APPENDIX 14d

Kevins Corner Coal Project
EIS Extracts

02 Project Description

Section 02 Project Description

2.1 Overview of the Project

Hancock Galilee Pty Ltd (HGPL), the Proponent, proposes to develop the Kevin's Corner Coal Mine Project (the Project), a new 30 million tonnes per annum (Mtpa) capacity thermal coal open-cut and underground coal mine in the Galilee Basin, Central Queensland. The Project proposes to primarily service international export energy markets, as well as potential national markets, for thermal coal. Mining operations will predominately target the "D" seam in the Upper Permian coal measures of the Galilee Basin, Queensland and the coal will be treated by a coal preparation plant (CPP) before being conveyed to a rail load out facility. The Project will involve the development of a rail spur connecting the mine to the proposed Hancock Coal Pty Ltd (HCPL) Alpha Coal Project railway. It is proposed to transport the coal to the port of Abbot Point for export. Initially all product coal is planned for export; however, domestic use will be explored. The Project has an expected mine life of 30 plus years, with sufficient Joint Ore Reserves Committee (JORC) compliant reserves to significantly extend the Project life beyond 30 years.

The Project will include the following key infrastructure; run of mine (ROM) stockpiles; coal handling and preparation plant (CHPP); tailings storage facility (TSF); raw water dams; environmental dams; construction camp and accommodation village and operational accommodation village; mine access roads; fuel and oil storage facilities; water and wastewater treatment systems; sewerage systems; creek diversions and drainage channels; rail loop; airport; light industrial area (LIA), including training and emergency services, light vehicle workshop and heavy welding shop; and mine industrial areas (MIA) for each mining area, including workshops, warehouses, administration buildings and tyre bays.

The Project consists of two open-cut pits (Central and Northern open-cut pits) extending over an initial strike length of 6.5 km and in time reducing to a steady strike length of 4 km, plus three underground longwall operations (Southern, Central and Northern underground) proposed in three independent mining areas.

Mining of the open-cut pits will commence at the seam sub-crop and progress down dip towards the west. The overburden will be removed by truck and shovel, excavators and dragline operations. Initially overburden will be stockpiled in out-of-pit spoil emplacements, after which it will be used to progressively backfill the open-cut pits as the mine working areas advance to the west.

For the underground component, each longwall panel will be allocated an independent set of mains roadways for access, coal clearance and ventilation. The underground workings will require a separate belt drift and man-and-materials drift dedicated to each longwall operation.

The coal from the open-cut operations will be mined by excavator and transported by truck. Raw coal from the open cut will be processed at two ROM facilities where it will be reduced in size for further processing at the CPP. For the underground longwall operations, all ROM coal will be transported directly to the CPP via an overland conveyor.

Coal will be transported by rail along the Kevin's Corner rail spur (approximately 17.8 km) extending from the Kevin's Corner mine to the Alpha Coal Rail Alignment at approximately chainage 30 km. The Alpha Coal Rail Alignment extends from the Alpha Coal Mine to Abbot Point. A siding is proposed at the LIA to allow two-way shunting at the loop turnout and on the return side of the rail loop. This enables substantial flexibilities in the turnaround of freight trains.

It is proposed to use the Abbot Point Coal Terminal for the export of product coal from the Kevin's Corner mine to overseas markets. The North Queensland Bulk Ports Corporation (NQBP) is the owner and port authority for the Port of Abbot Point. The port facility has a current capacity of 21 Mtpa. In 2007, approvals were granted to expand to 50 Mtpa. The NQBP has recently completed a Voluntary Environmental Assessment (VEA) for a proposed expansion to 110 Mtpa (Terminal 3), with a potential multi-cargo facility.

The construction phase of the Project is envisaged to take nominally four years, commencing early works in 2012 to initially establish access roads to the mine and to construct the airport and accommodation centres. The projected combined construction and capital cost of the Project is approximately $6.95 million. The scheduled life of mine (LOM) for the Project mining operations is 30 years, commencing in 2014, with first coal late in the same year. However, as noted above, it is possible that there will be sufficient economic reserves to potentially extend the Project life beyond 30 years.

The Project will look to employ a combined workforce of approximately 2,500 at the peak of construction in 2014. Long-term employment during operations will be maintained at approximately 1,500 people, with intermittent increases of contractors for maintenance shutdowns or similar activities. The staffing profile of the operational workforce and the elemental groups for construction have been described in more detail in the Social section (Volume 1, Section 20) of this Environmental Impact Statement (EIS).

2.2 Location

2.2.1 Kevin's Corner Mine

The Project site is located in the Galilee Basin, Central Queensland, approximately 65 km north-west of the township of Alpha; 110 km south-west of the township of Clermont and approximately 340 km south-west of Mackay (see Figure 2-1).

The development of these tenements has not been economically viable until now due to historical demand for thermal coal being met by existing suppliers, coupled with its inland location requiring substantial rail and port infrastructure development. The medium to long-term demand from China, India and other rapidly growing nations for Australia's good quality, reliably supplied thermal coal is forecast to remain consistently strong.

Figure 2-2 illustrates the layout of all key components of the Project, including the two open-cut pits and three longwall operations.

Figure 2-3 presents the local property descriptions and the applicable mining tenure.

Figure 2-4 illustrates the underlying exploration petroleum permits (EPPs) and authorities to prospect (ATPs).

Figure 2-5 details the locations of all proposed Project road and rail infrastructure, including access points, ramps, haul roads, stock routes and rail loops.

Figure 2-6 illustrates the proposed mining infrastructure area (MIA) buildings and layout, including the light industrial area (LIA).

Figure 2-7 presents the Project disturbance area and easements over the Project site.

2.2.2 Tenure

The Project is largely contained within mining development licence (MDL) 333. Since the mid 1970s the Proponent has held MDL 333 and in the mid 1990s extended its tenure holding to include exploration permit for coal (EPC) 570 now known as MDL 285. In December 2007, the Proponent obtained a further EPC 1210. Portions of MDL 333 and EPC 1210 have been combined to form the new mining leases currently under application. HGPL has applied for mining lease application (MLA) 70425.

2.2.3 Relationships to Other Projects

There are a number of existing or proposed projects in the region that are at various stages of the EIS and/or development process. Details of these are provided in Table 2-1.

Table 2-1: Existing and proposed projects in the region

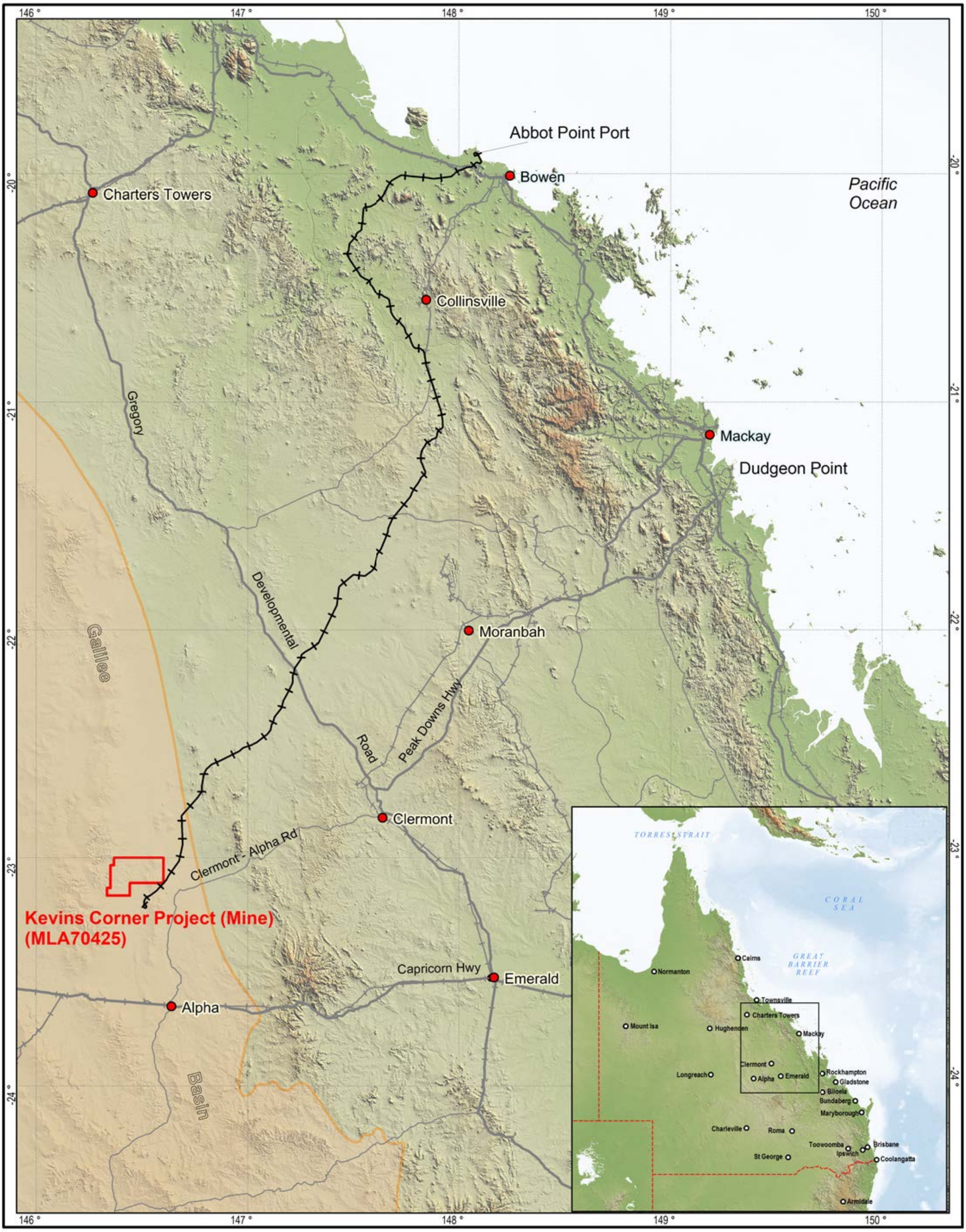
Project name and Proponent	Location (Distance from the Project)	Description	Project status
Existing Projects			
Blackwater, BMA	Blackwater (300 km)	Open-cut coal mining operation producing 11 million tonnes per annum (Mtpa) and employing 1570 personal	30 year mine life remaining
Blair Athol, Rio Tinto Coal Australia Ltd	Clermont (110 km)	Open-cut coal mine operation producing 11 Mtpa with 290 employees.	5 year mine life remaining.
Clermont, Rio Tinto Coal Australia Ltd	Clermont (110 km)	Open-cut coal mine operation producing 12 Mtpa with 360 employees.	7 year mine life remaining.
Cook, Caledon Resources PLC	Blackwater (300 km)	Underground coal mine operation producing 12 Mtpa with 360 employees.	At least 10 year mine life remaining.
Crinum, BMA	Tieri (250 km)	Underground coal mine operation producing 4 Mtpa with 420 employees.	Only two years of mining remaining.
Curragh, Wesfarmers Ltd	Blackwater (300 km)	Open-cut coal mine producing 7 Mtpa. Curragh operations employ 1,530 staff, in total.	At least 10 year mine life remaining.
Curragh North, Wesfarmers Ltd	Blackwater (300 km)	Open-cut coal mine producing 3 Mtpa.	At least 20 year mine life remaining.
Ensham, Ensham Resources Ltd	Emerald (40 km)	Open-cut coal mine producing 7 Mtpa with 600 employees.	At least 20 year mine life remaining.
Gregory, BMA	Tieri (250 km)	Open-cut coal mine producing 2 Mtpa with 225 employees.	Only two years of mining remaining.
Jellinbah East, Jellinbah Resources Ltd	Blackwater (300 km)	Open-cut coal mine producing 4 Mtpa with 380 employees.	At least 10 years of mine life remaining.
Kestrel, Rio Tinto Coal Australia Ltd	Tieri (250 km)	Underground coal mine producing 4 Mtpa with 515 employees.	At least 20 year mine life remaining.

Project name and Proponent	Location (Distance from the Project)	Description	Project status
Yarrabee, Yancoal Australia Ltd	Blackwater (300 km)	Open-cut coal mine producing 2 Mtpa with 220 employees.	15 year mine life remaining.
Proposed Projects			
Galilee Basin Power Station, Galilee Power Pty Ltd (fully owned subsidiary of Waratah Coal Pty Ltd)	Alpha (35 km)	Coal-fired power station producing 900 MW (net).	Initial Advice Statement (IAS) completed
Alpha Coal Project, Hancock Coal Pty Ltd	Alpha (15 km)	Open-cut coal mine producing 30 Mtpa.	SEIS completed
Waratah Galilee Coal Mine, Waratah Coal Inc. (China First)	Alpha (40 km)	Open-cut mine with export capacity of 25 Mtpa and capability to expand to more than 50 Mtpa.	EIS advertised
The South Galilee Coal Project (SGCP), joint venture of AMCI (Alpha) Pty Ltd and Alpha Coal Pty Ltd.	Alpha (80 km)	15-20 Mtpa open-cut and underground mining operation and associated infrastructure.	IAS completed
Water for Bowen Project, SunWater.	-	Water pipeline from Connors River Dam to raw water dam within MLA (during construction phase of the Project).	-
Galilee Basin Transmission Project, Powerlink.	-	Transmission lines from Lilyvale substation to a new Galilee Hub substation (during construction phase of the Project).	EIS advertised
Carmichael Coal Mine and Rail Project	Clermont (160 km)	Open-cut and underground mine and rail infrastructure up to 60 Mtpa.	IAS completed

The projects with a direct geographical relationship to the Project are:

- Alpha Coal Project, Hancock Coal Pty Ltd (HCPL);
- Galilee Basin Transmission Project, Powerlink; and
- Water for Bowen Project, SunWater.

The proposed Alpha Coal mine is directly south of the proposed Kevin's Corner coal mine with adjoining MLAs.



Mining Lease Application (MLA70425) Boundary

Proposed Alpha Project Rail Line

Source: See Copyright Details below and for full disclosure Please Refer to the EIS *Volume 1 - References*

0 25 50km
Scale 1:2,500,000 (A4)
Projection: Geographic (GDA94)

Datum: GDA94, MGA Zone55

N W E S

HANCOCK GALILEE PTY LTD

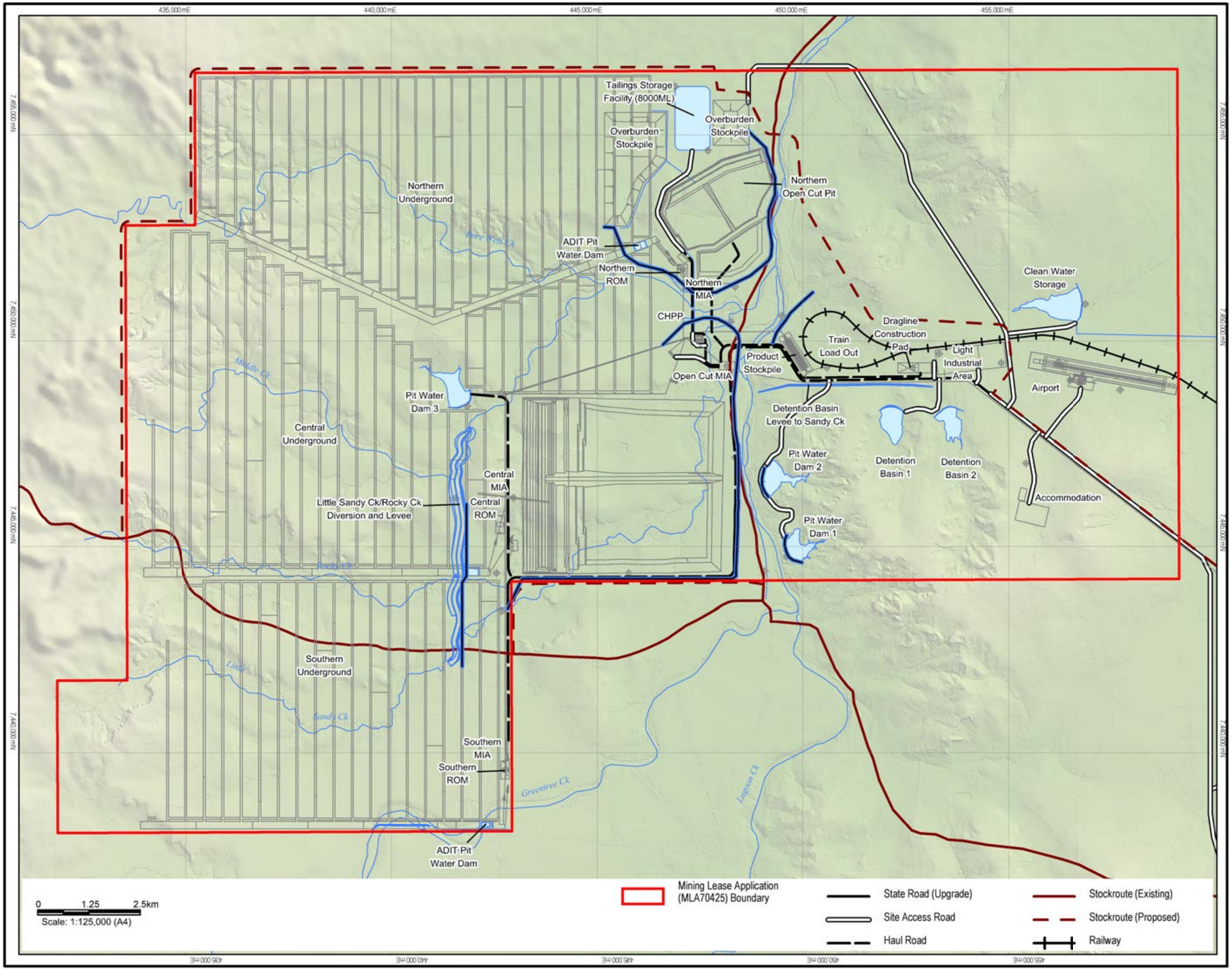
Kevin's Corner Project
Environmental Impact Statement

