



BMA Bowen Basin Growth Project

Initial Advice Statement

May 2008

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Document history and status

Revision	Date issued	Reviewed by	Approved by	Date approved	Revision type
Rev 0	13 May 2008	S.Ferris	R.Willims	13 May 2008	Draft for Dept of Infrastructure and Planning
Rev 1	27 May 2008	S. Ferris	S. Ferris	27 May 2008	Final for Dept of Infrastructure and Planning

Distribution of copies

Revision	Copy no	Quantity	Issued to
0	1	Electronic	DIP
1	1	2 (Hard Copy) 1 (Electronic)	DIP

Printed:	27 May 2008
Last saved:	27 May 2008 03:29 PM
File name:	C:\Hum_Temp\BMA_KM-#5858325-v1-BMA_Bowen_Basin_Growth_Project_Final_IAs.DOC
Author:	Shaun Ferris
Project manager:	Shaun Ferris
Name of organisation:	BM Alliance Coal Operations Pty Ltd
Name of project:	BMA Bowen Basin Growth Project
Name of document:	Initial Advice Statement – BMA Bowen Basin Growth Project
Document version:	Rev 1 – DIP Issue

Executive Summary

The BMA Bowen Basin Growth Project (“the Project”) involves the growth of BM Alliance Coal Operations Pty Ltd (“BMA”) coal mining operations in the northern section of the Bowen Basin, near Moranbah, Queensland. The Project involves the production of an additional 20 million tonnes per annum (Mt/a) of coal products through the development of two new coal mining operations (known as Daunia Mine and Caval Ridge Mine), an expansion of the existing Goonyella Riverside Mine, and the development of associated mine infrastructure for each of these operations. BMA is also considering the development of a new, larger capacity airport in the vicinity of Moranbah, to accommodate increased travel to and from the area.

The Project proponent is BM Alliance Coal Operations Pty Ltd. This entity is manager and agent on behalf of the Central Queensland Coal Associates Joint Venture governed by an overarching strategic alliance between BHP Billiton and Mitsubishi Corporation known as BHP Billiton Mitsubishi Alliance (BMA).

The Project will mostly occur on existing mining leases, but a new mining lease is required for both the Caval Ridge Mine and the Goonyella Riverside Mine Expansion. New and amended Environmental Authorities will be required for each key element of the Project. Coal will be exported via the existing Hay Point and/or Dalrymple Bay coal terminals, with potential to export via Abbot Point coal terminal following construction of the Northern Missing Link rail line.

BMA is Australia’s largest metallurgical coal miner and exporter. BMA continues to build upon its strong position within the sector by increasing production at existing operations and through new operations. BMA is a long term member of the Bowen Basin community.

BMA believes that there will be continued, strong demand for its products from India, China and other markets. In response to this demand, BMA is strengthening its growth options. BMA has identified quality coal reserves associated with the Project.

The Project is expected to contribute significantly to the State’s economy and contribute directly to the employment of approximately 2450 people during construction and approximately 1240 during operation across all project elements. The Project will also contribute significantly to local and regional economies through direct and indirect employment and investment expenditure.

An Environmental Impact Statement (EIS) will be completed in a stage approach for each project element to address key environmental issues including: rehabilitation and land management, water and groundwater, flora and fauna, air quality, greenhouse gas emissions, and noise. BMA is also aware that addressing the needs of our community stakeholders will also be critical to this Project. Community

issues such as housing, population increases and demographic change, the availability of community services and community infrastructure will also be addressed in the EIS processes.

BMA's approach to sustainable development involves generating economic value for local communities and managing environmental and social impacts.

1 Introduction

1.1 Project Background and Location

BM Alliance Coal Operations Pty Ltd (“BMA”) proposes the BMA Bowen Basin Growth Project (“the Project”) to grow its Bowen Basin mining operations through the development of two new mines, Daunia and Caval Ridge, and the expansion of an existing operation, Goonyella Riverside mine. These growth elements will together deliver up to an additional 20 million tonnes per annum (Mt/a) of coking coal for export markets.

The Project is located in the northern Bowen Basin approximately 170 km south-west of Mackay, Queensland, in the general vicinity of Moranbah (**Figure 1** and **Figure 2**).

In addition to the mining elements of the Project, BMA are also investigating the potential to develop a new airport to service the increasing demands associated with the proposed growth. Whilst such investigations are at the concept stage, it is envisaged that a new airport would enable larger capacity aircraft to fly in and out of the Moranbah region. A suitable location for an airport has not been selected at this stage.

The key elements of the Project are outlined in **Table 1 Key Elements of the Project**.

■ **Table 1 Key Elements of the Project**

Project Element	Tonnage Contribution (Mt/a)	Construction Commencement	First Coal	Workforce	
				Construction	Operation
Daunia Mine	4	2009	2010	350	200
Caval Ridge Mine	5.5	2009	2011	1200	340
Goonyella Riverside Mine Expansion	8	2010/2011	2013	900	700
Airport	N/A	2009	N/A	TBC	Minimal

An additional 2.5 Mt/a of coal will be produced by the Peak Downs Mine and will be processed through the Caval Ridge Mine Coal Handling and Preparation Plant (CHPP), giving the Caval Ridge CHPP an initial product capacity of 8Mt/a. The incremental 2.5Mt/a from Peak Downs Mine does not form part of the Caval Ridge Mine component of the Project as it is within the currently approved capacity of the mine. Caval Ridge Mine also has the potential to expand by a further 4 Mt/a or more, which will be subsequently assessed, and therefore does not form part of this Project.

1.2 The Proponent

The Project proponent is BM Alliance Coal Operations Pty Ltd as manager and agent on behalf of the Central Queensland Coal Associates Joint Venture (CQCA). CQCA is an unincorporated joint venture between BHP Billiton (50%) and Mitsubishi Corp. (50%). Joint venture arrangements are regulated in accordance with the CQCA Joint Venture Agreement as amended (most recently by Deed dated 28 June 2001) and a Strategic Alliance Agreement dated 28 June 2001 which created BMA. Operations are managed by BM Alliance Coal Operations Pty Ltd on behalf of the CQCA Joint Venturers under a Management Agreement dated 28 June 2001.

BMA has equal ownership and management of seven Central Queensland coal mines: Goonyella Riverside, Broadmeadow, Peak Downs, Saraji, Norwich Park, Gregory Crinum and Blackwater, and also manages the Hay Point coal terminal near Mackay, Queensland (**Figure 1**).

In addition, BMA manages the operations of BHP Mitsui Coal, which is owned by BHP Billiton (80%) and Mitsui and Co (20%). These operations include the South Walker Creek Mine and Poitrel Mine, which is immediately west of the Daunia Mine.

BMA's operations provide significant benefits to the local communities, the broader Central Queensland region and to the Queensland economy as a whole. BMA is the largest employer in the region and plays a key role in the economic development of Central Queensland.

BMA's contribution during the 2006/2007 financial year included:

- \$1,362 million spent on equipment, goods and services from Central Queensland regional business;
- \$829 million spent on equipment, goods and services from other Queensland business;
- \$959 million spent on equipment, goods and services from other Australian business;
- \$462 million paid in coal royalties to the Queensland Government;
- \$626 million in wages and salaries to employees; and
- Over \$20 million spent on local townships and communities.

1.3 Project Need

The Project will meet export demand for coking coal. BMA believes that there will be continued, strong demand for this product from India, China and other markets. In response to such demand, BMA is strengthening its growth options. BMA has identified quality coal reserves associated with the proposed Daunia and Caval Ridge Mines and with the expansion of the Goonyella Riverside Mine.

Coal is Queensland's largest export commodity. The Queensland Government benefits significantly from the \$2.3 billion contribution of revenue from the minerals and energy sector, including \$1.4 billion in mineral royalties and \$900 million in dividends from government-owned rail, port and energy enterprises.

In addition to these economic benefits, the coal industry provides extensive support for community development, education, health, social and recreational programs, as well as considerable employment and training opportunities.

1.4 Purpose and Scope

This Initial Advice Statement (IAS) has been prepared by the Proponent to provide information to:

- enable the Coordinator-General to determine whether the Project meets the criteria for declaration as a ‘Significant Project’ under section 26(1)(a) of the *State Development and Public Works Organisation Act 1971*; and
- provide sufficient detail to enable advisory agencies and other stakeholders to have effective input into establishing a Terms of Reference (TOR) for an Environmental Impact Statement (“EIS”) for the Project.

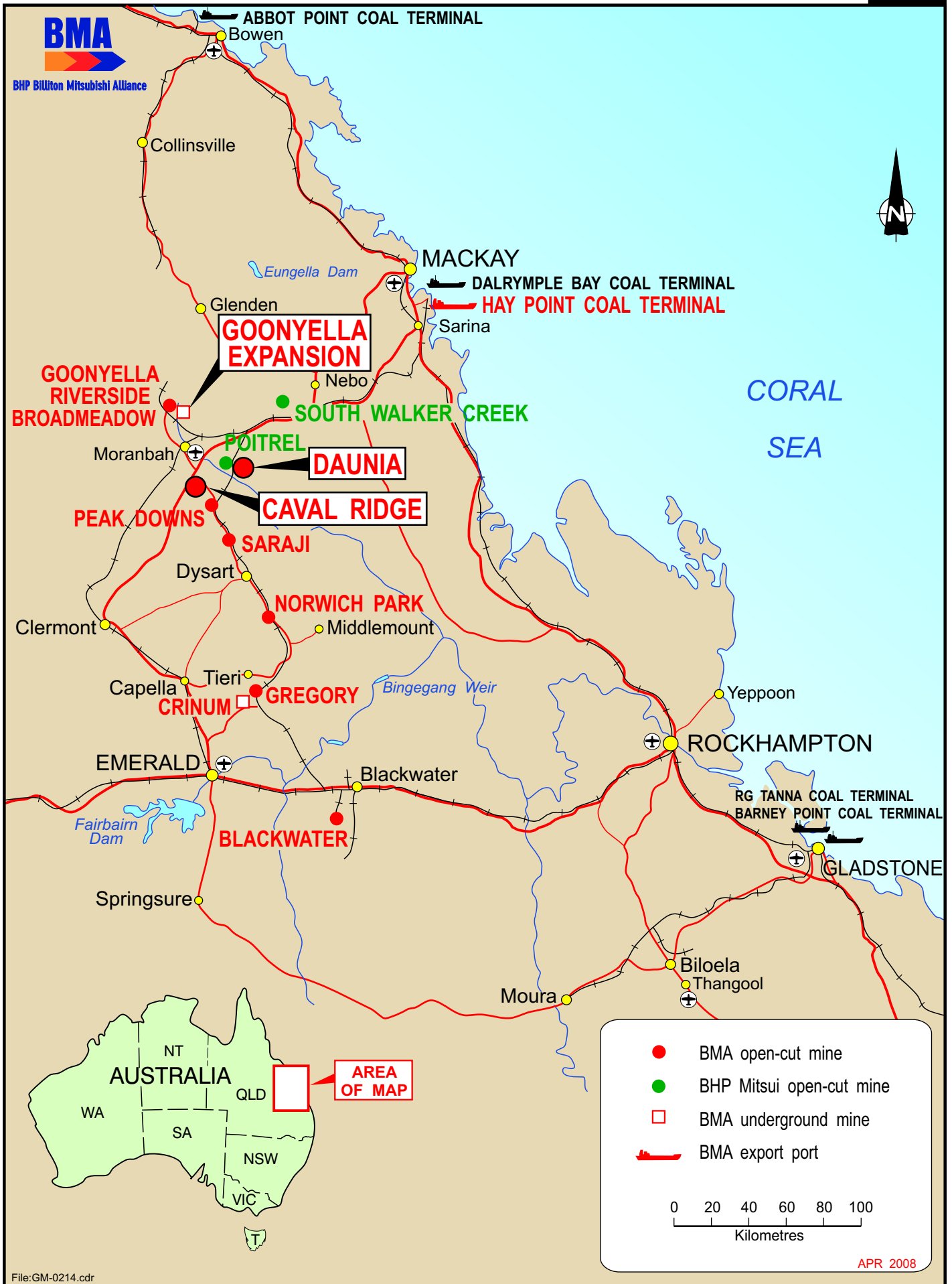
Declaration of the Project as a ‘Significant Project’ under the *State Development and Public Works Organisation Act 1971* allows for the separate staged preparation of an EIS by the Proponent for each of the following Project elements:

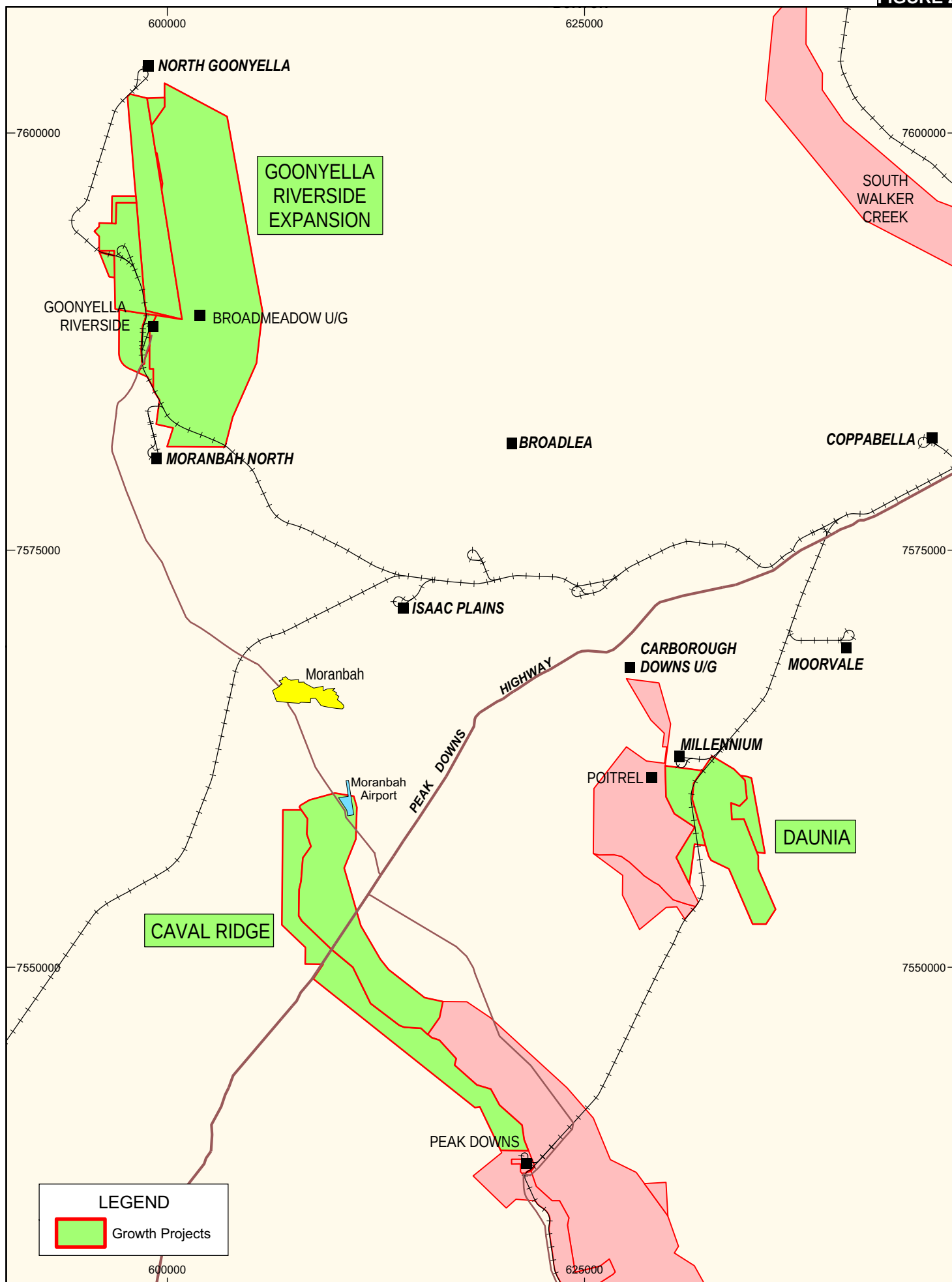
- Daunia Mine;
- Caval Ridge Mine;
- Goonyella Riverside Mine Expansion; and
- Airport infrastructure.

