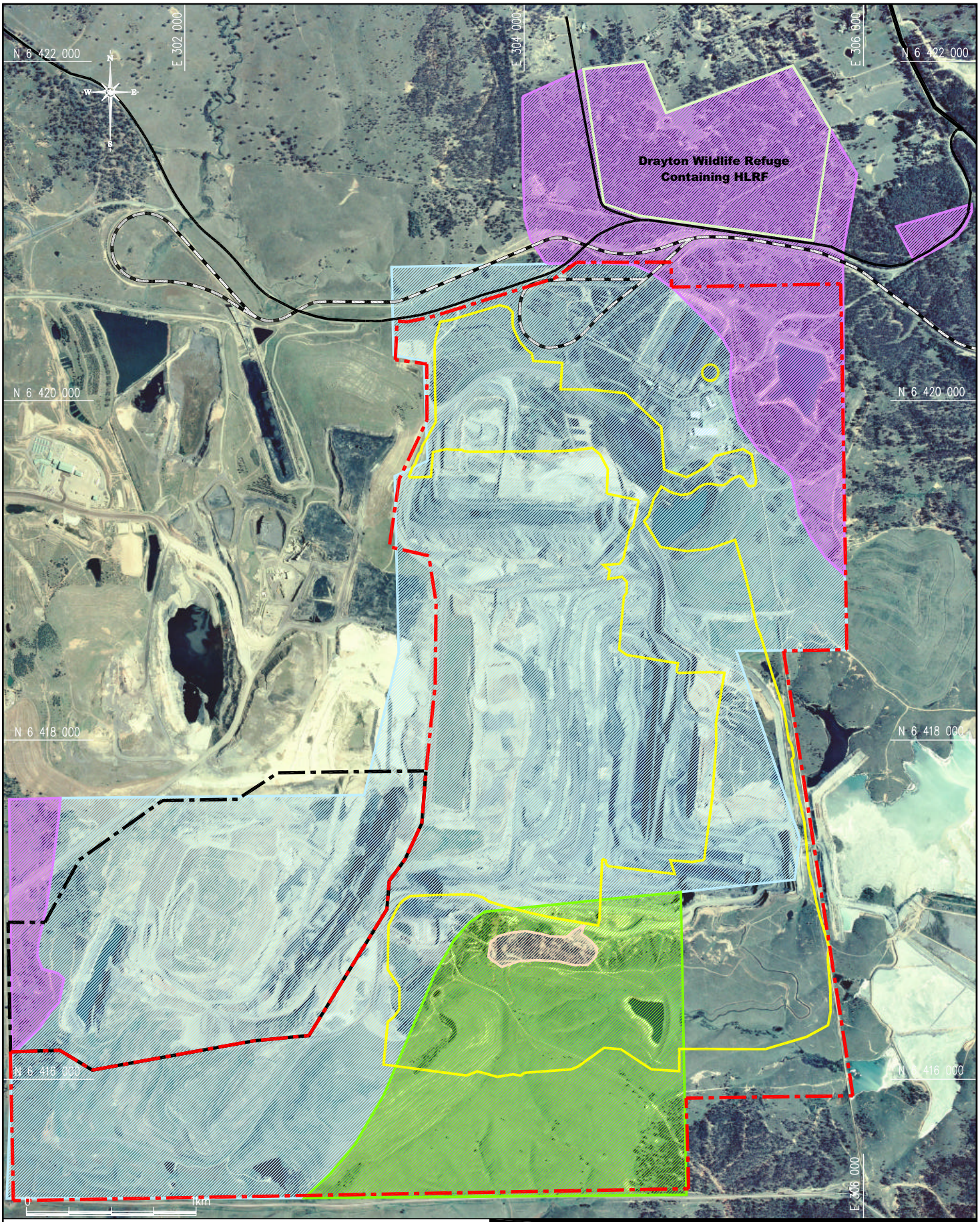
The woodland vegetation located in the Mining Zone between the Drayton Rail Loop and coal stockpiles (Spotted Gum-Grey Box Open Forest & HLRF) is of particular conservation significance. HLRF is an EEC listed under the TSC Act and this woodland vegetation supports a number of species designated as Vulnerable under the TSC Act and EPBC Act. The Project requires the clearance of 0.3 ha of this area of woodland vegetation for open cut mining operations.

However, as part of the Project, the majority of vegetation in this area will be retained and managed to enhance its habitat values.

Drayton will continue to manage the Mining Zone for the primary objective of mining, with the implementation of the measures described above to limit impacts on flora and fauna.

***Grazing Zone***

Management of wildlife in the Grazing Zone includes the use of grazing lands and associated dams as both a food and water source for macropods. The Grazing Zone is also managed to ensure that existing stands of woodland vegetation are retained and regrowth vegetation is encouraged as a localised refuge for native fauna. These management practices enhance the ecological value of this zone.




Legend

- EA Boundary
- MAC Sub-lease
- Project Mining Area
- Mining Zone
- Natural Zone
- Erosion Control / Revegetation Zone
- Grazing Zone
- Drayton Wildlife Refuge Containing HLRF

Hansen Bailey

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DRAYTON

Co-ordinate System: MGA Zone 56 Aerial Date: Dec 2005
Source: Drayton Coal Wildlife Refuge Plan (1986)

# DRAYTON MINE EXTENSION EA

## Wildlife Refuge Zonings

| Cad File: 02048D.dwg | Date: 16.04.2007 | Drawn:JD | Figure 23 |
|---|---|---|---|

Much of the Grazing Zone will be cleared for the Project and the measures described in the Mining Zone section will be implemented to limit impacts on flora and fauna.

***Natural Zone***

The Natural Zone has been managed to conserve and enhance the native flora and fauna of the area. Considerable effort has been invested in encouraging the propagation of the 114 Ha Drayton Wildlife Refuge containing HLRF as shown on **Figure 23**.

Management actions in this area include, but are not limited to:

- Maintenance of native vegetation in the north and north-east to provide corridors for fauna movement and improve the effectiveness of the refuge as a conservation area;
- Encouraging the re-establishment of natural vegetation succession; and
- Making selected areas of the refuge available, by arrangement with Drayton, for use by groups for ecological research.

This area has been successfully managed by Drayton for the past 26 years. This approach has been successful in facilitating the regeneration of much of the Drayton Wildlife Refuge containing HLRF (**Figure 21**) into a high quality remnant vegetation.

The Natural Zone will not be impacted by the Project and the area will continue to be managed to enhance its flora and fauna values. In particular, the management of 114 Ha Drayton Wildlife Refuge containing HLRF will compensate for the impacts of the Project on flora and fauna meeting the 2:1 offset ratio recommended by the DECC (excluding rehabilitated mined areas) (i.e. 114 ha of Drayton Wildlife Refuge to the 38 ha of native land disturbed).

**Management Plan**

Drayton will continue to utilise the SHECMS for the Project and the existing FFMP will be revised in consultation with relevant regulators to the approval of DoP.

The FFMP will describe measures to assist in minimising the impacts of the Project, ensuring the further enhancement of the Natural Zone of the Drayton Wildlife Refuge. In particular, the FFMP will specify mechanisms for the encouragement of the regrowth of further areas of the HLRF.

## 8.7 REHABILITATION, FINAL LANDFORM & VOIDS

### 8.7.1 Background

**Principles & Objectives**

The principles and objectives for mine rehabilitation at Drayton are as follows:

- To integrate mine planning to minimise areas of disturbance;
- To progressively rehabilitate disturbed areas with the aim of establishing as much of original floristic diversity as possible;
- To create a stable, free-draining post-mining landform which is compatible with the surrounding landscape and which is capable of a productive land use and maintains a land capability equal to pre mining conditions; and
- To create a post-mining landform which enhances the local and regional habitat corridors as presented in the *Synoptic Plan: Integrated Landscapes for Coal Mine Rehabilitation in the Hunter Valley of New South Wales* (Synoptic Plan) (DMR, 1999).

Drayton has over 20 years of experience in the successful rehabilitation of overburden emplacements resulting from open cut mining operations.

This is demonstrated by the success of rehabilitation at the East Pit and West Pit and viticulture activities on the East Pit, on similar overburden, topsoil and growing conditions to the Project. The Project rehabilitation strategy will continue to build on this experience.

**Local & Regional Planning Instruments**

The Project will aim to incorporate the following land use objectives for lands zoned Rural 1(a) in the Muswellbrook LEP:

> *" b) The encouragement of continued growth in the Shire's rural economic base,*
>
> *c) Ensure that building development in rural areas is carried out in a manner that minimises risks from natural hazards, functions efficiently, does not unreasonably increase demands for public services or reduce existing levels of service, does not prejudice other economic development and does not detract from the scenic quality of rural areas,*
>
> *d) Enable mining to occur in an environmentally acceptable manner."*

The Hunter REP also provides objectives relevant to the Project rehabilitation planning as follows:

> *"a) To promote the balanced development of the region, the improvement of its urban and rural environments and the orderly and economic development and optimum use of its land and other resources, consistent with conservation of natural and man made features and so as to meet the needs and aspirations of the community."*

**MAC Sub-Lease Area**

Drayton has entered into an Agreement with MAC over the MAC Sub-lease area (as shown in **Figure 8**), which facilitates the ongoing emplacement of Drayton overburden in this area.

This Agreement is to be replaced by another Agreement, currently being negotiated with MAC, to transfer part of CL 229 and part of CL 395 to MAC under Section 126 of the Mining Act. Once the part Mining Lease transfer has occurred, any responsibility for rehabilitation of the MAC Sub-lease area will be the responsibility of MAC under the Mining Act.

Drayton has approval under DA-799 to emplace overburden in the MAC Sub-lease area. Drayton will continue to do so under that approval until the Project Approval sought in this EA is granted, which will provide ongoing approval for Drayton to place overburden in this area. When Project Approval is gained, DA-799 will be surrendered.

**Macquarie Generation Lease**

On 26 February 2003, Drayton entered into a lease with Macquarie Generation over an area in A173 (Lot 11, DP 701496 – shown as block 126 on **Figure 4**) to facilitate the continuation of mining at Drayton. In accordance with this lease, Macquarie Generation has notified Drayton that it requires the East Pit void on completion of mining for the disposal of fly ash from its Power Stations.

As a result of the Macquarie Generation notice, Macquarie Generation assumes responsibility for rehabilitation of part of the East Pit void which is intended to be utilised for the emplacement of fly ash from its nearby Power Stations.

To facilitate and implement this, an agreement will be entered into at the relevant time under the provisions of the Mining Act to allow Macquarie Generation to assume responsibility for the rehabilitation and for obtaining any Planning Approval required for emplacement of fly ash in the East Pit void.

### 8.7.2 Impact Assessment

**Void Use & Management**

Three voids will remain within the EA Boundary at the completion of mining – one void in each of the North, South and East Pits as shown on **Figure 11**.

The void in the North Pit may potentially be used for coarse reject emplacement from adjacent mining operations. It will remain the prospective mining operation's responsibility to gain any necessary approvals for the placement of such material in the North Pit void. The South Pit void is expected to be utilised as a water retention basin.

The East Pit void will be utilised for the disposal of fly ash by Macquarie Generation in accordance with the Macquarie Generation lease.

The potential uses of the three voids as described above present a preferred land use option which relies upon an integrated approach to rehabilitation planning and design at Drayton. The proposed void uses will assist in developing an improved and integrated final landform as discussed below.

**Conceptual Final Landform**

With the arrangements in place between Drayton, Macquarie Generation and MAC, the landform at the conclusion of active mining for the Project will be as generally indicated in **Figure 10**.

The East Pit void will be rehabilitated by Macquarie Generation (in accordance with the Macquarie Generation lease) and the MAC Sub-lease area will be rehabilitated by MAC (in accordance with the MAC Agreement) under approvals to be obtained by each of them respectively.

It is anticipated that the North Pit and East Pit voids will be capped with at least 2 m of overburden, rehabilitated and left in a free-draining state upon completion of fly ash and reject emplacement, as shown in **Figure 24**.

The South Pit void will be rehabilitated so that any water from the western part of the void will overflow into the larger eastern part of the void to represent natural water movements.

The final landform proposed is consistent with the surrounding landscape, with a maximum design height of 330 m AHD and slopes generally less than 10 degrees (up to a maximum of 18 degrees).

The final landform will result in a class of land capability that is at least equal to the pre mining land capability. This will be detailed as relevant in the Rehabilitation and Landscape Management Plan.

Any surface infrastructure (with no ongoing beneficial use) will be removed at the completion of the Project. The drainage pattern of the final landform will be designed to integrate with the surrounding catchment and will include permanent diversion drains and contour banks, as conceptually shown in **Figure 24**.

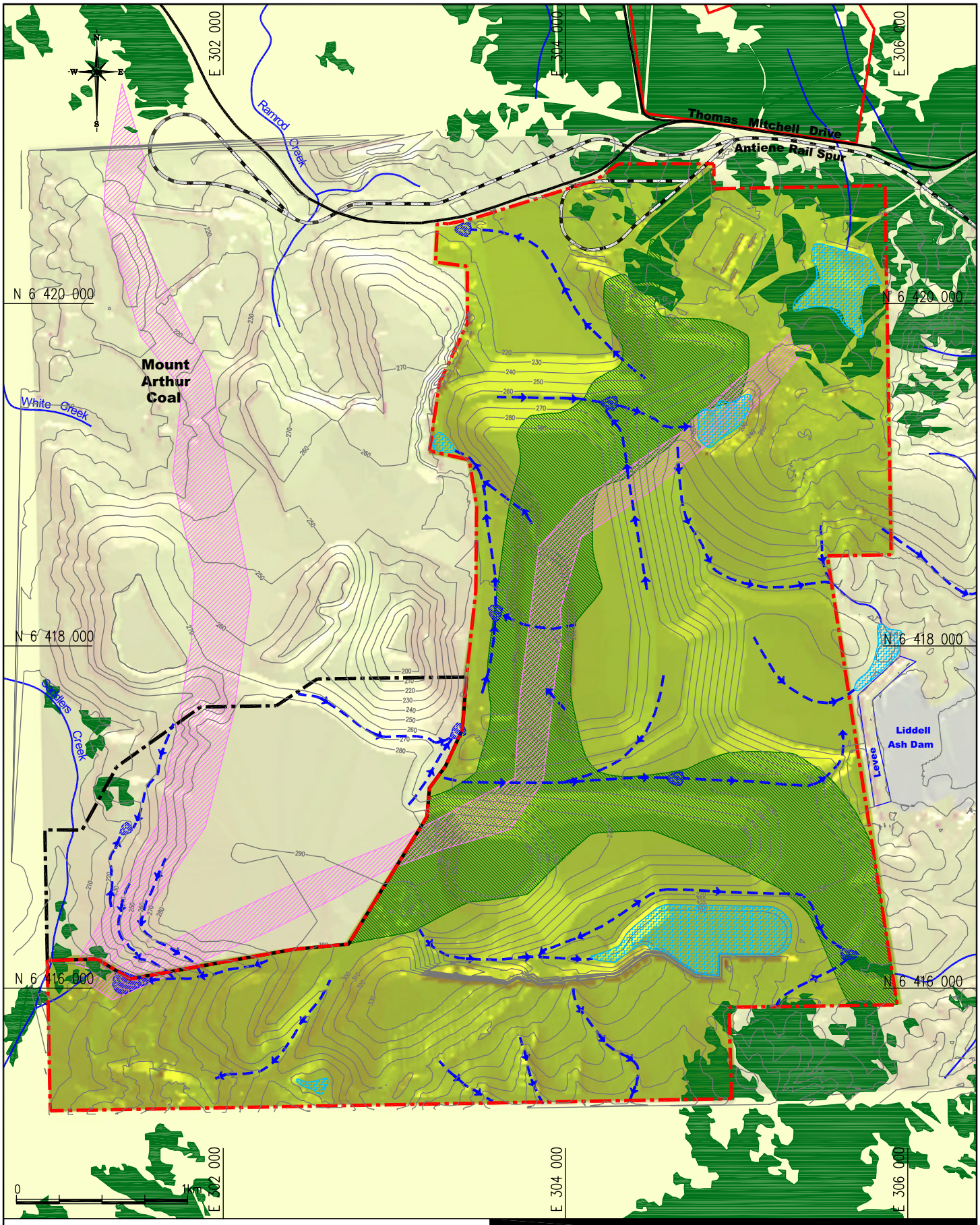
The conceptual final landform provides an integrated landscape consistent with the Synoptic Plan which aims to link existing woodland with rehabilitation to provide corridors for the movement of flora and fauna.