KEVINS CORNER
REGIONAL LOCATION

Job Number	4262 6660
Revision	B
Date	12-09-2011

Figure: 2-1

File No: 42626660-g-1001.wor



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Kevin's Corner Project
Environmental Impact Statement

N S E W

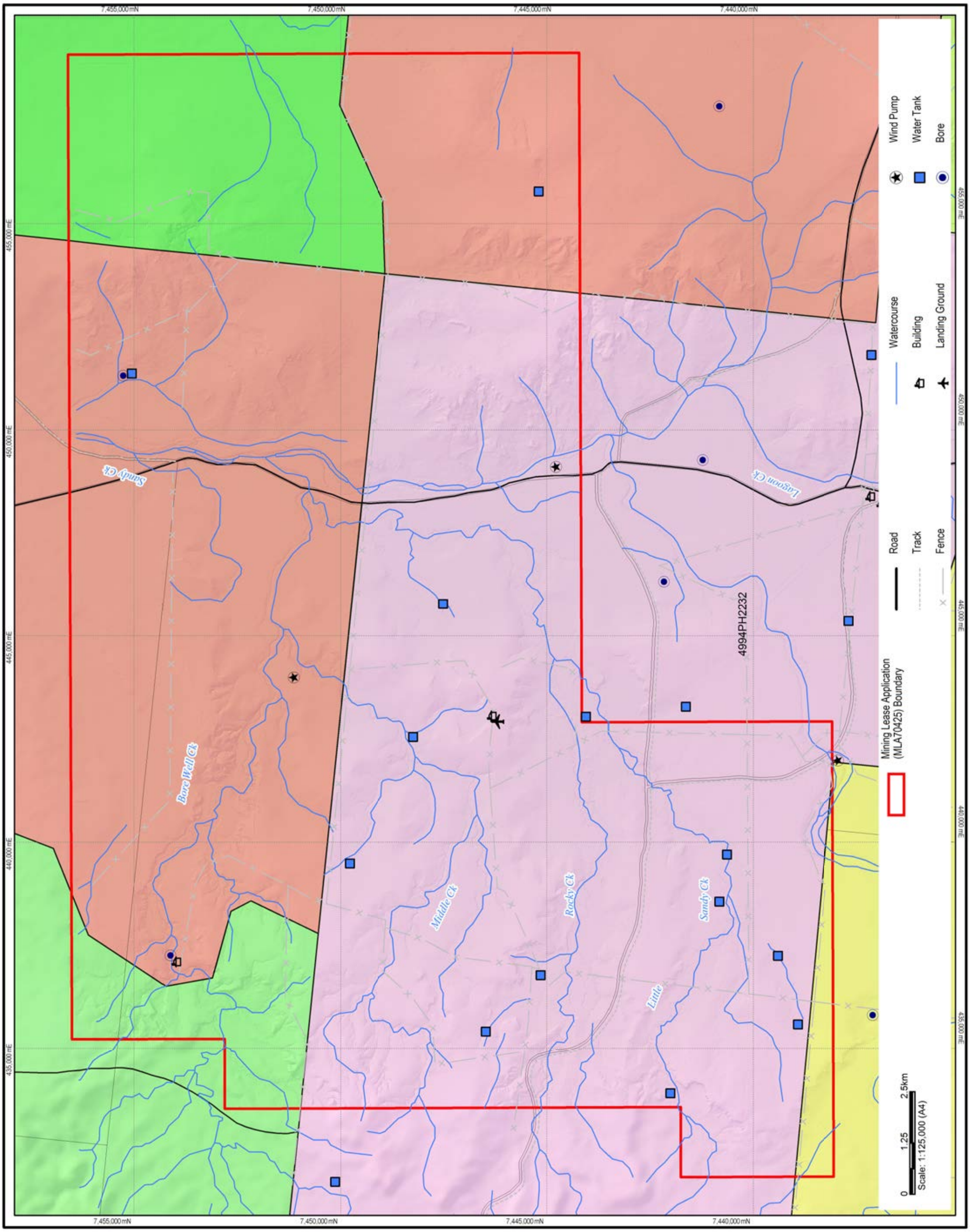
Datum: GDA94, MGA Zone55

File No: 42626660-g-1002.wor

KEVINS CORNER
OVERALL SITE LAYOUT PLAN

Job Number	4262 6660
Revision	C
Date	12-09-2011

Figure: 2-2



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Datum: GDA94, MGA Zone55

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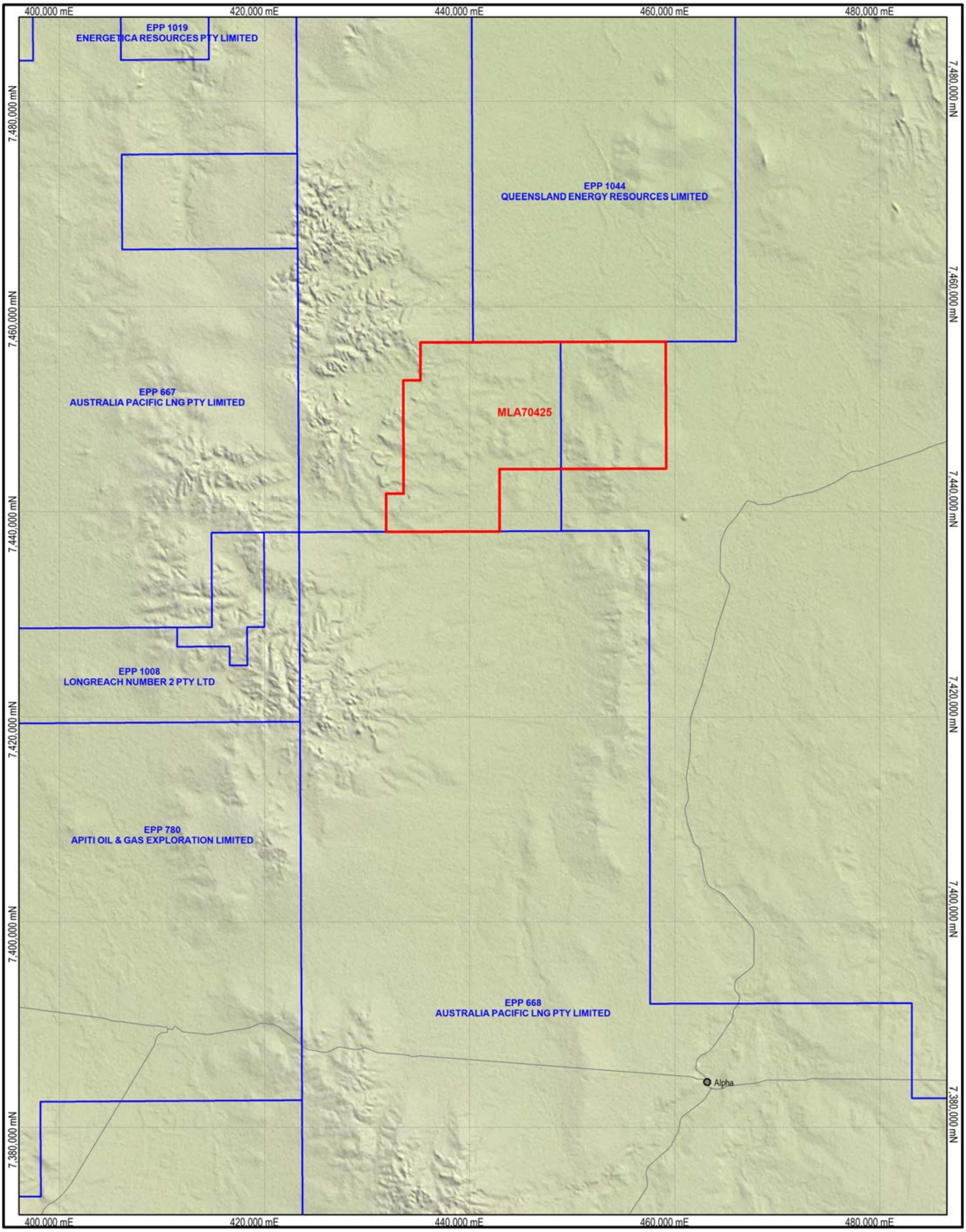
Kevin's Corner Project
Environmental Impact Statement

PROPERTY DESCRIPTIONS AND APPLICABLE MINING TENURE

Job Number | 4262 6660
Revision | B
Date | 12-09-2011

Figure: 2-3

File No: 42626660-g-1003.wor



Mining Lease Application (MLA70425) Boundary
Exploration Permit for Petroleum (EPP)
Major Road

Source: See Copyright Details below and for full disclosure Please Refer to the EIS *Volume 1 - References*

0 5 10Km
Scale: 1:500,000 (A4)

Datum: GDA94, MGA Zone55

N W E S

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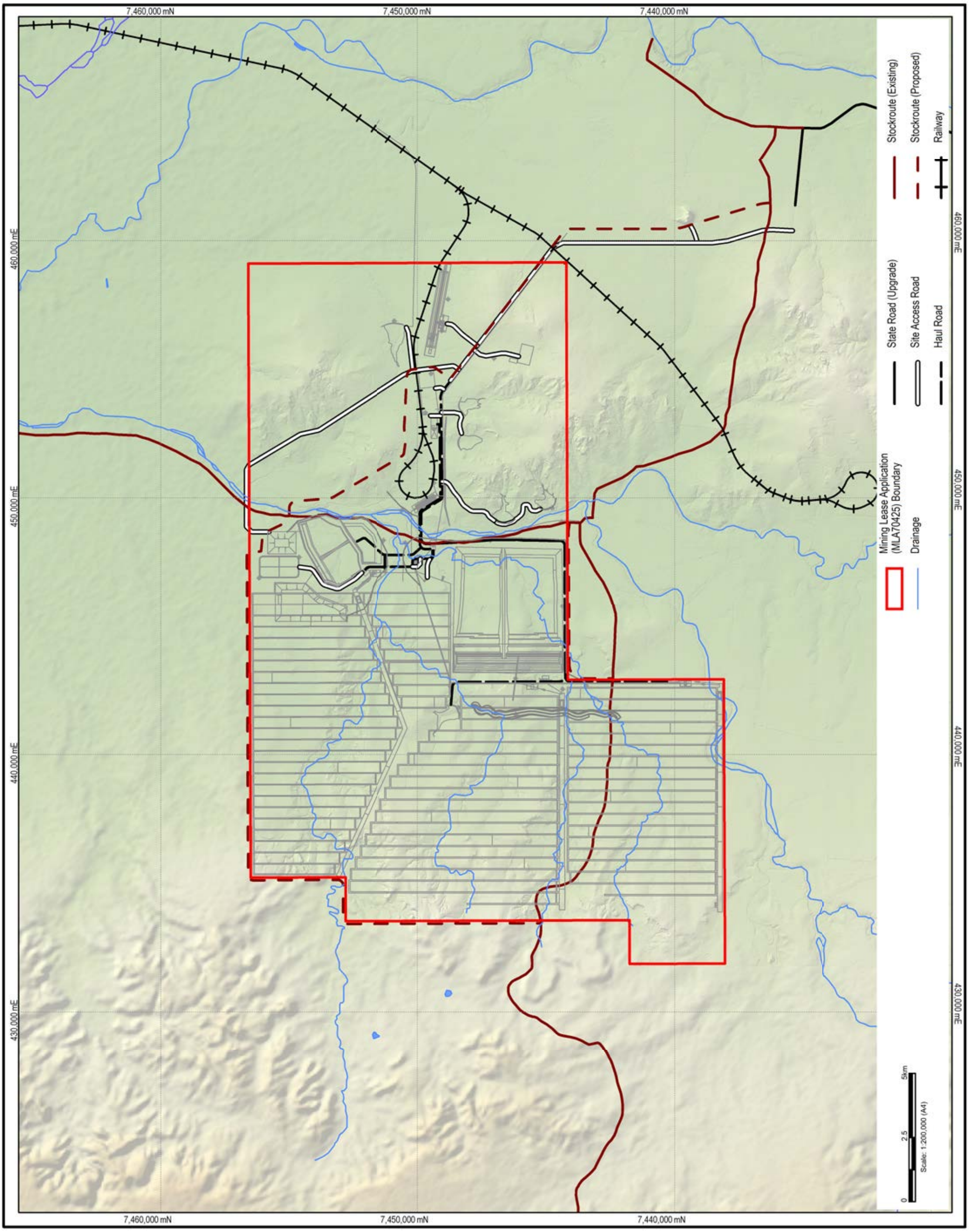
Kevin's Corner Project
Environmental Impact Statement

EXPLORATION PETROLEUM PERMITS (EPP) AND AUTHORITIES TO PROSPECT (ATP)

Job Number	4262 6660
Revision	B
Date	12-09-2011

Figure: 2-4

File No: 42626660-g-1004.wor



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Datum: GDA94, MGA Zone55

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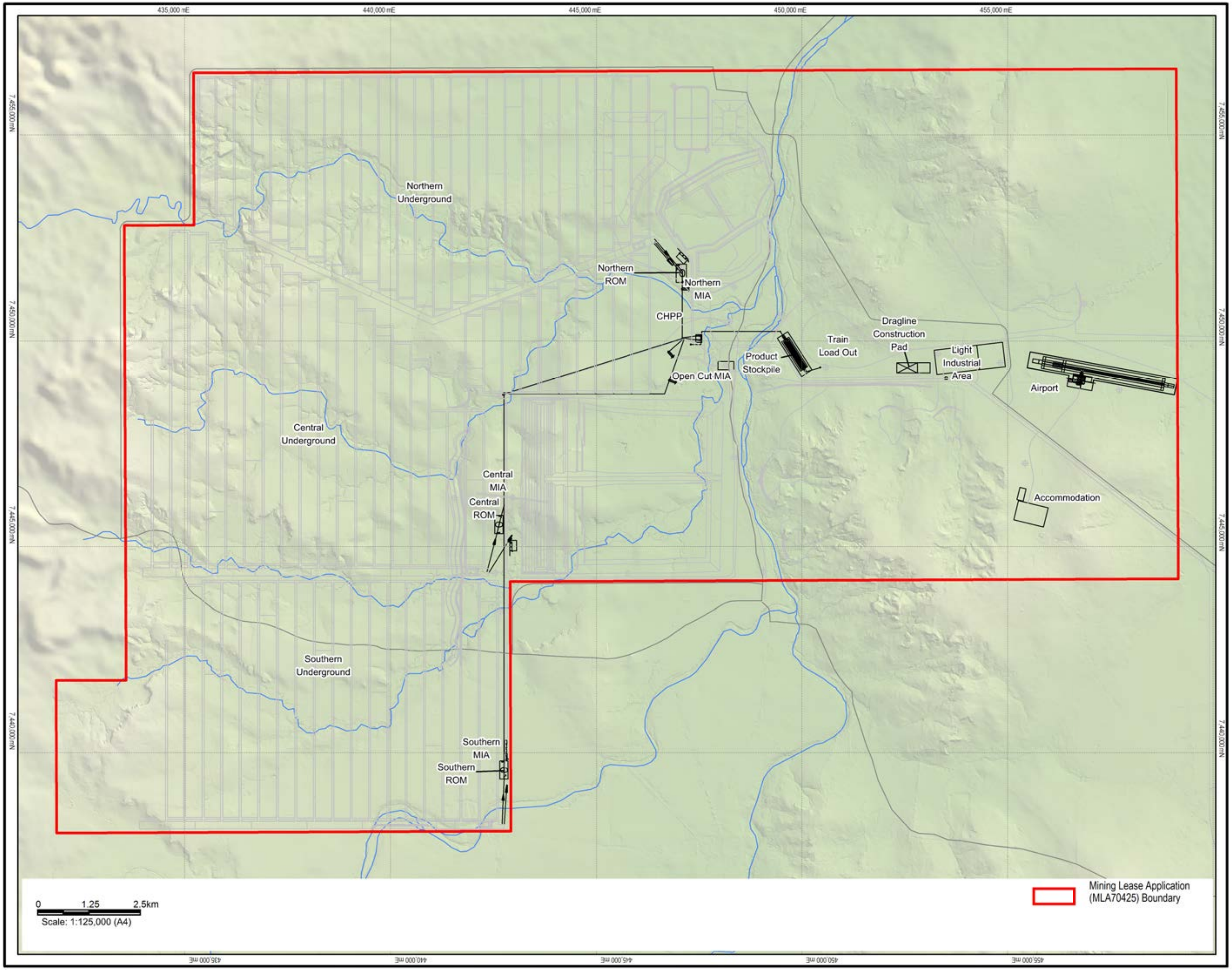
Kevin's Corner Project
Environmental Impact Statement