These developments are each considered to be individual elements of the Project. The ToR covers the entire Project.

REGIONAL MAP

FIGURE 1





BHP Billiton Mitsubishi Alliance
ABN 67 096 412 752
Mapping Services Brisbane

0 5 10 kms

Transverse Mercator Projection.
AMG Zone 55. AGD84 Datum.



BMA GROWTH PROJECTS LOCATION OVERVIEW

Drawn: R.Stephens	Date: 28.04.2008	Revision: 0
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2 Project Description

2.1 Daunia Mine

The Daunia element of the Project involves the development of a new mining operation on the existing Daunia mining lease (ML1781) and Daunia East mining lease (ML70115, and a new Coal Handling Preparation Plant (CHPP) on the existing Red Mountain lease (ML70116). Additional mine infrastructure and vehicle parking areas are likely on the existing mining leases, Millennium East ML70312 and Poitrel ML4749.

Mining and processing will yield a mix of Semi Hard Coking Coal and Pulverised Coal Injection coal products for the export market.

The new mine will be an open cut coal mining operation and will use a conventional excavator and truck fleet. Mining activities will include the clearing of vegetation, waste rock removal to waste rock dumps, coal mining and progressive rehabilitation over the 21-year life of the mine. The footprint of the proposed mining and processing operations are shown in **Figure 3**. Construction is expected to commence in early 2009, with first coal in 2010.

2.1.1 Mineral Resource

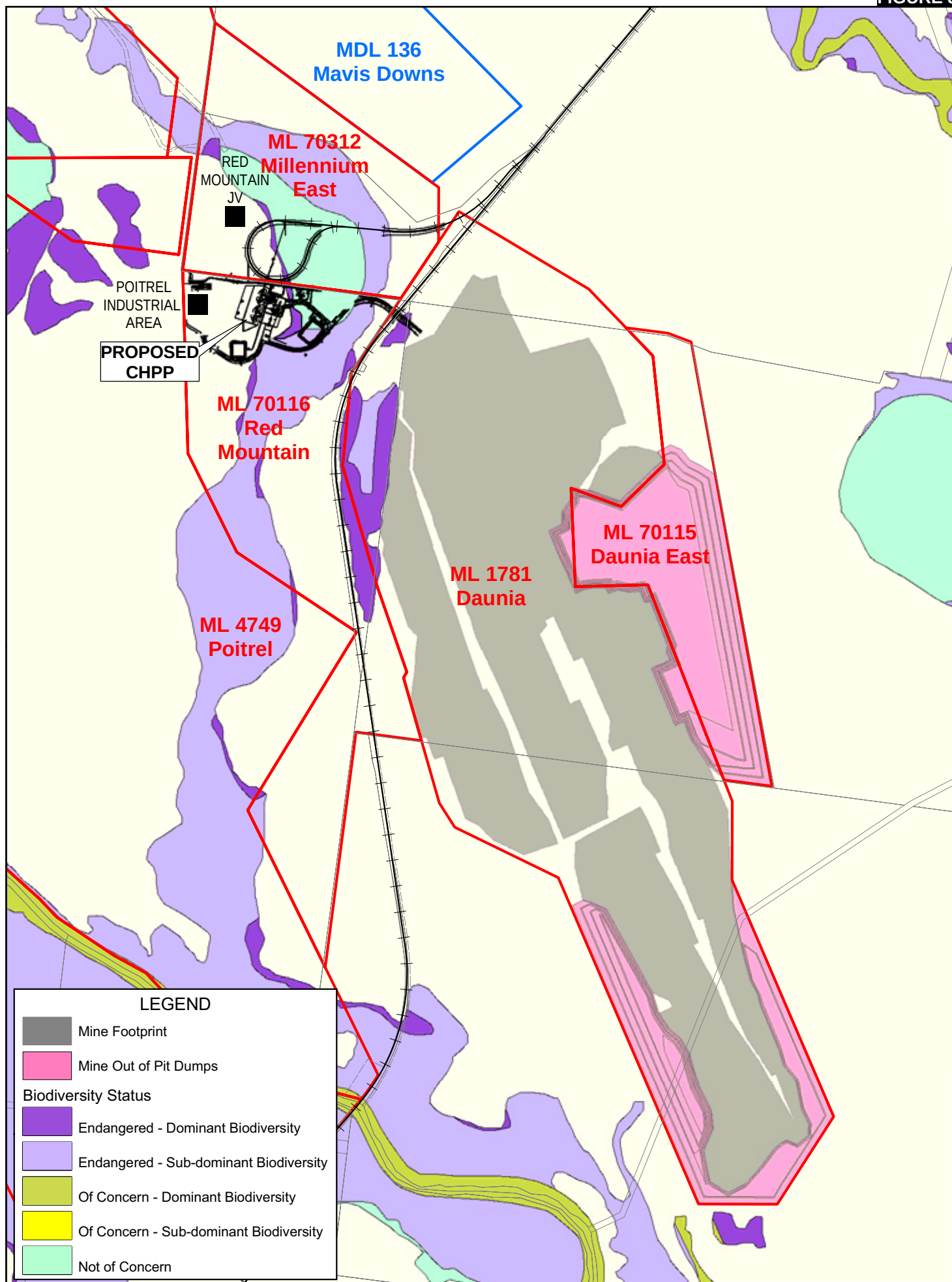
The Daunia deposit is located in the northern part of the Permo-Triassic Bowen Basin containing principally fluvial and some marine sediments. The Bowen Basin is part of a connected group of Permo-Triassic basins in eastern Australia, which includes the Sydney and Gunnedah Basins. The basins are oriented north-northwest to south-southeast, roughly parallel to the Paleozoic continental margin. Tectonically, the basin can be divided into north-northwest to south-southeast trending platforms or shelves separated by sedimentary troughs.

Structurally, the Daunia deposit lies near the western boundary of one of these sedimentary troughs, the Taroom Trough, which was filled by a thick accumulation of mainly terrestrial sediments during the Permo-Triassic. Daunia occurs within a shallow basinal structure immediately east of the New Chum Fault, which separates Daunia from the Poitrel deposit to the west.

The economic seams are contained in the Late Permian, Rangel Coal Measures, which are approximately 100m thick. The Rangel Coal Measures are underlain by the Fort Cooper Coal Measures and overlain by the Late Permian to Early Triassic Rewan Group. The Daunia coal deposit is defined along its western and eastern margins by the seam LOX or fault defined limits of mining. The northern limit is defined by steeply dipping coal and the mining lease boundary. To the south, the deposit is confined by intrusions and the mining lease boundary.

The Daunia deposit contains two coal seams of economic interest, the Leichhardt Seam and Upper Vermont Seams of the Rangel Coal Measures. The coal seam nomenclature is illustrated in **Figure 4**.

The Leichhardt Seam (DL1) is typically 5m thick and has a lower split (DL0) about 0.5m thick located approximately 1m below DL1. The Upper Vermont Seam (DV4), located 10m to 35m below the Leichhardt Seam, is typically 3.5m thick and splits to the north into upper and lower plies (DV2 and DV1 respectively) with up to 30m of interburden. DV1 is high in ash, typically greater than 25%.



LEGEND

- Mine Footprint
- Mine Out of Pit Dumps
- Biodiversity Status**
- Endangered - Dominant Biodiversity
- Endangered - Sub-dominant Biodiversity
- Of Concern - Dominant Biodiversity
- Of Concern - Sub-dominant Biodiversity
- Not of Concern



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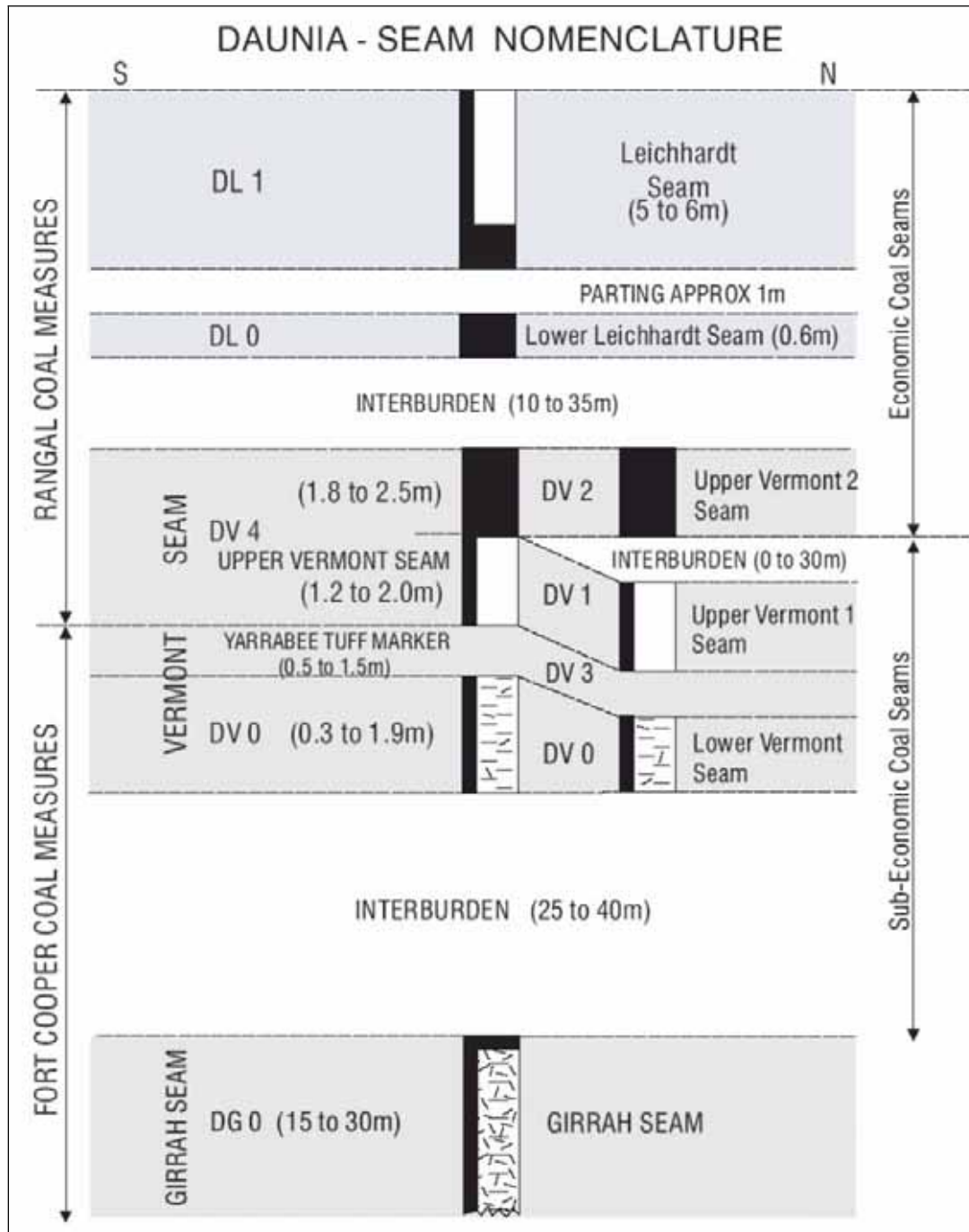
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AMG Zone 55. AGD84 Datum.



DAUNIA MINE AND
INFRASTRUCTURE FOOTPRINT

Drawn: R.Stephens	Date: 28.04.2008	Revision: 0
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■ **Figure 4 Daunia Coal Seam Nomenclature**

2.1.2 Mining Operations

The proposed mining operation will use traditional open cut excavator and truck strip mining methods, with the emphasis on in-pit waste rock dumping. There is the potential to introduce a dragline later in the life of the Daunia Mine.

The mining sequence will generally entail:

- progressive clearing of vegetation occurring on areas required for the operation;
- stockpiling topsoil from disturbed areas for storage and use in future rehabilitation of the site;
- blasting for fragmentation of waste rock;
- removal of waste rock, using a combination of dozers, excavators and trucks;
- approximately 4 Mt/a coal production, using a combination of dozers, excavators, loaders and trucks; and
- rehabilitation of the site by re-shaping the waste rock dumps, topsoiling and revegetation using native vegetation.