The proposed corridors will join the corridors proposed in the Synoptic Plan and the rehabilitation plans of MAC for the MAC Sub-lease area as conceptually shown in **Figure 24**. The integrated rehabilitation planning approach proposed will result in significant economic and environmental benefits, namely:

- The maximum extraction of the available coal resource;
- An optimal use of the East Pit void for the disposal of fly ash;
- Economies for MAC with the availability of the MAC Sub-lease area;
- The management and ultimate cessation of spontaneous combustion within the EA Boundary and the MAC Sub-lease area;
- A reduction in the number of mining voids in the Upper Hunter; and
- Integration and implementation of the principles of the Synoptic Plan.

### 8.7.3 Mitigation & Management

Rehabilitated areas will continue to be delineated to prevent uncontrolled entry and to enhance the initial establishment phase. Monitoring of rehabilitated areas will continue on a regular basis to ensure rehabilitation objectives are achieved fulfilling DPI Completion Criteria and to identify areas requiring maintenance works. Regular monitoring will occur and the results will be reported in the AEMR.




Legend

- Rehabilitation
- EA Boundary
- MAC Sub-lease
- Rail
- Roads
- Creeks
- Water bodies
- Wildlife Refuge
- Remnant Vegetation
- Proposed Woodland Area
- Synoptic Plan Corridors
- Drainage

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DRAYTON

Co-ordinate System: MGA Zone 56
Source: Synoptic Plan (DMR 1999)

# DRAYTON MINE EXTENSION EA

## Conceptual Final Landform

| Cad File:02131E.dwg | Date: 16.04.2007 | Drawn: JD | Figure 24 |
|---|---|---|---|

The rehabilitation techniques that will continue to be utilised for the Project are discussed further below.

**Progressive Rehabilitation**

Rehabilitation of land disturbance associated with the Project will continue to occur progressively as an integral component of the mining operations, in accordance with the SHECMS. Progressive rehabilitation will be scheduled as soon as possible after mining disturbance as detailed in **Section 4.3** and shown on **Figure 8** to **Figure 10** in accordance with the requirements of DPI Rehabilitation Completion Criteria.

Detailed mining and rehabilitation schedules will be prepared for the MOP and AEMR, submitted to DPI over the life of the Project. Progressive rehabilitation minimises the areas of disturbed land, and thus minimises the visual impact of the Project and the potential for wind blown dust and erosion.

**Erosion & Sediment Control**

Erosion and sediment control will be an integral aspect of the Project rehabilitation design. This will include the construction of contour furrows or banks at intervals down the rehabilitation slope to control surface flow on disturbed areas. This prevents run-off from reaching a depth of flow or velocity that will cause erosion. The use of engineered waterways using erosion blankets, groundcover vegetation and/or rip rap will be undertaken to safely dispose of run-off down slope. For further detail on erosion and sediment control, refer to **Appendix J**.

**Topsoil Handling**

Topsoil resources will be identified, stripped and stockpiled ahead of mining, in accordance with the SHECMS and **Section 9.4**. Topsoil stockpiles will be managed to ensure the long-term viability of the soil resource and will be revegetated as soon as possible. Once the landform has been shaped and contoured, topsoil will be respread to approximately 100 mm depth. If the topsoil is unsuitable, appropriate ameliorative measures such as the application of gypsum will be undertaken.

All rehabilitation will be contour ripped to cultivate the surface in readiness for sowing.

**Revegetation**

The revegetation program at Drayton will continue to establish significant vegetated areas and result in a net increase in woodland vegetation over the long-term. Accordingly, in recognition of the importance of vegetation corridors to regional biodiversity, initiatives for the Project aim to link rehabilitation and remnant vegetation through the establishment of woodland corridors. These corridors are consistent with the principles presented in the Synoptic Plan.

The revegetation program will aim to establish as much of the original floristic diversity as possible and will include:

- The use of endemic plant species characteristic of original vegetation communities in the EA Boundary, focusing on HLRF species where possible; and
- Establishment of upper, mid and lower storey native vegetation.

Revegetation will be conducted following the completion of shaping, topsoiling and cultivation of disturbed areas. Revegetation will be established as soon as possible after the completion of preparation works to minimise erosion and visual impacts. Species to be used in the revegetation program will be consistent with the SHECMS and principles of the Synoptic Plan and *Rehabilitation of Open Cut Coal Mines using Native Grasses: Management Guidelines* (Department of Sustainable Natural Resources, 2003).

**Long - Term Protection & Management Measures**

An integral component of the Project will include ensuring the long-term protection and management of the area within the EA Boundary following cessation of mining operations.

Drayton will develop a Void Management Plan which will include details on the long-term protection and management measures proposed for the voids.

# 9.0 ENVIRONMENTAL ASSESSMENT - SECONDARY ISSUES

## 9.1 INTRODUCTION

The potential environmental impacts of Secondary Issues identified in the ERA associated with the Project have been assessed with a summary of findings presented below. Management and mitigation measures have been developed, where required.

## 9.2 SURFACE WATER

### 9.2.1 Introduction

A Surface Water Impact Assessment has been undertaken by Hansen Bailey for the Project and is presented in **Appendix I**. The assessment includes modelling of potential surface water impacts, a site water balance and a detailed description of void management. This section provides a summary of the Surface Water Impact Assessment for the Project.

### 9.2.2 Background

The existing water management system for Drayton is based on the following key water management strategies, as conceptually illustrated in **Figure 25**:

- Diversion of clean surface water run-off away from areas disturbed by mining activities;
- Collection of surface water run-off from areas disturbed by mining activities in catch drains and sediment traps for control of suspended sediment prior to run-off from site or reuse on-site;
- Collection of run-off from industrial areas (such as the CHP and Workshop) in catch drains, directing this run-off to the oil pollution control dam for treatment, and return to storage dams for reuse as mine water supply; and
- Transfer of open cut pit water to storage dams for reuse as a mine water supply.

Drayton generally produces surplus water which is stored on-site and with the exception of potable water for domestic use, operates without the need for an external water supply. Drayton cannot discharge water off-site under the Hunter River Salinity Trading Scheme (HRSTS); however, it does have a water sharing arrangement with MAC. Under the agreement, Drayton may transfer up to 600 ML per annum of excess mine water to supplement MAC's net water deficit.

The existing mine water storage system has an approximate total volume of 2,140 ML storage capacity. The West Pit contributes a further 1,000 ML available storage capacity. Water quality in the dams is monitored on a monthly basis at the locations shown in **Figure 7**. Parameters measured indicate that pit water quality is moderately saline and typical of other mines in the region. All mine water is contained within the internal mine water management system and is not discharged off-site.

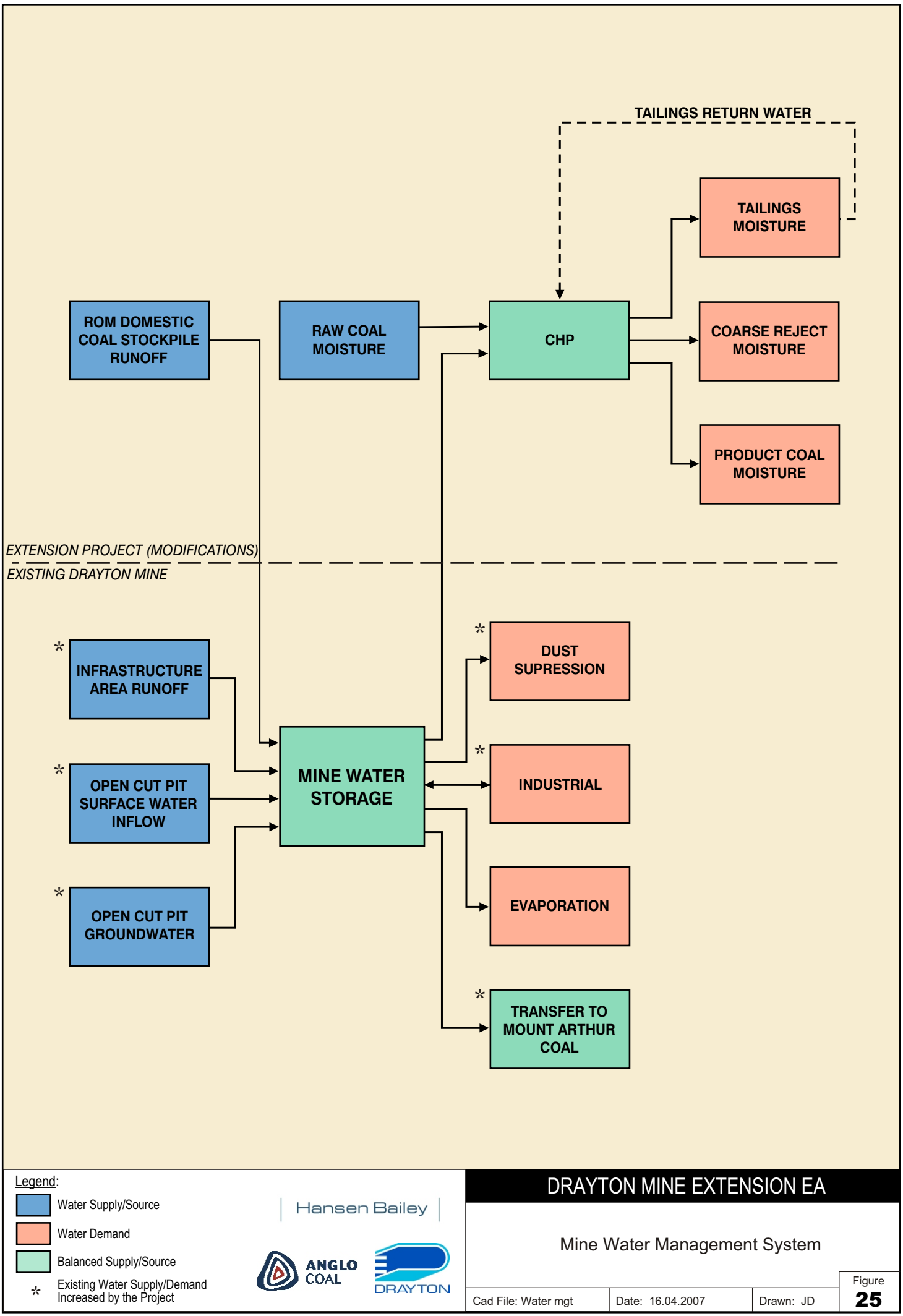
#### Model Methodology

A site water balance was calculated for Years 5 and 10 of the Project using identified mine water sources and demands to enable a complete assessment of a full range of water management scenarios which may occur (i.e. dry, average and wet annual rainfall scenarios).

Water demands for dust suppression and industrial use have been estimated for key years of the Project on the basis of existing usage rates, forecast coal production and operational experience.

As discussed in **Section 8.5**, groundwater will also enter the mine water management system through inflow from the coal seam aquifers, with the predicted inflows used in the water balance.

The evaporation losses have been estimated by applying a pan coefficient of 0.7 to the average annual pan evaporation of 1,601 mm, recorded at the BOM's Scone station over a period exceeding 40 years.


TAILINGS RETURN WATER
TAILINGS MOISTURE
ROM DOMESTIC COAL STOCKPILE RUNOFF
RAW COAL MOISTURE
CHP
COARSE REJECT MOISTURE
PRODUCT COAL MOISTURE
EXTENSION PROJECT (MODIFICATIONS)
EXISTING DRAYTON MINE
* INFRASTRUCTURE AREA RUNOFF
* OPEN CUT PIT SURFACE WATER INFLOW
* OPEN CUT PIT GROUNDWATER
MINE WATER STORAGE
* DUST SUPRESSION
* INDUSTRIAL
EVAPORATION
* TRANSFER TO MOUNT ARTHUR COAL
Legend:
Water Supply/Source
Water Demand
Balanced Supply/Source
* Existing Water Supply/Demand Increased by the Project
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ANGLO COAL
DRAYTON
DRAYTON MINE EXTENSION EA
Mine Water Management System
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Date: 16.04.2007
Drawn: JD
Figure 25

The dry year water balance has been calculated using the 10th percentile annual rainfall and the 90th percentile annual pan evaporation records. The wet year water balance has been calculated using the 90th percentile annual rainfall and the 10th percentile annual pan evaporation records. An average year is based on annual average rainfall and evaporation.

### 9.2.3 Impact Assessment

**Water Management System Model**

The existing Drayton mine water management system will be expanded for the Project as shown in **Figure 25**. The volume of water managed through the system will generally increase; however, the sources of water supply and the mine water demands will remain substantially unchanged as discussed below.

***Project Water Supply***

The Project will generate additional water to contribute to the mine water management system, including:

- Open cut pit water (including surface run-off and groundwater inflow) from open cut areas;
- Run-off from areas disturbed by mining (including overburden emplacement areas and rehabilitation); and
- Surface water run-off from industrial areas.

The upgrade to the CHP as discussed in **Section 4.0** will continue to allow CHP water to be reused and recycled through the water management system.

Groundwater is also predicted to contribute a significant amount of water to the mine water management system, as discussed in **Section 8.5**, with predicted rates of inflow ranging from 2.2 ML/day in Year 5 to 2.7 ML/day in Year 10.

***Project Water Demands***

The Project will generate additional water demands from the mine water management system, including:

- Dust suppression for haul roads and coal stockpiles;
- Water for industrial use; and
- Water for coal handling and processing.

In addition to the demands summarised above, water will also be lost due to evaporation.

***Water Balance***

The predicted Project water balance for Year 5 and Year 10 is shown in **Table 29** and discussed below.

The maximum annual water demand for the Project is predicted to occur in Year 5, correlating with the predicted maximum production rate of the Project. In the event of average rainfall in Year 5, a small surplus of water is predicted to occur; whilst in the event of extremely low rainfall in this year, an overall water deficit is forecast.

In the event of extremely low rainfall in Year 5, Drayton will draw on water stored in existing site storages (up to 1,700 ML storage capacity due to the mining out of Delpah Dam). An additional store of up to 1,000 ML may also be available depending on the quantity stored in the West Pit void (in accordance with the MAC Agreement).

In the event of extremely high rainfall in Year 5, an overall surplus of water is predicted to occur to which Drayton could transfer to MAC or utilise the storage capacity on-site or within the West Pit void.

The water demand in Year 10 is predicted to reduce significantly, correlating with a decrease in the production rate of the Project and a lessening demand for CHP water and dust suppression.

Groundwater inflows are predicted to increase in Year 10, thereby contributing to a net surplus of water. In the event of average rainfall in Year 10, a significant surplus is predicted to occur. Drayton will use this surplus to provide 600 ML to MAC and direct the remainder to mine water storages or the West Pit void.

The water balance indicates that the worst-case scenario for a mine water surplus will occur in the event of extremely high rainfall during Year 10. Following transfer of 600 ML to MAC, Drayton could still have a surplus of 855 ML water, and if necessary will utilise the West Pit void which has a water storage capacity of 1,000 ML.

**Table 29**
**Project Water Balance**

| Water Balance | Annual Water Volume (ML) | | | | | |
|---|---|---|---|---|---|---|
| | Year 5 | | | Year 10 | | |
| | Dry | Average | Wet | Dry | Average | Wet |
| **Water Supply Sources** | | | | | | |
| Pit water | | | | | | |
| • Surface Water Run-off | 515 | 780 | 1,000 | 410 | 620 | 795 |
| • Groundwater Inflow | 815 | 815 | 815 | 980 | 980 | 980 |
| Industrial Area Run-off | 90 | 140 | 175 | 85 | 125 | 160 |
| Rehabilitated Area Run-off | 80 | 120 | 155 | 95 | 145 | 185 |
| Dam Catchments | 145 | 215 | 285 | 135 | 205 | 265 |
| *Sub-Total* | *1,640* | *2,065* | *2,425* | *1,705* | *2,075* | *2,385* |
| **Water Demands** | | | | | | |
| Dust Suppression | | | | | | |
| • Haul Roads | 600 | 600 | 600 | 300 | 300 | 300 |
| • Coal Stockpiles | 50 | 50 | 50 | 25 | 25 | 25 |
| Industrial Use | 400 | 400 | 400 | 200 | 200 | 200 |
| Coal Handling Plant | 600 | 600 | 600 | 130 | 130 | 130 |
| Evaporation Losses | 370 | 330 | 280 | 370 | 325 | 275 |
| *Sub-Total* | *2,020* | *1,980* | *1,930* | *1,025* | *980* | *930* |
| **SURPLUS (DEFICIT)** | **(380)** | **85** | **495** | **680** | **1,095** | **1,455** |

### Salinity

There will not be any significant accumulation of salt within the mine water management system, and modelling of a salinity balance is therefore not necessary for the Project. Pit water may have elevated salinity levels; however, all pit water will be contained within the mine water management system and reused by the mine or, in the event of surplus water, may be transferred off-site to MAC or other neighbours and Power Stations. Therefore there is no mechanism for significant salt accumulation as a result of the Project.