PROPOSED PROJECT ROAD AND RAIL INFRASTRUCTURE

Job Number	4262 6660
Revision	B
Date	12-09-2011

Figure: 2-5

File No: 42626660-g-1005.wor



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Kevin's Corner Project
Environmental Impact Statement

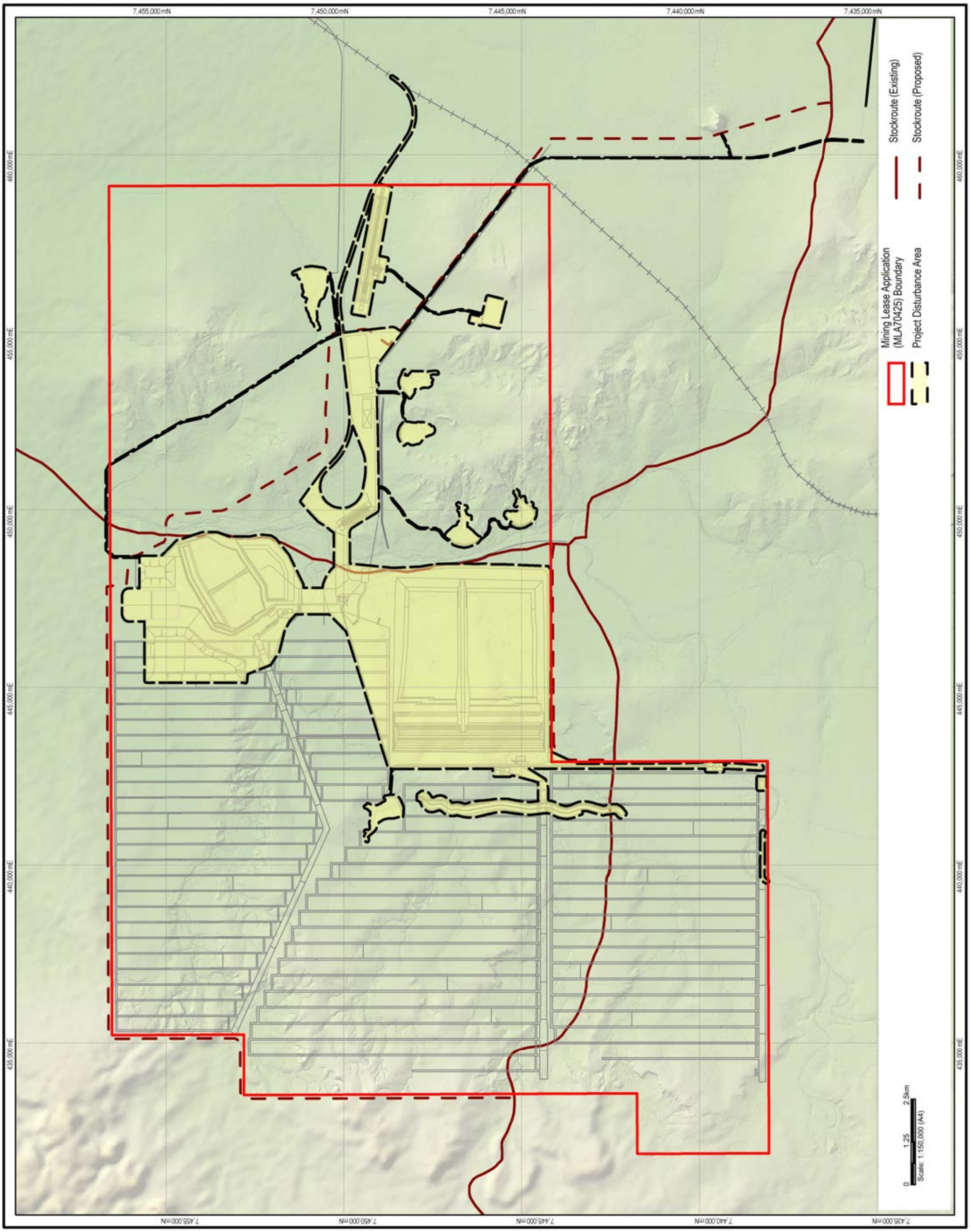
PROPOSED MINING INFRASTRUCTURE AREA (MIA) BUILDINGS AND LAYOUT

Job Number	4262 6660
Revision	C
Date	12-09-2011

Figure: 2-6

Datum: GDA94, MGA Zone55

File No: 42626660-g-1006.wor



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Kevin's Corner Project
Environmental Impact Statement

Datum: GDA94, MGA Zone55

PROJECT
DISTURBANCE AREA

Job Number	4262 6660
Revision	C
Date	12-09-2011

Figure: 2-7

File No: 42626660-g-1007.wor

2.3 Project Components

2.3.1 Coal Mine

The coal mine will be a combined open-cut and underground thermal coal mine consisting of two open-cut pits, extending over an initial strike length of 6.5 km reducing to a steady strike length of 4 km. The open-cut overburden will be removed by truck and shovel, excavators and dragline operations. The coal from the open-cut operations will be mined and transported by truck and excavator operations to ROM stations, where the coal will be loaded onto the overland conveyors.

The underground operations will consist of three individual retreating longwall mines (North, Central and South). The mines will be developed towards the west while individual longwall panels will retreat from North to South. The coal mined from the underground operations will be transported by conveyor to a top-of-drift stockpile before being transferred to the overland coal handling conveyors.

2.3.2 CHPP

The proposed CHPP concept incorporates highly robust, industry proven systems. The raw coal handling comprises two ROM sizing facilities for open-cut ROM coal receival and three remote ROM sizing facilities for underground operations transported by overland conveyor systems to the CHPP. Automated stacking and reclaim facilities will be provided to handle product coal including automated train load out bins.

Sized raw coal will be transferred from the ROM facilities via conveyors to the multi-module CHPP, where it will be washed. The coal resource mined and placed through the ROMs will be processed to produce on average a sub-10% ash export thermal product, with a proportion of the coal reserves having potential to be marketed without processing. A tailings storage facility is required for the high moisture fine coal fraction rejects (tailings) (see Section 2.6.8.4). The coarse rejects from the CHPP will be placed in designated locations within the open-cut spoil emplacement areas.

The CHPP will operate up to 7,200 hours per year to meet peak ROM throughput demands.

2.3.2.1 Raw Coal Handling

The raw coal handling system sizes and transports coal to the CPP for processing to remove non-combustible materials and size the coal to meet market specifications.

The critical requirements of the raw coal handling plant are to:

- Provide surge capacity between mining and processing operations;
- Provide a means of blending differing raw coal types from open-cut and underground mining operations;
- Reduce particle top size to 50 mm, whilst limiting fines production; and
- Deliver correctly sized coal to the preparation plant at a constant rate and size distribution.

For further details refer to Section 2.5.2.1.

2.3.2.2 Coal Preparation Plant

The CPP arrangement comprises of four 1,500 tonnes per hour (tph) modules. Utilisation of the CPP module concept considers use of common, proven technology in the coal mining industry, while alleviating bottleneck and availability issues through the multi-module arrangement.

The CPP configuration will be based on four of the highest capacity modules that can be designed using the largest coarse circuit equipment that is currently available. Using the least number of equipment items possible will limit unnecessary complexity in operations and maintenance.

For further information on the CPP refer to Section 2.5.2.2.

2.3.2.3 Product Coal Handling

Two plant product conveyors will each collect coarse and fine product material from two of the four modules and transport it to a transfer station where it will be conveyed to one of two stacking / reclaim conveyors, which will each feed a bucket wheel stacker reclaimer.

The CPP product will be either stacked out to the stockpile or conveyed directly to the train load out (TLO) system to meet rail scheduling requirements. While direct loading from the CPP, the bucket wheel stacker reclaimer machines will be required to simultaneously reclaim additional coal from the product stockpiles to achieve the maximum loading rate.

Product coal will be conveyed to a transfer station that will direct material onto a wide train load out conveyor. The TLO will elevate coal and discharge into the TLO bin incorporating two weigh flasks, which to discharge into the coal wagons at the required capacity.

2.3.3 Rail Loop and Rail Spur

The proposed rail loop and rail spur (to the main Alpha Coal Project rail line) has been located to facilitate alignment with the Alpha Coal rail line while avoiding excessive cuts and/or filled embankments, which should minimise the impact on the environment. The alignment also considered the placement of other Project infrastructure drainage and access to local properties.

The proposed alignment allows the train load-out bins to be located in line with the out-loading conveyors from the product coal stockpiles at the CHPP area.

2.3.4 Accommodation Village

There is a limited amount of available accommodation within a reasonable travel distance to the Project. To ensure employee fatigue is appropriately managed, stand-alone accommodation will be required for both the construction and operational phases.

It is planned to build a construction camp in the vicinity of the permanent accommodation village so that accommodation services can be easily shared.

Refer to Section 2.6.1 for details on the Kevin's Corner accommodation strategy.

2.3.5 Airport

Due to the remoteness of the site and the large numbers of both construction and operational workforce required for the Project, a fly-in fly-out (FIFO) operation is required, especially as preceding projects are likely to absorb immediately available labour. As such an on-site airport is proposed. The airport will be located 8km east of the Project MIA and will be supported by the light industrial area (LIA) (Figure 2-2).

It is anticipated that the airport will provide the primary means of staff movement to and from the mine. With a total of up to 1,600 FIFO employees and regular contractors across 2 week cycles there will typically be 700 to 800 FIFO employees per week on-site. An average of 80 employees per flight is anticipated resulting in 10 flights arriving from and departing to various main population centres each week.

To service this number of FIFO employees each week the proposed airport has been designed to cater for aircraft up to and including an Airbus A320 or Boeing 737. Eastern and Western flight approaches are available, allowing the flexibility required to minimise impacts on the Project operations (Figure 2-8 and Figure 2-9).

While the final design will be subject to Civil Aviation Safety Authority (CASA) approval, the preliminary stages of design include:

- A runway or around 2,500 m in length and 45 m width;
- A passenger screening area;
- An air traffic control ;
- Access roads with controlled public road access to the landside facilities;
- Emergency maintenance, light freight and refuelling facilities; and
- Bus depot to transport employees to and from the site

Construction of the airport is planned to take place as part of the early works following approvals to make it available as early as possible for management of the construction workforce. Materials used for construction of the runway (TMR Type 2) are ideally to be sourced locally at Surbiton South Quarry or equivalent material. Asphalt will be supplied by either an existing local supplier or from a temporary asphalt plant proposed as part of the Alpha Project. The airport facility buildings will be prefabricated off-site, transported to the site and reconstructed ready for operation.

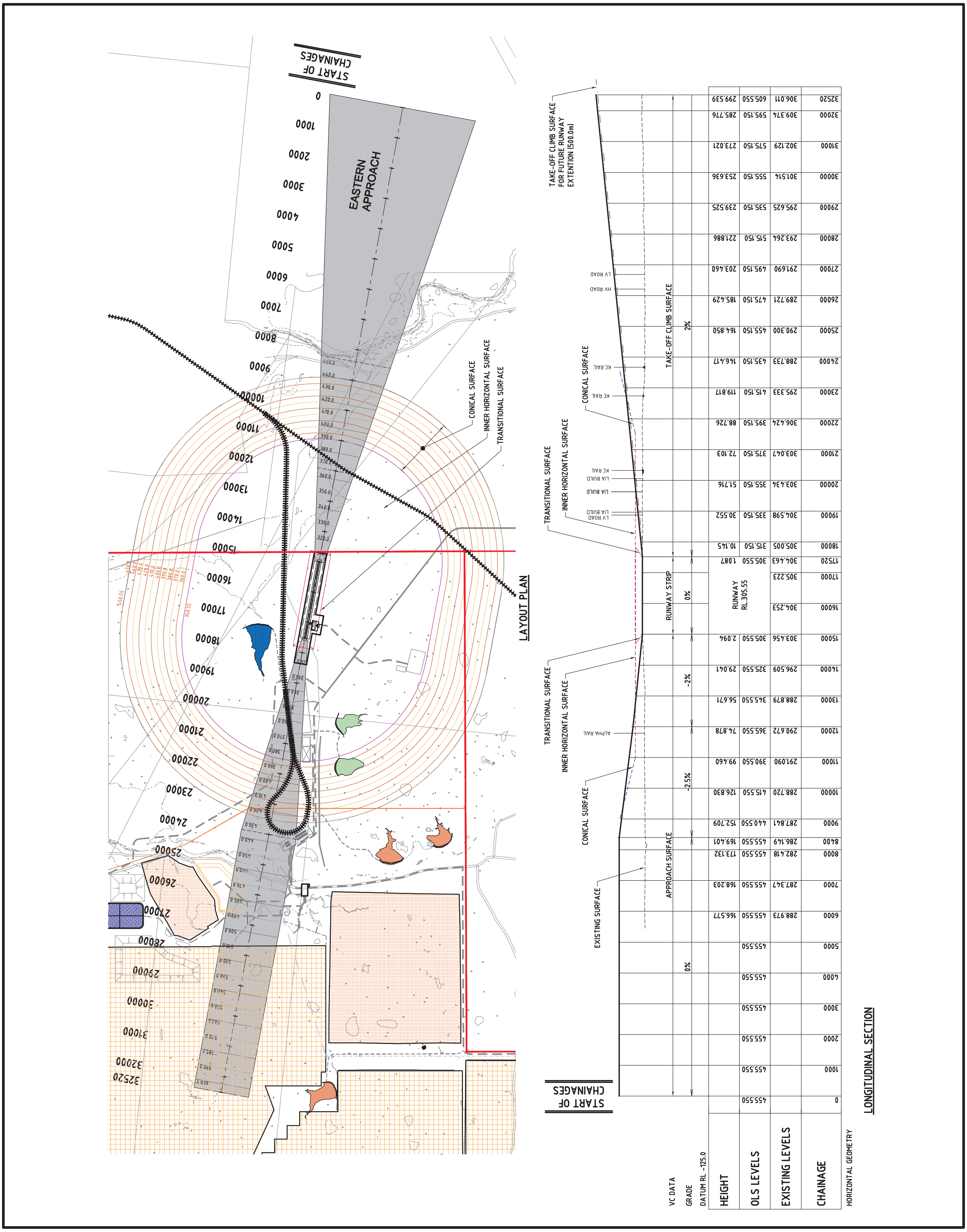
There will be limited public access to the facility; however, the airport will be made available for the evacuation of those in need in the event of a local emergency such as flooding, or by special arrangement with the local land-holders. The airside of the facility will be restricted to authorised personnel only. Such personnel will include emergency and safety teams, the management and operation of which will be planned as part of the airport operational manual and will be included in the submission to CASA for airport approval.

While maintenance and refuelling of aircraft are expected to be undertaken at other airport facilities, it is necessary for the airport to include these facilities for use in emergency situations. An emergency supply of A1 aviation fuel will be stored on the Project site as part of these services and cycled through periodically to ensure the quality of emergency fuels is attained.

2.3.5.1 Rationale for the Airport

The advantages of having a local airport on-site are numerous, including but not limited to:

- The type of aircraft it can land (Airbus A320), and therefore the range of state and national destinations can be reached with reduced travel times for employees;
- The distance employees need to travel by road to the aerodrome would be greatly reduced (around 75km additional distance from the Kevin's Corner Airport) to the nearest alternative airport, Alpha Township Shire airport;
- It would reduce the cumulative effects on the Alpha Township community caused by Kevin's Corner and other Proponents using the Alpha Township airport. For example, high levels of traffic associated with employees commuting from the Alpha airport to the Project site would be minimised.
- Emergency services can land on-site for rapid response to an event in the area;
- Importantly, it forms an integral part of the personnel and materials logistics strategy reducing vehicle numbers on the regional roads and is an important fatigue management strategy for employees.