Mining will occur seven days per week and excavate to depths ranging from 20 m to 120 m. Daunia (ML1781) and Daunia East (ML70115) cover an area of 2230 and 360 ha respectively. A total area of approximately 2000 ha will be disturbed over the life of the mine, including the mine area and out of pit waste dump footprints. These disturbed areas will be progressively rehabilitated. A further 10 ha will be disturbed on Red Mountain (ML70116) for mine infrastructure, including the CHPP.

2.1.3 Supporting Site Infrastructure

In addition to coal mining activities, the Daunia Mine will also include:

- a CHPP and associated loading facilities for Run-Of-Mine (ROM) coal;
- a water supply, using a combination of site water reuse and a raw water supply via a pipeline from the existing Braeside pipeline;
- an all weather access road from the Peak Downs Highway,
- power supply from the existing power network;
- a mine water management system, including clean water diversion, disturbed area runoff collection and treatment, pit water management, water reuse and water disposal if there is surplus water at any time;
- sewage and wastewater treatment by a package sewage treatment plant (STP);
- site offices, workshop and stores area, which would include diesel storage, portable/temporary power generator, and storage for tyres and other material; and
- additional trackwork to the Red Mountain rail loop, with associated product coal loading facilities.

2.1.4 Coal Handling and Processing Activities

The CHPP will have a capacity of up to 1,000 tonnes per hour (t/hr) feed, and will be capable of processing up to 7 Mt/a producing approximately 5 Mt/a of product coal, though the nominated production based on mining will be 3.5 to 4 Mt/a. The plant will operate seven days per week.

ROM coal will be transported to the CHPP by trucks via on-site haul roads. Handling and processing of ROM coal at the CHPP will most likely include:

- a truck dump hopper, crushing by feeder breaker and sizers and stockpiling prior to transfer to the CHPP;
- a modular wet coal processing design with a capacity of about 800-1000 t/hr of ROM coal giving a total ROM capacity up to 7 Mt/a;
- stockpiles for ROM and product coal;
- reclaiming systems using dozer fed stockpile activators and conveyor, with coal transferred into the train loading bin; and
- fine and coarse rejects from the CHPP will be dewatered and disposed of to the waste dumps, with supernatant wastewater reused in the CHPP as makeup water.

The product coal will be railed approximately 160 km to the Hay Point and/or Dalrymple Bay coal terminals for shipment to the international market. Potential also exists for coal to be railed to Abbot Point coal terminal following construction of the Northern Missing Link rail line.

2.1.5 Mine Waste Management

Initially, the waste rock produced by mining will be placed in box-cut waste rock dumps, most likely located immediately to the east of the mining area.

When sufficient space is created within the mined-out areas, subsequent waste rock will be placed within in-pit waste rock dumps.

Water management, including sediment dams to control runoff from disturbed areas, will be integrated with the mining operation and CHPP operation. The release of surplus water will only occur if there is no storage capacity available and there are no further opportunities to reuse the water on site at the time. Releases will only occur in accordance with the conditions of the environmental authority.

2.1.6 Workforce

The Daunia Mine will employ about 350 people during construction and approximately 200 during the peak of operation. The construction and operational workforce is expected to be housed in the district, in the vicinity of Coppabella. It is anticipated that a small number of houses will be constructed in

Moranbah. The EIS will include a Social Impact Assessment that examines the issue of housing in detail. It will also review options for workforce transportation to and from the site.

2.1.7 Operational Land and Tenure

The Daunia Mine will be located on a number of MLs. Actual coal mining operations will be situated on ML1781 (Daunia) and the adjoining ML 70115 (Daunia East) both held by CQCA. The major coal processing infrastructure for the Project will be located on ML70116 (Red Mountain) which is jointly held by CQCA and BHP Mitsui Coal Pty Ltd. The conveyor for product coal, power line and certain haul portions of haul road will be located on ML70312 which is jointly held by BHP Mitsui Coal Pty Ltd and Millennium Coal Pty Ltd. Car parking and some minor facilities will be located on ML4749 (Poitrel) held by BHP Mitsui Coal Pty Ltd. Further details of the relevant leases are provided in **Table 2**.

■ **Table 2 Mining Tenures Associated with the Daunia Mine**

Tenure	Name	Holder	Development Associated with the Daunia Mine
1781	Daunia	BHP Coal Pty Ltd and Others (CQCA Joint Venture participants)	Mining and mining related infrastructure
70115	Daunia East	BHP Coal Pty Ltd and Others (CQCA Joint Venture participants)	Mining and Mining related infrastructure
70116	Red Mountain	BHP Coal Pty Ltd and Others (CQCA Joint Venture participants) – 50% and BHP Mitsui Coal Pty Ltd – 50%	CHPP, workshops, haul road, ROM and product coal stockpiles
70312	Millennium East	Millennium Coal Pty Ltd – 50% BHP Mitsui Coal Pty Ltd - 50%	Mining related infrastructure (haul road, product conveyor and train load out)
4749	Poitrel	BHP Mitsui Coal Pty Ltd 100%	Mining related infrastructure

Note: Registration of BHP Mitsui Coal Pty Ltd's 50% interest in ML 70312 is being finalised by the Office of State Revenue.

The Daunia Mine is south of the Peak Downs Highway and adjacent to the Peak Downs / Hay Point railway line. Coal will be transported by rail to Hay Point and/or Dalrymple Bay coal terminals, and potentially to Abbot Point coal terminal.

2.1.8 Environmental Authorities

The existing environmental authorities relating to the Daunia ML and Daunia East ML will each require amendment. Existing environmental authorities for the other MLs already allow for the activities proposed by the Daunia Mine.

2.2 Caval Ridge Mine

The Caval Ridge Mine element of the Project involves a new open cut coal mine north of and adjacent to BMA's existing Peak Downs Mine. Caval Ridge is located in the northern section of the existing ML

1775, with Harrow Creek acting as the southernmost boundary. Open cut mining operations (using dragline and truck/shovel equipment) are proposed, producing approximately 5.5 Mt/a of hard coking coal product primarily for the export coking coal market.

The coal will be processed at an on-site CHPP. Construction is expected to commence 2009, with first coal in 2011.

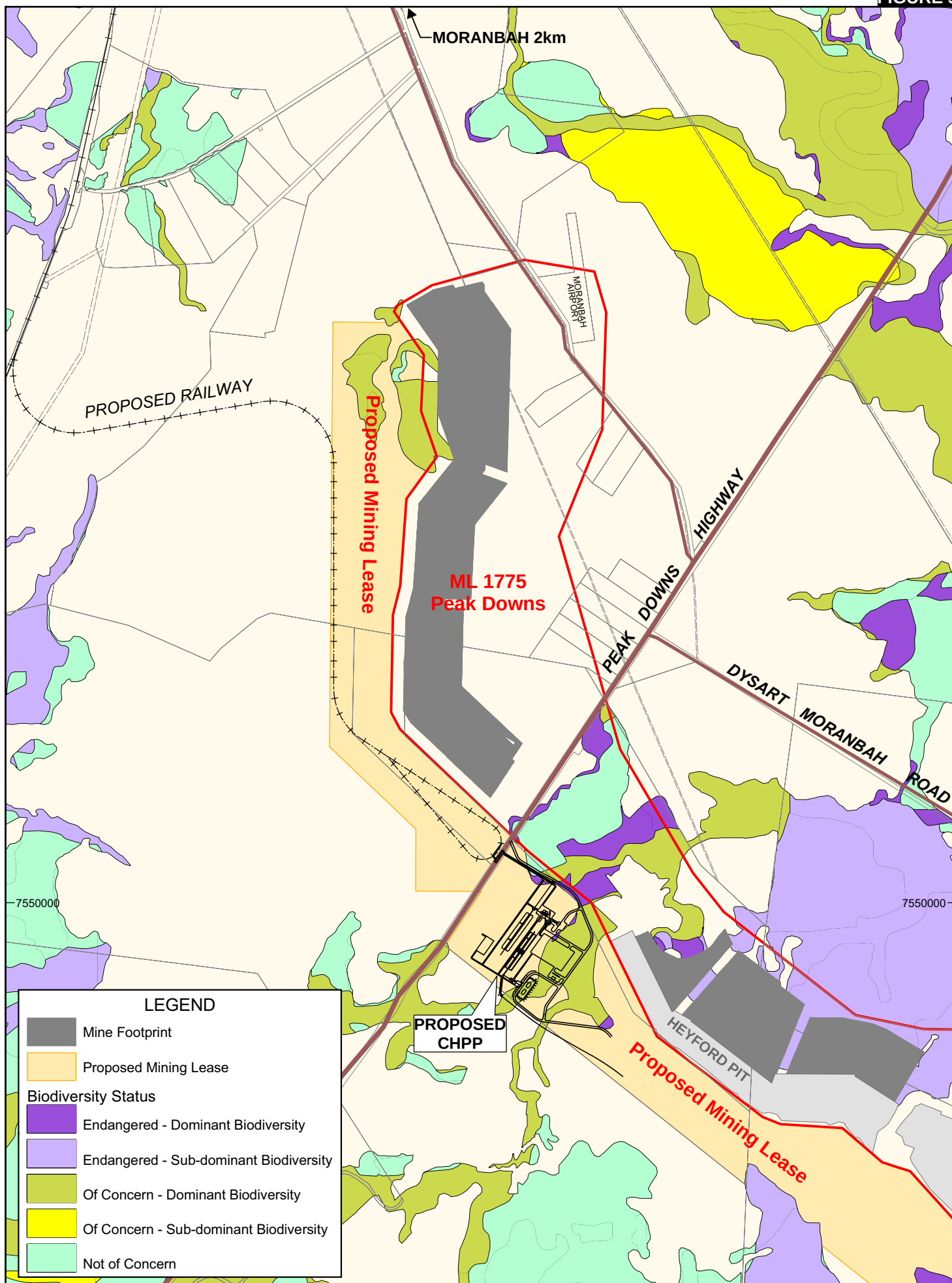
An additional 2.5 Mt/a of coal will be produced by the Peak Down Mine and will be processed through the Caval Ridge Mine CHPP, giving the Caval Ridge CHPP an initial product capacity of 8Mt/a. The incremental 2.5Mt/a from Peak Downs Mine does not form part of the Caval Ridge Mine element of the Project as it is within the currently approved capacity of the Peak Downs Mine. Caval Ridge Mine also has the potential to expand by a further 4 Mt/a or more, which will be subsequently assessed, and therefore does not form part of this Project.

A new mining lease to the west of ML 1775 will be required for site infrastructure, temporary landforms and to maximise resource recovery from ML 1775. The footprint of the proposed mining and processing operations are shown in **Figure 5**.

2.2.1 Mineral Resource

The Caval Ridge Mine is to be situated on the relatively undisturbed western limb of the northern Bowen Basin at the southern end of the Collinsville Shelf. Economic coal seams occur in the terrestrial Moranbah Coal Measures consisting of 300m of labile sandstone, siltstone, mudstone, tuffaceous-claystones and coal. These coal seams were deposited on the eastern margin of the Collinsville Shelf, which provided a predominantly fluvial flood plain environment and is one of the structural elements of the Clermont Stable Block.

At the end of coal deposition in the late Triassic, the Bowen Basin was subject to significant tectonic compression from the eastern side with major thrust faulting creating the present commercial coal deposits. The regional dip of coal in the area is 3 - 6 degrees though the northern extension of the Peak Downs Mine shows considerable deformation with strata dipping to 30 degrees and along strike flexures in excess of 10 degrees. Faulting and seam splitting is common, producing local steepening of the coal seam dips to over 10 degrees. The area has been influenced by several stages of structural deformation, including an extensional phase resulting in normal faulting and igneous intrusion in the form of sills and dykes, with a final late Cretaceous to early Tertiary compressional phase that resulted in thrusting and reversed re-activation of normal faults and a regional horizontal stress field. In the north, remains of Tertiary basalt flows overlay the Permian sequence, while in the south Quaternary sands and clayey sands up to 30 m thick have accumulated along the course of Boomerang Creek. A typical cross section of the Caval Ridge Mine coal seams is illustrated in **Figure 6**.



BHP Billiton Mitsubishi Alliance
ABN 67 096 412 752
Mapping Services Brisbane

0 1 2 3 kms

Transverse Mercator Projection.
AMG Zone 55. AGD84 Datum.



CAVAL RIDGE MINE AND INFRASTRUCTURE FOOTPRINT

Drawn: R.Stephens	Date: 28.04.2008	Revision: 0
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■ **Figure 6 Caval Ridge Coal Seam Cross Section**



2.2.2 Mining Operations

The Caval Ridge Mine will use integrated truck shovel prestripping, a dragline for waste excavation and a combination of front end loaders and excavators for mining coal. The mining sequence will generally entail:

- progressively clearing of any vegetation occurring on areas required for the operation;
- stockpiling topsoil from disturbed areas for storage and use in future rehabilitation of the site;
- prestripping / excavation of unconsolidated / soft overburden waste using excavators and trucks, and dumping over previously stripped dragline spoil;
- drill and blasting of upper competent overburden waste;
- removal of waste rock, using a combination of dozers, excavators and trucks; and dumping over previously stripped dragline spoil;
- coal mining of upper seams using a combination of dozers, excavators, loaders and trucks;
- drill and blasting of lower competent overburden waste;
- side casting of lower overburden into the previously mined strip using a dragline;
- coal mining of lower seams using a combination of dozers, excavators, loaders and trucks; and
- rehabilitation of the site by re-shaping the waste rock dumps, topsoiling and revegetation using native vegetation.

Mining will occur seven days per week and excavate to depths ranging from 20 m to 180 m. The Caval Ridge Mine will occur on part of ML1775, the Peak Downs mining lease. In addition to that disturbed by the existing Peak Downs mining operation, a total area of approximately 2500 ha will be disturbed over the life of the proposed Caval Ridge Mine including the mine area and out of pit waste dump footprints.

2.2.3 Supporting Site Infrastructure

In addition to coal mining activities, the Project will also include:

- a CHPP and associated loading facilities for ROM coal, including raw coal and product coal handling systems;
- a water supply, using a combination of site water reuse and a raw water supply via a new off take pipeline from existing bulk pipelines;
- an all weather access road from the Peak Downs Highway;
- an overpass for the Peak Downs highway to allow for the transportation of material under the Peak Downs Highway, using heavy and light vehicles;
- power supply to the Caval Ridge Mine from the existing network;

- a mine water management system, including clean water diversion, disturbed area runoff collection and treatment, pit water management, water reuse and water disposal if there is surplus water at any time;
- sewage and wastewater treatment by packaged sewage treatment plant (STP);
- site offices, ablution and bathhouse facilities, workshops and stores area, which would include diesel storage, and storage for tyres and other consumable materials; and
- a new rail line and spur with associated product coal loading facilities.