### Long Term Voids

The final landform design is shown in **Figure 11** and retains three voids – one void in each of the North, South and East Pits.

The rehabilitation, management and use of these voids is discussed in **Section 8.7** and the surface catchment areas of the voids will be minimised where possible, as conceptually shown on **Figure 11**.

The voids will act as groundwater sinks and water levels will recover over time due to the inflow of groundwater, seepage from the overburden emplacement areas and rainfall. Evaporative losses will assist in the control of these inflows and the final steady state void water level is not anticipated to be reached until more than 200 years after mine closure (**Section 8.5**).

The salinity of the long-term void waters will exceed that of the natural groundwater in the area due to net evaporation from the void water surfaces over time. However, as the voids will act as groundwater sinks, this will prevent the migration of high salinity void water away from the void and reduces the risk of contamination of the surrounding aquifer.

### 9.2.4 Mitigation & Management

Surface water will continue to be managed in accordance with the SHECMS and a Water Management Plan will be prepared for the Project.

The mine water management system will continue to be utilised for the Project and therefore, no substantial changes to the system are proposed.

Drayton will obtain all relevant Water Access Licences for the Project required under the Water Act.

Recalculation of the mine water balance will be undertaken annually to confirm that the water management system can meet predicted water demand or store surplus water and will be reported in the AEMR. In the event that the annual water balance review predicts a water surplus in excess of available mine water storage capacity, Drayton will seek agreements with neighbouring mines and/or Power Stations for the transfer of excess mine water.

A Void Management Plan will be developed which will include water management strategies for the voids.

## 9.3 SPONTANEOUS COMBUSTION

### 9.3.1 Introduction

Drayton will continue to mine the Greta coal measures which are known to be susceptible to spontaneous combustion. This section provides a summary on the cause and history of spontaneous combustion and research undertaken at Drayton to date.

An assessment for the Project to impact on future spontaneous combustion occurrences is also provided. The existing mitigation and management techniques used to manage spontaneous combustion will continue for the Project and are discussed below.

### 9.3.2 Background

**Spontaneous Combustion Causes**

Spontaneous combustion occurs when coal and other carbonaceous materials heat up and oxidise at temperatures of about 350°C, causing ignition.

The nature of open cut mining results in the formation of overburden emplacement areas consisting of waste rock.

The carbon content of these materials renders them susceptible to spontaneous combustion if oxidised. Coal stockpiles or rehabilitation are also susceptible to spontaneous combustion due to the potential extent of carbon material available for oxidisation.

Spontaneous combustion is generally characterised by smoke, steam and gases. Spontaneous combustion can cause geotechnical hazards due to changes in spoil pile and surface stability, whilst the release of PAH could present occupational health risks.

**Spontaneous Combustion History at Drayton**

The West Pit area is recognised as having the highest propensity to spontaneously combust at Drayton. This has necessitated active management.

Field measurements at Drayton have identified carbon content in overburden emplacement areas to be between 8.8% and 10.0%, which is sufficient to cause spontaneous combustion should the carbonaceous material be exposed to oxygen. Temperatures in excess of 450°C have been measured within the overburden emplacement areas where spontaneous combustion has expressed.

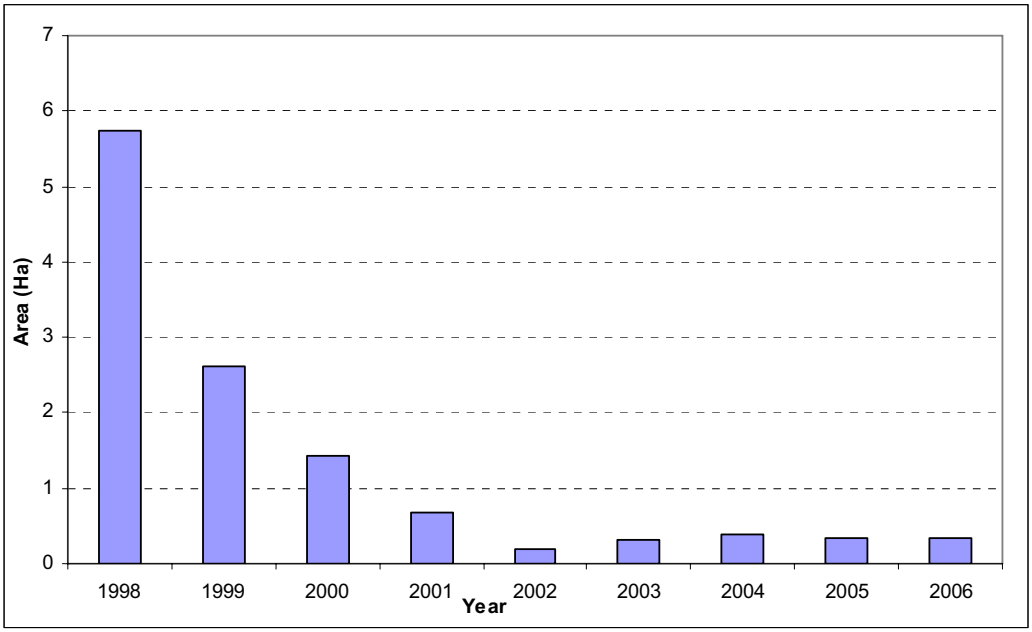
A historical review on the occurrence of spontaneous combustion at Drayton indicates the main incidences were recorded in 1998, with over 5.6 ha affected (**Figure 26**). However, the historical review shows that spontaneous combustion has generally declined since 2000, with only 0.4 ha affected in 2006.

Variations (within 0.5 ha) in the area affected may occur due to climatic conditions or geological interactions; however, the proactive management of spontaneous combustion at Drayton has ensured the area affected is kept to a minimum and will continue to decline.

This decline is generally attributable to an increased understanding of spontaneous combustion and the implementation of targeted management techniques.

Further, consultation with the local community (as discussed in **Section 6.0**) highlights the reduction in the noticeable effects of spontaneous combustion at Drayton, which is attributable to a targeted management program.

**Figure 26**
**History of Spontaneous Combustion at Drayton**




**Management Techniques**

***Spontaneous Combustion Management Plan***

Spontaneous combustion is managed in accordance with the SCMP which has been developed in consultation with MSC, DPI and DECC and lists Drayton's statutory and company obligations to control and reduce spontaneous combustion. The SCMP describes the potential causes of spontaneous combustion, determines accountabilities for its management, recommends remediation work to prevent recurrences and specifies monitoring and reporting requirements.

Specific management strategies listed in the management plan are discussed below.

***Stockpile Management***

Carbon material present in coal stockpiles renders them susceptible to spontaneous combustion. Therefore, in order to reduce the risk of spontaneous combustion, the "first-in-first-out" principle is used as a general rule to ensure the age of the stockpiles is maintained and managed.

When a stockpile reaches the age of six weeks and movement is not expected within the next two weeks, a program of temperature monitoring and visual inspections commences. Where the monitoring program identifies the potential for spontaneous combustion then remedial action, such as removing localised hot spots or relocating the stockpile, is undertaken.

***Placement of Overburden & Partings***

Where possible, Drayton manages spontaneous combustion in the overburden emplacement areas by encapsulating carbonaceous materials in selected areas, compacting these materials by truck or dozer and covering the materials with inert material.

***Rehabilitation***

Overburden emplacement areas which have reached their nominal landform height and which are identified as having a risk of spontaneous combustion are capped with 2 m of inert material prior to rehabilitation. Topsoil is then placed over this capping to enable revegetation to be conducted.

***Mapping & Reporting***

As discussed in **Section 3.0**, Drayton actively monitors and reports spontaneous combustion in accordance with EPL 1323, and reports incidences quarterly to DECC and in the AEMR.

Areas of spontaneous combustion at Drayton are identified by visual observation in the early morning, when smoke and water vapour are more evident, and through the use of thermal imagery. The intensity of spontaneous combustion is classified based on three scales of the extent of visible steam, smoke and flames. All areas which are capped with inert material are tracked by survey.

**Investigations & Research Trials**

Drayton has sponsored extensive research programs into the mechanisms of spontaneous combustion, occupational health and environmental effects and methods for detecting and managing its occurrence.

### 9.3.3 Impact Assessment

The MAC Agreement allows Drayton and MAC to place inert overburden in the MAC Sub-lease area to allow rehabilitation of this area and to assist remediation of areas currently subject to spontaneous combustion. As described in **Section 8.7.1**, MAC is responsible for the environmental management and rehabilitation activities associated with the MAC Sub-lease area.

The MAC Agreement will continue to significantly assist ongoing future spontaneous combustion management in the MAC Sub-lease area and at Drayton. Emplacing overburden in the MAC Sub-lease area will be a staged operation in which Drayton will also provide up to 25 million bcm of inert overburden to the MAC Sub-lease area to assist in extinguishing any remaining spontaneous combustion. The Agreement will eventually result in the whole MAC Sub-lease area (which was the worst area to be affected by spontaneous combustion at Drayton) being filled with inert material and rehabilitated, effectively being free of the effect of spontaneous combustion.

The Project has been specifically designed such that the occurrence of spontaneous combustion will decrease over the life of the mine.

Ongoing mitigation and management techniques discussed in **Section 9.3.2** will ensure that spontaneous combustion occurrences are effectively managed and eliminated upon rehabilitation and final landform completion at the end of the Project.

### 9.3.4 Mitigation & Management

Spontaneous combustion at Drayton will continue to be managed in accordance with the SHECMS and the SCMP.

In particular, the SCMP will be revised in consultation with DECC and DPI to the approval of DoP, to incorporate mining techniques and proactive management strategies to prevent and reduce spontaneous combustion at Drayton. The revision will include the addition of an inert material balance which will identify non-combustible materials available for capping of spontaneous combustion to ensure the adequate management of spontaneous combustion areas.

In accordance with the EPL and regulatory reporting requirements, Drayton will continue to provide regular reports to DECC on the extent of spontaneous combustion and on the methods being implemented to reduce occurrences of spontaneous combustion and their effectiveness.

## 9.4 SOILS & LAND CAPABILITY

### 9.4.1 Introduction

An assessment of soils, rural land capability and agricultural suitability has been undertaken for the Project by GSS Environmental and is presented in **Appendix J**. This section provides a summary of the assessment and its findings.

### 9.4.2 Methodology

An initial soil map was developed using aerial photographs, topographic maps and previous soil survey results. Surface soil exposures were assessed to ascertain potential mapping units, delineate soil unit boundaries and identify locations for targeted sub-surface investigation (test pits).

A total of 17 soil profile exposures were assessed at selected sites (**Figure 27**) and test pits between 1 m and 1.5 m deep were utilised to provide representative profiles of the soil types in the EA Boundary. Soil layers at each profile site were assessed according to Elliot & Veness (1981). Soil samples were sent for laboratory analysis to establish the suitability of these soils for rehabilitation.

The land capability of the Survey Area was assessed in accordance with the DWE rural land capability assessment system, which classifies land based on soil erosion hazard and versatility of use.

The system allows for land to be allocated into eight potential classes (with land capability decreasing progressively from Class I to Class M). It should be reiterated that Drayton is a brownfield site and the land capability of the Project Area has been comprehensively assessed in previous assessments by Connolly (2001) and Dames and Moore (1980) and is illustrated in the MOP. The scope of this assessment therefore focuses on the Project Mining Areas.

There are five classes of agricultural land suitability which assess land on the basis of suitability and potential for agricultural production (with suitability decreasing progressively from Class 1 to Class 5).

### 9.4.3 Impact Assessment

#### Soil Survey

The two major soil units identified during the soil survey were dark clays (which dominated southern parts of the Survey Area) and yellow duplex soils (which dominated northern parts of the Survey Area) as shown in **Figure 27**.

#### *Dark Clays*

The dark clays consisted mainly of dark red brown uniform clay soils and closely resembled the Red Clay soil landscape unit commonly associated with the Brays Hill soil landscape unit (Kovac & Lawrie, 1991). Dark clays were generally recorded in the South Pit and in a small area of the East Pit, where the topsoil is structurally stable and typically 15 centimetres (cm) to 20 cm deep and dark reddish brown in colour. This topsoil is suitable for stripping and use in rehabilitation.

The subsoil ranges in depth between 90 cm and 110 cm and contains fine texture (high clay content) and massive structure. This subsoil layer is not suitable for stripping or use in rehabilitation.

#### *Yellow Duplex*

The yellow duplex soil unit consists mainly of yellow solodics and is commonly associated with the Brays Hill and Liddell soil landscape units (Kovac & Lawrie, 1991). Yellow duplex soils occur throughout the North Pit, where the topsoil is structurally stable and typically 14 cm to 25 cm deep and generally dark brown in colour. This topsoil is suitable for stripping and for use in rehabilitation. The subsoil ranges in depth up to 90 cm and contains fine texture (high clay content) and massive structure. This subsoil layer is not suitable for stripping or use in rehabilitation.

#### *Steep Slopes*

These soils consist of reddish brown clays and yellowish brown sands and were identified on steep slopes in the South Pit. These soils are highly eroded and are not suitable for stripping or use in rehabilitation.

#### *Disturbed & Rehabilitated Land*

The majority of the North and East Pits were identified as disturbed land, whilst areas of rehabilitated land occurred throughout the entire Survey Area.

#### Land Capability

The majority of land within the North and East Pits were identified as Class M, whilst a small area of undisturbed land in the North and East Pit is classified as Class V.

Within the South Pit, the Project areas were classified as Class M, and the steep slopes were limited to Class VI. The steeper slopes with significant erosion or situated on yellow duplex soils are limited to Class VII and are considered unsuitable for agricultural production.


Legend

- EA Boundary
- MAC Sub-lease
- Survey Area
- Dark Clays
- Yellow Duplex
- Disturbed Area
- Steep Slope
- Rehabilitation
- 1 Soil Profile Site

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Co-ordinate System: MGA Zone 56 Aerial: Dec 2005
Source: GSS Environmental (2006), Umwelt (2000) and Dames and Moore (1980)

# DRAYTON MINE EXTENSION EA

## Soil Types

| Cad File: 01953E.dwg | Date: 16.04.2007 | Drawn: JD | Figure 27 |
|---|---|---|---|

Areas of the South Pit, which were undisturbed on moderately sloping dark clay soil with good pasture cover, were classified as Class IV due to soil rockiness and slope. The remaining areas in the South Pit with moderately sloping yellow duplex and a good pasture cover were classified as Class V due to soil characteristics and slope.

As discussed in **Section 8.7**, the land capability of the Project Area will be rehabilitated with the key objective to develop a post mining landform with a land capability at least equal to the pre mining land capability.

**Agricultural Land Suitability**

The undisturbed land within the North, South and East Pits were classified as Class 4 primarily due to yellow duplex soil characteristics in the North Pit and soil rockiness and slope in the South and East Pits.

Previously mined land, steep eroded land and steep yellow duplex land were classified as Class 5 due to mining disturbance, slope steepness, soil structure and instability or existing erosion.

### 9.4.4 Mitigation & Management

Land resources within the EA Boundary will continue to be managed in accordance with the SHECMS.

## 9.5 VISUAL ASSESSMENT

### 9.5.1 Background

A visual impact assessment has been conducted for the Project by Integral Landscape Planning and Architecture and is included in full in **Appendix K**.

The visual impact assessment was designed to identify and address the visual impacts associated with the Project, including the cumulative impact with the existing operation and surrounding visual setting. A summary of the assessment is presented below.

### 9.5.2 Methodology

The visual impact assessment includes a consideration of visual sensitivity, visual effect and visual impact at representative viewing locations around the EA Boundary. Each component of the methodology is discussed below.

***Representative Viewing Locations***

A number of sites within the Primary Visual Catchment (PVC) (see **Figure 28**) were selected as representative viewing locations of the Project including:

- Thomas Mitchell Drive;
- Hassall Road;
- Lake Liddell; and
- New England Highway.

These sites were selected through field assessment, aerial photography and topographic plans to determine the visibility of the Project.