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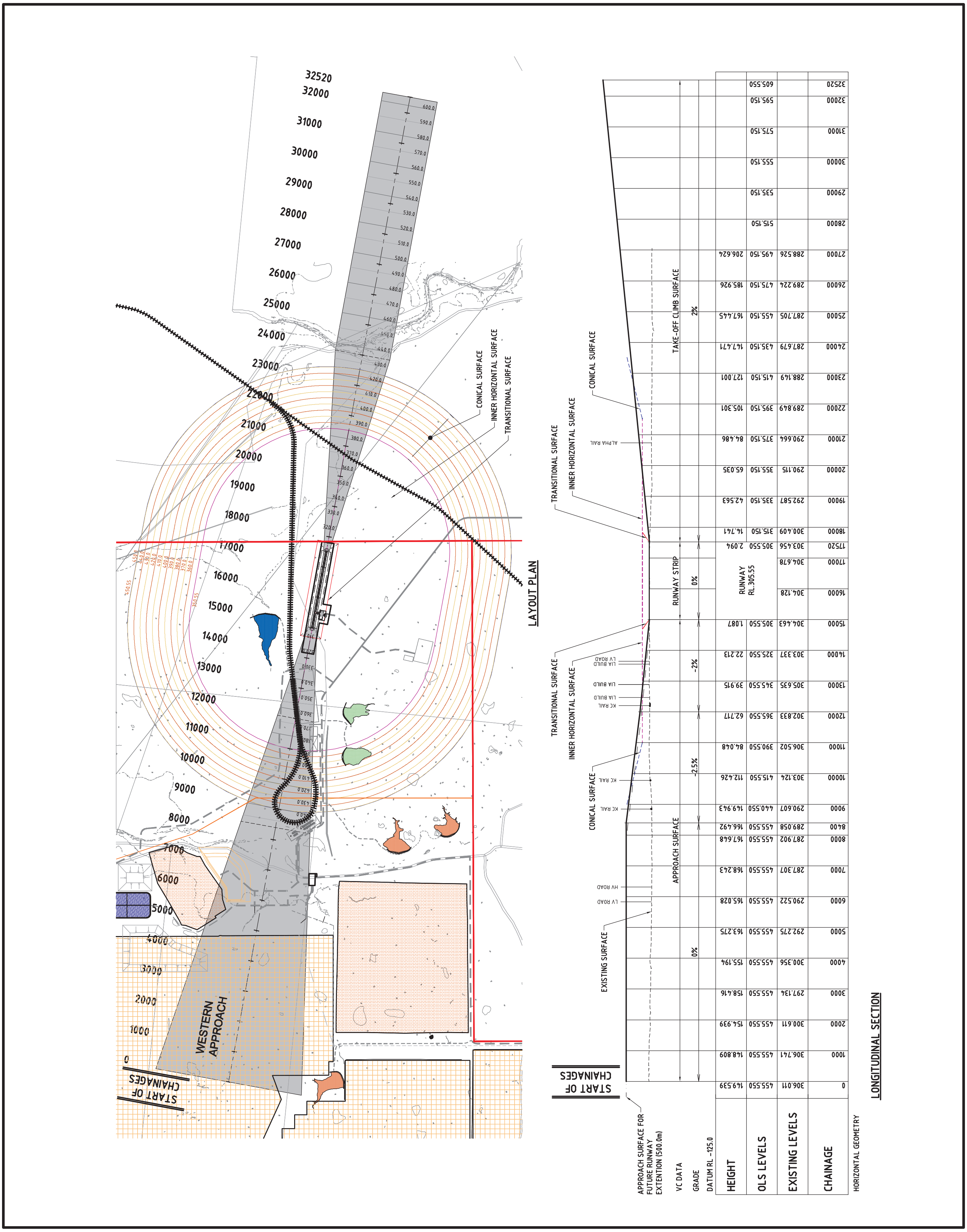
HANCOCK GALILEE PTY LTD
Kevin's Corner Project
Environmental Impact Statement

EASTERN FLIGHT APPROACH

Job Number 4262 6660
Revision B
Date 12-09-2011

Figure: 2-8

File No: 42626660-g-1148.cdr



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HANCOCK GALILEE PTY LTD

Kevin's Corner Project
Environmental Impact Statement

WESTERN FLIGHT APPROACH

Job Number 4262 6660
Revision B
Date 12-09-2011

Figure: 2-9

File No: 42626660-g-1149.cdr

2.3.6 Light Industrial Area (LIA)

The LIA is proposed to be located along the mine access road, adjacent to rail, power and water supplies and the site airport location and will include; vehicle workshops; warehouse facilities; drum storage area; fuel / lube storage facilities; and a heavy-welding shop for truck trays and bucket repair. Other mine and support services will also be located in this area such as security, administration, waste management and environmental management facilities. This is an important concentration of services for the site that would otherwise be disseminated across the open-cut and underground working areas. The accommodation village will be 3 km from the LIA (Figure 2-2).

Key elements to be designed into the LIA are discussed below in Section 2.5.3.2.

2.3.7 Mine Infrastructure Area (MIA)

The MIA provides a focal point for a range of mine operations activities. It includes site operations control facilities, site vehicle parking, heavy vehicle tyre change facilities, vehicle wash facilities, servicing and maintenance workshops, small stores, and first aid facilities.

Separate MIAs are planned at each underground mine access portals for safety and emergency services, underground stores, lamp rooms, control rooms, bath houses, rapid response and monitoring purposes.

MIAs are to include facilities associated with direct operations. All other facilities, including shared services, will be in the LIA. The MIA layout design is based on:

- Separating heavy mine vehicles from light vehicles;
- Easy and safe access between facilities by personnel on foot; and
- Heavy Vehicle loop access to MIA area to reduce potential for vehicular and personnel clashes; and
- Minimising the infrastructure at the MIAs to that critical for operations.

Refer to Section 2.5.3 for details on the Kevin's Corner MIA.

2.4 Construction

The construction period has been estimated at 48 months. Within the initial nominal 27-month time frame prior to first coal, the following activities are planned:

- Mine infrastructure will be constructed, such as site administration buildings, first aid facilities, workshops, water management infrastructure, roads, accommodation, hardstands, the airport, electrical and communication systems, etc.;
- The first phases of mine operational equipment will be delivered, constructed and commissioned;
- The initial modules of the CHPP will be constructed and commissioned; and
- The underground operations access will be developed.

Throughout the operating life of mine; infrastructure construction, maintenance, rehabilitation and decommissioning activities will be undertaken. As mining advances, infrastructure such as internal roads and additional water management infrastructure will be constructed, relocated, maintained or upgraded as required in order to fulfil operational and regulatory requirements.

The construction stage has three components:

- Site preparation (Section 2.4.1 below);
- Civil works (Section 2.4.2 below); and
- MIA building and CHPP construction (Section 2.4.3 below).

Construction stage activities will typically occur during daylight hours, seven days a week. Some activities may be required to be conducted over a continuous 24-hour period; these may include but are not limited to:

- Deliveries of materials, plant and equipment;
- Concrete batching and pouring;
- Electrical installation;
- Structural / mechanical erection of critical path activities; and
- Plant and equipment commissioning.

Due to the close proximity to Sandy Creek all critical infrastructure, especially electrical and any potential environmental contaminants (e.g. hydrocarbons), is to be located at least 0.5 m above the predicted 1 in 3,000 year flood inundation level. This is in excess of the general requirement for protection from the Q100 flood inundation level and has been designed with additional safety and environmental precautions.

It should be noted that commissioning of the various mining activities will occur over time. Commissioning process will be incorporated into normal activities of the Project, the environmental impacts of which are discussed forthwith in the EIS.

2.4.1 Site Preparation

2.4.1.1 Removal of Existing Structures

Any structures, buildings and infrastructure within MLA 70425 currently in use by local landholders will be acquired and then removed as necessary. The Proponent will consult with affected landowners and other third parties to develop an appropriate relocation plan.

2.4.1.2 Site Clearance

Site clearance will include vegetation clearing, topsoil stripping and stockpiling, bulk earthworks, and temporary drainage and water runoff management works only where infrastructure is required, and progressively with mining. Site clearance will be staged to minimise the time of exposure of disturbed areas and degradation of topsoil. Refer to Volume 1, Section 9 for the details on the extent and types of vegetation present on-site. Plant and equipment involved in site clearance activities will include, but not be limited to, excavators, dozers, scrapers, graders, and water carts. All site vehicles and equipment will be properly serviced and maintained. It is an objective of the mine to minimise disturbed areas and prevent the spread of weeds.

2.4.1.3 Access Road

During the initial construction period and prior to the permanent mine access road being completed; a site access road will need to be constructed from Degulla Road to the construction office site. The access roads will make use of existing tracks where possible, otherwise the construction roads will be adjacent to the permanent roads.

2.4.1.4 Initial Temporary Water Supply and Wastewater Management

Temporary potable water treatment and sewage treatment plants will be installed on-site to provide for the initial construction workforce. Both of these treatment plants will be decommissioned once permanent plants are commissioned. Refer to Section 2.6.4 below.

2.4.1.5 Power Supply

For the initial construction accommodation village and construction works, power will be supplied using temporary diesel driven generators.

The power supply authority will also provide a connection from the Galilee Basin Transmission Project to the Kevin's Corner Project site to supply power to complete the construction stage and to supply power to Project infrastructure, and commence operations with electric powered equipment.

2.4.1.6 Communications

Communications during the construction stage will be via a microwave link to the Alpha Township or nearest communications hub. The provision of this link will be undertaken by a third party.

2.4.1.7 Emergency and Security

A temporary security service will provide controlled access to the construction work. The security building will be one of the first buildings constructed, and will provide access control during initial stages of the Project.

The permanent security building will be located on the newly constructed access road just after the Jericho-Degulla Road deviation, to provide access control to the mine operations area. Security services will patrol all areas of the Project.

Temporary emergency first aid facilities will be constructed during early works. The MIA and associated fire and emergency infrastructure are detailed on Figure 2-6.

A temporary relocatable structure will be required while the permanent security structure is established.

The Project will implement an Emergency Management Plan as soon as construction activities commence.

2.4.2 Civil Works

Civil works will generally occur early in the construction phase and will include, but may not be limited to:

- Civil earthworks, including piling and foundation construction;
- Installation of permanent and temporary drainage, and water diversions;

- Trenching and laying of reticulated services and any other underground pipelines and services;
- Road construction, rail formation and airport construction;
- Ramps and walls;
- Hardstand construction;
- Water storage infrastructure; and
- Underground boxcuts and stockpiles.

Hardstand areas will be constructed according to relevant design criteria, and include items such as building construction pads, hardstands for CHPP, TLO, ROMs, car park areas, dragline construction areas, AN and emulsion storage compound, workshop areas, raw and product stockpile areas.

Road works and road construction will be undertaken in accordance with appropriate road construction standards (e.g. Austroads Standards for public roads; Department of Transport and Main Roads (DTMR) Road Planning and Design Manual for intersections, etc.), except for off-highway roads and access tracks, which will be designed fit for purpose.

Road works and specific standards are described further in Section 2.6 below.

2.4.3 Mining Infrastructure Area Building and Coal Handling Preparation Plant Construction

Building construction will commence following completion of components of the civil works. Where practicable and cost effective, infrastructure components will be modularised units, utilising off-site fabrication and assembly.

Concrete and asphalt will be batched on-site, with suitable batching materials and facilities delivered to site by third parties. Gravel suitable for concrete production, hardstand and road base construction purposes will be sourced from the on-site quarry pits and selected borrow pits, as well as near-by local sources, e.g. Surbiton South Quarry.

2.4.3.1 Quarry Pits

To provide for fill material for various civil structures, select fill material will be obtained from a number of local borrow pits identified by the exploration team. In addition, the Project is proposing access the Surbiton South Basalt Quarry located along the new Mine Access road alignment.

2.4.3.2 Dragline and Rope Shovel

Two mid-sized draglines are required for overburden removal in the current schedule. The draglines will be constructed on the designated dragline construction hardstand area located near the LIA. This area and the supporting infrastructure are described in Section 2.6 below. Dragline construction will commence late in the Project construction stage in preparation for the mine operations, and rope shovels will be mobilised for prestrip operations.

2.4.3.3 Clean-up of Construction Areas

After construction, the contractors will be required to clear all construction waste, equipment and plant per their construction environmental management plan (EM Plan). Disturbed areas that are not proposed to be utilised during operational activities will be rehabilitated.

2.4.4 Construction Equipment and Materials

Refer to Section 2.6.2.3 below for details on the equipment and materials to be transported to the site during the construction phase.

2.5 Project Operations

Following construction, operational activities will be ramped-up over five years, peaking at production of approximately 40 Mtpa of ROM coal. The mine has the capacity to produce up to 30 Mtpa of product coal through the CPP. Typical coal production levels are expected to be around 26 to 27 Mtpa of product coal. During operations, total employment is estimated to reach 2,000 full-time equivalent positions.

2.5.1 Mine

The development of the Project and associated mine plan have been based on the following criteria:

- A staged build-up to a target production rate of 30 Mtpa of product;
- 100% export thermal coal product from the C and D coal seams (primarily the D-seam);
- Scheduled LOM of 30 years with reserves enabling extension beyond this;
- Connectivity to Alpha Coal rail and existing port infrastructure.

Table 2-2 shows the expected ROM tonnes from each mine source.

Table 2-2: Expected Run of Mine (ROM) tonnes per mine source

Year of Operation		Mine Plan Throughput by Source (tpa [as])					Total Feed
		Northern Underground (ROM)	Southern Underground (ROM)	Central Underground (ROM)	North Pit Open Cut (ROM)	South Pit Open Cut (ROM)	
2014	1	35,092			2,390,636	981,634	3,407,364
2015	2	575,287		70,099	3,323,714	3,185,070	7,154,170
2016	3	4,495,745	128,271	794,838	4,747,608	5,128,919	15,295,381
2017	4	8,158,099	922,506	5,025,991	4,918,844	5,679,905	24,705,345
2018	5	9,144,543	3,859,148	9,245,209	3,908,255	1,207,224	27,364,379
2019	6	9,487,804	9,654,289	9,527,297	4,083,554	3,666,077	36,419,021
2020	7	12,890,487	9,500,317	9,663,456	1,810,956	4,180,301	38,045,517
2021	8	11,950,652	9,526,063	9,639,695		5,157,452	36,273,862
2022	9	11,934,890	9,774,432	9,632,971		4,026,221	35,368,514
2023	10	12,616,748	9,221,396	9,690,840		4,071,541	35,600,525
2024	11	12,405,211	9,858,322	9,836,190		4,153,956	36,253,679
2025	12	12,942,478	9,285,119	9,561,022		4,011,483	35,800,102
2026	13	12,746,494	9,374,338	9,619,773		4,157,231	35,897,836
2027	14	12,308,033	9,681,864	9,407,940		4,691,759	36,089,596
2028	15	11,819,427	9,378,623	8,623,349		4,408,263	34,229,662
2029	16	11,635,232	9,545,166	9,456,223		4,733,023	35,369,644
2030	17	12,497,316	9,384,087	9,587,992		5,478,096	36,947,491
2031	18	12,547,962	9,333,523	9,614,910		6,377,371	37,873,766
2032	19	11,453,031	9,782,309	9,565,263		5,833,615	36,684,218
2033	20	10,536,857	9,234,356	9,486,185		5,560,009	34,817,407
2034	21	8,604,148	9,659,877	9,488,075		6,637,172	34,389,272
2035	22	8,555,602	9,271,023	9,366,760		7,859,974	35,053,359
2036	23	8,675,802	8,162,935	9,374,625		7,467,082	33,680,444
2037	24	8,556,851	9,398,188	9,002,126		7,112,363	34,069,528
2038	25	8,450,534	8,994,937	9,325,173		9,104,854	35,875,498
2039	26	7,970,997	9,566,162	9,012,644		8,457,463	35,007,266
2040	27	7,847,072	9,024,301	9,227,995		8,859,837	34,959,205
2041	28	7,188,503	9,508,959	9,246,607		9,233,776	35,177,845
2042	29		9,022,893	9,132,914		7,894,406	26,050,213

NB: These volumes are subject to change with further mine planning and equipment specification.

2.5.1.1 Coal Resource Base and Mine Life

The Kevin's Corner coal deposit and adjacent Alpha Coal deposit are situated in the Galilee Basin in Central Queensland, Australia (Figure 2-1). The Galilee Basin is of Palaeozoic to Triassic age. The Galilee Basin is approximately 480 km long and extends from the town of Tambo in the south to Pentland in the north, as detailed in There are six logged coal seams in the Project (mine) area designated (in descending stratigraphical order) as A, B, C, D, E and F. Seams A through D are considered to be recoverable under JORC with a Measured-plus-Indicated Resource tonnage of 1,269

Mt. A combination of open-cut and underground mining will focus on marketable coals primarily from the C and D seams. A and B seams form minor proportion of production output. Inferred Resources total an additional 3,000 Mt (as at 2010 Model). These resource classifications will be upgraded with current and future drilling programs. The coal seams strike approximately north-south through the tenement area and have a regional dip of 1 to 2 degrees to the west.

Coal resources within the Project area of MDL 333 have been estimated in accordance with the JORC Code and are listed in Table 2-3 and Table 2-4.

Table 2-3: Estimated coal resources 2010

MDL 333 Kevin's Corner	All seams (million tonnes)			
	Measured	Indicated	Inferred	Total
Kevin's Corner	229	1040	3000	**4269**

The seams are contained within the Permian coal measures, which are unconformably overlain across the total area by an unconsolidated cover of Tertiary sediments, ranging in thickness from 15 m to 45 m. A further weathered zone of Permian rocks, typically 8 m to 10 m thick, covers the seams subcrop. Due to the very shallow dip, the subcrop alignments are dominated by changes in the depth of weathering and local seam dips. The A and B seams are located at the top of stratigraphic sequence separated by approximately 12 m of interburden. These seams will be mined later in the life of the central open cut as mining progresses to the West where these seams subcrop. B seam also has the potential for coal-to-liquids with tests indicating it could yield 75 to 150 litres of synthetic oil per tonne. The C and D seams, underlying the B seam by 60 m to 80 m, are the main target seams for the production. They are separated by up to 20 m of interburden. The E seam which lies up to 25 m below the D seam is considered uneconomic due to high incremental product strip ratios to recover it by open cut, and its thin work section making it difficult to recover by underground mining. The deposit has been evaluated as a potential thermal coal resource based on slim-core and large diameter cores.

The D seam is the most marketable and economically attractive seam in the deposit with a density average in situ ash content of approximately 21% (adb) with product ash consistently below 10%, making it highly marketable. Some plies of the D seam may be marketable without processing.