2.2.4 Coal Handling and Processing Activities

The proposed Caval Ridge CHPP will have a nominal feed capacity of 2000 t/h and is capable of processing 14-16 Mt/a to produce a nominal 8Mt/a of hard coking coal, 5.5Mt/a of which will be sourced from the Caval Ridge Mine. An additional 2.5 Mt/a of coal will be produced by the Peak Down Mine and will be processed through the Caval Ridge Mine CHPP, giving the Caval Ridge CHPP an initial product capacity of 8Mt/a. The incremental 2.5Mt/a from Peak Downs Mine does not form part of the Caval Ridge Mine project as it is within the currently approved capacity of the mine. Caval Ridge Mine also has the potential to expand by a further 4 Mt/a or more, which will be subsequently assessed, and therefore does not form part of this Project.

The facility shall operate seven days per week on a continuous basis.

ROM) coal will be transported from north of the Peak Downs Highway via an overpass to the CHPP for processing.

The CHPP will consist of:

- ROM dump hopper for primary sizing;
- secondary and tertiary sizers with intermediate screening;
- raw coal stockpiles with mechanised stacking and reclaim facilities;
- two (2) module coal preparation plant, nominally 1000 tph, per module;
- product coal stockpiles with mechanised stacking and reclaim facilities;
- train loadout to the north of the Peak Downs highway, a conveyor will transport material crossing the highway;
- reject bin and handling system; and
- ultrafine tailings dewatering system.

Process plant water will be recycled to minimise raw water make-up requirements for the site. The CHPP layout will be designed to contain local area run off and run-off from stockpile areas. These dirty water retention dams and environmental dams will be used as the primary source of water for the CHPP.

The CHPP will have sufficient capacity to process some coal mined from the Peak Downs Mine. Although the Peak Downs Mine currently produces 9Mt/a, it is actually authorised to produce 12.5Mt/a of product coal.

The product coal will be railed approximately 185 km to the Hay Point and/or Dalrymple Bay coal terminals for shipment to the international market.

2.2.5 Mine Waste Management

Initially, the waste rock produced by mining at the Caval Ridge Mine will be placed in out of pit waste rock dumps, most likely located within and close to the perimeter of the mining lease to contribute to bunding for environmental management. When sufficient space is created within the mined-out areas, subsequent waste rock will be placed within in-pit waste rock dumps.

Water management, including sediment dams to control runoff from disturbed areas, will need to be constructed onsite to manage mine affected water and to provide a water source for mining and CHPP operations. The release of surplus water will only occur if there is no storage capacity available and there are no further opportunities to reuse the water on site at the time. Releases will only occur in accordance with the conditions of the environmental authority.

2.2.6 Workforce

The Caval Ridge Mine will employ about 1200 people during construction and approximately 340 during the peak of operation. The construction and operational workforce is expected to be housed in the district, within the vicinity of Moranbah and Dysart. The EIS will include a Social Impact Assessment that examines the issue of housing in detail. It will also review options for workforce transportation to and from the site.

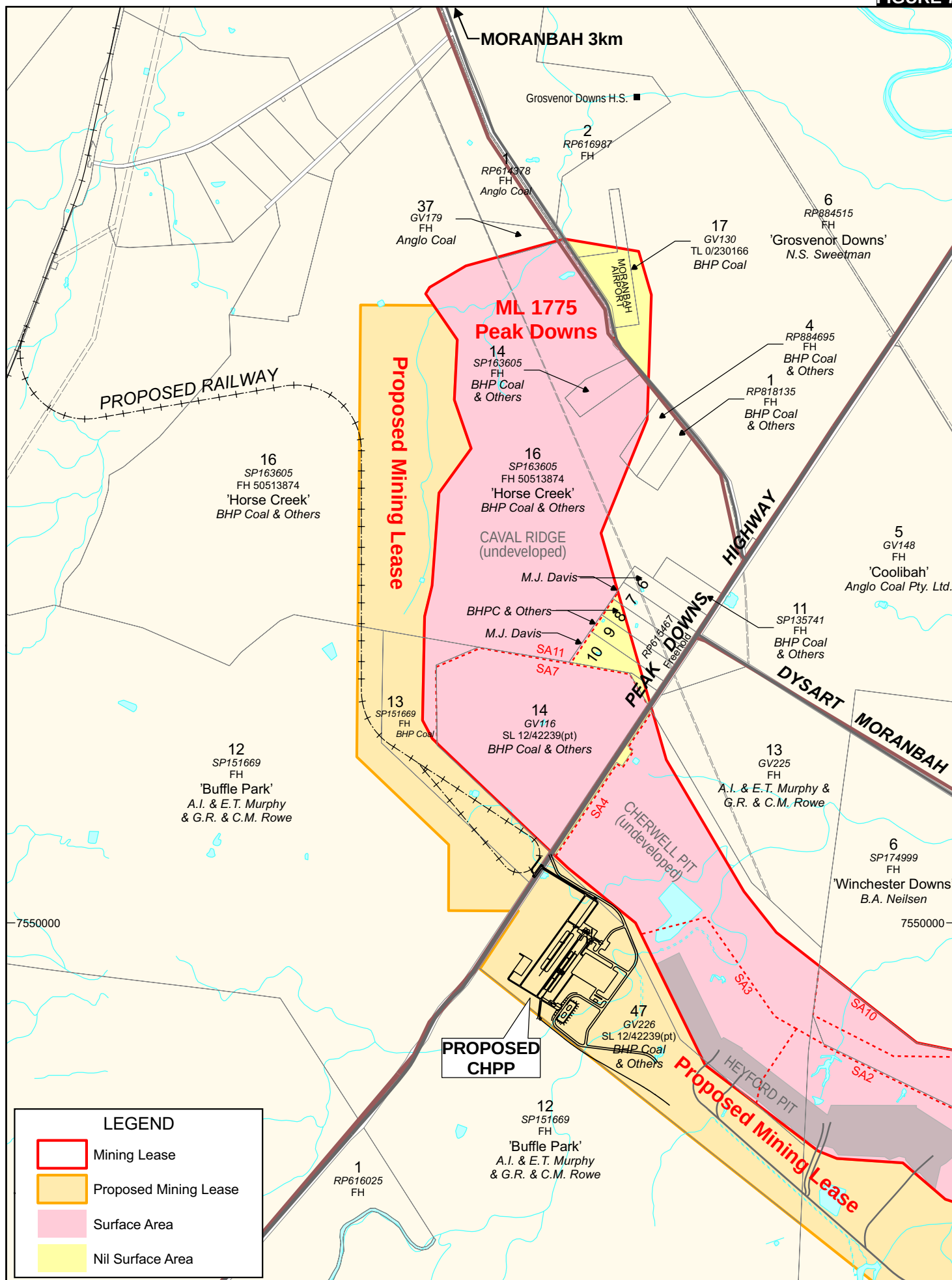
2.2.7 Operational Land and Tenure

Mining for the Caval Ridge element of the Project will occur on the northern part of ML1775, the Peak Downs mining lease held by CQCA. The major coal processing infrastructure, haul roads, rail line, rail loop, train loadout and waste rock dumps will be located immediately to the west of ML1775.

Figure 7 illustrates the location of the Project in reference to mining tenures and land ownership.

2.2.8 Environmental Authorities

The existing environmental authorities relating to the Peak Downs ML may require amendment.



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0 1 2 3 kms

Transverse Mercator Projection.
AMG Zone 55. AGD84 Datum.



CAVAL RIDGE MINE AND LAND OWNERSHIP

Drawn: R.Stephens	Date: 28.04.2008	Revision: 0
Checked: M.Vincent	Filename: 20080428-2c.mxd	

2.3 Goonyella Riverside Mine Expansion

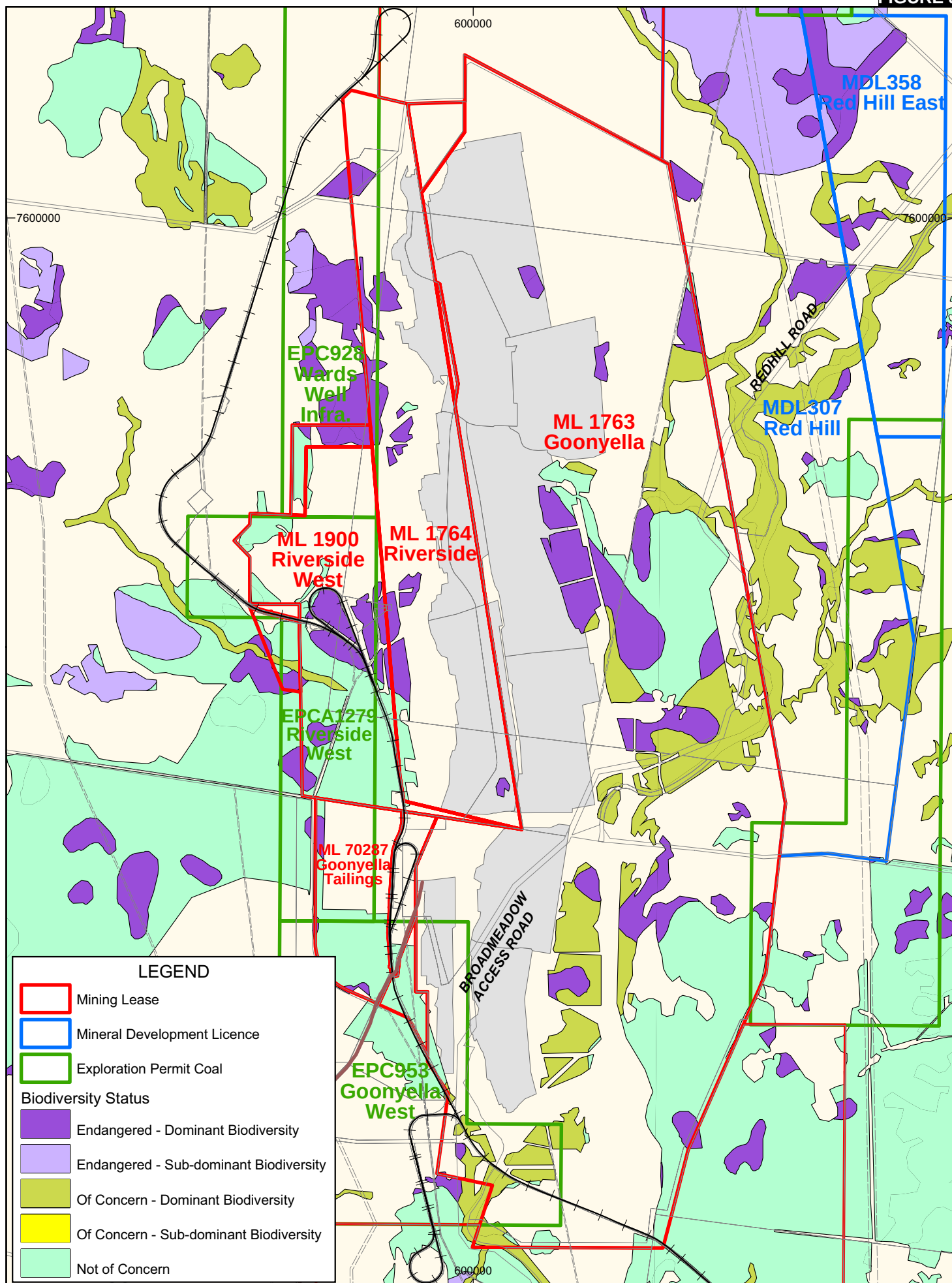
The Goonyella Riverside Mine Expansion element of the Project involves an expansion of the existing Goonyella Riverside open cut and the underground operations at Broadmeadow to increase the capacity from 16Mt/a to 24 Mt/a. Mining and processing will yield a Hard Coking Coal product for the export market. The open cut expansion and underground expansions will result in an additional 5 Mt/a and 3 Mt/a of product coal respectively. The Goonyella Riverside Mine tenements in shown in **Figure 8** and the footprint of the proposed mining operations is shown in **Figure 9**.

2.3.1 Mineral Resource

The Goonyella Riverside Mine Expansion element of the Project is situated on the north-western margin of the Bowen Basin, on the stable Collinsville Shelf. Three major coal bearing geological formations of Permian age occur in the area – the Rangal Coal Measures (RGM), the Fort Cooper Coal Measures (FCCM) and the Moranbah Coal Measures (MCM). The RCM only outcrop in the far eastern corner of BMA's mining tenements, on MDLA 358 Red Hill East.

The FCCM contain thick, stone banded, poor quality coal seams which are not considered economic. The MCM is the productive unit and underlies the FCCM. It typically contains up to seven coal seams which are separated by inter-banded sandstones, siltstones and claystones and includes several tuff units. The main tuff unit, the “P” Tuff is recognisable across the area and can be used as a useful correlation marker within the formation.

A typical cross section of the Goonyella Riverside Mine coal seams is illustrated in **Figure 10**.