Whilst there will be some variation in the impacts on specific viewing locations, it is anticipated that an overall assessment of the visual impacts on the selected locations will be representative for the majority of views experienced and thus, is designed to display typical, worst-case views.

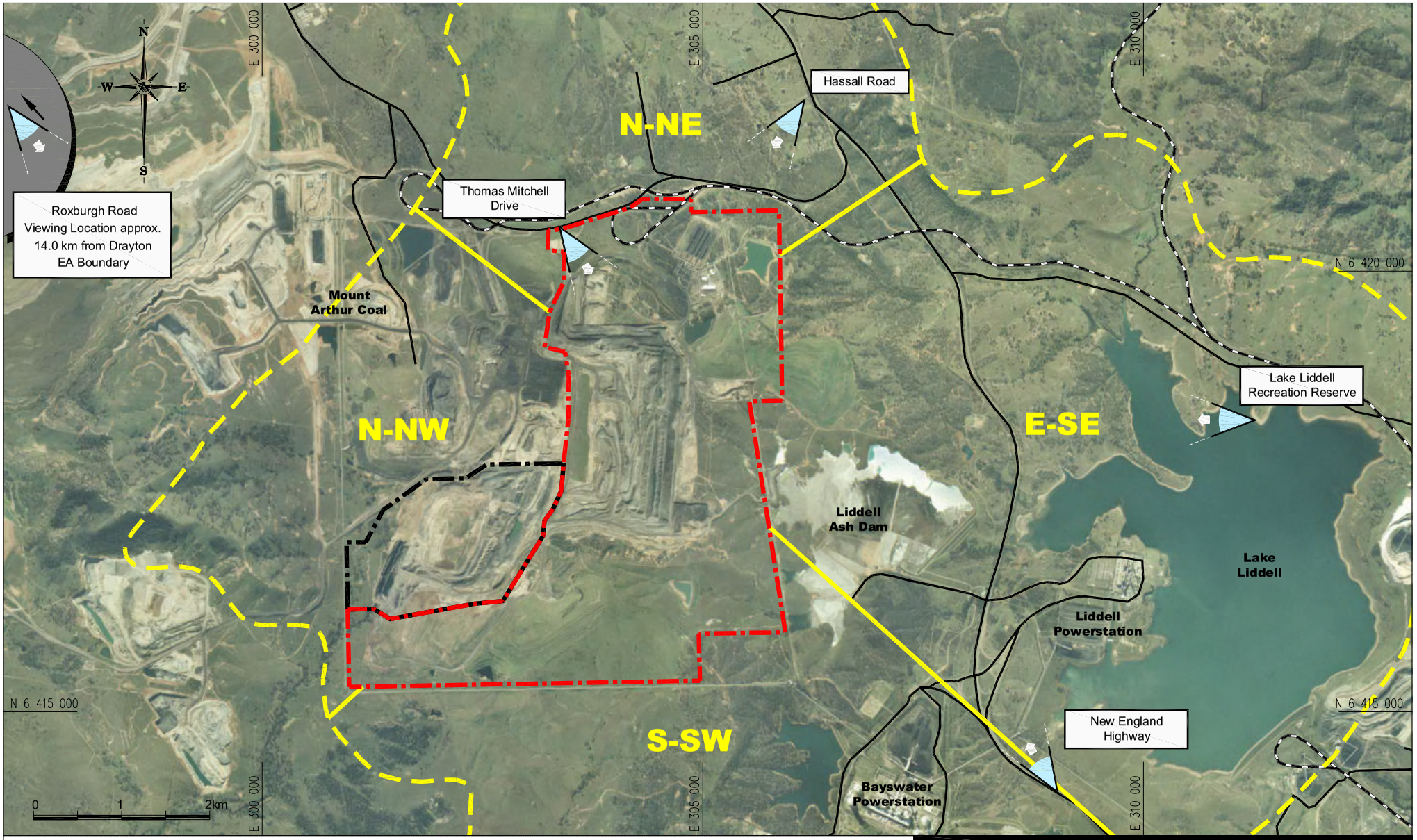
***Visual Sensitivity***

Visual sensitivity is a measure of how significantly a change to the existing landscape is viewed from different land use areas in the vicinity of the Project. The visual sensitivity towards the Project was determined by review of aerial photography, mine plans of the Project and topographic plans of the surrounding areas. This included the consideration of land use, viewing distances and the general level of screening available from topography, buildings and vegetation. The assigned sensitivities within each Sector were also evaluated based on ground truthing and other previous study data.

***Visual Effect***

Visual effect is a measure of the level of visual contrast and integration of the Project with the existing visual environment. The magnitude of the visual effect is determined by a balanced consideration of the following:

- Screening by topography and vegetation at, or adjacent to, the proposed visually affected area;




Legend

- EA Boundary
- MAC Sub-lease
- Primary Visual Catchments
- Sectors
- Roads
- Photomontage Location

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Co-ordinate System: MGA Zone 56 Aerial: Aug 2003
Source: Integral (2006)

# DRAYTON MINE EXTENSION EA

## Photomontage Locations

| Cad File: 02080E.dwg | Date: 16.04.2007 | Drawn: JD | Figure 28 |
|---|---|---|---|

- The level of contrast and integration (i.e. form, shape, pattern, line, texture and colour) between the Project and the landscape within which it is presently viewed, including the existing mine area; and
- The proportion of the view occupied by the Project.

The visual effects of the Project at the representative viewing locations were evaluated by photomontage for Year 0 (Current), Year 5, Year 10 and Final Landform (see **Figure 30A, B and C**).

The photomontages were then used to assist in determining the level of visual impact of the Project, as discussed further in **Section 9.5.3**.

***Visual Impact***

The visual impact of the Project requires a consideration of both the visual sensitivity of potential view locations, as well as the visual effect of the Project as indicated in **Table 30**. This methodology has been used successfully for other major mining projects involving significant and complex visual impacts.

### 9.5.3 Impact Assessment

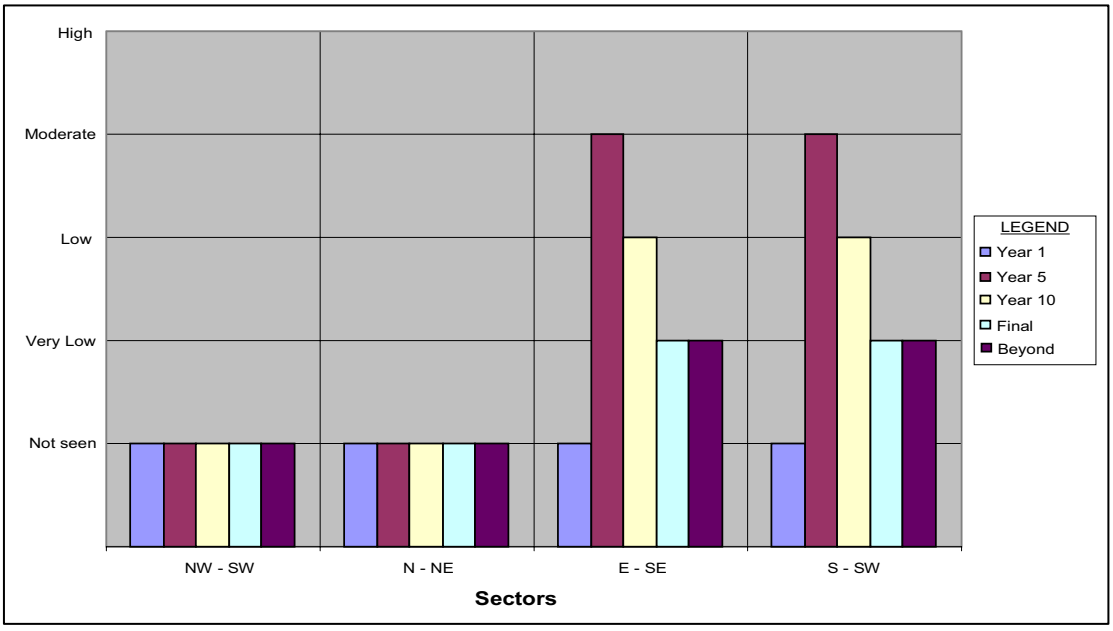
The visual impacts on each representative viewing Sector are described in detail below, whilst **Figure 29** illustrates the overall visual impacts of the Project.

**Table 30**
**Visual Impact Assessment Matrix**

| Visual Sensitivity | Visual Effect | | | | |
|---|---|---|---|---|---|
| | **High** | | **Moderate** | **Low** | **Very Low** |
| | **High** | High Impact | High Impact | Moderate Impact | Low Impact |
| | **Moderate** | High Impact | Moderate Impact | Low Impact | Low Impact |
| | **Low** | Moderate Impact | Low Impact | Low Impact | Low Impact |

*Source: Integral (2006)*

**Figure 29**
**Visual Impacts of the Project**




*Source: Integral (2006)*

**North-west - South-west Sector (Thomas Mitchell Drive)**

***Visibility***

Visibility in this Sector is limited to foreground views from Thomas Mitchell Drive. The remainder of the Sector is screened by minor ridges and spurs as well as MAC. The exception to this is the elevated area in the vicinity of Roxburgh Road (approximately 14 km from the EA Boundary), where some views over the Project may be experienced.

***Visual Effects***

The visual effects of the Project on this Sector are limited to foreground areas along Thomas Mitchell Drive, when the Project is closest to the road in Year 10. The visual effects of the Project on Thomas Mitchell Drive are illustrated in **Figure 30A.** No visual effect in this Sector will occur until Year 5 of the Project. From this time until Year 10, the north-west face of the mining area and overburden emplacement areas will be visible.

***Visual Sensitivity***

The visual sensitivity of this Sector is generally low. Thomas Mitchell Drive is an industrial road and acts as an access road to Drayton and MAC, as well as the Muswellbrook Industrial Estate. Limited rural residences on Roxburgh Road will have a moderate to low sensitivity, being some 14 km away from the Project.

***Visual Impact***

No visual impact will be experienced from the Project on Thomas Mitchell Drive between Years 1 and 5. The visual impact experienced during the period Year 5 to Year 10 is moderate to low and impacts will become low to very low once the final landform shaping and rehabilitation is completed.

The visual impact on Roxburgh Road is low due to moderate sensitivities and low to very low visual effects. This reflects the high visual integration of the Project with its surrounds and the distance of views from this location (approximately 14 km).

In summary there is no significant visual impact from the Project on this Sector.

**North - North-east Sector (Hassall Road)**

***Visibility***

The primary viewing areas of this Sector include the rural residential areas of Hassall Road, Balmoral Road and Pamger Drive. Dense vegetation and undulating topography screen these areas from the Project.

***Visual Effect***

The visual effects of the Project on this Sector are low due to the lack of visibility of the Project from dense vegetation and ridge lines. The very top of the overburden emplacement area may be visible for short periods; however, this effect will be a very small part of the overall viewing zone which will be dominated by vegetation and ridge lines. These effects will be reduced to low and very low as rehabilitation works are completed (**Figure 30B**).

***Sensitivity***

The rural-residential nature of this Sector generally leads to a high sensitivity to visual impacts; however, as the rural-residential areas are screened by dense vegetation and ridge lines, the sensitivity of the Project on this Sector is low.

**Visual Impact**

No visual impact will be experienced in this Sector as a result of the Project. The screening effect provided by the forested ridge and dense vegetation to the north-east of the EA Boundary reduces the visual impact on this Sector primarily due to a lack of visibility towards the Project.



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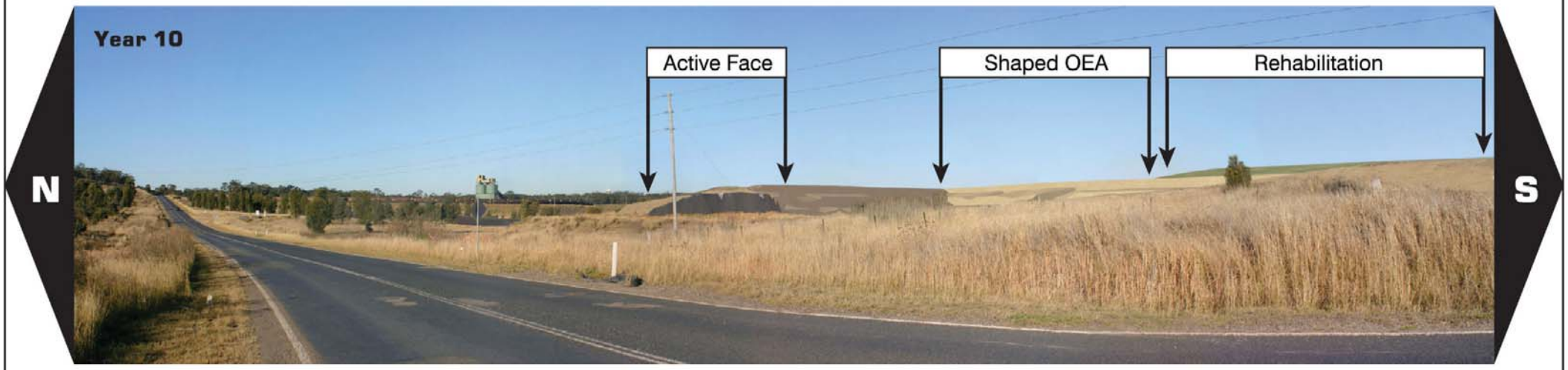
Photomontage Thomas Mitchell Drive

Filename: DR 0614 - Photomontage - New England Hwy.ai | Date: 27.04.07

Figure 30A





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# DRAYTON MINE EXTENSION EA

Photomontage Thomas Mitchell Drive

Filename: DR 0614 - Photomontage - New England Hwy.ai | Date: 27.04.07

Figure 30A

**East - South-east Sector (Lake Liddell)**

***Visibility***

The recreation area of Lake Liddell and the New England Highway dominates the land use of this Sector. The eastern foreshores of Lake Liddell will have open, long-distance views of the Project until final rehabilitation is completed.

In particular, the South Pit mining area and overburden emplacement area will be visible between Years 5 and 10. The western parts of Lake Liddell will be screened from the Project due to elevation and dense vegetation.

The visibility of the New England Highway in this Sector is low as the highway is located at a lower elevation than the Project and is effectively screened by adjoining ridges, spurs and vegetation.

***Visual Effects***

The primary visual effect of the Project on this Sector will be the development and shaping of the overburden emplacement areas, which will come into view over adjoining lying ridges and spurs to the east of the EA Boundary (see **Appendix K**). As the overburden emplacement areas will borrow shape and form from the existing landscape, the visual effects of the overburden emplacement area will be moderate until rehabilitation is conducted. Once grass rehabilitation commences, the visual effects will be low and become very low when tree planting establishes.

***Sensitivity***

The visual sensitivity of this Sector is considered to be moderate, due to a relatively long viewing distance of 5 - 7 km from the Project. In particular, Lake Liddell will have a moderate sensitivity to the Project, due to the relatively long viewing distance to the Project and the fact that Lake Liddell is used predominantly as an Industrial Lake to service nearby Power Stations. The sensitivity of minor roads and rural areas within the Sector is low.

***Visual Impact***

The visual impact of the Project on this Sector is restricted to distant eastern views from Lake Liddell and rural areas which overlook low ridges and spurs into the Project. Moderate impacts will be experienced at Lake Liddell for short periods from Year 1 to Year 10, until the formation of the final landform and associated rehabilitation is completed (**Appendix K**).

There is no visual impact from the Project on the New England Highway in this Sector.

**South - South-west Sector (New England Highway)**

***Visibility***

This Sector is dominated by rural lands, mining areas, Bayswater and Liddell Power Stations and Power Station buffer lands. There are few private or sensitive rural residences within this Sector. The New England Highway is the most significant visual receptor in the Sector (**Figure 30C**).

Visibility to the Project occurs from the south-western part of the PVC, such as the New England Highway. These areas afford a visibility to the Project due to elevation and orientation. Low woodland hills and ridges occur in the foreground to the Project; however, provide a minor visual screen.

Visibility to the Project from the New England Highway is limited to a viewing shed of approximately 500 m to 1000 m, which equates to less than one minute of viewing time of a road view. The Project will not be visible to highway users travelling south.

***Visual Effects***

The primary visual effect on this Sector is created by the formation and rehabilitation of the overburden emplacement areas. High visual effects will be experienced in this Sector from Year 1 to Year 5, reflecting the scale of the Project, its visual prominence on the skyline and the colour contrast created by the overburden material (**Figure 30C**).