The product thermal coal is export grade quality being of typical calorific value and ash levels, with low sulphur and low heavy metal content; making it highly desirable in international markets. Mean sulphur levels in the product are approximately 0.55% (adb), with other coal proximate analysis results showing the coal has minimal contaminants and clean burning characteristics.

The dip of the deposit is low and ranges between 1 to 2 degrees. This, combined with the simple geometry of the deposit and apparent lack of significant faulting, lends itself to simple open-cut strip layouts and underground panel layouts. This allows the possible application of large-scale semi-mobile open-cut mining equipment and underground longwall methods.

The C and D coal seams which will be mined by the open-cut operation will use draglines, shovels and trucks to expose the coal.

The underground mines will be developed from portals independent of the open-cut operations, commencing immediately to the west of the open cut. The D seam at this point is approximately 90 m below surface for the Northern Longwall, a level which can comfortably be accessed through the excavation of drifts. The Central and Southern longwall mines are deeper, accessing the D seam at

120 m and 150 m depth of cover. The establishment of the portals at these points creates enough separation from the open-cut operations to preclude any operations interaction issues and provides the opportunity to run longwall and open-cut operations concurrently, to achieve economic production levels. Extracting the D seam beyond the open-cut reserves and proceeding down dip to the western boundary has the potential to provide sufficient mining reserves for three world-class underground longwalls to operate concurrently.

The initial Project construction phase is anticipated to commence construction in 2012 and take 2 to 3 years, with first coal being recovered in 2014. Final construction is completed in 2019 when the third longwall is ready to go into production.

To enable utilization of rail and port assets, the initial mine plan is aligned with the Alpha Coal Project's scheduled plan; however, the mine life has potential to extend well beyond 30 years with mining so far only scheduled to mine approximately one billion tonnes of the resource. The 2010/2011 exploration program is expected to rapidly upgrade the resource status and mining reserves to conform to Bankable Feasibility Study standard levels.

Table 2-4: Expected mineable reserves upgrade after 2010-11 drilling program

Resources	Proven	Probable	Total
Total Mine (Mt)	237	551	**788**

2.5.1.2 Mining Method

Underground

Three underground longwall operations are proposed in three independent mines. Each longwall panel will be allocated an independent set of mains for access, coal clearance, services and ventilation. With the scale of construction envisaged, the underground workings will require a separate belt drift and man-and-materials drift dedicated to each longwall operation. The longwalls will share similar specifications with spare face equipment being ready to commence production as soon as possible after the recovery of the preceding longwall panel. A common set of surface facilities, critical equipment area, management team and service labour pool will facilitate operational efficiency, with dedicated production teams in each mine.

The Northern Underground is scheduled to be developed first, being the shallowest access point and having the shortest initial panel length. The Central and then Southern Underground will be developed sequentially on the basis of depth of access, available reserves and product blending requirements.

It is estimated that it will take 12 months to sink the drifts to service each longwall mining area, with the Northern wall taking the shortest time. For phasing purposes it has been assumed that the 3 pairs of drifts will progressively develop over the first four years of operation. On this basis, the development schedule will reach full underground production from three longwalls or just under 28 million ROM tonnes per annum, within 7 years of commencement of the first drift.

Mine portal construction/decline drift development of the Northern Underground is scheduled to begin in Q1 2014. First development coal extraction is expected to occur in late 2014.

Operating two shifts per day seven days per week, development of the first longwall panel installation road in the Northern Underground is scheduled to be completed by early 2016. Two months are then allowed to install the longwall, with first longwall production scheduled for mid 2016.

Subsequent development of the Southern and Central Underground is scheduled in the same manner with the development schedule having the second longwall able to commence production in the Southern Underground late 2017 and the third longwall commencing production in the Central Underground in late 2018 and achieving full underground production levels in early 2019.

For development of the longwall panels, two-heading gate roads have been selected. This is normal for shallow operations with limited in-seam gas emissions. Ventilation assessment will be a critical step in the final mine design with long gate roads and ventilation pressures. Initial modelling has been completed indicating additional ventilation shafts will be required as the mine progresses west to lower ventilation pressures and maintain a suitable working environment.

Open Cut

The open-cut mining will commence at the seam sub-crop, and progress down dip. The open-cut operation commences as a truck-excavator operation, after which it will evolve into a dragline stripping operation. The pre-strip truck-excavator fleet will mine all of the weathered tertiary overburden.

At peak production, there will be two draglines operating, and up to five waste truck-shovel and/or excavator fleets. Almost all of the waste will be used to backfill the pit, although an initial out-of-pit emplacement area will be required to establish the box cut. The maximum backfill height will be around 30 m above the natural surface in the eastern areas, and are planned to be rehabilitated early in the mine's life.

In steady-state operations, prestrip operations will work in the upper horizons, and then two draglines will expose the coal. Coal haulage will be by rear dump or belly trucks to ROM coal feed stations initially located adjacent to the box cuts. The total open-cut strike length of approximately 6.5 km will be divided into two pit areas. Each pit has a central ramp for coal removal and in pit end wall haul roads for trucked waste. The Northern pit area of 2.5 km strike will be completed 5 to 7 years after commencement, making a void available for storage of fine coal rejects for the remaining mining operations.

The mine layout includes surface water corridors. These corridors will also provide coal transport access from the underground mining areas to the CHPP and road access to the main infrastructure area from the underground MIA's.

The Northern Open pit will be the first pit to commence utilising hydraulic excavator and truck operations. The Northern pit will have an increased amount of ex-pit spoil emplacement to enable the northern pit void to be used for tailings storage in the long-term. In the Southern pit, the draglines will operate in the lower horizons with electric rope shovels and hydraulic excavators removing prestrip. The Southern Pit will operate for the scheduled life of operations.

With respect to coal mining, coal faces greater than 3 m will be free-dug and loaded into rear dump coal trucks by backhoe excavator. All coal less than 3 m thick will be ripped by tracked dozer and pushed up for loading by front-end loader, or a small excavator. The coal will be hauled via the low-wall ramps rising at a maximum grade of 10 % to haul roads, then to the nearest ROM feeder, to connect to the CPP by conveyor. The ramps will be backfilled and re-graded as they progress down dip to allow the overburden dumps to be progressively rehabilitated, minimising material lifting height and limiting the water catchment for the pit void area.

Whilst initially all CPP coarse rejects will be hauled to the overburden placement areas by rear dump truck, it may be possible to convey this once the mine reaches steady state operations. The coarse reject will be placed in the top 20 m of the backfill horizon above groundwater levels and capped by the final backfill pass. Other than the box cut spoil, only a small fraction of the prestrip is expected to be placed out of the pit footprint and the final landform will rise gently to the west as the mine deepens. At the FY2042 strip location, the embankment profile is expected to be no more than RL 360 which is approximately 60 m above the natural surface.

For open-cut operations all coal will be hauled out of the mine via a series of shallow coal ramps, each of which reports to one ROM semi-mobile coal feed station. The ramps will be progressively backfilled as the mine progresses, and the backfilled areas progressively rehabilitated. All coarse coal rejects, which consist mostly of inert mudstone and siltstone materials, will be buried within the mined backfill. For underground longwall operations all ROM coal will be transported directly to the CPP via an overland conveyor.

Overburden Removal

The topsoil is proposed to be stripped in advance of mining activities and will either be stockpiled for future use, or placed directly onto the regraded areas.

The Tertiary and weathered Permian overburden will be excavated by large rope shovels and backhoe excavators then hauled to out-of-pit emplacement areas adjacent to the low walls by rear-dump truck. Much of this will be free-dig material; however, some blasting will be required to maintain productivity of digging where harder bands are intersected. All overburden material will be relocated by excavator until the draglines are introduced.

Once the thickness of fresh overburden in each pit is sufficient for efficient dragline operations, the truck-shovel operation will continue on pre-strip operations ahead of the dragline benches hauling around the end-wall of each pit.

At full production in the open cut an overburden removal rate peaking at around 115 million bank cubic metres (Mbcm) per annum will be required using truck-shovel / excavator and dragline mining methods. Draglines commence stripping operations after 2 years in 2016. From 2020 onwards the overburden removal rate for the open cut reduces to less than 100 Mbcm per annum until further excavator pre-stripping is required around 2028.

Drill and Blasting

When fragmentation is required, blasting will be carried out using ANFO and emulsion-based nitrate explosives. The transportation, storage and use of explosives will be in accordance with the relevant Australian Standards (i.e. AS 2187 Explosives – storage, transport and use) and all state legislation (i.e. *Explosives Act* 1999). The greatest annual amount of explosives is estimated to be approximately 30,000 tonnes. A secured explosives magazine will be constructed for the storage of blasting initiation equipment.

2.5.1.3 Mining Equipment

With the scale of the operation that is planned, it has been recognised that even with the largest equipment capacity, the earthmoving fleet sizes will be large. Continuous surface mining conveyor systems have potential to be applied to the operation, potentially providing lower impact more efficient and productive operations and will be assessed in the next phase of engineering studies.

Details of the expected major equipment to be used for the mining operation are provided in Table 2-5, for transport details refer to Volume 1, Section 17.

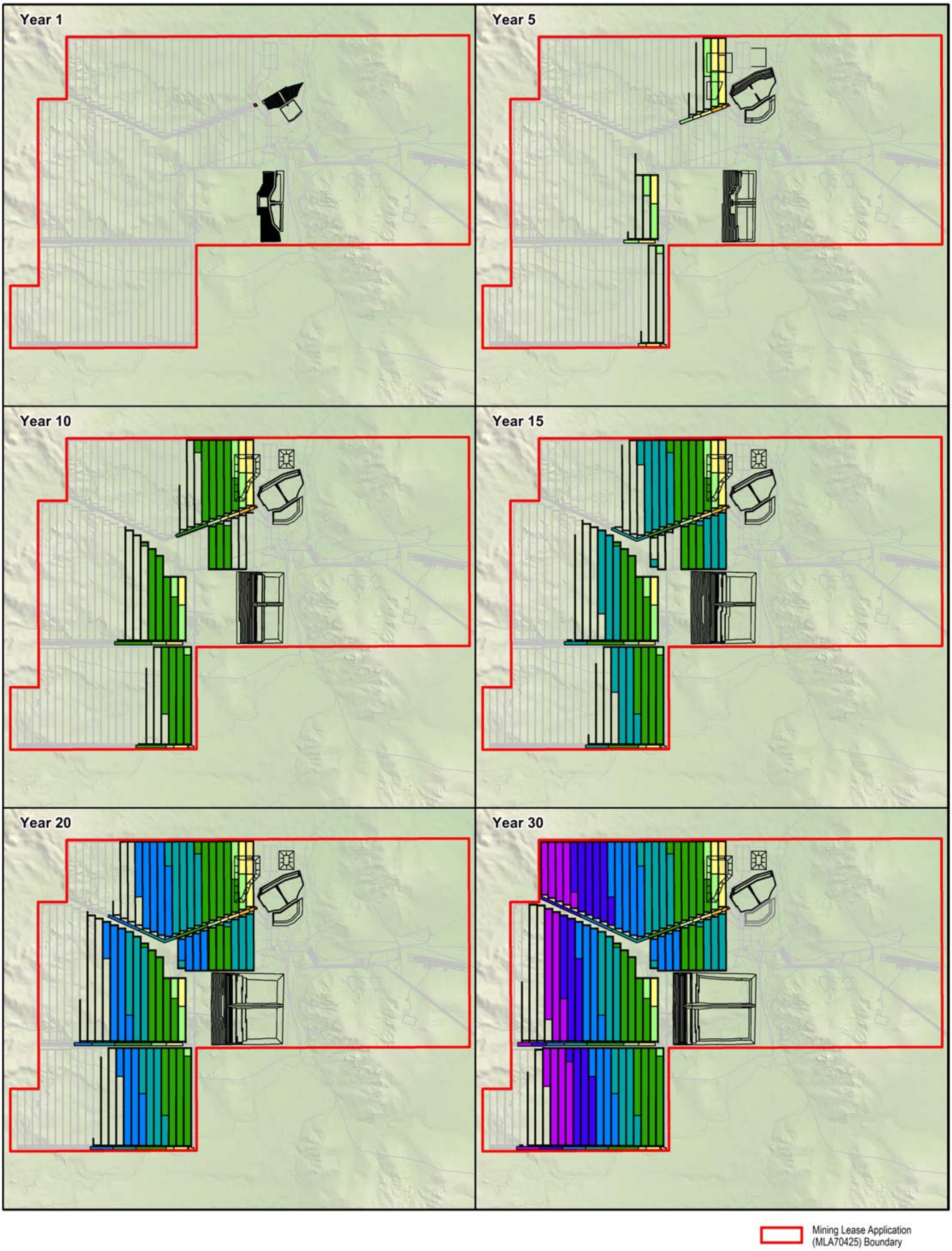
Table 2-5: Major mining equipment

Type of Major Equipment (or Equivalent)	Description of Works	Quantities*
Open Cut Equipment		
Dragline 80 m^3	Works in the lower levels of the Southern Open Pit only	2
Shovel 110 t	Works in the prestrip horizons in the Southern Open Pit	1
Excavator 800 t	Works in the prestrip horizons in the Southern Open Pit and the Northern Pit	1
Excavator 650 t	Works primarily in the Northern Pit and the development of the box cuts in the Southern Open Pit	3
Excavator 320 t	Works in the Northern Pit initially then also in the post-strip / parting horizons on the Northern Pit	4
High Lift FEL Loader	Works in the coal mining areas	1
Dump Truck 360 t	These are prestrip trucks and will work under the face shovel and large excavators	13
Dump Truck 190 t	These are parting trucks, rejects and occasional coal haulage units. They work primarily under the 9350's but can also be loaded by the R996B's	8
Water Truck 190 t		5
Dozer – Shovel Ex	D11 dozers are for excavator assist and rope shovel assist	6
Dozer for Dragline Assist	D11 dozers are for dragline assist	2
CHPP Dozer for CHPP		1
Dozer ROM	D10 dozers are for ROM stockpiles, coal mining assist and for dumps	6
Grader	The graders are used on haul roads for heavy trucks as well as drill bench preparation	6
Drill Blast Hole	Drilling 270 mm holes	1
Drill Blast Hole	Drilling 229 mm holes	2
Coal Haulers	Coal hauling only	10
Underground Equipment		
Development Units	Continuous Miner, Shuttle Car, LHD, Fan and Feeder Breaker for the development of underground roadways	6-9
Longwall Units	Operating longwall face production units including trunk conveyor, face conveyors, face shields, shearer, pumping and power units.	3
Mine Ventilation Fans	Underground environmental control	3 - 6
Conveyors Systems	Transport of ROM coal	3 - 6

*Highest unit number at any given time over LOM

2.5.1.4 Mine Sequencing

Figure 2-10 is an overview of the mine sequencing figures for the years 1, 5, 10, 15 and 30. Figure 2-11 through Figure 2-16 illustrate each of the mine years individually.