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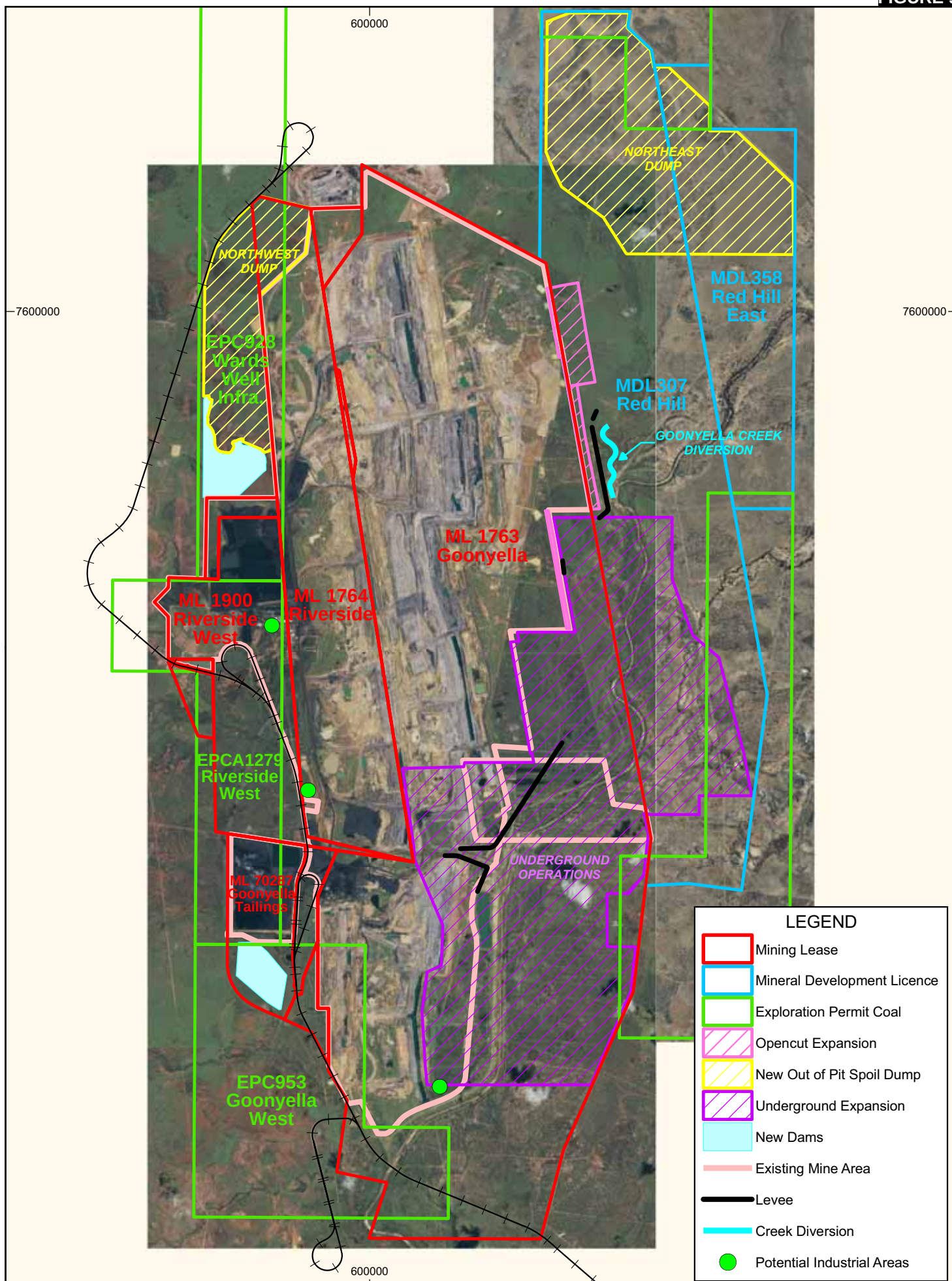
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AMG Zone 55. AGD84 Datum.



EXISTING GOONYELLA RIVERSIDE MINING TENEMENTS

Drawn: R.Stephens	Date: 28.04.2008	Revision: 0
Checked: M.Vincent	Filename: 20080428-3b.mxd	



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Mapping Services Brisbane

0 1 2 3 4 kms

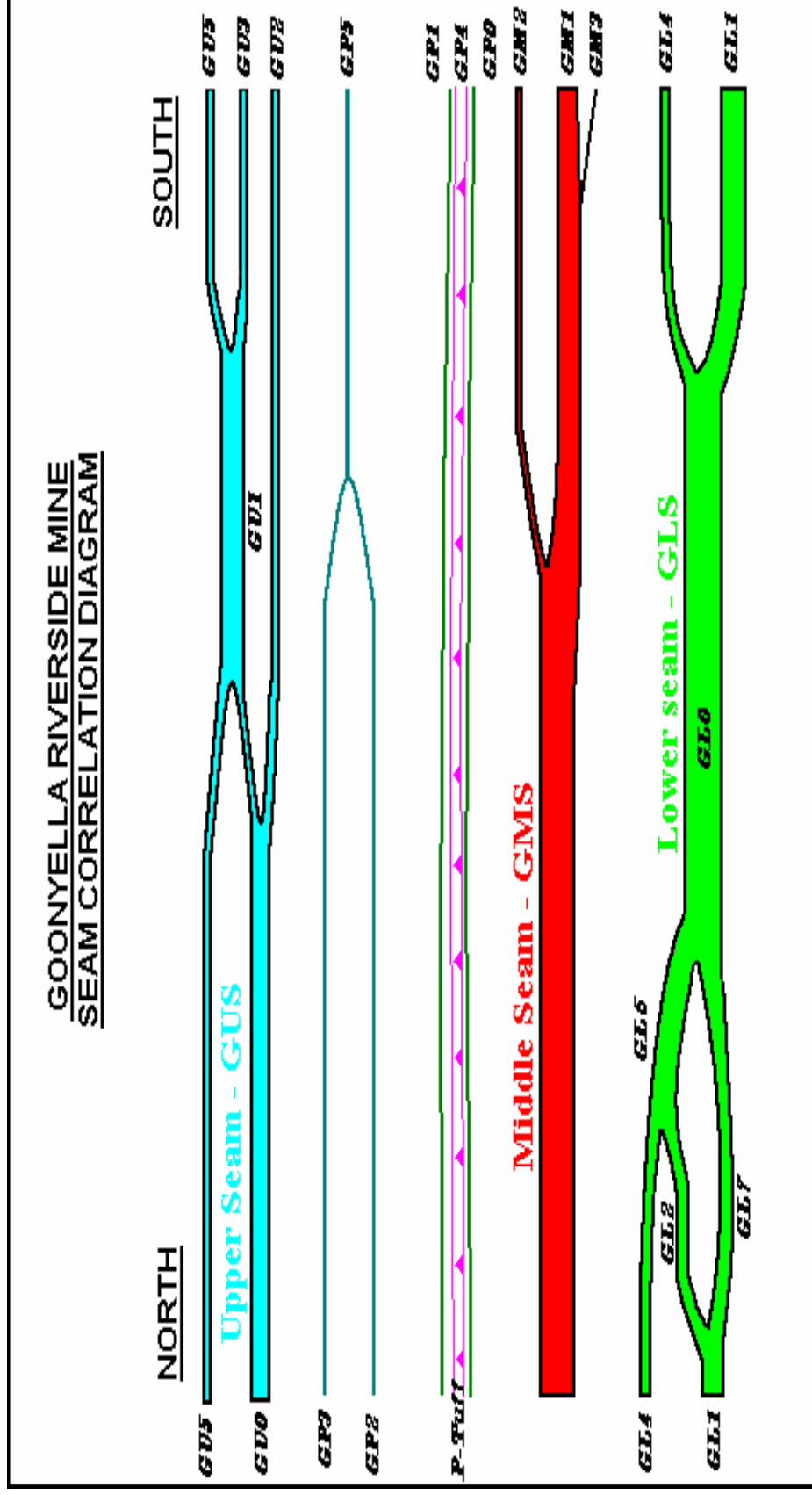
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GOONYELLA RIVERSIDE EXPANSION FOOTPRINT

Drawn: R.Stephens	Date: 28.04.2008	Revision: 0
Checked: M.Vincent	Filename: 20080428-3c.mxd	

■ Figure 10 Typical Cross Section of the Goonyella Riverside Mine Coal Seams



2.3.2 Mining Operations

2.3.2.1 Open Cut

The existing open cut mine will progress eastwards into MDL 307 and to the south-west into EPC953. A new ML will be required to cover the areas proposed to be mined. The surface expansion will use the current open cut mining methods, which involve truck and shovel fleets and draglines exposing coal with pits 1.5 – 2.0 km long and 60 m wide. A typical mining cross section is provided in **Figure 11**.

Most of the open cut spoil from the expanded operations will be disposed of within mined out pits as is the current practice. However, it is expected that some of the spoil will need to be disposed of in out-of-pit spoil dumps. Two possible locations have been identified for these dumps, one to the north-east of the mine and the other to the west.

2.3.2.2 Underground

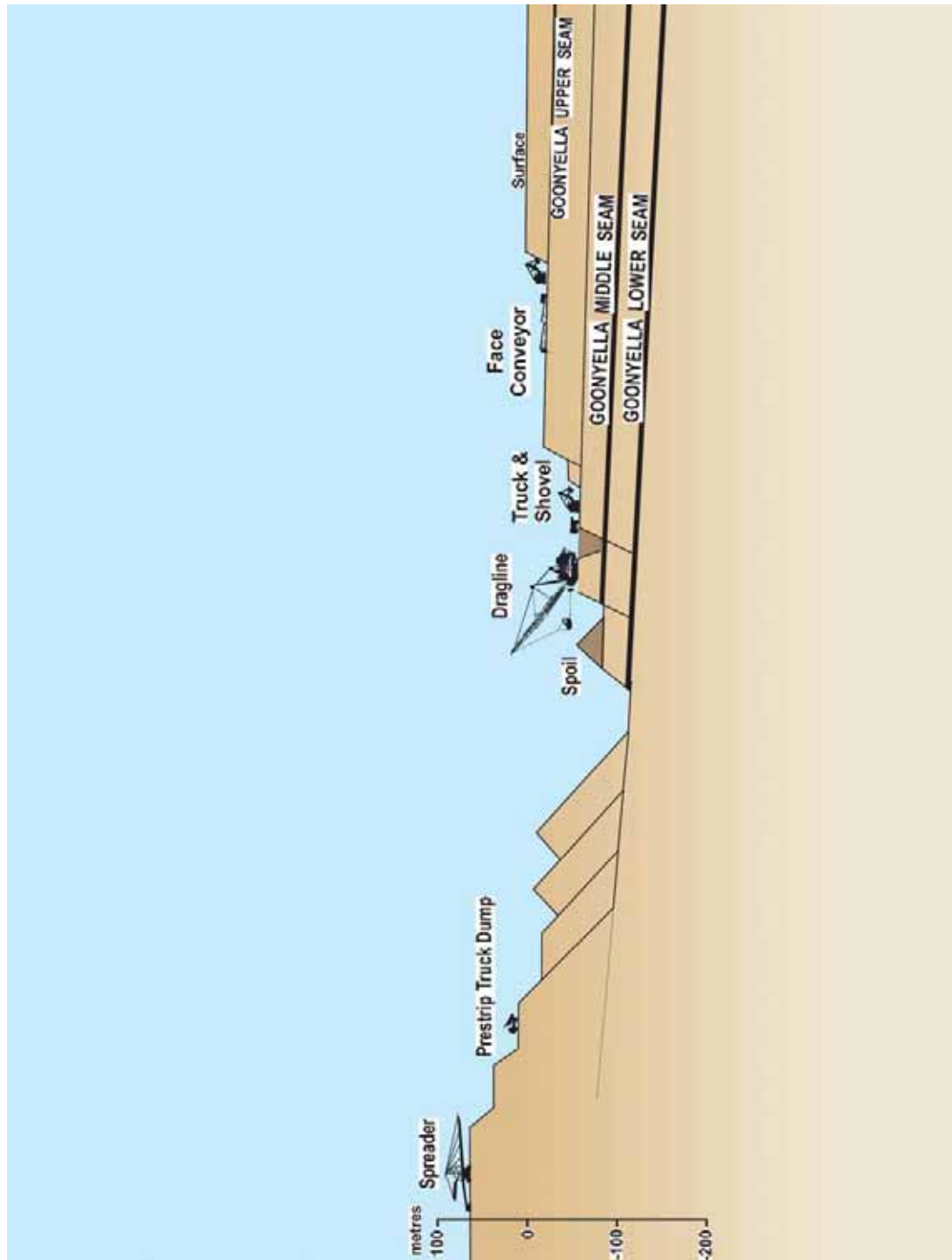
The existing Broadmeadow Mine, which extracts the Goonyella Middle Seam (GMS), will be expanded eastwards into MDL 307 using either the conventional longwall mining practices currently being used for its operations within ML 1763 or see the introduction of Longwall Top Coal Caving (LTCC) technology once its feasibility is proven as a means to improve the levels of resource recovery compared to conventional longwall mining methods. LTCC is extensively used in China to maximise levels of coal seam recovery. This method is also being used to mine a 6.0 metre thick seam at Austar Coal Mine near Cessnock, New South Wales.

The LTCC underground mining method is very similar to conventional retreat longwall mining. It has longwall face equipment specifically designed for the extraction of thicker coal measures (> 5.0 metres). A second armoured face conveyor (AFC) facilitates the controlled capture of broken coal from the roof above the shields. The method is attractive due to higher resource recovery. In the event that LTCC is utilised, the subsidence expected would be marginally greater than the conventional single pass thick seam longwall mining method currently used at BMA's Broadmeadow Mine.

A second longwall mine is currently under investigation using either conventional longwall methods or LTCC method. Both the GMS and Goonyella Lower Seam (GLS) are considered targets for a second longwall. It is probable that longwall mining of the GLS would occur under existing GMS planned operations. Under this scenario, the 'footprint' of a second longwall operation would be similar to the existing footprint of the GMS mining layout.

Subsidence will occur over a 5km section of the Isaac River as a result of the underground mining within MDL 307. In the event, a second underground mine is developed in the GLS, the subsidence could be expected on two separate occasions. First, from the mining of the GMS and second from the mining of the GLS. The underground mining within ML 1763 will also result in the subsidence along a 4 km section of the Isaac River and a 5 km section of the existing Isaac River diversion.

■ **Figure 11 Typical Mining Cross Section**



2.3.3 Supporting Site Infrastructure

The existing mine has much of the necessary infrastructure in place including industrial areas, power transmission lines, rail infrastructure, tailings dams, rejects emplacements, roads (both service and haul), sediment dams, water supply dams and water supply pipelines. However, there are infrastructure upgrades required for the expansion of the mine including:

- a new CHPP and upgrade to the existing Goonyella Riverside CHPP;
- construction of an additional 66 kV feeder adjacent to the present Goonyella 66 kV line;
- expansion of existing tailings storage facilities to accommodate increased tailings volumes;
- improvements to the existing mine water management system, including clean water diversion, disturbed area runoff collection and treatment, pit water management, water reuse and water disposal if there is surplus water at any time that cannot be reused on site.