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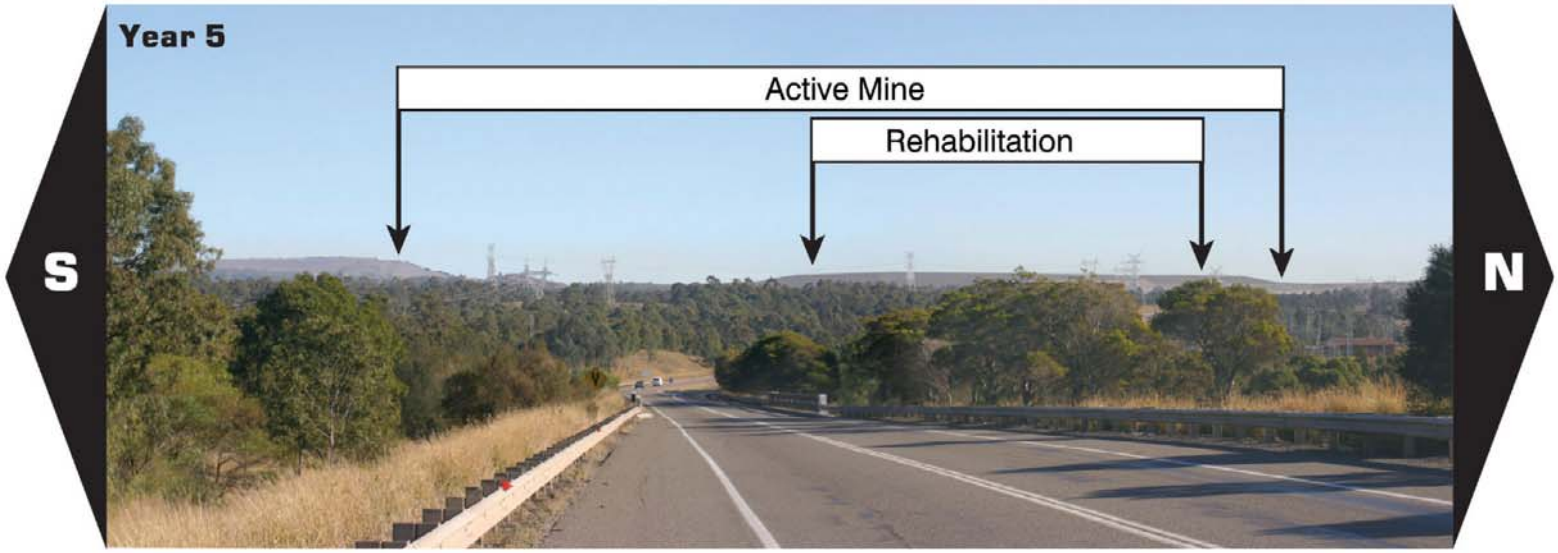
Photomontage Hassall Road

Filename: DR 0614 - Photomontage - New England Hwy.ai | Date: 27.04.07

Figure 30B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Photomontage New England Highway

Filename: DR 0614 - Photomontage - New England Hwy.ai | Date: 27.04.07

Figure 30C



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# DRAYTON MINE EXTENSION EA

Photomontage New England Highway

Filename: DR 0614 - Photomontage - New England Hwy.ai | Date: 27.04.07

Figure 30C

This visual effect will reduce to moderate and low when grassing is complete and very low when informal tree planting is carried out.

From Year 5 until Year 10, smaller areas of the view-shed are affected by overburden emplacement creating a moderate visual effect that will reduce to low and very low when rehabilitation establishes.

***Visual Sensitivity***

The visual sensitivity of the Sector is generally low, reflecting the rural, mining and power generation land use of the locality.

The only land use with slightly higher sensitivity in the Sector is the New England Highway, which has moderate to low sensitivities to the Project being a major highway with a viewing distance of 5 to 8 km to the Project.

***Visual Impacts***

The visual impact of the Project on this Sector overall is moderate to low. The visual impact on the section of the New England Highway which has visibility to the Project is high while the visual effect of the overburden emplacement area is moderate to high.

However, once visual effects of the overburden emplacement area are reduced to moderate or low from Year 5, visual impacts on the New England Highway will reduce from high to moderate and low as rehabilitation occurs and becomes established.

**Lighting Impacts**

***Introduction***

The visual effect of lighting surrounding the Project will vary and will be influenced by the locality of operations on-site, the reduced level at which the viewing location is situated and the presence of any off-site barriers such as topographic features and/or vegetation.

There are two types of lighting effects that could be experienced from the Project as discussed below.

***Direct Light Effects***

The only locations where the light source is directly visible, and thus will have direct line of sight to night lighting are elevated locations such as Roxburgh Road that overview any screening topography and vegetation. These locations are distant being over 14 km away from the EA Boundary which thereby mitigates the effect.

As is currently experienced, direct night lights in this viewing zone include that of MAC, Bengalla, Liddell and Bayswater Power Stations and the existing Drayton lights.

***Diffuse Light Effects***

Operational areas and machinery night lighting at Drayton will not be directly visible to most locations due to the screening effect of adjoining topography and vegetation. Rather, a diffuse effect of light and its interaction with atmospheric conditions may from time to time create a glow around the Project.

Due to the proximity of the viewing zone, this glow will not create a significant visual impact. Further, the influence of surrounding industrial operations and associated lighting activities will reduce the visual impact of diffuse light associated with the Project.

The diffuse night lighting effect of the Project will be similar to that which is currently experienced and will include illumination created by MAC, Bengalla, Liddell and Bayswater Power Station and by Drayton itself, depending on the proximity of the receiver.

***Night Light Impact Level***

The visual effect of lighting associated with the Project will be at a similar level to that currently approved and experienced. The Project extends the timeframe to which direct and diffuse lighting effects will be experienced, however the level of impact from both direct and diffuse light effects is not considered significant.

### 9.5.4 Mitigation & Management

All visual and lighting impacts will continue to be managed in accordance with the SHECMS.

The normal sequence of overburden emplacement, shaping, rehabilitation and planting of tree species will be continued. Expeditious completion of rehabilitation with priority given to south-easterly and southerly views will occur, where practical.

Dense tree planting along Thomas Mitchell Drive in the early years of the Project will be undertaken to assist reducing visual impacts to very low.

The establishment of informal tree stands that reflect the scale and pattern of adjoining tree/grass areas will also be undertaken (consistent with **Figure 8** to **Figure 10**). These will consider the skyline location of the overburden emplacement area. Completion of this treatment will reduce impacts to very low.

Night lighting will be kept to the minimum level necessary for operational and safety needs. Care will continue to be taken to orientate lighting away from private viewing points and public roads and all night lighting will continue to be directed to the ground and work areas.

## 9.6 ABORIGINAL ARCHAEOLOGY

### 9.6.1 Background

An Aboriginal Archaeology Impact Assessment has been undertaken by Archaeological Risk Assessment Services (ARAS) to assess the potential impacts of the Project on Aboriginal archaeology within the EA Boundary. A summary is presented below, whilst the full assessment is presented in **Appendix L**.

This assessment was conducted in accordance with the EARs and the DECC Draft Guidelines (DEC, 2005a).

The primary purpose of this assessment was to assess the potential Aboriginal artefacts within Drayton's Mining Leases which may be impacted and to further compliment the known Cultural Heritage values of the EA Boundary. The assessment also aimed to satisfy the statutory requirements of DECC and of Aboriginal Stakeholders.

Representatives from the local Aboriginal community were involved throughout the assessment process and provided comment on Cultural Heritage within the EA Boundary, as discussed further in **Section 9.7**.

**Survey Area**

As the majority of the EA Boundary has previously been surveyed and assessed for Aboriginal archaeology, this assessment focused on the two remaining un-surveyed areas of Delpah and Ramrod as shown on **Figure 31**.

**Methodology**

Prior to the commencement of the field survey, an archival search of the DECC Aboriginal Heritage Information Management System (AHIMS) database was performed to determine if there were any known Aboriginal sites registered within the EA Boundary (see **Appendix L** for relevant results).

To compliment the AHIMS database search, a review of aerial photography, previous Aboriginal archaeology and Cultural Heritage assessments and topographic maps was undertaken to highlight high-risk landform areas which the survey should target.

A field assessment of the Survey Area was conducted over a seven day period in August 2005 with seven representatives of the local Wonnarua Aboriginal community. Survey participants traversed the land spaced evenly apart with an estimated coverage of 100%. The high potential landform units were targeted again with a 100% foot traverse assessment.

Average visibility across the EA Boundary ranged up to 25% and accordingly, lack of ground visibility was the most significant constraint encountered throughout the survey. Any surface exposure was related to vehicle tracks and small patches of erosion due to cattle grazing. Weather conditions for the survey were fine and all areas were accessible.

A total of 11 transects were delineated in the Survey Area. Red flags were used to mark potential artefacts for further detailed recording by the Archaeologist.

### 9.6.2 Impact Assessment

**Results**

The survey identified a total of 480 Aboriginal objects within the EA Boundary as detailed in **Figure 31** and **Table 31**. The Aboriginal Cultural record of the EA Boundary consisted of 39 sites (22 open stone artefact scatters of varying densities and 17 individual stone artefact isolated finds).

The majority of the record (70%) was identified as exposed stone artefacts. The majority of the sites identified contained less than 10 stone artefacts collectively. Most of the cultural material was located within gully features on sloping ground, previously disturbed by cattle grazing and sheet erosion.

**Discussion**

Site R3 (see **Figure 31**) is the only site identified within the EA Boundary to be considered of high archaeological significance. This is due to its relatively undisturbed nature, size, quantity of exposed artefacts and potential for undisturbed Archaeological deposits.

Three other Aboriginal sites (D1, D5 and R4) are considered to be of medium archaeological significance due to their undisturbed nature, contents and location.

The remaining artefact scatters and isolated finds are considered to be of low archaeological significance, due to their physical condition and location. As noted in **Table 31**, the Project is likely to impact on 29 Aboriginal sites.

Despite the low surface visibility of the EA Boundary (up to 25%), the intensive field coverage of the area was considered sufficient to ensure an effective assessment of the remaining Aboriginal heritage record present within the EA Boundary.

**Table 31**
**Aboriginal Cultural Heritage Artefacts**

| ID | Type | Intensity | Project Status | ID | Type | Intensity | Project Status |
|---|---|---|---|---|---|---|---|
| D1 | Artefact scatter | 55 | To be impacted | R1 | Artefact scatter | 33 | To be impacted |
| D2 | Isolated find | 1 | To be impacted | R2 | Isolated find | 1 | To be impacted |
| D3 | Artefact scatter | 3 | To be impacted | R3 | Artefact scatter | 169 | To be impacted |
| D4 | Artefact scatter | 5 | To be impacted | R4 | Artefact scatter | 71 | To be impacted |
| D5 | Artefact scatter | 31 | To be impacted | R5 | Isolated find | 1 | Not impacted |
| D6 | Isolated find | 1 | To be impacted | R6 | Artefact scatter | 3 | Not impacted |
| D7 | Isolated find | 1 | To be impacted | R7 | Isolated find | 1 | Not impacted |
| D8 | Artefact scatter | 6 | To be impacted | R8 | Isolated find | 1 | Not impacted |
| D9 | Artefact scatter | 4 | To be impacted | R9 | Isolated find | 1 | Not impacted |
| D10 | Artefact scatter | 28 | To be impacted | R10 | Isolated find | 1 | Not impacted |
| D11 | Artefact scatter | 26 | To be impacted | R11 | Artefact scatter | 4 | Not impacted |
| D12 | Isolated find | 1 | To be impacted | R12 | Artefact scatter | 2 | Not impacted |
| D13 | Isolated find | 1 | To be impacted | R13 | Isolated find | 1 | To be impacted |
| D14 | Artefact scatter | 2 | Not impacted | R14 | Isolated find | 1 | To be impacted |
| D15 | Artefact scatter | 5 | Not impacted | R15 | Isolated find | 1 | To be impacted |
| D16 | Artefact scatter | 2 | To be impacted | R16 | Isolated find | 1 | To be impacted |
| D17 | Isolated find | 1 | To be impacted | R17 | Isolated find | 1 | To be impacted |
| D18 | Isolated find | 1 | To be impacted | | | | |
| D19 | Artefact scatter | 4 | To be impacted | | | | |
| D20 | Artefact scatter | 3 | To be impacted | | | | |
| D21 | Artefact scatter | 4 | To be impacted | | | | |
| D22 | Artefact scatter | 2 | To be impacted | | | | |

*D = Delpah Area, R = Ramrod Area (Figure 31)*


Legend

- EA Boundary
- MAC Sub-lease
- European Heritage Site
- Aboriginal Archaeology Site

Hansen Bailey

ANGLO COAL

DRAYTON

Co-ordinate System: MGA Zone 56 Aerial: Dec 2005

Source: ARAS (2006) and Veritas Archaeology and History Service (2006)

# DRAYTON MINE EXTENSION EA

## Cultural Heritage Sites

| Cad File: 02044F.dwg | Date: 16.04.2007 | Drawn: JD | Figure 31 |
|---|---|---|---|

### 9.6.3 Mitigation & Management

The Aboriginal Archaeology & Cultural Heritage Management Plan (AACHMP) will be revised for the Project. In particular, the Management Plan will outline and facilitate the salvage of the 29 sites identified to be impacted by the Project and will ensure the continued management and protection of remaining Aboriginal sites (**Table 31**).

The Management Plan will be developed in consultation with DECC and the local Aboriginal community and will be implemented prior to the disturbance of any archaeological sites.

## 9.7 ABORIGINAL CULTURAL HERITAGE

### 9.7.1 Background

An assessment of Aboriginal Cultural Heritage has been undertaken by ARAS which considered the potential impacts of the Project on Aboriginal Cultural Heritage within the EA Boundary, incorporating the views of the local Aboriginal community. The assessment is presented in **Appendix L**.

**Consultation with the Aboriginal Community**

All of the key stages of the Cultural Heritage consultation process were incorporated into a Stakeholder Consultation Timeline (**Figure 14**). The following consultation process was conducted during the Aboriginal Cultural Heritage assessment:

- On 6 May 2005 an advertisement was placed in the Muswellbrook Chronicle requesting expressions of interest in the Project from any interested Stakeholder. Responses were received from:
    - Upper Hunter Wonnarua Council Inc.;
    - Wanaruah Local Aboriginal Land Council;
    - Ungooroo Aboriginal Corporation;
    - Lower Wonnarua Tribal Consultancy;
    - Hunter Valley Aboriginal Corporation;
    - Yarrawalk Aboriginal Corporation;
    - Giwiirr Consultants;
    - Upper Hunter Heritage Consultants;
    - Hunter Valley Cultural Consultants; and
    - Aboriginal Native Title Elders Consultants.
- In addition to the newspaper advertisement, Aboriginal groups who had previously worked at Drayton were notified by letter and sent a copy of the advertisement. Since the original advertisement, the following groups expressed an interest in the Project:
    - Wanaruah Aboriginal Custodians Corporation; and
    - Wonnarua Nation Aboriginal Corporation.
- A stakeholder consultation meeting was held on-site at Drayton on 1 July 2005. At the meeting, a brief presentation provided representatives an appreciation of the Project. An inspection of the EA Boundary was undertaken directly after the meeting.
- Following the stakeholder consultation meeting, all represented groups were asked for feedback on the proposed methodology. No responses on the proposed methodology were received from the Aboriginal community.
- Subsequent to the stakeholder consultation meeting and review of methodology, applications were sought from interested groups for the field work. In accordance with the DECC Draft Guidelines, the following groups were engaged for the field work:
    - Upper Hunter Wonnarua Council Inc. (Ms Tracey Skene);
    - Upper Hunter Heritage Consultants (Mr Darrel Mathews);

- Wanaruah Local Aboriginal Land Council (Mr Barry French and Ms Kylie Griffiths);
- Ungooroo Aboriginal Corporation (Mr Alan Paget); and
- Wanaruah Aboriginal Custodians Corporation (Ms Barbara Foot).

The field survey was conducted over seven days in August 2005 with the above representatives. Ms Foot was unable to participate in the field survey; however, has since visited the identified sites.