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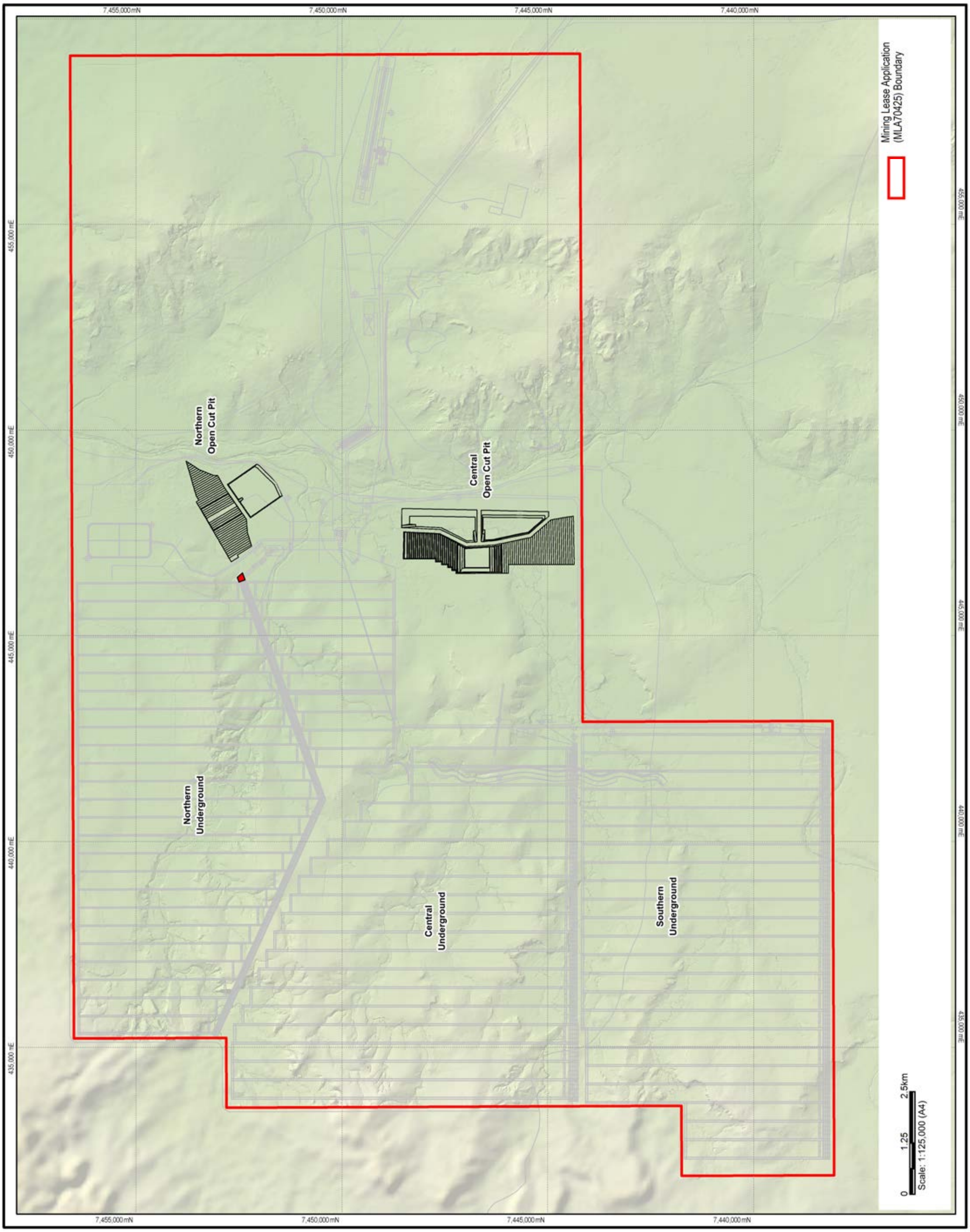
MINING SEQUENCE OVERVIEW

Job Number	4262 6660
Revision	C
Date	12-09-2011

Figure: 2-10

File No: 42626660-g-1014.wor



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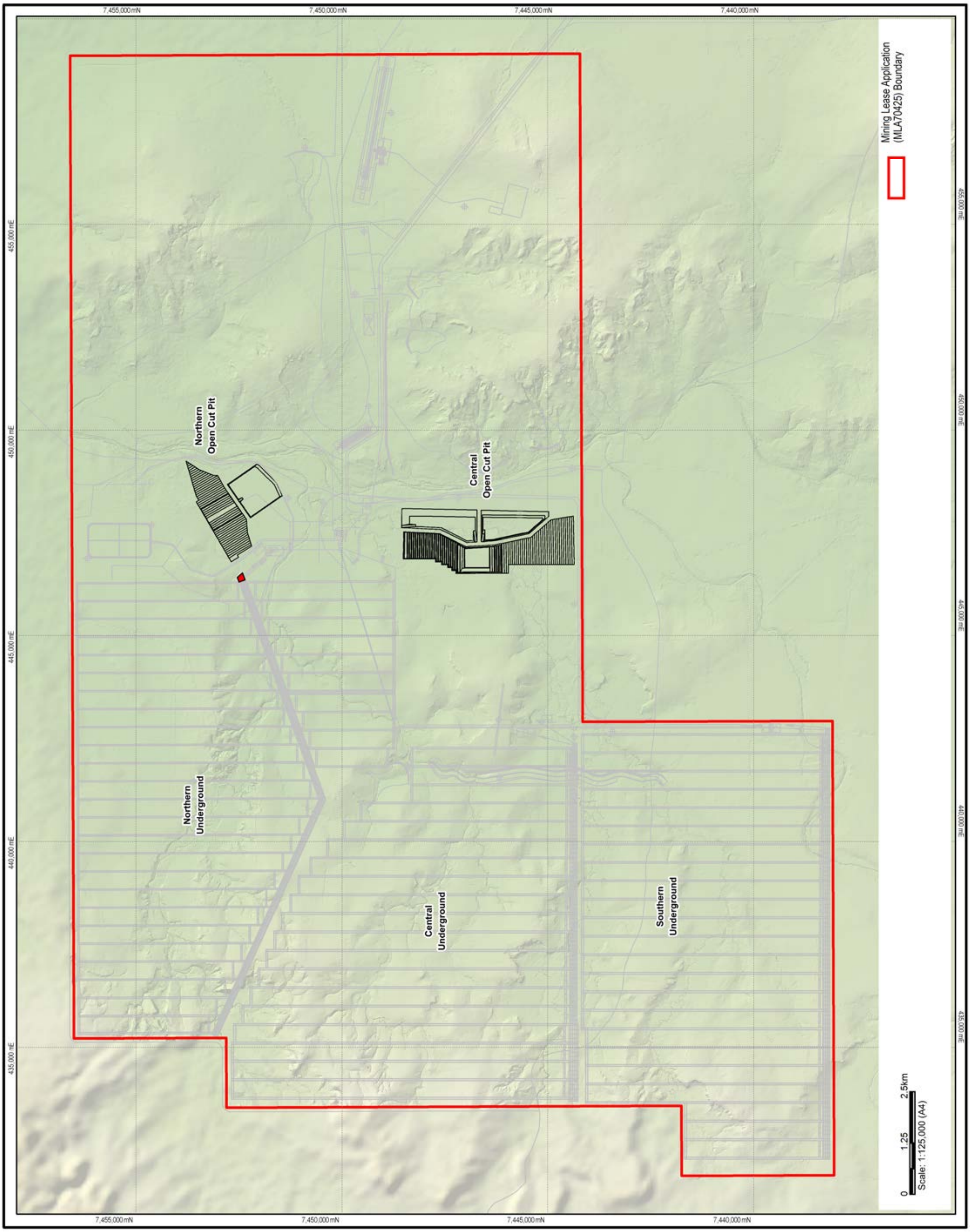
PROPOSED MINE
STAGE PLAN
YEAR 1

Job Number	4262 6660
Revision	C
Date	12-09-2011

Figure: 2-11

File No: 42626660-g-1008.wor



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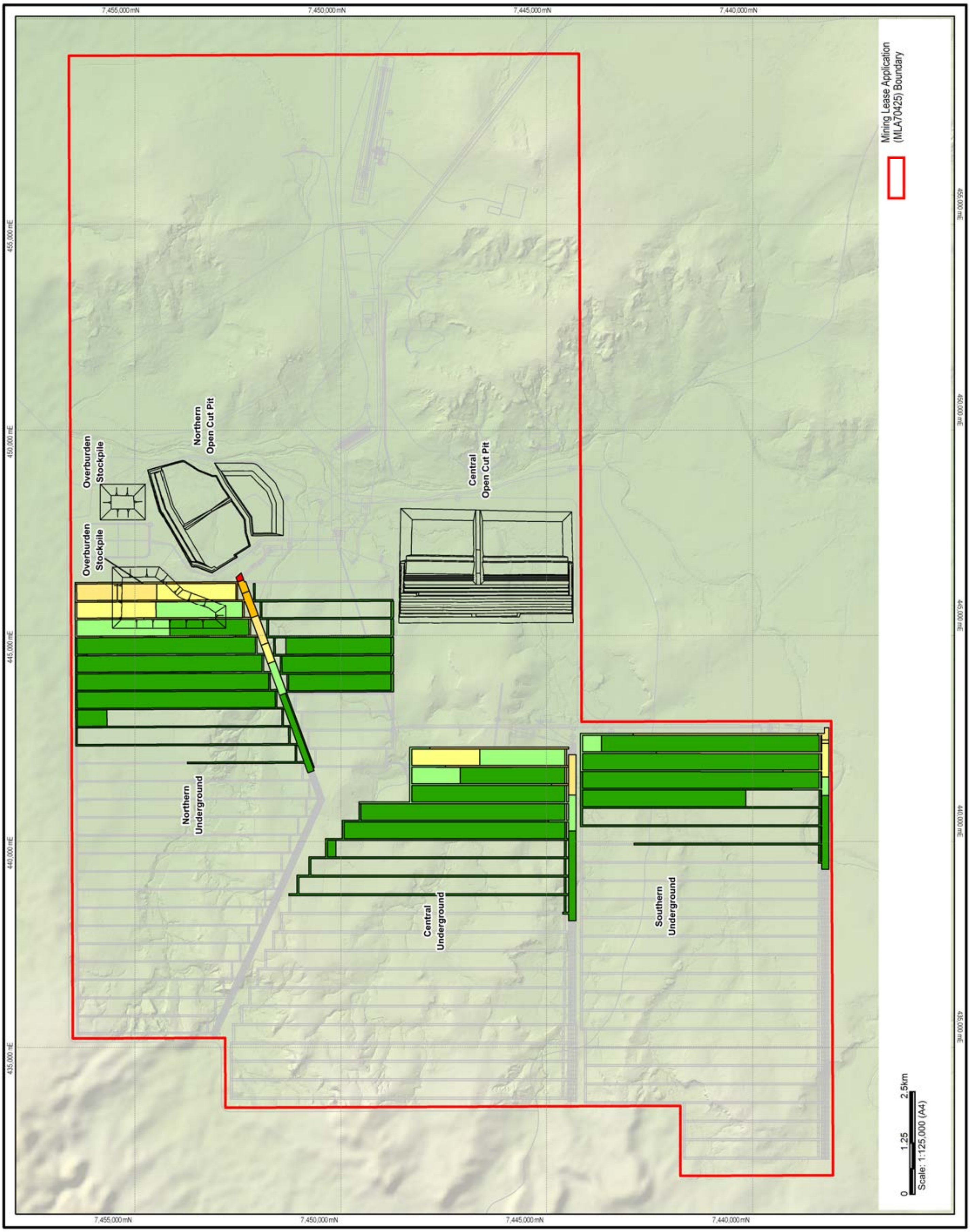
Environmental Impact Statement

PROPOSED MINE
STAGE PLAN
YEAR 5

Job Number	4262 6660
Revision	C
Date	12-09-2011

Figure: 2-12

File No: 42626660-g-1009.wor



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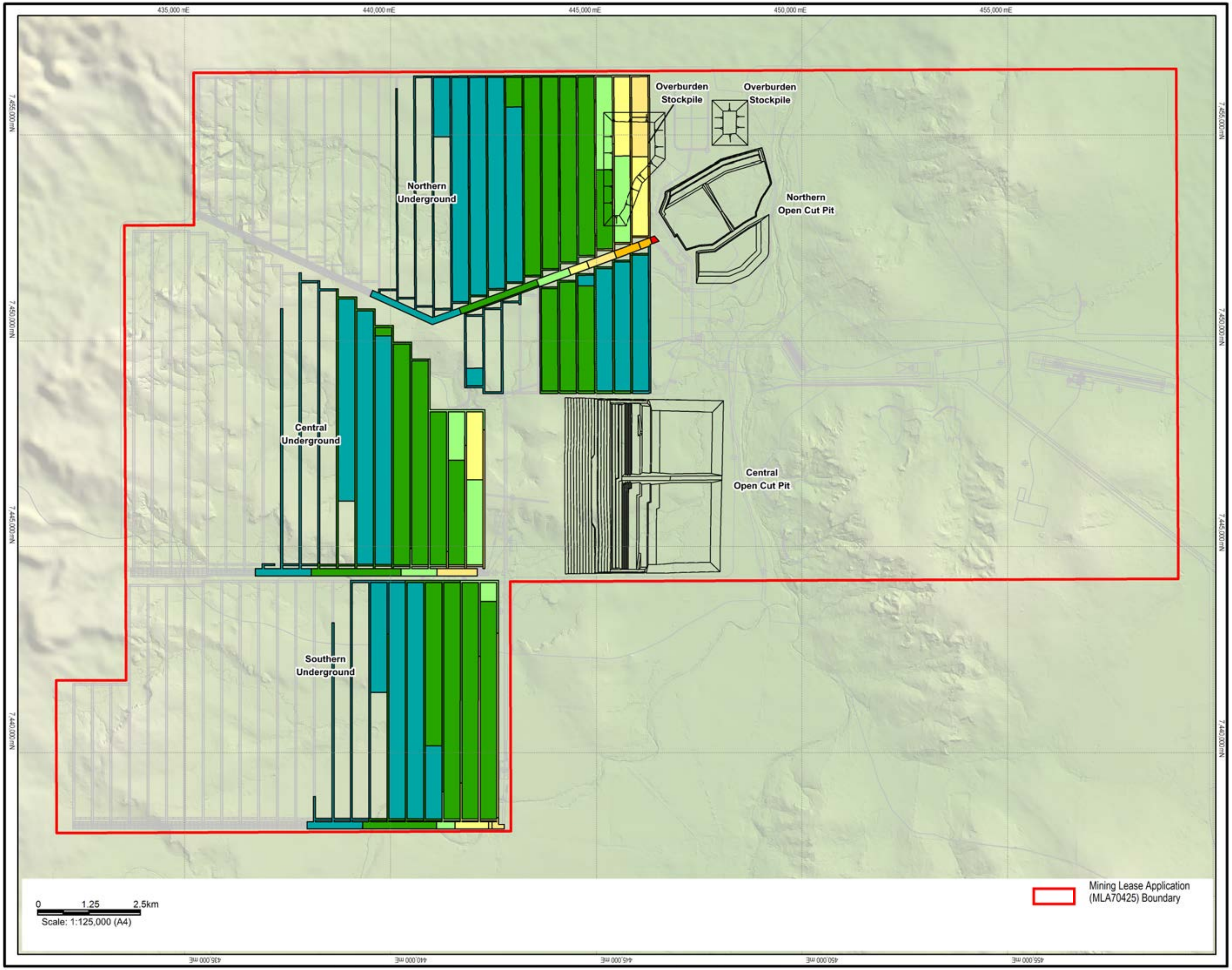
Environmental Impact Statement

PROPOSED MINE
STAGE PLAN
YEAR 10

Job Number | 4262 6660
Revision | C
Date | 12-09-2011

Figure: 2-13

File No: 42626660-g-1010.wor



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Kevin's Corner Project
Environmental Impact Statement

PROPOSED MINE STAGE PLAN YEAR 15

Job Number	4262 6660
Revision	C
Date	12-09-2011

Figure: 2-14

Datum: GDA94, MGA Zone55

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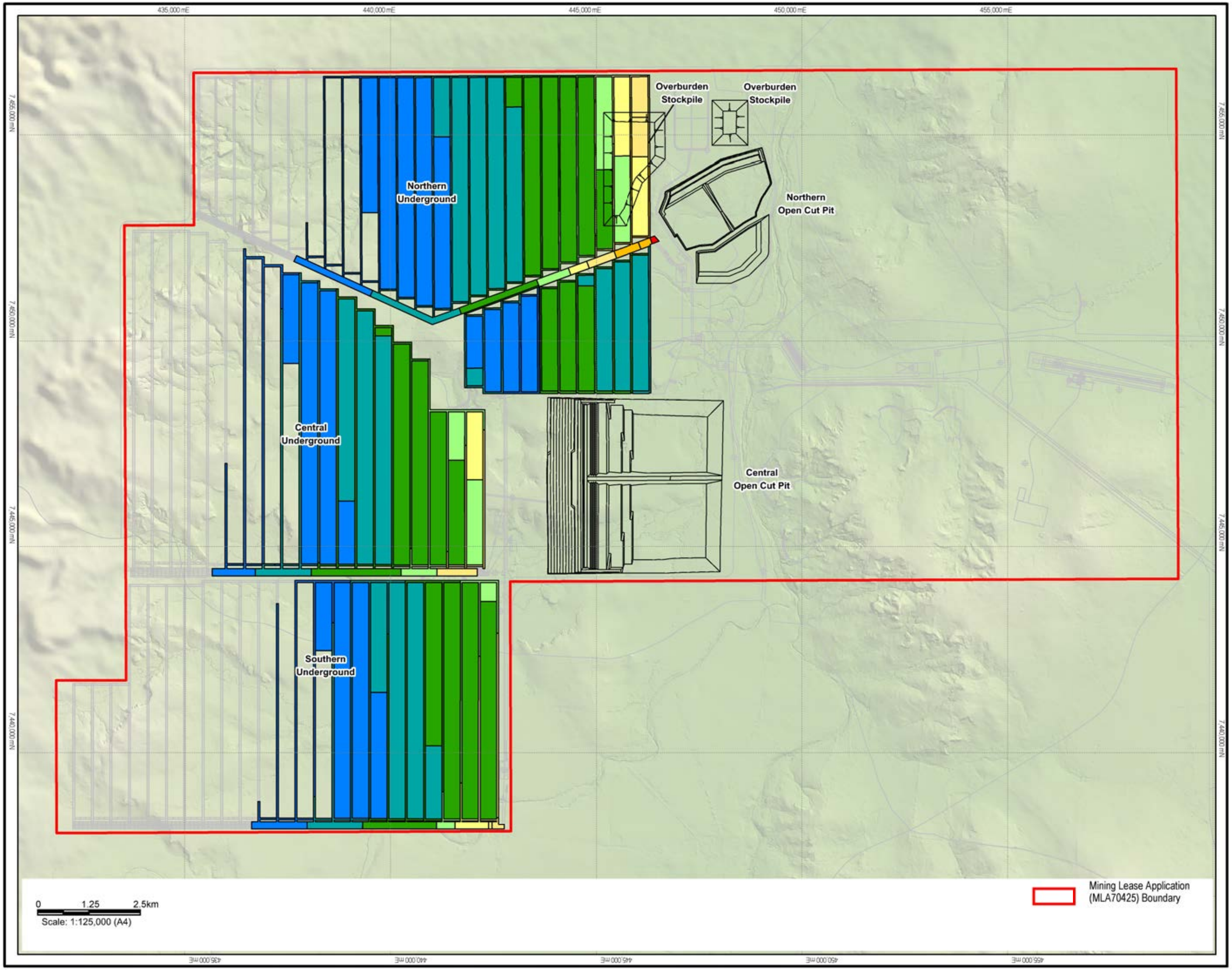