2.3.4 Coal Handling and Processing Activities

The Goonyella Riverside Expansion element of the Project requires an additional coal preparation capacity of approximately 2,370 tonnes per hour (t/h) to achieve a production rate of 24 Mt/a. The options to achieve this throughput are to expand the existing CHPPs and/or build a new plant to supplement one or both existing plants. The current preferred option is to:

- improve the efficiency of the Goonyella CHPP from 1,930 to 2,220 t/h;
- upgrade the Riverside CHPP from 1,420 to 2,400 t/h; and
- construct a new CHPP with a maximum capacity of 1,850 t/h.

The new CHPP is likely to be tied into the existing product handling system. Alternatively a separate train load-out will be constructed on one of the existing rail loops.

The product coal will be railed approximately 190 km to the Hay Point and/or Dalrymple Bay coal terminals for shipment to the international market.

2.3.5 Workforce

The Goonyella Riverside Mine Expansion element of the Project will employ about 900 people during construction and approximately an additional 700 people during the peak of operation. The construction and operational workforce is expected to be housed in the district, within the vicinity of Moranbah. The EIS will include a Social Impact Assessment that examines the issue of housing in detail. It will also review options for workforce transportation both to and from work and home.

2.3.6 Operational Land and Tenure

The Goonyella Riverside Mine Expansion element of the Project is within the area of the following mining tenures:

- ML1763, which is the main Goonyella mining lease granted in 1971.
- ML 1764, which is the main Riverside mining lease granted in 1978.
- ML1900, granted in 1982.
- EPC928, granted in 2005.
- EPC 953, granted October 2006.
- MDL307, granted August 2007.
- MDL358, granted January 2006.
- EPCA 1279, lodged April 2008.

The Goonyella Riverside Mine currently also operates on the following mining tenures; ML1802, ML70121, ML70038, ML70193, ML70194, ML70287, MLA70288, MLA70289 and EPC554.

The locations of these mining tenures (in addition to underlying land tenures) are provided in **Figure 8**. Additional MLs will be required to enable the Project to operate on those areas covered by EPC and MDL tenements.

2.3.7 Environmental Authorities

The existing environmental authorities relating to the Goonyella Riverside MLs will each require amendment.

2.4 Airport Development

In order to service the requirements, and the need for a wider range of work choices for the larger workforce, associated with BMA's growth program, investigations are currently underway to enable larger capacity aircraft to fly in and out of the Moranbah region. These investigations include the potential for developing a new airport to provide this improved regional capability.

While the scale, location and timing of such an airport is yet to be confirmed, it is envisaged that an airport development would be designed and constructed on the following broad criteria:

- the airport will be sited so as to ensure that the overall amenity of the residents of Moranbah is not adversely affected;

- sizing of the airport facilities (runway, terminal, refuelling capability) will be such that larger aircraft (including high capacity aircraft) can service directly the Moranbah area and potentially wider region; and
- flexibility of operation, such that the airport may be owned and managed either by BMA or by a third party.

The development of a new airport would also be required in time to access coal in the vicinity of the current airport.

It is envisaged that the development of a new airport would involve the following:

- clearing of onsite vegetation, and cutting and filling of the site to manage stormwater and to provide suitable site levels to construct the runway;
- construction of a new runway facility capable of allowing a variety of aircraft types, including high capacity aircraft;
- construction of a new terminal facility enabling the processing of passengers and associated luggage; and
- construction of ancillary airport infrastructure such as fuel storage, aircraft hanger facilities, runway lighting systems, ground aircraft navigation equipment, vehicle parking, security facilities/fencing and internal roads.

Depending on the selected location of the airport, there may be a need for a new road to be constructed to the airport from a suitable access point.

Location of the new airport would take these considerations into account along with the location of BMA village accommodation for the likely increased share of BMA's workforce not accommodated in permanent housing in Moranbah as part of BMA's expanded operations.

3 Existing Environment and Potential Impacts

3.1 Daunia Mine

3.1.1 Surface Water

All watercourses in the vicinity of the Daunia element of the Project are ephemeral. The Daunia Mine area drains into the Isaac River, which flows in a south easterly direction. The catchment possesses a long history of agricultural use in the form of grazing, and as a result, is a highly disturbed creek system.

The Daunia Mine is also within the catchment that drains into the Shoalwater and Corio Bays Area which is identified as a RAMSAR wetland and is protected under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). This area is located 200 km away and will not be affected given the water management controls proposed for the Daunia Mine.

The Daunia Mine activities that may affect surface waters are changes in the landform, run-off from disturbed areas including the infrastructure areas and due to the voids left after mining ceases. The following mitigation strategies will reduce the potential impacts on surface waters:

- implementation of a “clean water – dirty water” system to divert clean runoff around disturbed areas and direct run-off from disturbed areas to retention dams for treatment; and
- the development of a detailed water management plan to ensure water released from site (if any) meets the licensed discharge limits in the environmental authority and the water quality objectives for the Isaac River.

3.1.2 Groundwater

The regional groundwater system has been previously characterised through investigations at the Poitrel Mine that abuts the Daunia Mine site to the west. Groundwater occurrence within the Poitrel Mine area was described as being limited, with major ion chemistry data suggesting that there were no clear delineation of groundwater types with depth and strata within the project area. These data suggest that groundwater within the alluvium, Permian rock and coal measures are in full hydraulic connection and are largely unconfined across the site. The results from groundwater modelling undertaken at this site suggested that regional groundwater drawdown from the Poitrel Mine would be negligible and limited to a localised cone of depression around the operational mine pit.

Given the Poitrel Mine’s proximity to the Daunia Mine, similar groundwater conditions are anticipated. The EIS for the Daunia Mine will assess the nature and extent of groundwater and its use in the vicinity of the site and present any mitigation measures that may be required. Groundwater modelling will be used to simulate the current groundwater environment and to assist in prediction of regional impacts on groundwater users and the environment resulting from mine related groundwater extraction and any final voids left after mining ceases.

3.1.3 Land Resources

The landscape is generally near-flat to gently undulating plains and comprises a number of soil types. Vegetation has been extensively cleared to allow the sowing of improved pastures for grazing. The likely impacts on land resources from the Daunia mine include changes to:

- landform;
- drainage patterns;
- land suitability; and
- land uses.

Out of pit waste dumps are likely to be located on the eastern edge of the Daunia Mine site. The designs of these dumps and the topsoiling and revegetation measures that will be applied to them will ensure that they will be rehabilitated to a sustainable post-mining land use. The EIS will also include land use and suitability assessments.

3.1.4 Regional Ecosystems

Although a substantial proportion of the Daunia Mine area is used for grazing, remnant vegetation occurs on ML 70116. **Table 3** lists the regional ecosystems that occur on the site and gives their status under the Queensland *Vegetation Management Act 1999* and the status of analogous Ecological Communities as listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*. Both mining and infrastructure will be arranged to minimise the impact on remnant vegetation. **Figure 3** presents the regional ecosystems previously mapped in the Daunia Mine area.

■ **Table 3 Regional Ecosystems of the Daunia Mine Site**

RE Code	Description	VMR status ¹	EPBC Act Status ²
11.3.1	Acacia harpophylla and/or Casuarina cristata on alluvial plains	Endangered	Endangered
11.3.2	Eucalyptus populnea woodland to open-woodland.	Of Concern	N/A
11.3.25	Eucalyptus camaldulensis or E. tereticornis open-forest to woodland.	Not Of Concern	N/A
11.5.3	Eucalyptus crebra, Callitris glaucophylla, C. endlicheri, E. chloroclada, Angophora leiocarpa on Cainozoic sand plains/remnant surfaces.	Not Of Concern	N/A
11.9.2	Eucalyptus melanophloia and/or E. orgadophila grassy woodland to open-woodland	Not of Concern	N/A
11.9.3	Grassland dominated by Dichanthium sericeum and/or Astrebla spp.	Not of Concern	Endangered
11.9.5	Open-forest dominated by Acacia harpophylla and/or Casuarina cristata	Endangered	Endangered
11.4.9	Open-forest, occasionally woodland, dominated by Acacia harpophylla usually with a low tree mid-storey of Terminalia oblongata and Eremophila mitchellii	Endangered	Endangered

¹ Status under the *Vegetation Management Act 1999*

² Status under the *Environment Protection and Biodiversity Conservation Act 1999*.

3.1.5 Significant Flora and Fauna

An assessment of flora and fauna values across the Daunia mining lease was completed in 2005. Additional surveys will be undertaken as part of baseline studies for the EIS. These surveys will focus on changes in vegetation since 2005 and will include a targeted fauna survey focusing on: the Southern Squatter Pigeon, Collett's Snake and Brigalow Scalyfoot.

An EPBC Protected Matters Search Report revealed no threatened species. However, a literature review has been undertaken to produce a list of the flora species that may occur at the Daunia Mine site. Those rare and threatened plants that potentially occur near the Project area are listed in **Table 4**.

■ **Table 4 Rare and Threatened Flora Species That Could Occur At Daunia**

Species	Common Name	EPBC Status	Presence in relation to the Daunia Site
<i>Thesium australe</i>	Austral Toadflax	Vulnerable	Species or habitat likely to occur in the area
<i>Picris evae</i>	Hawkweed	Vulnerable	Species or habitat likely to occur in the area
<i>Stemmacantha australis</i>	Austral Cornflower	Vulnerable	Species or habitat likely to occur in the area
<i>Bothriochloa biloba</i>	Lobed Blue Grass	Vulnerable	Species or habitat likely to occur in the area
<i>Digitaria porrecta</i>	Finger Panic Grass	Endangered	Species or habitat likely to occur in the area

The regional ecosystem type 11.9.3 is habitat for the plant species *Thesium australe*, *Picris evae*, *Stemmacantha australis*, *Dichanthium queenslandica*, *Bothriochloa biloba* and *Digitaria porrecta*.

A list of the threatened fauna species which could potentially occur in the Daunia region is provided in **Table 5**. The conservation significance of each of the identified species is also shown.

■ **Table 5 Rare and Threatened Fauna species That Could Occur At Daunia**

Species	Common Name	EPBC Status	Presence in relation to the Daunia Site
Birds			
<i>Erythrotriorchis radiatus</i>	Red Goshawk	Vulnerable	Species or species habitat likely to occur within area
<i>Geophaps scripta scripta</i>	Squatter Pigeon	Vulnerable	Species or species habitat likely to occur within area
<i>Neochmia ruficauda ruficauda</i>	Star Finch	Endangered	Species or species habitat likely to occur within area
<i>Rostratula australis</i>	Australian Painted Snipe	Vulnerable	Species or species habitat likely to occur within area
Mammals			
<i>Dasyurus hallucatus</i>	Northern Quoll	Endangered	Species or habitat likely to occur in the area
<i>Nyctophilus timoriensis</i>	Eastern Long-eared Bat	Vulnerable	Species or habitat likely to occur in the area
Reptiles			
<i>Egernia rugosa</i>	Yakka Skink	Vulnerable	Species or habitat likely to occur in the area
<i>Furina dunmali</i>	Dunmall's Snake	Vulnerable	Species or habitat likely to occur in the area
<i>Rheodytes leukops</i>	Fitzroy Tortoise	Vulnerable	Species or habitat likely to occur in the area

3.1.6 Noise and Vibration

Noise and vibration in the Daunia Mine area is affected by rural activities, local road and rail, and the activities at Poitrel Mine (operated by BMA) and Millennium Mine (operated by Peabody).

Recently conducted noise monitoring for BMA's Poitrel operations included attended and unattended noise measurements at the Olive Downs and Winchester properties. These properties will also be neighbouring landholders to the Daunia Mine. The monitoring found that noise levels were consistent with the land use and rural zoning. No obtrusive, tonal or impulsive noise levels of significance were detected. Noise levels were found to be highest during the evening due to the seasonal effects of insect and bird activity.

Noise sources from the Daunia Mine will include mining (trucks, excavators, shovels, blasting) and processing activities (conveyors, crushers, screens, loading). The level of noise at a given receptor will vary depending on the type of machinery in use and traffic in the area. A baseline noise survey will be undertaken and information from this and additional studies will be used to develop mitigation strategies. This will include identifying noise sensitive receptors in the vicinity of the Project area. A preliminary review suggests that there are three local landholders (or sensitive receptors) within 3-5 kilometres of the Daunia Mine.

Sensitive receptors may also be affected by blasting. The Daunia Mine design processes will confirm the nature and frequency of blasting and this will also be assessed to determine appropriate mitigation measures. Noise and vibration impacts will be further addressed in the EIS. The existing levels of vibration and overpressure experienced locally are being recorded at Winchester Downs and this information will be used to help assess both the existing environment and likely cumulative impacts from the mine.

3.1.7 Air Quality

The Daunia Mine will be required to meet air quality standards for dust under the *Environmental Protection Act 1994* and subordinate legislation. Assessment of the air quality and suitable mitigation methods will be outlined in the EIS. Air quality in the region is mainly influenced by pastoral conditions, open cut mining, and nearby rail and road transportation activities.

Air quality issues include dust deposition. The principal dust sources include heavy mining equipment movements, topsoil stripping, and coal handling. During operations, dust generation will be managed by the use of water carts for road watering, sprays on crushers and conveyor transfer points, conducting progressive rehabilitation (if required), limiting disturbance to what is required for safe operations and, if appropriate, changing work practices during adverse meteorological conditions.

Existing monitoring data will be used to assess existing dust levels and identify potential sensitive receptors.

3.1.8 Greenhouse Gases

Mining coal from the Daunia Mine will result in the emission of some greenhouse gases to the atmosphere. The EIS will estimate the total quantity of greenhouse gases (including direct and indirect emissions) attributable to this element of the Project. This information will be used to assess mitigation strategies in the EIS and to provide an appropriate context for actions that are being undertaken at a corporate level by the BMA.

The EIS will also examine the contribution that the mine makes to the cumulative greenhouse gas emissions from the region.

3.1.9 Infrastructure Impacts

The Daunia Mine will necessitate the use and development of infrastructure in the region, including:

- power (new connections to the grid, with the possibility of supplementary on-site diesel generation);
- water (supplied via the Braeside pipeline to the site); and
- road and rail transport corridor used to access the site and transport the coal product to the Hay Point and/or Dalrymple Bay coal terminals.