- Draft copies of the Aboriginal archaeology and Cultural Heritage reports (**Appendix L**) were provided on 22 June 2006 to all 12 Aboriginal groups who had initially expressed an interest in the Project. All the groups were invited to provide comment on the draft report within 30 days.
- Only one comment was received in response to the draft report from the Upper Hunter Wonnarua Council Inc. which did not request any amendments to the draft report (**Appendix L**).
- A second stakeholder consultation meeting was held on 28 June 2006 with all 12 Aboriginal groups who previously expressed an interest in the Project to discuss the survey results, proposed mitigation strategies and conduct a final field visit.
- The final report has been provided to all groups in 2007.

### 9.7.2 Impact Assessment

The Cultural Heritage assessment for the Project has been conducted in accordance with the DECC Draft Guidelines. No individual within the Aboriginal community provided Cultural knowledge in relation to the Project.

Whilst the local Aboriginal community generally expressed an interest in archaeological sites and their protection, there were no objections to the Project on Cultural Heritage assessment grounds.

### 9.7.3 Mitigation & Management

The AACHMP will be revised for the Project and will include measures to manage the Aboriginal Cultural record and Cultural Heritage values within the EA Boundary. This Management Plan will be developed in consultation with DECC and the local Aboriginal community and implemented prior to the disturbance of any archaeological record within the EA Boundary.

## 9.8 NON-ABORIGINAL HERITAGE

### 9.8.1 Background

A Non-Aboriginal Heritage Impact Assessment has been undertaken by Veritas Archaeology and History Service and assessed the potential impacts of the Project on Non-Aboriginal heritage within the EA Boundary.

The assessment was conducted in accordance with the EARs and *Assessing Heritage Significance* Guidelines (NSW Heritage Office, 2001). A summary of the assessment is presented below, whilst the full assessment is presented in **Appendix M**.

**Historical Background**

The Hunter Region is one of the longest settled areas in Australia, with parts of the EA Boundary utilised from the 1830s as part of the Edinglassie Estate. Between the 1840s and 1850s, parts of land within the EA Boundary were developed by the Edinglassie Estate for sheep farming and wool production.

For the period 1870 to 1880, the Edinglassie Estate then utilised parts of the EA Boundary as a cattle fattening area, whilst some areas of the ironbark woodlands were exploited for timber production. By the 1950s, the Edinglassie Estate was broken up and sold as small farm areas and from the 1960s, some parts were utilised for the Liddell Ash Dam development. Since the 1980s, coal mining has been the dominant land use within the EA Boundary.

**Statutory Requirements**

The Non-Aboriginal Heritage Assessment has been conducted in accordance with the requirements of the *Heritage Act 1977*. Relevant Commonwealth and State heritage lists were accessed to identify any registered Non-Aboriginal heritage items of significance within a 5 km radius of the EA Boundary.

No heritage-listed items were found to be within 5 km of the EA Boundary and therefore there are no heritage statutory restrictions on the Project.

**Survey Area**

As the majority of the EA Boundary had previously been assessed for Non-Aboriginal heritage, this assessment focused on the two remaining un-surveyed areas of Delpah and Ramrod as shown on **Figure 31**.

**Methodology**

The methodology consisted of three components to ensure the successful identification of all Non-Aboriginal heritage within the EA Boundary:

- A review of Parish of Savoy maps was undertaken to determine which portions of the EA Boundary were early selections. This was complimented by searches of land transfers with the Department of Lands;
- A review of previous Non-Aboriginal assessments of the EA Boundary; and
- The EA Boundary was traversed by vehicle and foot to physically locate, photograph and assess Non-Aboriginal heritage items.

### 9.8.2 Impact Assessment

A total of five sites were located within the Delpah Survey Area (**Table 32** and **Figure 31**). No other items of Non-Aboriginal heritage were identified within the EA Boundary.

Sites 1 and 3 are of local importance with moderate significance. They will not be disturbed as a consequence of the Project.

Site 2 has been determined to be of local importance with moderate significance and will be impacted by the Project. Site 4 is less than 50 years old and was surveyed and recorded. No further action is required.

Site 5 is of local importance with high significance; however, it will not be impacted by the Project.

### 9.8.3 Mitigation & Management

Site 2 will be destroyed by the Project. No mitigation is warranted for this site.

A physical barrier will be constructed around Site 5 to prevent it from accidental damage due to its high local significance.

Sites 1, 3 and 4 will not be impacted by the Project and Drayton will continue to manage these items of Non-Aboriginal heritage in accordance with the SHECMS.

**Table 32**
**Non-Aboriginal Heritage Sites**

| | Name | Description | Significance | Action |
|---|---|---|---|---|
| **1** | Stock Yard Site | Selected by Richard Campion 1877 | Local-moderate | Recorded. No further action |
| **2** | Stock Yard Site | Selected by W J Dickinson 1880. Site could date from 1890s | Local-moderate | Recorded. Site will be destroyed by the Project |
| **3** | Stock Yard Site | Could have been a holding yard for White's sheep. Modified by recent owners | Local-moderate | Recorded. No further action |
| **4** | House Site | Design and building material indicate a 1950s construction | Local-intrusive | Recorded. No further action |
| **5** | Potential Burial Site | Area marked with irises | Local-high | Will not be disturbed by the Project. Fence area. |

## 9.9 TRAFFIC & TRANSPORT

### 9.9.1 Introduction

A Traffic and Transport Impact Assessment has been undertaken by Hansen Bailey for the Project in accordance with the EARs and the *Guide to Traffic Generating Development and Road Design* (RTA 2002). A summary of the report is provided below while the full report is presented in **Appendix N**.

### 9.9.2 Background

The regional transport network in the vicinity of Drayton is shown on **Figure 1**. Vehicular road access is via the private Drayton Mine Access Road which runs south off Thomas Mitchell Drive. Thomas Mitchell Drive connects the New England Highway (to the east) and Denman Road (to the west) and is heavily relied upon for mine related industrial purposes.

**Methodology**

The Transport and Traffic Impact Assessment for the Project included an assessment of the following:

- The existing road network;
- Baseline road traffic volumes;
- Existing road safety statistics;
- Predicted increases in road traffic due to the construction and operation of the Project;
- Predicted impact on traffic volumes and the level of service on the road network;
- Impact on intersections and local roads; and
- Potential cumulative impacts from other existing and proposed mining developments.

Increased road traffic due to the operation of the Project was estimated based on survey data collected from the existing Drayton workforce and the types and volumes of service and delivery vehicles for existing mining operations.

Mount Pleasant traffic volumes as provided in the Mount Pleasant EIS (ERM Mitchell McCotter 1997) were included in baseline traffic forecasts for the assessment, as were predicted traffic volumes for Bengalla Mine and the Anvil Hill Project.

The additional daily traffic volumes predicted to be generated by the Project at its peak production were added to the forecast Year 5 base traffic flows.

***Baseline Road Traffic Volumes***

The most recent traffic study of Thomas Mitchell Drive and its adjoining road network was undertaken as part of the MAN EIS in April 2000. The study predicted the traffic volumes on roads in the vicinity of MAC from the time of construction through to 2021. The study included traffic generation by MAC, Drayton and the approved Mount Pleasant Project. It also made allowance for 1.5% annual growth increase in New England Highway traffic volumes.

As the MAN EIS traffic study considered all currently approved major projects in the vicinity of the EA Boundary, it is still regarded as a current reference for baseline road traffic volumes in the area.

### 9.9.3 Impact Assessment

**Road Traffic Volumes**

The additional daily traffic volumes predicted to be generated by the Project at peak production are shown in **Table 33**.

The predicted peak traffic volumes will be only slightly higher than the 2013 base traffic volumes forecast in the MAN EIS.

The maximum predicted increase of 3.9% will occur on Thomas Mitchell Drive with predicted volume increases on the New England Highway and Denman Road in the order of 0.4% or less.

The greatest increase in heavy vehicle traffic volumes will occur on Thomas Mitchell Drive and will not exceed five heavy vehicle movements per day in either direction.

**Table 33**
**Predicted Traffic Volumes at Project Year 5**

| Roads | Location | Direction | Base Traffic (vpd) | Project Traffic (vpd) | Total (vpd) | Project Increase |
|---|---|---|---|---|---|---|
| Thomas Mitchell Drive | West of Drayton Mine Access Road | Eastbound | 749 | 8 | 757 | 1.1% |
| | | Westbound | 803 | 8 | 811 | 1.0% |
| | East of Drayton Mine Access Road | Eastbound | 915 | 36 | 951 | 3.9% |
| | | Westbound | 969 | 36 | 1,005 | 3.7% |
| New England Highway | North of Thomas Mitchell Drive | Northbound | 4,497 | 19 | 4,516 | 0.4% |
| | | Southbound | 4,533 | 19 | 4,552 | 0.4% |
| | South of Thomas Mitchell Drive | Northbound | 5,059 | 17 | 5,076 | 0.3% |
| | | Southbound | 5,064 | 17 | 5,081 | 0.3% |
| Denman Road | North of Thomas Mitchell Drive | Northbound | 3,341 | 6 | 3,347 | 0.2% |
| | | Southbound | 3,327 | 6 | 3,333 | 0.2% |
| | South of Thomas Mitchell Drive | Northbound | 2,958 | 2 | 2,960 | 0.1% |
| | | Southbound | 2,947 | 2 | 2,949 | 0.1% |

*Vpd - Vehicles per day*

***Construction Road Traffic***

The road traffic impact assessment found that construction aspects of the Project will be undertaken in parallel with existing approved mining operations and will have a minor and short-term impact on external road traffic. The temporary traffic increase due to the construction phase will be less than the additional peak traffic volumes which will be generated during the operation of the Project.

**Level of Service**

As noted in **Table 33**, the maximum predicted increase of 3.9% will occur on Thomas Mitchell Drive with predicted volume increases on the New England Highway and Denman Road in the order of 0.4% or less. On this basis, the level of service of traffic flow on these roads will not be noticeable.

Traffic will continue to access the Project via Thomas Mitchell Drive from either the New England Highway or Denman Road. All of these roads have been assessed as having adequate capacity to convey the predicted increases in traffic volumes without a discernible change in the level of service.

**Intersections**

The two major public road intersections used by traffic travelling to the Project via Thomas Mitchell Drive are the New England Highway and Denman Road. Both intersections have been upgraded in recent years to increase capacity, decrease delay times and improve safety.

The intersection of Thomas Mitchell Drive with the New England Highway was recently upgraded to a rural Type C intersection configuration and has adequate capacity to accommodate the predicted maximum increase of approximately 36 additional vehicles per day in either direction due to the Project.

The intersection of Thomas Mitchell Drive with Denman Road was also recently upgraded to a rural Type C intersection configuration and has adequate capacity to accommodate the predicted maximum increase of approximately 8 additional vehicles per day in either direction due to the Project.

The intersection of the Drayton Mine Access Road with Thomas Mitchell Drive is adequate to accommodate the 44 additional vehicles per day in each direction due to the Project.

**Cumulative Road Traffic**

The cumulative traffic impacts of other potential mine developments in the area were assessed and were not considered to have a significant additional impact on the road network in the vicinity of the EA Boundary.

**Blasting & Road Traffic**

As the Project progressively mines towards Thomas Mitchell Drive, Drayton will implement the management techniques discussed in **Section 9.9.4**, to ensure that no safety concerns arise. Blasting will result in an occasional disruption to traffic flow during blasting activities.

Alternative routes are available via both the New England Highway through Muswellbrook or Denman during any necessary temporary road closures. All temporary road closures (e.g. for blasting) will be managed in accordance with RTA and MSC requirements and in a manner which will not unduly disturb the access of emergency services.

**Rail Transport**

Domestic coal from Drayton will continue to be transported via an overland conveyor to Macquarie Generation's Bayswater Power Station. Additionally, up to 7 Mtpa of export coal will continue to be railed to the Port of Newcastle, from the Antiene Rail Spur via the Main Northern Railway, as approved in the Antiene Rail Spur DA. No change to rail transport is required for the Project.

### 9.9.4 Mitigation & Management

Prior to carrying out blasting within 500 m of Thomas Mitchell Drive, Drayton will continue to meet the requirements of MSC, providing for temporary road closure during blasting. This will ensure that the local school bus is not affected and that any delay to the general public is kept to a practical minimum.

No road improvement works are proposed as a result of the Project.

However, the following traffic management measures will continue:

- Consultation with RTA prior to the movement of oversize loads on public roads; and
- Continued encouragement of carpooling amongst the mine workforce and consideration by management.

## 9.10 WASTE

### 9.10.1 Introduction

Drayton aims to minimise the amount of waste generated on-site and to ensure its responsible management. Drayton has an existing comprehensive Waste Management System (WMS) (incorporating waste reuse and recycling) which addresses all issues relevant to the management of waste from its operations. Waste management is further discussed below.

### 9.10.2 Waste Management System

Drayton's WMS utilises an approved, independent waste contractor working within the provisions of the POEO Act to remove and report wastes. Drayton also maintains an on-site tracking register for all wastes generated.

Complimenting this, the waste segregation component of the WMS ensures each waste stream is disposed of in the appropriate receptacles for recycling, reuse and/or disposal.

Any spills that occur within collection areas are contained within bunds and managed by Drayton's pollution control systems, whilst regular inspections of the WMS ensure compliance with regulatory requirements.

**Oil & Grease**

Waste oils and fluids are collected within the workshop and removed off-site for recycling by an independent waste contractor. Resealable drums are utilised for the storage and collection of waste grease.

**General Waste**

Scrap metal, batteries, empty drums, paper and cardboard, recyclable plastics, wooden pallets, mixed recyclables (including paper and aluminium cans) and general waste are collected and segregated into appropriate bins for reuse, recycling and/or disposal.

**Sewage Treatment**

Drayton's sewage treatment plant collects and treats on-site effluent. The treated effluent is transferred to two settling ponds where it is then pumped to an area of rehabilitation in the East Pit to be used as an irrigation water supply in accordance with Drayton's EPL.

Toilet facilities exist around Drayton which are not connected to the on-site treatment system. These facilities are regularly inspected by a certified contractor who disposes this effluent at an off-site public sewage treatment plant.

### 9.10.3 Impact Assessment

The current WMS and sewage treatment plant will continue to be utilised for the Project. There is not expected to be any significant change or additional demand for these waste management or sewage services as the respective number of employees of each shift will not significantly increase.

The continued use of existing waste infrastructure enables current arrangements to adequately address the waste management requirements of the Project in accordance with the requirements of the POEO Act.

### 9.10.4 Mitigation & Management

The WMS will continue to be utilised for the Project, in accordance with the SHECMS.

Training on ways of minimising the production of waste streams, reuse and recycling options and management strategies for each major waste stream relevant to key work areas will continue to be implemented.

Irrigation of treated wastewater will continue to monitored in accordance with EPL 1323 and the *Environmental Guideline for the Utilisation of Treated Effluent* (DEC, 1995).

## 9.11 HAZARD ANALYSIS

### 9.11.1 Introduction

A Preliminary Hazard Analysis (PHA) has been undertaken by Hansen Bailey to identify potential hazards associated with the Project and to demonstrate that the Project will not impose an unacceptable level of risk. The PHA assesses hazards and risks of the Project in two ways:

1. A qualitative assessment of all Project risks was undertaken in accordance with *Applying SEPP 33 – Hazardous and Offensive Development Application Guidelines* (DUAP, 1994); and
2. Additional Project hazards and their risks associated with prescribed dams were considered in accordance with the Dams Safety Act.

A summary of the assessment is presented below, whilst the full assessment is presented in **Appendix O**.

### 9.11.2 Hazardous Materials Management

Drayton primarily manages hazardous materials on-site via the SHECMS. All chemicals used, or proposed to be used on-site are checked for their safety and potential environmental effects by the SHEC department.

The CHEMALERT database is utilised at Drayton to assist in chemical management. This is a chemical management system and contains a Material Safety Data Sheet (MSDS) for all chemicals used on-site.

**Diesel**

Fuel containment at Drayton consists of both above and underground storage tanks and is managed in accordance with SHECMS procedures.

The major containment for diesel is in a Class C1 above ground tank with a capacity of 860,000 Litres (L). Two other above ground tanks are located around the operations, each being Class C1 with a capacity of 110,000 L.

In addition to these above ground tanks, an underground tank of Class C1 exists with a capacity to store 30,000 L of diesel.

**Explosives**

Drayton utilises a variety of explosive products, including initiating products, detonators, and emulsion explosives, to facilitate the open cut mining method of the operation. These commonly used forms of explosives are managed in accordance with SHECMS procedures.

Drayton utilises an independent, licensed contractor to supply explosive materials to site. There is no bulk storage of explosives on-site. The contractor primarily transports explosive materials and accessories from their depot at MAC, via internal haul roads between Drayton and MAC.