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Kevin's Corner Project
Environmental Impact Statement

PROPOSED MINE
STAGE PLAN
YEAR 20

Job Number	4262 6660
Revision	C
Date	12-09-2011

Figure: 2-15

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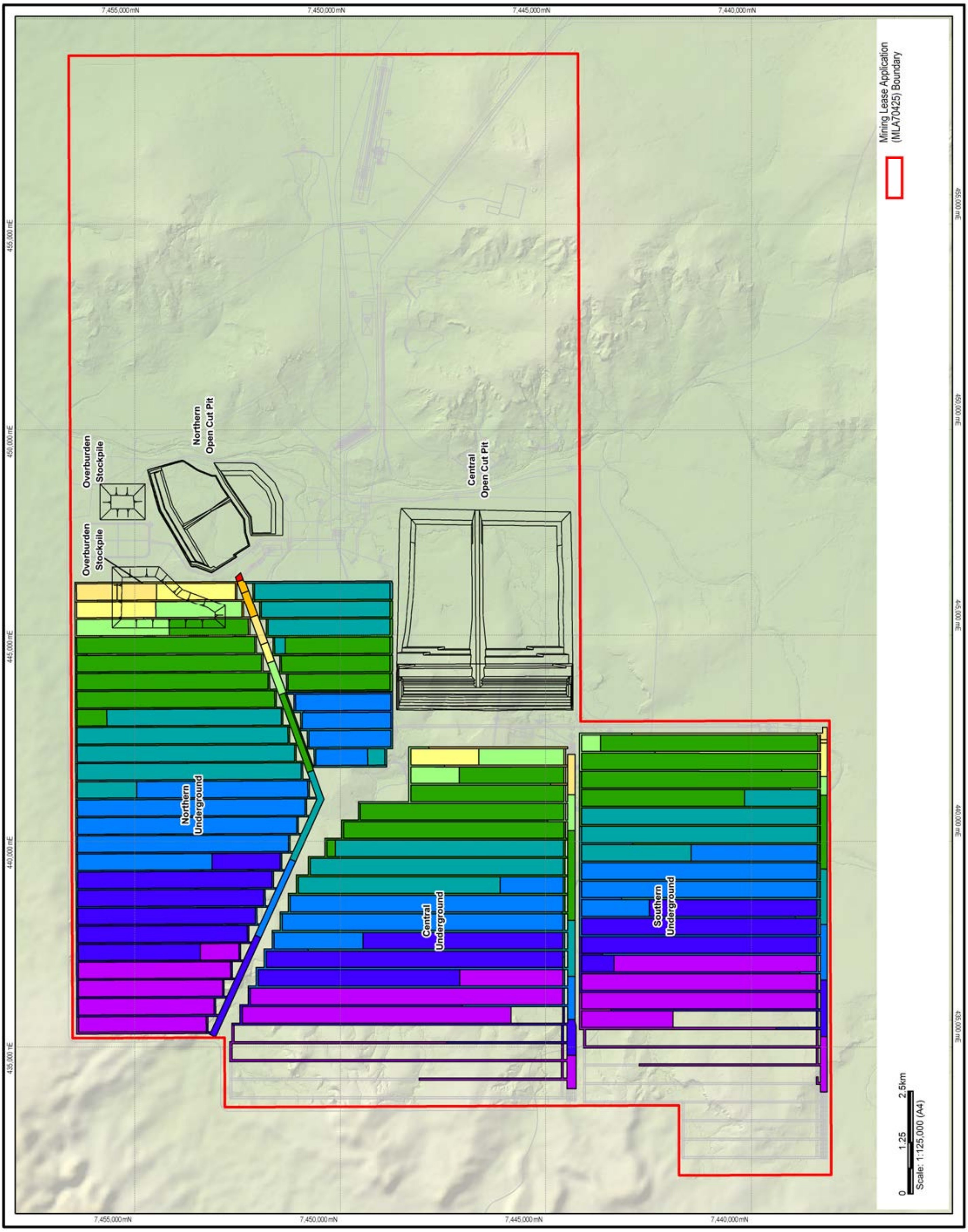

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Kevin's Corner Project
Environmental Impact Statement

PROPOSED MINE
STAGE PLAN
YEAR 30

Job Number 4262 6660
Revision C
Date 12-09-2011

Figure: 2-16

Datum: GDA94, MGA Zone55

File No: 42626660-g-1013.wor

Mining Rate

Coal mining and product tonnage will build up over a five-year period and then be maintained at an average of 27 Mtpa for the scheduled life of the Project, as indicated in Table 2-6. Note that opportunities to improve production outputs have been identified with an objective of the mine delivering capacity of 30 Mtpa of product.

Table 2-6: mining rate

Year	2014	2015	2016	2017	2018	2019	2020
Product Tonnes (Mt)	3.2	4.4	13	16.1	22	26.5	28.2

2.5.1.5 Ongoing Evaluation and Exploration Activities

Considerable exploration was undertaken by several companies in the 1970s and early 1980s in the Galilee Basin. These previous exploration efforts covered the present-day Kevin's Corner MDL 333 area.

There have been extensive exploration activities conducted by the Proponent between 2009 and 2011. These have been undertaken in an effort to upgrade the resource to JORC standards, thereby confirming the economic viability of the resource. In addition, many of the drill-holes undertaken were of a technical nature allowing geotechnical evaluation and environmental assessments to be completed.

The following exploration activities will be conducted as the Project progresses:

- Coal quality drilling – in areas of early mining to add confidence in early product to be produced, and CHPP utilisation;
- Characterisation studies – specialised drilling to further evaluate chemical and mechanical properties of the coal and burden materials;
- Hydrology studies – specialised drilling to further evaluate groundwater capacity and effect of operations on supply as well as long-term effects on third parties and neighbours.

Exploration will continue to further define the resource in western areas of MDL 333.

2.5.2 Coal Handling and Preparation Plant

Underground longwall operations will feed overland conveyors that will transport the ROM coal to the ROM Surge Bins, which will then feed the CHPP after sizing. The open-cut mining operations will also utilise the overland conveyor system.

The proposed CHPP incorporates remote ROM sizing facilities transferring crushed raw coal to a tertiary sizing facility feeding a multi-module dense medium cyclone (DMC) reflux classifier plant. The estimated CHPP capacities are detailed in Table 2-7.

Automated product stacking and reclaim facilities with dual automated train load out bins are planned, with the CHPP nominal feed rate of 6,000 tph (4 x 1500 tph modules).

Table 2-7: Coal Handling and Preparation Plant estimated capacities

Option	Required Product Mtpa	Coal Processing Plant (CPP) Yield %	ROM Mtpa	ROM tph	Approximate CHPP Feed tph
100% Washed	30.0	76.2	40.2	6,040	6,040 up to 6,500

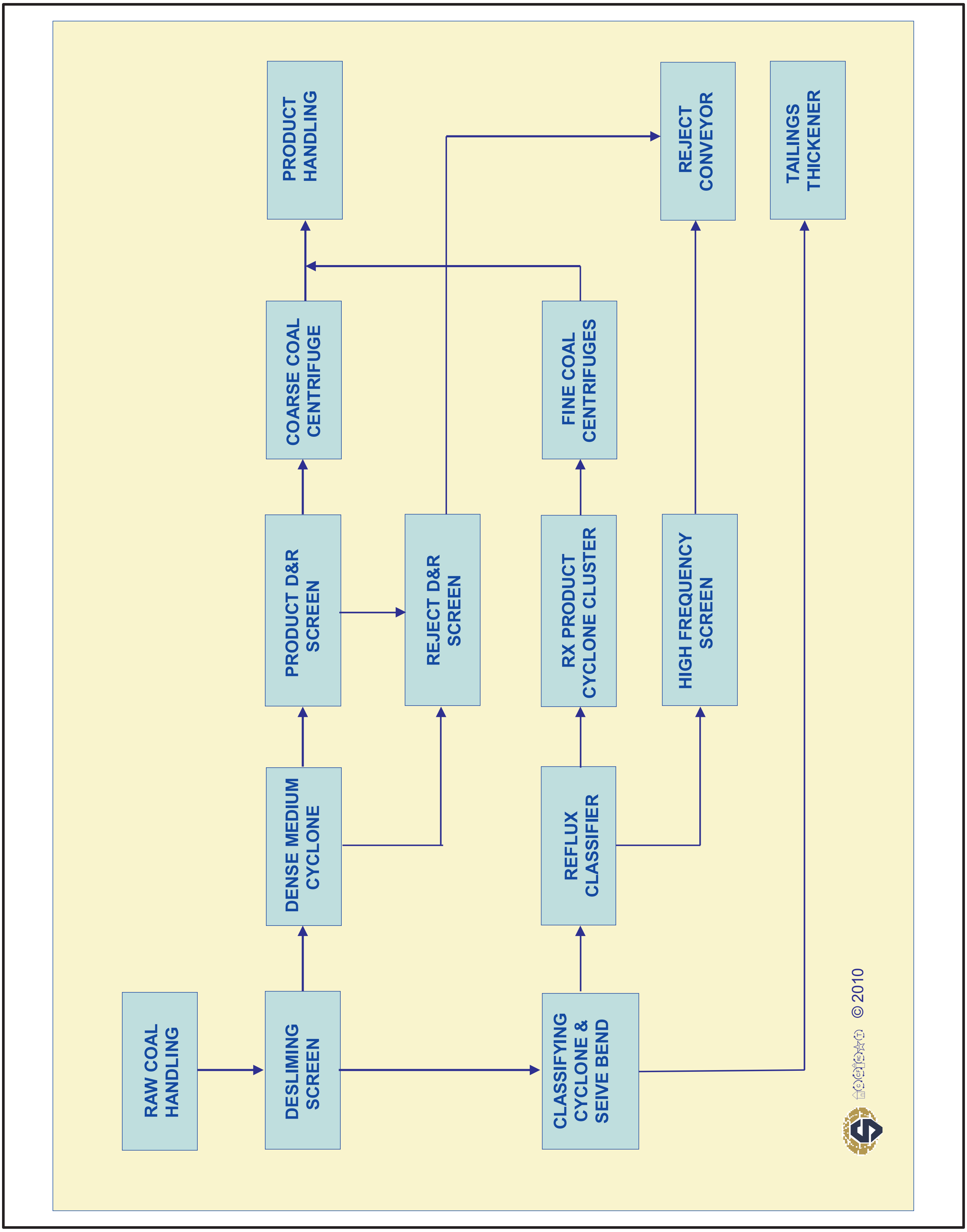
The following principal design objectives were considered when designing the CHPP:

- The CHPP facility will be designed to produce 30 Mtpa export thermal coal;
- The CHPP facility will be constructed over a period of four years to meet production requirements;
- The CHPP facility will be designed for a 30-year mine life, operating 24 hours per day, seven days per week, up to peak 7,200 hours per year;
- The CHPP facility will be based on a safe, economical, durable and functional design suitable for heavy duty mining application; and
- The CHPP facility will be designed to minimise water and power consumption, dust and loss of coal.

On average for every 100 tonnes (t) of ROM coal processed, the CHPP will produce approximately 75 t of product coal, 17 t of coarse reject, and 8 t of fine rejects. Course Rejects consist primarily of dilution materials such as siltstone and mudstone, while fine rejects typically consist of clay materials and coal of unmarketable characteristics.

A block diagram illustrating the concept for the CHPP and approximate capacities is shown on Figure 2-17. The CHPP will consist of the following process components:

- Raw Coal Handling:
  - ROMs and Sizing
  - Stockpiles
  - Overland conveyors
  - Surge Bins
- Coal Processing Plant:
  - Desliming
  - Coarse coal circuit
  - Correct medium and magnetite recovery circuits
  - Fine coal circuit
  - Tailings (fine rejects)
  - Coarse rejects
- Product Coal Handling
  - Overland conveyers
  - Stacker/Reclaimers
  - Stockpile
  - Train Load-Out



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Kevin's Corner Project
Environmental Impact Statement

SCHEMATIC BLOCK
FLOW DIAGRAM
OF THE CHPP

Job Number | 4262 6660
Revision | B
Date | 12-09-2011

Figure: 2-17

File No: 42626660-g-1136.cdr

2.5.2.1 Raw Coal Handling

Open-cut ROM and Sizing Area

In the complete CHPP system there will be two identical open-cut ROM and sizing systems for the Northern and Southern Open-cuts. ROM coal will be discharged from 190 t rear dump trucks or 200 t Belly Dump Trucks, into a 1,000 t hopper. Below the hopper will be a feeder breaker which will discharge onto the raw conveyor which will elevate the coal to a secondary sizer (which will reduce the coal from < 250 mm to < 120 mm) and ROM surge bin. This will discharge into a ROM surge bin controlling the feed rate onto the overland collection conveyor.

Underground ROM and Sizing Area

There will be three underground ROM receival and sizing systems; South, Central and Northern. Of these the south and central materials handling will be identical, while the northern underground ROM will be different allowing for the rotary breaker station from the Northern open-cut ROM coal. ROM coal will be received directly from the underground drift conveyor.

The drift conveyor will discharge in two directions. The primary direction will feed into a twin roll centre sizing primary sizer, delivering coal directly onto a stacking conveyor elevating the coal to a height of 42 m creating a 100,000 t conical stockpile. The secondary direction will feed onto a short stacking conveyor, discharging onto an emergency stockpile. It may also be utilised to extract unwanted rock entering the sizing system.

The conical stockpile will be reclaimed through reclaim feeders, located in a reclaim tunnel installed on ground level.

For both the south and central underground ROM's the transfer overland will be by conveyor. The northern underground ROM will convey transport coal to discharge into a surge bin. This bin will be reclaimed by a belt feeder capable of feeding into the collection system.

Collection and Surge System

A collection system of overland conveyors and surge bins is required to collect the coal and transport it to a central locations so it can be tertiary sized and fed to the plant for processing.

The northern underground ROM reclaim system will be of similar design to the southern and central undergrounds discharging via an overland conveyor into a surge bin. The northern overland conveyor is capable of accommodating an open-cut ROM station.

Tertiary Sizing and Plant Feed System

The plant feed surge bins will be run nominally full to provide surge capacity to accommodate stoppages in the ROM receival system. The plant feed surge bin conveyors will elevate raw coal into two plant feed surge bins. The discharge of the plant feed surge bins will be regulated via vibrating feeders. Tertiary sized coal will be discharged onto four plant feed conveyors each feeding one module each.

2.5.2.2 Coal Preparation Plant

The CPP will consist of four separate plant modules rated at 1,500 tonnes per hour (tph) to process nominally 6,000 tph. Two tailings thickener systems will be installed and each one will service two

CPP modules. The four plant modules will be identical with the tailings thickener, clarified water, plant services and conveyors (product and reject) considered as common equipment items. A schematic block flow diagram of the CPP is given on Figure 2-6. The coal is separated into coarse and fine coal circuits for processing by desliming screens.

Coarse Coal Circuit

The oversize material from the screens will be pumped to the Dense Medium Cyclone (DMC), which will separate the coarse product from the coarse reject material. Product coal and reject medium will overflow from each DMC cyclone and discharge to product drain and rinse screens. Oversize material will be directed to coarse coal centrifuges for dewatering prior to being discharged onto the product conveyor.

Fine Coal Circuit

The fine coal (< 1.4 mm ww) will be pumped to the desliming cyclone clusters. The cyclone overflow will flow to the tailings thickener. The underflow will be transferred to reflux classifiers, to beneficiate the fine coal into rejects and fine product.

Fine coal product from the reflux classifiers will be transferred to reflux classifier product sumps and then pumped to reflux classifier product-thickening cyclone clusters. The thickened cyclone underflow product will be distributed to the fine coal centrifuges for dewatering and will be discharged onto the plant product conveyor.

Coarse Reject Handling

Reject coal and medium will underflow from each DMC into a reject screen. The reject screen will discharge coarse rejects onto a conveyor.

The coarse reject conveyor will transport the reject material to the coarse rejects bin, which will be capable of loading up to 220 t payload trucks. Trucks will haul and place the rejects to the overburden emplacement areas.

Tailings

Desliming cyclone overflow and sieve bend underflow will gravitate to the tailings thickeners. Two high rate thickeners will be installed each processing the fine reject tailings from the CPP process modules.

Fine rejects (thickener underflow) will be pumped to the tailings storage facilities. Return water decanted from the tailings dam will be pumped back to the clarified water sump for reuse within the CPP.

The tailings have remaining energy (catalytic) value, so it is possible to be dewatered and reprocessed in the future.

Consumables

The estimated amount of flocculants and magnetite to be used within the CHPP per annum for processing 41 Mt ROM are detailed in Table 2-8.

Table 2-8: CHPP consumables

Mine Operation Component	Approximate Amount
ROM (tonnes)	41,000,000
Magnetite (tonnes)	20,000
Anionic Flocculants (tonnes)	400
Cationic Flocculants (m^3)	60

Correct Medium and Magnetite Recovery Circuits

Correct medium will sluice the coarse coal from the desliming screen discharge chutes to the DMC feed sumps.

Adhering medium will be rinsed from the coal and reject by clarified water sprays on the rinse section of the screens. Concentrate from the separators will gravitate back to the respective correct medium sump. Separator effluent will be collected and will be recycled.