The EIS will quantify the scale of infrastructure use and its impacts on the region.

3.1.10 Visual Amenity

The physical features associated with the Daunia Mine that may have aesthetic impacts include out-of-pit overburden dumps, and other infrastructure including CHPP, power lines and administration buildings. The EIS will present an assessment of the impacts that these features have on the landscape.

3.1.11 Cultural Heritage Values

Investigation of Aboriginal cultural heritage values will be undertaken in consultation with relevant Traditional Owners, the Barada Barna Kabalbara & Yetimarla (BBKY) people. Work is also proposed to evaluate the remnants of European settlement.

3.2 Caval Ridge Mine

3.2.1 Surface Water

The Caval Ridge Mine area covers tributary streams of the Isaac River in the headwaters of the greater Fitzroy River catchment. The area is generally divided by a relatively indistinct ridgeline dividing two watersheds: the northern watershed includes Horse Creek and tributaries; and the southern watershed includes Nine Mile Creek, Cherwell Creek and tributaries. Within the Caval Ridge Mine area, Nine Mile Creek joins Cherwell Creek and downstream (east) of the study area, Cherwell Creek joins the Isaac River. Horse Creek joins Grosvenor Creek (Isaac River tributary) downstream of the Caval Ridge Mine area.

All watercourses and tributaries within the Caval Ridge Mine are ephemeral watercourses. Periods of flow are generally short and limited to periods during and immediately after rainfall.

The majority of the catchment has been cleared for agriculture (cattle grazing) and several small farm dams have been constructed within the catchment to support these agricultural activities.

The Caval Ridge Mine is also within the catchment that drains into the Shoalwater and Corio Bays Area which is identified as a RAMSAR wetland and is protected under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). However, this area is located 200 km away and will not be affected by the Caval Ridge Mine, given the water management controls proposed for the operation.

The Caval Ridge Mine activities that may affect surface waters are changes in the landform, run-off from disturbed areas including the infrastructure areas and due to the voids left after mining ceases. The following mitigation strategies will reduce the potential impacts on surface waters:

- implementation of a “clean water – dirty water” system to divert clean runoff around disturbed areas and direct run-off from disturbed areas to retention dams for treatment; and
- the development of a detailed water management plan to ensure water released from site (if any) meets the licensed discharge limits in the environmental authority and the water quality objectives for the Isaac River.

3.2.2 Groundwater

The EIS will assess the nature and extent of the groundwater and its use in the area and will present any mitigation measures that may be required. Installation of piezometers, groundwater monitoring and groundwater modelling will be used to simulate the current groundwater environment and to assist in prediction of regional impacts on groundwater users and the environment resulting from mine related groundwater extraction and any final voids left after mining ceases.

3.2.3 Land Resources

The landscape is generally near-flat to gently undulating plains and comprises a number of soil types. Vegetation has been extensively cleared to allow the sowing of improved pastures for grazing.

The likely impacts on land resources from the Caval Ridge Mine include changes to:

- landform;
- drainage patterns;
- land suitability; and

- land uses.

Out of pit waste dumps will be located on the western edge of the Caval Ridge Mine site and the designs of these dumps will be reviewed during the EIS to ensure they are sustainable. The EIS will also include land use and suitability assessments.

3.2.4 Regional Ecosystems

The Caval Ridge is used for grazing north of Cherwell Creek, while the section between Cherwell Creek and Harrow Creek has been partially mined. Remnant vegetation does occur on the Caval Ridge Mine site. **Table 6** lists the regional ecosystems that are currently mapped for the site by the EPA and gives their status under the Queensland *Vegetation Management Act 1999* and the status of analogous Ecological Communities as listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*. Both mining and infrastructure has been arranged to minimise the impact on remnant vegetation.

■ **Table 6 Regional Ecosystems of the Caval Ridge Mine Site**

RE Code	Description	VMR status ¹	EPBC Act Status ²
11.3.2/11.3.25	<i>Eucalyptus populnea</i> woodland on alluvial plains/ <i>E. tereticornis</i> or <i>E. camaldulensis</i> woodland fringing drainage lines	Dominant Of Concern	N/A
11.3.2/11.3.25/11.5.9	As above, with <i>E. crebra</i> and other <i>Eucalyptus</i> spp. and <i>Corymbia</i> spp. woodland on Cainozoic sand plains/remnant surfaces	Not Of Concern	N/A
11.3.25	<i>E. tereticornis</i> or <i>E. camaldulensis</i> woodland fringing drainage lines	Not Of Concern	N/A
11.4.9	<i>Acacia harpophylla</i> shrubby open forest to woodland with <i>Terminalia oblongata</i> on Cainozoic clay plains	Endangered	Endangered
11.5.3	<i>Eucalyptus populnea</i> and/or <i>E. melanophloia</i> and/or <i>Corymbia clarksoniana</i> on Cainozoic sand plains/remnant surfaces	Not of Concern	N/A
11.5.3/11.3.2	<i>Eucalyptus populnea</i> and/or <i>E. melanophloia</i> and/or <i>Corymbia clarksoniana</i> on Cainozoic sand plains/remnant surfaces/ <i>Eucalyptus populnea</i> woodland on alluvial plains	Subdominant Of Concern	N/A
11.5.3/11.5.9	<i>Eucalyptus populnea</i> and/or <i>E. melanophloia</i> and/or <i>Corymbia clarksoniana</i> on Cainozoic sand plains/remnant surfaces / <i>E. crebra</i> and other <i>Eucalyptus</i> spp. and <i>Corymbia</i> spp. woodland on Cainozoic sand plains/remnant surfaces	Not Of Concern	N/A
11.5.9	<i>Eucalyptus crebra</i> and other <i>Eucalyptus</i> spp. and <i>Corymbia</i> spp. woodland on Cainozoic sand plains/remnant surfaces	Not Of Concern	N/A
11.8.11	<i>Dichanthium sericeum</i> grassland on Cainozoic igneous rocks	Of Concern	Endangered
11.8.11/11.8.5	<i>Dichanthium sericeum</i> grassland on Cainozoic igneous rocks/ <i>Eucalyptus orgadophila</i> open woodland on Cainozoic igneous rocks	Dominant Of Concern	Endangered
11.8.5	<i>Eucalyptus orgadophila</i> open woodland on Cainozoic igneous rocks	Not Of Concern	N/A

¹ Status under the *Vegetation Management Act 1999*

² Status under the *Environment Protection and Biodiversity Conservation Act 1999*.

3.2.5 Significant Flora and Fauna

An assessment of flora and fauna values across of the Caval Ridge Mine site have been undertaken in the past and these are currently being verified by baseline studies for the EIS. Desktop searches and the results from previous surveys indicate that a number of rare or threatened flora and fauna species may occur at the Caval Ridge Mine site, as listed in **Table 7** and **Table 8**.

■ Table 7 Rare and Threatened Flora Species Which Could Occur At Caval Ridge

Species	Common Name	NCA Status	EPBC Status
<i>Dichanthium queenslandicum</i>	King Blue-grass	Vulnerable	Vulnerable
<i>Dichanthium setosum</i>		Rare	Vulnerable
<i>Digitaria porrecta</i>	Finger Panic Grass	Rare	Endangered

■ Table 8 Rare and Threatened Fauna Species Which Could Occur At Caval Ridge

Species	Common Name	NCA Status	EPBC Status
Reptiles			
<i>Denisonia maculata</i>	Ornamental Snake	Vulnerable	Vulnerable
<i>Egernia rugosa</i>	Yakka Skink	Vulnerable	Vulnerable
<i>Lerista allanae</i>	Allan's Lerista	Endangered	Endangered
<i>Paradelma orientalis</i>	Brigalow Scaly-foot	Vulnerable	Vulnerable
<i>Rheodytes leukops</i>	Fitzroy River Turtle	Vulnerable	Vulnerable
Birds			
<i>Ephippiorhynchus asiaticus</i>	Black-necked Stork (Jabiru)	Rare	
<i>Erythrotriorchis radiatus</i>	Red Goshawk	Endangered	Vulnerable
<i>Geophaps scripta scripta</i>	Squatter Pigeon (southern subsp.)	Vulnerable	Vulnerable
<i>Neochmia ruficauda ruficauda</i>	Star Finch (Eastern subsp)	Endangered	Endangered
<i>Nettapus coromandelianus albipennis</i>	Cotton Pygmy-Goose	Rare	Migratory
<i>Rostratula australis</i>	Australian Painted Snipe	Vulnerable	Vulnerable
Mammals			
<i>Chalinolobus picatus</i>	Little Pied Bat	Rare	
<i>Nyctophilus timoriensis (SE Form)</i>	Greater Long-eared Bat (SE Form)	Vulnerable	Vulnerable
<i>Taphozous troughtoni</i>	Troughton's Sheath-tail Bat	Endangered	

3.2.6 Noise and Vibration

Whilst the Caval Ridge Mine is in a rural setting, the northern extents of the mine will be within approximately 8km of the southern extents of the town of Moranbah. The proximity of the mine to Moranbah increases the potential for impacts from noise and vibration due to the operation of the mine.

The main noise and vibration sources include:

- overburden blasting and removal;
- coal preparation plant operations;
- rail traffic;
- coal haulage, preparation and loading of trains; and
- traffic flow in and around the mine-site vicinity.

The EIS will assess the potential for noise to be a nuisance to the nearby sensitive receptors. Appropriate noise mitigation strategies will be presented in the EIS if required.

3.2.7 Air Quality

The Caval Ridge Mine element of the Project will be required to meet air quality standards for dust levels under the *Environmental Protection Act 1994* and subordinate legislation. Assessment of the air quality and suitable mitigation methods will be outlined in the EIS. Air quality in the region is mainly influenced by pastoral conditions, open cut mining, and both rail and road transportation activities nearby.

Air quality issues include dust deposition. The principal dust sources include heavy mining equipment movements, topsoil stripping, and coal handling. During operations, dust generation will be managed by the use of water carts for road watering, sprays on crushers and conveyor transfer points, conducting progressive rehabilitation (if required), limiting disturbance to what is required for safe operations and, if appropriate, changing work practices during adverse meteorological conditions. Existing monitoring data will be used to assess existing dust levels and identify potential sensitive receptors.

3.2.8 Greenhouse Gases

Mining coal from the Caval Ridge Mine will result in the emission of some greenhouse gases to the atmosphere. The EIS will estimate the total quantity of greenhouse gases (including direct and indirect emissions) attributable to the mine. This information will be used to assess mitigation strategies in the EIS and to provide an appropriate context for actions that are being undertaken at a corporate level by the BMA.

The EIS will also examine the contribution that the mine makes to the cumulative greenhouse gas emissions from the region.

3.2.9 Infrastructure Impacts

The Caval Ridge Mine will necessitate the use and development of infrastructure in the region. This will include:

- power (new connections to the grid);
- water (supplied via the Eungella pipeline to the site); and

- road and rail transport corridor used to access the site and transport the coal product to the Hay Point and/or Dalrymple Bay coal terminals.

The EIS will quantify the scale of infrastructure use and its impacts on the region.

3.2.10 Visual Amenity

The physical features associated with the Caval Ridge Mine that may have aesthetic impacts include out-of-pit overburden dumps, and other infrastructure including road overpass, CHPP, power lines and administration buildings. The EIS will present an assessment of the impacts that these features have on the landscape, taking into account the proximity of the mine to the town of Moranbah.

3.2.11 Cultural Heritage Values

Investigation of Aboriginal cultural heritage values will be undertaken in consultation with relevant Traditional Owners, the Barada Barna Kabalbara & Yetimarla (BBKY) people. Work is also proposed to evaluate the remnants of European settlement.

3.3 Goonyella Riverside Mine Expansion

3.3.1 Surface Water

The Goonyella Riverside Mine Expansion element of the Project is located in the catchment of the Isaac River. The area is traversed by a number of tributaries that include Eureka Creek, Platypus Creek, Fisher Creek, Goonyella Creek and Cleanskin Creek. Streams in the area flow intermittently with extreme variability in flow throughout the year. The development of the mine has affected the drainage pattern across the leases.

Eureka Creek, Platypus Creek and Fisher Creek and a section of the Isaac River have been permanently diverted as part of the existing mining operation. Creeks have also been diverted to control flooding and maximise extraction of the coal reserves.

The main use of water in streams downstream from the mine is to water livestock. The natural systems associated with the streams have generally been altered as a result of land clearing, agricultural use, mining activities and the regulation of stream flows not related to mining activity. Potential impacts from the Goonyella Riverside Mine expansion on surface water quality may occur from the following:

- suspended sediment and solutes from spoil, coal rejects, haul roads and general mine workings;
- hydrocarbons, detergents, organic solvents and other contaminants;
- fuel or oil spills from storages, supply lines or vehicles;
- overflows from mine site storages as a result of flooding;
- subsidence of the land surface;
- effluent from sewerage or ablution facilities; and/or

- contamination from waste streams.

The Goonyella Riverside Mine Expansion is also within the catchment that drains into the Shoalwater and Corio Bays Area which is identified as a RAMSAR wetland and is protected under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). However, this area is located 200 km away and will not be affected by the Goonyella Riverside Mine Expansion given the water management controls proposed for the operation.

3.3.2 Groundwater

Groundwater suitable for stock watering is generally limited to isolated low yielding alluvial aquifers. Very few porous rock type aquifers exist within the Bowen Basin coal system which is confirmed by the lack of high yielding groundwater bores on surrounding properties. Groundwater associated with the coal seams is moderately to highly saline and is not used. These aquifers typically have low yields, with only certain parts of the aquifers providing seepage into pits all year. The groundwater associated with the Goonyella Middle Seam is hyper saline (up to 20, 000 $\mu\text{S}/\text{cm}$ conductivity) and is of no use to the mine or surrounding properties for potable or industrial purposes.

According to the hydrogeological reports produced for various stages of the mine development, the groundwater profile of the region is dominated by the three main coal seams at Goonyella Riverside Mine which act as the principal aquifers. These seams are isolated by the overburden and interburden rocks forming impermeable boundaries. The aquifer system of the Quaternary alluvium associated with the Isaac River is hydraulically associated with the Permian sequence in the mining area. Mine workings may drain the shallow stream channel aquifers, however they are rapidly recharged during stream flows. The coal seam aquifers may either drain or be recharged depending on the presence or absence of water in the pit.