Explosive accessories such as detonating cords and boosters are secured in the explosives magazine.

**Gases**

Drayton utilises two stores of Liquid Petroleum Gas (LPG) (acetylene and liquefied petroleum gas) each with a respective 2,000 L storage capacity. The tanks are bunded and tested regularly for their integrity.

**Prescribed Dams**

Drayton currently has three prescribed dams listed under the Dams Safety Act in or adjacent to the EA Boundary (Liddell Ash Dam Levee, Access Road Dam and Delpah Dam).

Drayton completes regular inspections and blast monitoring of the prescribed dams. A surveillance report on each of the prescribed dams is undertaken every five years in accordance with the requirements of the Dams Safety Act.

### 9.11.3 Impact Assessment

**Risk Assessment**

A qualitative risk assessment was undertaken in accordance with the methodology, risk criteria and risk ranking listed in **Appendix O**, identifying all potential hazards associated with:

- Transport to site;
- Storage of goods on-site;
- Prescribed Dams/Levee;
- General Operation;
- CHP; and
- Transport off-site.

The risk assessment found a medium to low risk associated with the Project, provided that the continued implementation of risk prevention and remediation measures occurs as discussed in **Section 9.11.4**.

The current diesel storage capacity on-site will be sufficient for the Project. The Project will require an increase from an average of three B-double refill trucks per day to four B-double refill trucks per day to deliver diesel to site at maximum production.

Explosives will continue to be produced and transported to site by a licensed contractor so that there will be no bulk storage of explosives. Explosives accessories such as detonating cords and boosters will continue to be delivered to site on an as required basis and stored securely in the explosives magazine. The inventory of explosives will not significantly change as a result of the Project.

The current LPG storage capacity on-site will be sufficient for the Project. The Project will require an increase from one refill truck per week to two refill trucks per week at maximum production. The product will continue to be transported to site by a licensed contractor and transported to the mine via the Drayton Mine Access Road, off Thomas Mitchell Drive.

**Project Risk**

***Liddell Ash Dam Levee***

The Liddell Ash Dam Levee (listed as a prescribed dam under the Dams Safety Act) is located immediately to the east of the EA Boundary. The Levee provides a barrier between the Liddell Ash Dam and mining operations at Drayton. The closest mining activity to the Liddell Ash Dam Levee associated with the Project is 200 m. The proposed area for mining does not lie within the "Notification Area" around the Liddell Ash Dam as defined by the DSC (Area Gazetted 13th February 1998).

The Liddell Ash Dam Levee was independently inspected in a Type 3 Surveillance Report under the Dams Safety Act in October 2006 and was considered to be in a "safe condition" (Connolly, 2006).

The surveillance report reconsidered the consequence of failure of the Liddell Ash Dam Levee in light of the Project mining closer towards the structure than previously proposed. The report considered the Consequence Categories defined by the DSC and found a low risk to the community, but a significant risk to the mining operations in the event of Levee failure.

A stability assessment of the East Pit Final Highwall and the Liddell Ash Dam Levee was conducted in March 2003 by Boyd Mining Pty Ltd (Boyd Mining, 2003). The principle aim of the study was to establish safe mining limits from the Liddell Ash Dam Levee by assessing any impacts of the pit proximity on the integrity of the Levee embankment and any possible impacts of blasting vibration on the Levee wall integrity. The assessment was supplemented by a field program of geotechnical drilling and logging.

The stability assessment concluded that progressive stripping and mining toward the final highwall demonstrated that "*little potential exists for cracking of the rock mass beneath the levees and directly under the ash dam and that lateral strains would be uniform, but insignificant"* (Boyd Mining, 2003).

Thus, the process of mining towards the Liddell Ash Dam Levee is anticipated to result in minimal impact on the Levee wall.

***Access Road Dam***

The Access Road Dam (listed as a prescribed dam under the Dams Safety Act) is located adjacent to the Drayton Mine Access Road in the north-east of the EA Boundary. The Access Road Dam will not be impacted by the Project as the closest approach to the dam associated from mining is 1200 m.

The Access Road Dam was independently inspected in a Type 3 Surveillance Report under the Dams Safety Act in April 2005 and was considered to be in a "safe condition" (Connolly, 2005).

***Delpah Dam***

Delpah Dam (also referred to as Dam 1690) (listed as a prescribed dam under the Dams Safety Act) is located in the south of the EA Boundary. Delpah Dam will be removed by the progression of mining associated with the Project and is currently being dewatered in preparation for its removal. Approval will be sought to de-list Delpah Dam from Schedule 1 of the Dams Safety Act.

The hazard associated with Delpah Dam will be eliminated due to the removal of the dam as a result of the progression of mining by the Project.

### 9.11.4 Mitigation & Management

All hazardous materials will continue to be transported by a licensed contractor in accordance with the relevant Australian Standard.

Drayton will continue to utilise the SHECMS to manage the hazards and risks associated with the Project. In particular, the Overburden, Waste and Hazardous Materials Procedure and the Drayton Risk Management System will be updated to include hazards associated with the Project.

Drayton will continue to ensure all carriers of dangerous goods are licensed and maintain a communications system (e.g. two-way radio or mobile) in truck cabs to allow prompt communication in the event of an emergency.

## 9.12 SOCIO-ECONOMICS

### 9.12.1 Introduction

This section outlines the existing socio-economic characteristics of the EA Boundary and the Muswellbrook LGA. It describes the potential impacts of the Project on these characteristics and outlines the management measures proposed to mitigate these potential impacts.

### 9.12.2 Existing Socio-Economic Environment

The Muswellbrook LGA covers an area of approximately 3,400 km$^2$. The area has a diverse economic base featuring a successful blend of agriculture, commerce and industry.

Coal mining in the Muswellbrook area commenced in the 1890s with small underground operations. During the latter half of the 1900s, large open cut coal mines developed in the Muswellbrook area. Today, mining, power generation and mining related businesses are major industries within the LGA. The rural sector, involving wine/olive production and horse, beef cattle and dairy farming also make significant contributions to the local economy.

Up until recent years, both the presence of mining and the associated development of the Liddell and Bayswater Power Stations resulted in rapid growth within the Shire.

**Existing Social Environment**

***Population Profile***

In June 2006, the Australian Bureau of Statistics (ABS) estimated the residential population of the Muswellbrook LGA at 15,236 persons. This represents an increase of around 440 persons (annual increase of 0.6%) from the 2001 Census of 14,796 persons.

The majority of these residents reside in the Muswellbrook urban area, with a smaller proportion located in the township of Denman and surrounding districts.

Recent projections for the region suggest the population will continue to grow slowly in the local areas. Time series analysis reveals that the proportion of the population in the majority of age groups is decreasing, whilst there is an increasing trend in relation to the percent of people aged 50-59 years within the LGA.

**Existing Economic Environment**

***Regional Economy***

The local region combines the LGAs of Muswellbrook, Singleton and Upper Hunter. A comparison of the local regional contributions to the Gross Regional Product (GRP) shows that the mining, agriculture and services sectors are the major contributors to the regional economy. The mining industry contributes around 41% of the total output of the regional economy (ABS, 2001).

***Employment Profile***

According to the 2001 census, coal mining accounted for 10% of the employed workforce in the Muswellbrook Shire with another 5% being employed by the coal dependent electrical supply industry. The agriculture, forestry and fishing industry sectors combine to employ around 10.7% of the working population within the Muswellbrook area.

In 2001, the unemployment rate in the Muswellbrook LGA was 7.9%. This figure had dropped to 6.6% by September 2004 (ABS, 2006).

**Existing Socio-Economic Strategies**

As discussed in **Section 3.3**, Drayton manages its environmental risks through the SHECMS. Drayton's S&SD Policy aims to source its workforce and contractors from the local community where possible and encourages the employment of local young people, women and disadvantaged groups.

The SHECMS facilitates Drayton having open dialogue with the local community via:

- Visits to neighbours by mine personnel;

- Bi-annual open days;
- Mine tours for local schools and the NSW Minerals Council;
- Participation in the Muswellbrook Mining Expo;
- Maintenance of the Drayton CCC;
- The preparation of AEMRs;
- Community Information Newsletters; and
- Annual SHEC Reports.

***Social - Economic Assessment Tool Process***

In 2006, Drayton implemented Anglo American's Socio-Economic Assessment Tool (SEAT) process at its operations, as a global initiative to identify and manage social and economic impacts of its operations on communities. The SEAT documents Drayton's social and economic contribution to the local community and identifies areas for improvement.

***Community Support***

Over the last 20 years, Drayton has provided support to the local community in the form of donations and in-kind support for various projects, in accordance with its S&SD Policy. This has resulted in the development of local social infrastructure such as the Victoria Park, Denman Recreational Area, the Muswellbrook Civic Centre and the subdivision of parcels of land.

In recent times, Drayton has made substantial donations to many of the local community groups. A Community Support Policy ensures that all requests for assistance from local community groups are assessed in a consistent and equitable manner.

***Community Engagement Plan***

A Community Engagement Plan was developed in 2005 and describes the processes Drayton use to engage with the local community. Key performance indicators and community targets from the plan have also been incorporated into the Business Plan to ensure the integration of business and community objectives and outcomes.

### 9.12.3 Impact Assessment

**Social Environment**

The Project will create additional employment for 59 persons at peak production, to bring the total workforce at Drayton to 388 persons.

The additional 59 persons will result in a family size impact on the regional population of approximately 206 persons (using the family quotient of 3.5 individuals per employee).

It is envisaged that over 50% of the additional workforce will locate within the Muswellbrook LGA leading to an increase in population of at least 103 persons. This equates to an additional 0.14% per annum population growth to the Muswellbrook LGA.

During the stakeholder consultation process, near neighbours raised concerns in regards to devaluation of surrounding properties. Investigations indicate that the Project should not result in any devaluation of properties within the surrounding area.

**Economic Environment**

***Employment Profile***

The proposed employment levels for the Project are substantially lower than originally approved levels at Drayton, and therefore Drayton has provided substantial economic and employment benefits to the community throughout its operation. It is expected that the economic contribution from the Project will result in the creation and retention of additional and existing jobs in related service industries.

***Regional Economy***

The Project will deliver significant economic benefits to both the Hunter region and the State of NSW through additional employment, income and output. Over its life, the Project will contribute approximately:

- $374 million in wages and salaries with a predicted flow-on effect to the regional economy of $354 million;
- $2,327 million in sales revenue;

- $135 million in State Government royalties;
- $110 million in Commonwealth Government taxes; and
- $2.3 million in contributions to Australian Coal Association Research Program (ACARP).

**Table 34** provides the estimated breakdown of the economic benefits associated with the Project.

### 9.12.4 Management & Mitigation

Drayton has made an offer to MSC to enter into a VPA which has been agreed in principle with MSC. Drayton has made a project commitment to enter into the VPA following the granting of Project Approval. The VPA will exclude the operation of Section 94 of the EP&A Act.

The VPA is commensurate with saleable production levels of the Project and ensures that Drayton will continue to provide support to the local community in which it operates.

The proposed employment levels for the Project are substantially lower than the originally approved employment levels for which Drayton has previously provided community contributions.

The proposed VPA reflects Drayton's previous employment and economic contributions to the local community and region.

**Table 34**
**Approximate Economic Impacts of the Project ($'000)**

| Component | Year 1 | Year 5 | Year 10 | Total |
|---|---|---|---|---|
| Wages and Salaries | 54,833 | 62,036 | 7,994 | **374,496** |
| Flow-On Effect to the Regional Economy | 41,942 | 55,297 | 10,413 | **354,955** |
| Sales Revenue | 368,732 | 325,614 | 80,020 | **2,327,659** |
| State Government Royalties | 22,004 | 18,727 | 4,636 | **135,367** |
| Commonwealth Government Taxes | 14,511 | 16,348 | 2,192 | **110,442** |
| ACARP | 350 | 328 | 69 | **2,311** |

# 10.0 STATEMENT OF COMMITMENTS

In addition to conditions of Project Approval, Drayton commits to the operational controls outlined in **Section 8.0** and **Section 9.0** for all activities associated with the Project.

This Statement of Commitments (SoC) summarises the major aspects of the Project as described throughout the EA and commits to required management and mitigation measures.

The aim of this SoC is to ensure that any potential environmental impacts resulting from the Project are minimised and managed by implementing relevant environmental management and monitoring strategies.

**Table 35**
**Statement of Commitments**

| Ref | Commitment | Section |
|---|---|---|
| | **Mining Operations** | |
| 1 | The existing Development Consents as identified in **Table 8** will be relinquished with a single Project Approval being sought for Drayton (with the exception of the Antiene Rail Spur Development Consent (DA 106-04-00) required to transport product coal to the Port of Newcastle). | **5.6** |
| 2 | Drayton will ensure that appropriate development consent will remain in place over the West Pit area until MAC obtains an appropriate planning approval over the area. | **8.7.2** |
| | **Environmental Management & Monitoring** | |
| 3 | The SHECMS will continue to be relied upon for environmental management, mitigation and monitoring at Drayton. The SHECMS will be revised to reflect the Project as required. | **3.3** |
| 4 | An Environmental Monitoring Program (EMP) will be developed for the Project, in consultation with relevant regulators for approval by DoP, and will consolidate monitoring aspects associated with:<br>• Air Quality;<br>• Noise; and<br>• Blasting. | **8.2.4**<br>**8.3.4**<br>**8.4** |
| 5 | The following Management Plans will be prepared and/or revised and relied upon for the operation of Drayton (in consultation with relevant regulators to the approval of DoP):<br>• Spontaneous Combustion Management Plan;<br>• Water Management Plan;<br>• Flora & Fauna Management Plan;<br>• Rehabilitation & Landscape Management Plan (including Void Management); and<br>• Aboriginal Archaeology & Cultural Heritage Management Plan. | **9.3.4**<br>**8.5.3 & 9.2.4**<br>**8.6.5**<br>**8.7.3**<br>**9.6.3** |
| | **Air Quality** | |
| 6 | Drayton will actively manage the dragline in the North Pit in accordance with the SHECMS, such that there is no visible dust encroaching on private residences when prevailing weather conditions are towards Antiene Estate. | **8.2.4** |
| 7 | Drayton will continue to monitor Scope 1 and Scope 2 greenhouse gas emissions and investigate ways to further reduce these emissions. | **8.2.4** |
| | **Noise** | |
| 8 | Drayton will implement the necessary noise control and management measures to ensure that the modelled noise outcome listed in **Table 21** is not exceeded. | **8.3.4** |
| 9 | Drayton will continue to manage the current noise monitoring program shown in **Figure 7** and install a real-time noise monitor with audio link within Antiene Estate. | **8.3.4** |

| | | |
|---|---|---|
| **Water Resources** | | |
| 10 | Drayton will undertake a census of privately owned groundwater bores identified in **Table 26** to ascertain their current usage and provide a baseline against which to compare any future impacts. In the event of interruption to water supply resulting from the Project, an alternative water supply will be provided. | **8.5.3** |
| 11 | Drayton will obtain all necessary Water Access Licences for the Project from DWE. | |
| **Flora & Fauna** | | |
| 12 | The Drayton Wildlife Refuge will remain in place to preserve flora and fauna and to provide an ecological offset for the Project, meeting DECC's recommended minimum 2:1 offset ratio. | **8.6.5** |
| 13 | Drayton will proactively manage key areas of the Drayton Wildlife Refuge to enhance its ecological values. | **8.6.5** |
| **Spontaneous Combustion** | | |
| 14 | Drayton will continue to monitor spontaneous combustion and implement the mitigation and management techniques discussed in **Section 9.3.4** and in the revised SCMP. | **9.3.4** |
| **Visual** | | |
| 15 | Dense tree planting will be undertaken along the northern edge of the EA Boundary on Thomas Mitchell Drive to create a visual screen within the initial Project years. | **9.5.4** |
| 16 | All visual and night light impacts will continue to be managed in accordance with the SHECMS. | **9.5.4** |
| **Aboriginal Archaeology & Cultural Heritage** | | |
| 17 | Aboriginal heritage will continue to be managed in accordance with the revised Aboriginal Archaeology & Cultural Heritage Management Plan in consultation with the local Aboriginal community and DECC. | **9.7.3** |
| **Non-Aboriginal Heritage** | | |
| 18 | Non-Aboriginal heritage Sites 1, 3 and 4 identified in **Section 9.8** will continue to be preserved and managed in accordance with the SHECMS. Site 5 identified in **Table 32** will be physically barricaded to prevent accidental damage. Site 2 will be cleared prior to disturbance. | **9.8** |
| **Community** | | |
| 19 | Drayton will enter into a VPA with MSC in the terms of the offer made by Drayton and agreed in principle by MSC. | **9.12** |
| 20 | Drayton will continue to facilitate the operation of the Drayton CCC. | **8.0 & 9.0** |
| **Reporting** | | |
| 21 | Drayton will prepare and submit to relevant regulatory departments an AEMR which will discuss monitoring results and include a discussion on predictions and commitments made within this EA. | **8.0 & 9.0** |

# 11.0 PROJECT JUSTIFICATION

## 11.1 INTRODUCTION

In accordance with the requirements of the EARs, a justification for the Project taking into consideration the environmental impacts of the Project, the suitability of the site, and any social, economic and/or environmental benefits that may arise as a result of the Project, is provided below. The principles of ESD as outlined in the EP&A Act and POEA Act are also considered (**Section 5.7**).

It should be reiterated that further to the Project Need described in **Section 4.2**, the Project will provide Drayton with the flexibility to extract coal up to a maximum rate of 8 Mtpa of ROM coal and will ensure the orderly conclusion of open cut coal mining within Drayton's current Mining Leases to most effectively rehabilitate the mine site.

## 11.2 SITE SUITABILITY

Drayton is an existing open cut coal mining operation, which has successfully operated for over 26 years under a variety of Planning Approvals within several Mining Leases. On this basis, it is recognised that the Project represents the continuation of previously anticipated mining to ensure the total extraction of all economically viable open cut coal reserves within the current Mining Leases.

The Project is a natural progression of the intended land use which will utilise the existing employee resource, infrastructure and equipment fleet currently in operation at the mine. Whilst allowing current mining operations to conclude in an orderly manner, the Project will result in Drayton extracting additionally identified coal reserves within its Mining Leases to meet both domestic and international energy demands.

Due to the long history of mining in the area and a commitment to best practice environmental management, the extraction of this coal will not greatly extend Drayton's current environmental footprint.

The other flexibilities sought by this Project will ensure that Drayton can effectively handle and process ROM coal and quickly respond to market demands ensuring Drayton's competitiveness. The conceptual mine plan presented for the Project is required to uphold the economic productivity for the Project, whilst complying with all relevant environmental criteria presented in this EA.

## 11.3 ENVIRONMENTAL IMPACTS

This EA encompasses detailed assessments of all identified environmental and social issues associated with the Project, as discussed in **Sections 8.0** and **9.0**. This EA has assessed environmental impacts by utilising the following key components:

- Application of the environmental risk assessment process throughout the Project planning, design and assessment process;
- Consideration of ESD principles and best practice environmental and social standards in the development of project specific mitigation and management measures;
- Undertaking comprehensive stakeholder consultation and addressing all issues raised; and
- Optimising social and economic benefits associated with the Project.

As highlighted throughout this EA, all environmental impacts have been assessed on a worst-case scenario, assuming the Project will reach the proposed maximum production rate of 8 Mtpa of ROM coal. It should be noted however, that the Project may not reach the maximum proposed production rate if unfavourable market conditions eventuate and therefore, the environmental impacts presented in this EA may not eventuate.

Despite the application of a stringent, contemporary environmental assessment, this EA has not identified any significant adverse environmental impacts associated with the Project.

It is proposed that Drayton will continue to best manage and minimise its environmental impacts through its risk based SHECMS which will be updated and revised following Project Approval determination.

## 11.4 ENVIRONMENTAL BENEFITS

The Project involves the extension of mining operations at Drayton through a mine plan which has been specifically designed to minimise environmental impacts and optimise the final landform and mine closure outcome. In particular the proposed mining will ensure that sufficient inert overburden material will be made available to extinguish any remaining spontaneous combustion within the EA Boundary. An improved final landform integrated with MAC and the Synoptic Plan will be achieved as a result of the Project.

Drayton has always envisaged the continuation of mining within its Mining Leases. For this reason it proactively established and gazetted the Drayton Wildlife Refuge in 1987. This refuge designated specific areas for wildlife conservation whilst reserving other areas for mining and grazing purposes.

The Project is consistent with this Wildlife Refuge ecological offset strategy implemented in 1987, with the Drayton Wildlife Refuge now managed to a stage where it will more than compensate for any ecological impacts associated with the Project.

## 11.5 SOCIO-ECONOMIC BENEFITS

The Project will deliver significant socio-economic benefits to both the Hunter Region and State of NSW through the generation of additional employment, export revenue, taxes and royalties. The Project will result in economic benefits of the following approximate values:

- The continued employment of 329 employees, whilst potentially providing an additional 59 full time positions;
- $374 million in wages and salaries with a predicted flow-on effect to the regional economy of $354 million;
- $2,327 million in sales revenue;
- $135 million in State Government royalties;
- $110 million in Commonwealth Government taxes; and
- $2.3 million in contributions to ACARP.

A VPA has been agreed in principle with MSC which provides community contributions for the Project and thus, provides socio-economic benefits to the local community.

These very significant economic benefits to Australia (and the State of NSW) will be foregone if the Project does not proceed.

## 11.6 ECOLOGICALLY SUSTAINABLE DEVELOPMENT

The Project and its assessment appropriately address ESD principles.

Impacts of the Project have been identified with certainty and measures to address them have been incorporated into the Project, thus addressing the Precautionary Principle.

The maximised recovery of the in situ coal resource and the optimisation of final rehabilitation and landform of the past and proposed mining area address the principles of Intergenerational Equity and Improved Valuation.

The principle of Conservation of Biological Diversity and Ecological Integrity is addressed by the Project in the commitment to the Drayton Wildlife Refuge.

# 12.0 ABBREVIATIONS

| Abbreviation | Description |
|---|---|
| AACHMP | Aboriginal Archaeology & Cultural Heritage Management Plan |
| ABS | Australian Bureau of Statistics |
| ACA | Anglo Coal Australia |
| ACARP | Australian Coal Association Research Program |
| AEMR | Annual Environmental Management Report |
| AGO | Australian Greenhouse Office |
| AGO Workbook | AGO Factors and Methods Workbook (2005) |
| AHD | Australian Height Datum |
| AHIMS | Aboriginal Heritage Information Management System |
| ANZECC | Australian and New Zealand Environment Conservation Council |
| bcm | bank cubic metres |
| BoM | Bureau of Meteorology |
| CAR | Corrective Action Register |
| CCC | Community Consultative Committee |
| CCL | Consolidated Coal Lease |
| CHP | Coal Handling Plant |
| CL | Coal Lease |
| CMHS Act | Coal Mines Health and Safety Act 2002 |
| CMHSR | Coal Mines Health and Safety Regulation 2006 |
| $CO_2$-e | Carbon dioxide equivalent emissions |
| CSIRO | Commonwealth Scientific and Industrial Research Organisation |
| CTU | Coal Treatment Unit |
| CY | Calendar Year |
| DA | Development Application |
| dBA | The peak sound pressure level, expressed as decibels (dB) and scales on the 'A-weighted' scale, which attempts to closely approximate the frequency response of the human ear |
| dBL | The peak sound pressure level expressed as decibels with no frequency weighting |
| Dams Safety Act | Dams Safety Act 1978 |
| DECC Guidelines | Draft Guidelines for Aboriginal Cultural Heritage Impact Assessment and Community Consultation (2005) |
| DECC | NSW Department of Environment and Climate Change (formerly Department of Environment and Conservation) |
| DoP | NSW Department of Planning (Incorporates former DIPNR, Planning NSW and DUAP) |
| DPI | NSW Department of Primary Industries (Incorporates the Department of Mineral Resources, Department of Fisheries, and Department of Agriculture) |
| DSC | Dams Safety Committee |
| DWE | NSW Department of Water and Energy (Incorporates former DNR) |
| EA | Environmental Assessment (formerly termed EIS) |
| EARs | Environmental Assessment Requirements |
| EC | Electrical Conductivity |
| EEC | Endangered Ecological Community |

| Abbreviation | Description |
|---|---|
| EIS | Environmental Impact Statement |
| EMP | Environmental Monitoring Program |
| ESD | Ecologically Sustainable Development |
| EPA | NSW Environmental Protection Authority (incorporated in DECC) |
| EPBC Act | Environmental Protection and Biodiversity Conservation Act 1999 (Commonwealth) |
| EPI | Environmental Planning Instrument |
| EPL | Environmental Protection Licence |
| EP&A Act | Environmental Planning and Assessment Act 1979 |
| FFMP | Flora and Fauna Management Plan |
| IPCC | Intergovernmental Panel on Climate Change |
| GDE | Groundwater Dependent Ecosystem |
| Gj/t | Gigajoules per tonne |
| GRP | Gross Regional Product |
| ha | hectare |
| HLRF | Hunter Lowland Redgum Forest |
| HRSTS | Hunter River Salinity Trading Scheme |
| HVAS | High Volume Air Sampler |
| ISO | International Standards Organisation |
| $LA_1$ | The noise level exceeded for 1% of the time |
| $LA_{10}$ | A noise level exceeded for 10% of the time |
| $LA_{90}$ | Commonly referred to as the background noise, this is the level exceeded 90% of the time |
| $LA_{eq}$ | The summation of noise over a selected period of time. It is the energy average noise from a source, and is the equivalent continuous sound pressure level over a given period |
| LEP | Local Environment Plan |
| LGA | Local Government Area |
| LPG | Liquid Petroleum Gas |
| MAC | Mt Arthur Coal Operations |
| MAN | Mount Arthur North Coal Mine |
| Mining Act | Mining Act 1992 (NSW) |
| ML | Megalitres |
| MNES | Matter of National Environmental Significance |
| MOP | Mining Operations Plan |
| MSC | Muswellbrook Shire Council |
| MSDS | Material Safety Data Sheet |
| Mtpa | Million tonnes per annum |
| m/s | Metres per second |
| $m^3$ | Cubic metres |
| mm/s | Millimetres per second |
| NPW Act | National Parks and Wildlife Act 1974 |
| NPWS | National Parks and Wildlife Service (Now part of DECC) |
| NSESD | National Strategy for Ecologically Sustainable Development (1992) |
| PAH | Polycyclic Aromatic Hydrocarbon |
| PDD | Project Description Document |
| PFM | Planning Focus Meeting |

| Abbreviation | Description |
|---|---|
| PHA | Preliminary Hazard Analysis |
| POEO Act | Protection of the Environment Operations Act 1997 |
| Property | Land adjacent the EA Boundary with no residence |
| PVC | Primary Visual Catchment |
| $PM_{10}$ | Particulate Matter <10μm. |
| REP | Regional Environmental Plan |
| Receiver | Property adjacent the EA Boundary containing a residence |
| Roads Act | Roads Act 1993 |
| ROM | Run-of-Mine |
| RTA | NSW Roads and Traffic Authority |
| S&SD Policy | Safety and Sustainable Development Policy |
| SCMP | Spontaneous Combustion Management Plan |
| SEAT | Socio-Economic Assessment Tool |
| SEPP | State Environmental Planning Policy |
| SHECMS | Safety, Health, Environment and Community Management System |
| SIS | Species Impact Statement |
| Synoptic Plan | Synoptic Plan: Integrated Landscapes for Coal Mine Rehabilitation in the Hunter Valley of New South Wales (1999) |
| TDA | Tailings Drying Area |
| TDS | Total Dissolved Solids |
| TLO | Train Load Out |
| TSC Act | Threatened Species Conservation Act 1995 |
| TSS | Total Suspended Solids |
| TSP | Total Suspended Particulates. |
| VPA | Voluntary Planning Agreement |
| Water Act | Water Act 1912 |
| WM Act | Water Management Act 2000 |
| WMS | Waste Management System |

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# 14.0 EA STUDY TEAM

| Section | EA Component | Team Member and Company | |
|---|---|---|---|
| ***EA Management*** | | | |
| | Project Director<br>Project Manager<br>Project Coordinator | James Bailey<br>Dianne Munro<br>Melissa Walker | Hansen Bailey |
| ***Stakeholder Consultation*** | | | |
| | | James Bailey<br>Dianne Munro<br>Melissa Walker<br>Daniel Sullivan<br>Nathan Cooper | Hansen Bailey |
| ***EA Sections*** | | | |
| 1.0 | Background | Melissa Walker | Hansen Bailey |
| 2.0 | Existing Environmental Setting | Melissa Walker | Hansen Bailey |
| 3.0 | Existing Mining Operations | Melissa Walker | Hansen Bailey |
| 4.0 | The Project | Melissa Walker | Hansen Bailey |
| 5.0 | Regulatory Framework | James Bailey | Hansen Bailey |
| 6.0 | Stakeholder Consultation | Melissa Walker | Hansen Bailey |
| 7.0 | Risk Assessment | Melissa Walker | Hansen Bailey |
| 8.1 | Introduction | Melissa Walker | Hansen Bailey |
| 8.2 | Air Quality | Dianne Munro | Hansen Bailey |
| 8.3 | Noise | Dianne Munro | Hansen Bailey |
| 8.4 | Blasting | Melissa Walker | Hansen Bailey |
| 8.5 | Groundwater | Ulrich Schott | Australasian Groundwater and Environmental Consultants |
| 8.6 | Flora and Fauna | Dr Monika Rhodes | Hansen Bailey |
| 8.7 | Rehabilitation, Final Landform & Voids | Melissa Walker | Hansen Bailey |
| 9.1 | Introduction | Melissa Walker | Hansen Bailey |
| 9.2 | Surface Water | Juliet Bates | Hansen Bailey |
| 9.3 | Spontaneous Combustion | Melissa Walker | Hansen Bailey |
| 9.4 | Soils & Land Capability | Lachlan Crawford | GSS Environmental |
| 9.5 | Visual Assessment | John Van Pelt | Integral Landscape Architecture and Visual Planning |
| 9.6 | Aboriginal Archaeology | Melissa Walker | Hansen Bailey |
| 9.7 | Aboriginal Cultural Heritage | Melissa Walker | Hansen Bailey |
| 9.8 | European Heritage | Melissa Walker | Hansen Bailey |
| 9.9 | Traffic and Transport | Juliet Bates | Hansen Bailey |

| Section | EA Component | Team Member and Company | |
|---|---|---|---|
| 9.10 | Waste | Melissa Walker | Hansen Bailey |
| 9.11 | Hazard Analysis | Melissa Walker | Hansen Bailey |
| 9.12 | Socio Economics | Mark Bennett | Hansen Bailey |
| 10.0 | Statement of Commitments | James Bailey | Hansen Bailey |
| 11.0 | Project Justification | James Bailey | Hansen Bailey |
| 12.0 | Abbreviations | Dorian Walsh | Hansen Bailey |
| 13.0 | References | Dorian Walsh | Hansen Bailey |
| 14.0 | EA Study Team | Melissa Walker | Hansen Bailey |
| ***Appendices*** | | | |
| Appendix A | Schedule of Land to which EA Applies | | |
| Appendix B | Regulatory Correspondence | | |
| Appendix C | Stakeholder Consultation | Melissa Walker | Hansen Bailey |
| Appendix D | Revised Environmental Risk Assessment | Melissa Walker | Hansen Bailey |
| Appendix E | Air Quality Impact Assessment | Nigel Holmes | Holmes Air Sciences |
| Appendix F | Noise and Vibration Impact Assessment | Mark Bridges | Bridges Acoustics |
| Appendix G | Groundwater Impact Assessment | Ulrich Schott | Australasian Groundwater and Environmental Consultants |
| Appendix H | Flora & Fauna Impact Assessment | James Bailey & Team of biologists listed | Hansen Bailey |
| Appendix I | Surface Water Impact Assessment | Juliet Bates | Hansen Bailey |
| Appendix J | Soils and Land Capability Assessment | Lachlan Crawford | GSS Environmental |
| Appendix K | Visual Impact Assessment | John van Pelt | Integral Landscape Architecture and Visual Planning |
| Appendix L | Aboriginal Archaeology & Cultural Heritage Assessment | Giles Hamm | Archaeological Risk Assessment Services |
| Appendix M | Non-Aboriginal Heritage Impact Assessment | Rob Tickle | Veritas Archaeology and History Services |
| Appendix N | Traffic and Transport Impact Assessment | Juliet Bates | Hansen Bailey |
| Appendix O | Preliminary Hazard Analysis | Melissa Walker | Hansen Bailey |
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