Overall, little impact to regional groundwater is likely from the Goonyella Riverside expansion, although the expansion has the potential to impact on local alluvial aquifers.

3.3.3 Land Resources

The Goonyella Riverside Mine Expansion is located on the western limb of the Bowen Basin, a 600 km long linear coal basin of Permian age that stretches from Collinsville in the north to Rolleston in the south. The Goonyella Riverside coal seams occur within the late Permian Moranbah Coal Measures.

Open cut mining disturbs the land surface, drainage patterns and geological sequences. Slope gradients of post-mined land will be greater than that prior to mining. This is a contributing factor to a change in the pre-mining land suitability.

Underground and open cut mining have the potential to cause surface subsidence. The introduction of the second longwall to the underground operations may increase the magnitude of surface subsidence. Potential impacts associated with subsidence include:

- Impacts on watercourses, including diversions and other water control structures, above the extraction area;
- Impacts on Aboriginal cultural heritage sites;
- Impacts on ecology; and
- Impacts on infrastructure.

BMA will monitor the areas likely to be affected by subsidence and take remedial action appropriate to the scale and impact of the subsidence as it occurs.

3.3.4 Flora

The major vegetation communities of the area include savannah woodlands, mixed shrub woodlands and brigalow. Unlike the brigalow stands of deep black cracking clay soils, stands within the mine lease are generally of inferior quality and reduced growth. This indicates the poor physical and chemical qualities of the soils supporting them. The mine is situated within the Brigalow Belt North Bioregion. Significant conservation values are currently placed on Brigalow (*Acacia harpophylla*) dominated vegetation communities, as the range of this vegetation type has significantly declined within the bioregion. Many areas have been cleared or thinned of vegetation for grazing.

Recent vegetation surveys found the following species in the lease area; and *Acacia harpophylla*, *Eucalyptus cambageana*, and *Dichanthium sericeum*. None of these flora species is currently listed as a significant species under either the *Environment Protection and Biodiversity Conservation Act 1999* or *Nature Conservation (Wildlife) Regulation 1994*.

However, the flora species mentioned are significant as the characteristic species found to be dominant in threatened Regional Ecosystems (REs) under the *Queensland Vegetation Management Act 1999* and, in the case of Brigalow and Bluegrass communities, ‘Threatened Communities’ under the *Environment Protection and Biodiversity Conservation Act 1999*.

Current vegetation mapping for the project area describes the following RE’s for the area as detailed in Table 9 Regional Ecosystems of the Goonyella Riverside Mine Expansion .

■ **Table 9 Regional Ecosystems of the Goonyella Riverside Mine Expansion Area**

RE Code	Description	VMR status ¹
11.3.25	Eucalyptus tereticornis or E. camaldulensis woodland fringing drainage lines	Not of Concern
11.3.10	Eucalyptus brownii woodland on alluvial plains	Not of Concern
11.9.9	Eucalyptus crebra woodland on Cainozoic finegrained sedimentary rocks	Not of Concern
11.11.19	Eucalyptus thozetiana, Acacia harpophylla woodland on old sedimentary rocks	Not of Concern
11.7.2	Acacia spp. woodland on Cainozoic lateritic duricrust.	Not of Concern
11.9.1	Acacia harpophylla, -Eucalyptus cambageana open forest to woodland on Cainozoic fine-grained sedimentary rocks	Endangered
11.9.10	Acacia harpophylla, Eucalyptus populnea open forest on Cainozoic fine-grained sedimentary rocks	Of concern
11.5.3	Eucalyptus populnea and/or E. melanophloia and/or Corymbia clarksoniana on Cainozoic sand plains/remnant surfaces	Not of Concern
11.3.1	Acacia harpophylla and/or Casuarina cristata open forest on alluvial plains	Endangered
11.4.8	Eucalyptus cambageana woodland to open forest with Acacia harpophylla or A. argyrodendron on Cainozoic clay plains	Endangered
11.4.9	Acacia harpophylla shrubby open forest to woodland with Terminalia oblongata on Cainozoic clay plains	Endangered
11.8.11	Dichanthium sericeum grassland on Cainozoic igneous rocks	Of Concern

¹ Status under the *Vegetation Management Act 1999*

Both *Acacia harpophylla* dominated communities (RE 11.3.1, 11.4.9, 11.9.1, 11.9.10) and Bluegrass (*Dichanthium sericeum*) dominant grasslands (RE 11.8.11) are also listed as 'Threatened Communities' under the *Environment Protection and Biodiversity Conservation Act 1999*.

3.3.5 Fauna

Fauna surveys have been conducted previously for the existing mining tenures (excluding MDLAs 307 and 358). As a result of these previous surveys, and a recent review of species of conservation significance for the project areas several species for the site have been identified as holding conservation significance under either the *Environment Protection and Biodiversity Conservation Act 1999* or the *Nature Conservation (Wildlife) Regulation 1994*. Their designations are as follows:

- Brigalow Scaly-foot (*Paradelma orientalis*): 'Vulnerable' *Nature Conservation (Wildlife) Regulation 1994* and 'Vulnerable' *Environment Protection and Biodiversity Conservation Act 1999*.
- Little Pied Bat (*Chalinolobus picatus*): 'Rare' *Nature Conservation (Wildlife) Regulation 1994*.
- Squatter Pigeon- southern sub species (*Geophaps scripta, scripta*): 'Vulnerable' *Nature Conservation (Wildlife) Regulation 1994* and 'Vulnerable' *Environment Protection and Biodiversity Conservation Act 1999*.
- Cotton Pygmy Goose (*Nettapus. coromandelianus*): 'Rare' *Nature Conservation (Wildlife) Regulation 1994*.

- Black-necked stork (*Ephippiorhynchus asiaticus*): 'Rare' *Nature Conservation (Wildlife) Regulation 1994*.

Additional species of conservation significance that are considered likely to occur in the area include:

- the Skink (*Anomalopus brevicollis*): 'Rare' *Nature Conservation (Wildlife) Regulation 1994*; and
- Ornamental Snake (*Denisonia maculate*): 'Vulnerable' *Nature Conservation (Wildlife) Regulation 1994*.

Changes may occur to fauna habitats in the project area due to:

- loss of habitat through clearing;
- changes in weed species abundance;
- changes to the structure and species of vegetation on rehabilitated land;
- possible degradation of water quality in creeks downstream of the project; and/or
- the introduction of permanent water bodies (i.e. retention dams and final voids).

3.3.6 Noise and Vibration

The Goonyella Riverside Mine Expansion is in a rural setting and therefore is generally remote from noise or dust sensitive receptors. The proximity of the nearest sensitive receptors will be identified. Mining by its very nature creates noise through the use of heavy equipment, processing of coal and blasting of the overburden and coal. The local area with the potential to be impacted from noise or vibration is very sparsely settled. The main noise and vibration sources include:

- overburden blasting and removal;
- coal preparation plant operations;
- rail traffic;
- coal haulage, preparation and loading of trains; and
- traffic flow in and around the mine-site vicinity.

The existing mine has no significant environmental noise and vibration issues associated with the operation due its remoteness from townships and homesteads.

3.3.7 Air Quality

Air pollution from the Goonyella Riverside Mine Expansion is expected to be confined to dust. The major dust sources include the operation of draglines, coal preparation, blasting and operation of large mobile equipment. Dust mitigation measures include watering of exposed, unsealed areas. The mitigation measures should be sufficiently effective so as not to contribute to cumulative dust generation levels.

The potential for spontaneous combustion is small due to the low levels of sulphur and low inherent moisture in the coal. In the event of coalface fires developing there will be additional localised impacts on air quality due to the emission of smoke and gases.

The mine will be required to meet air quality standards for dust levels under the *Environmental Protection Act 1994* and subordinate legislation. Existing monitoring data will be used to assess existing dust levels and identify potential sensitive receptors. Assessment of the air quality and suitable mitigation methods will be outlined in the EIS. Air quality in the region is mainly influenced by pastoral conditions, open cut mining, and both rail and road transportation activities nearby

3.3.8 Greenhouse Gases

Mining coal from the Goonyella Riverside Mine Expansion will result in the emission of greenhouse gases to the atmosphere. The EIS will estimate the total quantity of greenhouse gases (including direct and indirect emissions) attributable to the mine. This information will be used to assess mitigation strategies in the EIS and to provide an appropriate context for actions that are being undertaken at a corporate level by the BMA.

The EIS will also examine the contribution that the mine makes to the cumulative greenhouse gas emissions from the region.

3.3.9 Infrastructure Impacts

The Goonyella Riverside Mine expansion will necessitate the use and development of infrastructure in the region including:

- power (new connections to the grid);
- water (supplied via the Eungella and Braeside pipelines to the site); and
- road and rail transport corridor used to access the site and transport the coal product to the Hay Point and/or Dalrymple Bay coal terminals. .

The EIS will quantify the scale of infrastructure use and its impacts on the region.

3.3.10 Visual Amenity

The physical features associated with the Goonyella Riverside Mine Expansion that may have aesthetic impacts include out-of-pit overburden dumps, and other infrastructure including CHPP, power lines and administration buildings. The EIS will present an assessment of the impacts that these features have on the landscape.

3.3.11 Cultural Heritage Values

The Goonyella Riverside Expansion area contains traces of prior Aboriginal habitation and areas retaining Indigenous cultural significance. These include sites with stone artefacts, trees bearing scars caused by

Indigenous bark removal for artefact manufacture, and sites dating from the contact-era. Most of the previously located cultural features were recorded during earlier site clearance associated with coal mining projects in the district.

A detailed cultural heritage assessment has been completed, with the cooperation of the region's Traditional Owners and native title claimants, to assess potential mine expansion impacts on previously recorded sites, and on unrecorded cultural features. The heritage assessment entailed an on-site survey of areas potentially affected by the Goonyella Riverside Mine Expansion and associated infrastructure. Work has also been carried out to evaluate the remnants of European settlement. Results will be presented in the EIS for the Goonyella Riverside Mine Expansion.

3.4 Airport Development

The location of the proposed Airport Development is not yet decided. Hence, it is not yet possible to describe the existing environment, except to say that the area around the Moranbah district is characterised by:

- flat-moderately rolling topography;
- ephemeral streams;
- good air quality, affected only by burning, clearing and occasional dust storms
- low noise levels, except near the town and from mine traffic
- patches of endangered ecosystems, especially Brigalow
- some areas of cultural heritage significance due to past Indigenous habitation of the area;
- rural and regional societies.

The development of an airport will be subject of an EIS. The EIS will have to address the potential environmental impacts due to:

- clearing of vegetation and disturbance of the soils;
- loss of any potentially good quality agricultural land, and changes in land suitability;
- any impacts on water catchments, creeks and rivers in the area;
- potential impacts on air quality due to emissions;
- potential impacts on noise, due to air traffic and the associated road traffic;
- potential impacts due to clearing any significant vegetation and fauna habitat; and potential impacts due to bird strikes;
- potential disturbance of cultural heritage artefacts and impacts on other cultural heritage values; and
- potential impacts on the nearby communities.

The EIS will address all the issues relevant to the development of a regional airport in Central Queensland, and will present mitigation strategies appropriate to the nature and extent of the potentially adverse impacts.

4 Socio-Economic Considerations

The area surrounding the Project generally supports broad-acre agricultural activities. The closest town to the mine is Moranbah. The town was built in 1971 by the Utah Development Company Ltd to service the Goonyella Mine and later the Peak Downs Mine. Both of these operations are managed by BMA. The town's economy relies on the surrounding coal mines. The town has a population of approximately 10000. The average age in the population is 35. Copabella is also in the vicinity of the Project.

All elements of the Project are located in the Isaac Regional Council area, formerly within the Nebo Shire prior to the Queensland Local Government amalgamations.

The Project's primary impacts on the socio-economic environment will be to increase the region's population and increase demand for regional suppliers. Impacts may occur on housing, community values and lifestyle, the availability of education, medical and other support services. The EIS will examine these impacts and provide recommendations to enhance the benefits of the Project and minimise any potential adverse impacts.

To ensure these issues are well understood, stakeholders, including community members, will be consulted as part of the EIS. The objectives of this community engagement program will be to:

- initiate and maintain open communication with the community on all aspects of the projects and the environmental impact assessments;
- identify community issues and concerns in relation to BMA growth;
- target specific community stakeholders to help identify potential social impacts and develop appropriate mitigation strategies;
- proactively respond to and work with stakeholders to develop appropriate solutions and strategies to minimise negative impacts associated with the projects;
- address all stakeholder issues through the EIS process and communications;
- continue the long-term relationship between BMA and the community that is based on trust and mutual respect;
- provide feedback to stakeholders about their issues and concerns and how their feedback has been used; and
- manage a process which uses existing community contact points and avenues for discussion.

To achieve the objectives outlined in this plan, the detailed community engagement process will involve:

- recognising the history of the projects by building on previous regional consultation activities;
- planning for and implementing opportunities for the community and stakeholders to comment on the potential impacts of BMA's growth plans;

- working with the community to comment on technical documents such as the EIS by educating and assisting groups and individuals to provide submissions and comment;
- establishing flexible and mobile display and support facilities that maximise community and stakeholder involvement;
- recognising the contribution BMA makes in the economic development of the region;
- obtaining, considering, managing and documenting community and stakeholder comments and issues of concern; and
- building on information developed by BMA during the planning process for each project.

5 Environmental Management

The EISs to be prepared for each element of the Project will describe the measures that will be taken to prevent or mitigate any potential adverse environmental impacts on the environment, including to water resources (surface water and groundwater), land resources, air quality, noise and vibration, cultural heritage, and flora and fauna of conservation significance. The EISs will also address the potential for social impacts and present mitigation strategies to manage any potentially adverse impacts if required.

Environmental management requirements for operations will be stipulated in the regulatory documents that are prepared as part of the approvals process prior to mining (e.g. Environmental Management Plan (EM Plan), Environmental Authority, Plan of Operations). Regulation of environmental management during mining is the responsibility of the Environmental Protection Agency.

BMA operates all its projects in accordance with Environmental Management Systems that ensure that all environmental and social management strategies are implemented, monitored and reviewed to ensure a process of continual improvement in its operating practices.

6 Contact Details

For further information concerning the Project, please contact:

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