2.5.2.3 Product Handling and Train Load Out

CPP product will be collected by two product conveyors, one servicing CPP modules 1 and 2, the second servicing CPP modules 3 and 4.

Each will transfer to a common overland conveyor where the product coal will cross the Sandy Creek before discharging into a product surge bin situated at the head end of the product stockpiles.

The CPP product will be either stacked out to the stockpile or conveyed directly to the train load out (TLO) system to meet rail scheduling requirements.

Product Stockpiles

A live stockpile capacity of 500,000 t per side is envisaged. The stockpiles have been designed so that they are not bound on the external peripherals and subsequently will accommodate short-term push-out capacity if required.

Train Load Out

The product handling and TLO system will be capable of:

- Stacking and reclaiming from two separate stockpiles; and
- Direct through loading of trains from CPP to minimise the rehandling of product coal.

Product coal will be conveyed to a transfer station that will direct material onto a wide train load out conveyor. The TLO will elevate coal and discharge into the TLO bin incorporating two weigh flasks, which to discharge into the coal wagons at the required capacity.

This provides for the capability of loading trains with a net loading rate of 8,000 tph using direct loading and / or reclaim from the stockpiles. Approximately 3 - 4 product coal trains with a 24,000 t capacity will be loaded each day.

2.5.3 Mine Infrastructure Area and Light Industrial Area

The geographical spread of mining operations resulting from two open-cut and three underground operations necessitates the need for multiple Mine Infrastructure Areas and the addition of a Light Industrial Area (LIA) for centralised and common services. The primary MIA will service the CHPP and include servicing and warehouse areas for the open-cut mining operations. The three smaller MIAs will facilitate the needs of the underground mines. Most mine administration activities and general industrial activities will be carried out centrally in the Light Industrial Area (LIA). It is envisaged that major equipment overhauls will be carried out by service providers in the LIA reducing the need to transport equipment off-site.

All facilities will have appropriate fire and water management systems in accordance with Australian Standards.

2.5.3.1 Mine Infrastructure Areas (MIA)

The primary or open-cut MIA will contain the majority of production support services for the operational activities of the mining and processing departments. Each MIA is the hub for the operations support, and will include production offices, control rooms, consumables supply, and emergency services, as well as operations servicing and workshop facility.

The open-cut MIA infrastructure includes the main heavy vehicle workshop, medium workshop and lubrication tank farm, heavy vehicle washdown, medium and light equipment washdown, heavy and light vehicle re-fuelling stations, and MIA switch yard.

Where possible, natural vegetation will be maintained within and around the MIA to enhance the visual amenity and to reduce dust, heat and noise throughout the area, as well as provide a potential windbreak.

The underground mining MIA's will include facilities for underground equipment servicing and repair, workshop, hardstand for equipment maintenance, machine fluids store, stone-dust storage, day warehousing, underground equipment tyre change bay, emergency services, bath house for underground mining operators, control rooms, muster areas, and workforce and productions offices. Additional emergency services rescue equipment will be supplied at the primary MIA and LIA for use by all mining operations.

2.5.3.2 Light Industrial Area (LIA)

The LIA would be located along the mine access road, adjacent to rail, power and water supplies and the site airport location. This is an important concentration of services for the site. The accommodation village will be just 3 km from the LIA. The layout of the LIA is shown on Figure 2-18.

Key elements to be designed into the LIA include:

- Private (unregistered mine vehicle) access to the mine able to take wide loads and walk large mining equipment without interference to services infrastructure or interaction with registered vehicles.
- Easy access to services power and water with minimal service extensions.
- Combined mining support facilities.

- Short distance to accommodation to enable a camp-run shuttle service to operate.

Proximity to the rail spur enables:

- Fuel Wagon unloading and bunkering, as well as bulk storage of lubricants such as solcenic, hydraulic fluids, engine and transmission oils
- Freight unloading and bunkering
- Track Maintenance/ Dead car etc Equipment Centre

Site services supported by the LIA would be:

- Hydraulic hosing workshop
- Heavy welding shop (Truck Tray, Bucket Repair)
- Central warehousing of supplies (Pipes, Cables, Roof Support materials, Stone dust, Concrete)
- General consignment warehousing
- Bulk Emulsion Storage facilities
- Potable water processing
- Grey water processing
- Substation and power distribution for accommodation centre, airport, LIA services, possibly train load out and product stockpile services
- Emergency services.

Potential land to be made available for:

- Equipment hire services and maintenance
- Underground Equipment Off-site major maintenance / overhaul / warehousing facilities
- Open-cut equipment – Consignment warehousing and maintenance.
- CPP Storage and maintenance – high volume consumables and critical spares
- Electrical services
- Tyre storage and repair services
- Light Vehicle and small diesel (pumps and generators) maintenance and repair
- Contractors Mobilisation and storage yards
- Centralised training (including apprentices)
- Medical, security services, cleaning contractors
- Road haulage freight yards
- Concrete batch plant
- Site Information Technology service hubs
- Site building and grounds maintenance facilities

BUILDINGS/FACILITES KEY	
1	TRACK MAINTENANCE YARD
2	SECURE (NON EXPLOSIVE EMULSION STORAGE)
3	WATER TREATMENT PLAN
4	COLD FOOD STORAGE
5	MEDICAL FACILITES
6	MEDICAL FACILITES CAR PARK
7	TRAINING & INDUSTRIAL FACILITIES
8	SITE & AIRPORT MANAGEMENT CENTRE
9	RAIL FREIGHT YARD
10	GENERAL WAREHOUSING
11	HOSE FACILITY
12	CHROMING
13	SMALL TOOLS CONSIGNMENT (BLACKWOODS)
14	LOCAL BUSINESSES/OTHER
15	CPP COAL TESTING LAB
16	ENVIRO TESTING LAB
17	COMMS SERVER FARM
18	SUB STATION
19	FUEL & LUBES TANK FARM
20	DRAGLINE CONSTRUCTION OFFICE
21	OVERHAULS W/S BUCKET WELDING
22	OEM STORES (HEAVY)
23	PRESTRIP CONTRACTOR YARD
24	DRAGLINE CONSTRUCTION WORKSHOP
25	DRAGLINE CONSTRUCTION PAD

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N E S W

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Kevin's Corner Project
Environmental Impact Statement

LAYOUT OF LIGHT INDUSTRIAL AREA (LIA)

Job Number 4262 6660
Revision B
Date 12-09-2011

Figure: 2-18

File No: 42626660-g-1042.cdr

2.5.3.3 Training and Induction and Emergency Services Building

The training and induction and main emergency services building will be located within the LIA. The emergency vehicles will be stationed at this facility. Due to the dispersed nature of the Project it is necessary to have Emergency services such as an ambulance and fire control appliances, located within the LIA and therefore central to all Project activities, including airport and accommodation.

2.5.3.4 Ablutions

Adequate amenities, including showers, will be readily available for all mining personnel within the MIA's. In the satellite MIAs, grey water will be collected in holding tanks from where it will be pumped into a truck or pipeline for processing at the Sewage/Waste water treatment plant.

2.5.3.5 Warehouse

The major warehouse for general parts and equipment storage will be situated in the LIA, in a location central for rail and road delivery of freight, and dispatch of outgoing freight. A satellite store will be included in the CPP, open-cut and underground MIA workshops for daily servicing and supply requirements.

The Project is relatively isolated from the major centres, and the scale of operations warrants carrying of these facilities on-site, thereby also reducing heavy (commercial vehicle [CV]) traffic movements.

2.5.3.6 Workshops

Scheduled service, maintenance and repair for open-cut heavy vehicles will be carried out in the service workshop in the open-cut MIA. The equipment does not include contractor's equipment which may be done in contractors' specialised facilities. Slower moving tracked equipment such as dozers and drills will be transported to this MIA via low loader for services where distances are excessive.

In addition to service bay workshops, major servicing and overhauls may be carried out in the OEM supported LIA workshop. The LIA workshop will have a wider range of facilities and access to stores and support services enabling major overhauls to be carried out in a controlled environment with specialised equipment and personnel. The provision of these services on site will reduce the need to freight equipment from the site and will allow more space for extended overhaul periods.

The location for the LIA OEM workshops will be adjacent to the central warehouse, with the offices and amenities and specialist work areas such as hydraulics hose area, specialist tool storage rooms and electronics repair areas in the nearby maintenance facilities buildings.

2.5.3.7 Service and Light Vehicle Workshop

The service vehicle workshop will be located at the LIA and will contain mechanical service bays for the site's light and medium vehicles. There is the potential for this aspect of the operation to be out-sourced and completed in a purpose built facility. Having these service facilities on-site will reduce the potential for spread of weeds off the Project site.

2.5.3.8 Tyre Bays

A heavy vehicle tyre bay will be situated within both the LIA and at the MIA's, at the main hardstand area to service rubber tyred heavy equipment. Construction of the tyre bay will be a steel portal frame building over a concrete slab with dedicated tool store, crib room, amenities and office. A satellite tyre bay will be provided at the underground MIAs. The workshop equipment in the tyre bays will include:

- Tyre presses;
- Dedicated air compressor for tyre inflation contained within a protected area;
- Reticulated services including air and service water;
- Mobile tyre handlers and access areas;
- Tyre store; and
- Tyre repair facility.

Automated tyre changing facilities will be deployed as far as possible to reduce exposure of people to high air pressures. Medium and light vehicles will undergo tyre service and repair in the medium and light vehicle workshop with appropriate smaller scale facilities to suit the light vehicles.

2.5.3.9 Heavy Welding Shop

A separate heavy welding and bucket repair facility will be located within the LIA which will facilitate maintenance of the dragline buckets and other heavy welding by specialised contractors. It is deemed important to have these facilities on the Project to reduce large freight movements and increase equipment availability.

2.5.3.10 Washdown Areas

Light and heavy vehicle washdown areas will be located at the entrance of their respective areas of service sites. These include:

- A heavy to medium vehicle washdown pad;
- One vehicle washdown area to service medium and light vehicles; and
- Underground MIAs and the LIA will have small washdown pads for servicing.

Each group of washdown pads will consist of:

- Self-draining, bunded concrete pads;
- Cascading sediment separation pit with oil skimmers, oil/water separators and oil collection;
- Pump and tank station with connecting pipe work and fittings;
- Spray shields;
- Elevated platforms with water cannons for the heavy vehicle pads
- Fire-fighting equipment; and
- Lighting.

Fit-for-purpose washdown facilities enable servicing to be carried out on clean vehicles and prevent the weeds being spread by equipment.

2.5.3.11 Dragline Erection Site

The dragline erection site area located in the LIA will have a large lay-down area to facilitate shovel and dragline erection and ultra-class off highway vehicle mobilisation.

The site will have lay-down areas for draglines and for excavators and shovels, and level, firm access for cranage services. Buildings for this facility will be situated with the LIA OEM and heavy welding shops.

It is anticipated that these facilities will reduce the onsite transport of equipment components and provide permanent fit-for-purpose facilities, supporting safe mobilisation of large earth-moving equipment.

2.5.3.12 Heavy Equipment Access Track

The Project is designing segregated access ways for heavy/light equipment as much as practicable. This has resulted in separate roads for registered vehicles and off-highway equipment. Included in these separated networks is the Heavy Equipment Access Track (HEAT). The HEAT is an access road from the LIA to MIA to enable mobilising equipment, or for equipment preparing for overhaul, to travel to and from purpose built facilities.

2.6 Associated Infrastructure

2.6.1 Workforce Accommodation

2.6.1.1 Accommodation

There is very limited amount of available accommodation within a reasonable daily travel distance of the Project, especially with other large projects also placing high demands on accommodation facilities, set to precede the Project. To ensure employee fatigue is appropriately managed stand-alone accommodation will be required for both the construction and operational phases. The location of the accommodation village is shown on Figure 2-2.

Initial Temporary Accommodation

It is planned to build a construction camp in the vicinity of the permanent accommodation village so that accommodation services can be easily shared. It is likely that a substantial portion of the construction camp would be retained for periodic mining equipment assembly, contractor peaks in earth-moving operations, and intermittent services providers. The initial temporary camp will be required for approximately 12 months for up to 1,000 personnel. It will have the following infrastructure:

- All relocatable modules will be manufactured off-site and transported for installation and fit out;
- Potable water will be trucked in to the site, stored in an above ground tank and reticulated to the units through a temporary above ground pipe system until the Potable Water Treatment Plant (PWTP) is operational;

- Sewage will be collected from the units using a temporary pipe system and stored in an underground tank (similar to a septic tank), pumped out into a truck-mounted tank for transportation and discharged to an existing sewage treatment works (Alpha or Emerald) until the SWTP is operational;
- Power will be provided by suitably sized diesel generators and reticulated to the units until site power is provided;
- Initial communications will rely on the locally available mobile network and satellite services; and
- Basic earthworks only will be undertaken to provide an area for the construction of the initial temporary camp, car parking areas and hardstands.

2.6.1.2 Permanent Accommodation Village Construction

The permanent accommodation village is to be constructed as part of the early works to be used as the construction camp and then gradually set up for operations. The construction camp and permanent accommodation village are to be combined at the same location to minimise the impact footprint and services distribution networks.

The accommodation village will include the following facilities:

- Dining rooms and kitchens;
- Wet mess;
- Laundry facilities;
- Common rooms;
- Gymnasium;
- Swimming pool;
- Cricket / football pitch;
- Tennis and basketball courts; and
- Barbeque areas.

The accommodation village will consist of separate, air-conditioned rooms with ensuite, small fridge, television, telephone and internet connection. Permanent day shift employees and permanent staff will have dedicated rooms while even time rostered employees are likely to share rooms on an alternate roster basis. Spare rooms will be reserved for contract services to the mine.

- Peak construction workforce – approximately 2,500 employees
- Mine workforce – approximately 1,500 employees with accommodation allowances for additional workforce during longwall moves and maintenance shutdowns up to 2,000 persons.

The resulting facility will be an eco-village suitable for a workforce of approximately 2,000 employees (1,500 permanent employees plus additional periodic shut down maintenance allowances) will be situated approximately 10 km from the mine off the site access road and before the proposed Jericho-Degulla Road deviation. The accommodation village is designed for a fly-in-fly-out workforce.

The functional operations of the accommodation village will be as follows:

- All modularised components will be manufactured off-site and transported to site for installation and fit out;
- Potable water will be provided from the Potable Water Treatment facility and connecting underground mains constructed as an early works package and potable water demand to be based on a consumption of 240 L per person per day;
- Sewage disposal will be to the Sewage Treatment Facility constructed as an early works package and sewage disposal based on waste generation rate of 240 L per person per day;
- Power will be provided from either diesel generators, the substation at the LIA, or from the nearby existing 132 kV power lines and power demand equivalent to 2.5 KVA peak per person at 415 Volts (V);
- One person per room, per night;
- Access and circulating roadways to be two-way, 7.2 m wide, bitumen sealed and designed to accommodate a road registrable B-Double delivery vehicle;
- Separate pedestrian and electric cart service vehicle access roads around the village
- To avoid the possibility of insufficient accommodation being available at critical times, dragline and CHPP shutdowns will be carefully scheduled. Some of the construction village will remain on-site for these peak periods;
- Construction and commissioning of the accommodation village will continue over three years until all accommodation requirements are fulfilled for the operational workforce of up to 2,000 at the commencement of operational year 5. Towards the end of the mine life, accommodation may need to be modified as production levels or rosters change; and
- Vehicle parking areas for the operational workforce are to be bitumen sealed, and most parking spaces are likely to be covered. The majority of the workforce is expected to make use of mine transport services, so parking will be less than normal with overflow parking for shutdown being maintained.

2.6.2 Transport

2.6.2.1 Road

Road work and road construction will be undertaken in accordance with appropriate road construction standards and will occur both on and off MLA 70425. Road works and specific standards are described further in Volume 1, Section 17, including:

- Off-lease road works include:
  — Upgrades to the Clermont-Alpha road and Degulla road in conjunction with the Alpha Coal Mine Project; and
  — Diversion of a portion of the unsealed Jericho-Degulla-road to serve as both mine access road and continuation of the Jericho-Degulla Road.

- On-lease road construction includes:
  - Mine site access road;
  - Accommodation access road;
  - MIA roads and internal roads;
  - Stub-line roads (access to dragline power transformers and to conveyor access);
  - Access roads to proposed borrow pit areas and landfill;
  - Haul roads;
  - Heavy Equipment Access Roads; and
  - Miscellaneous Access Roads.

Temporary Site Access

During the initial construction period and prior to the permanent mine access road being completed; a temporary access road will need to be constructed from Degulla Road to the construction office site. The proposed mine access road will be designed to ensure the integrity of the road is not impacted by surface water during heavy rains.

Topsoil will be removed and stockpiled separately and subject to further geotechnical investigation, it is proposed to compact the sub-grade using an impact roller before constructing the new road with select fill to raise the finished level above the existing terrain levels. Typically, a crushed rock pavement of 300 mm of combined sub-base and base coarse material will be treated with a 7 m wide two coat seal in a 9 m wide formation for high use roads.

Road Closures and Openings

The most significant road closure will be the Jericho-Degulla Road which is a local shire road passing through the main area of the proposed mine. The current traffic load for this road is about four vehicles per day. In conjunction with the proposed Alpha Mine it is proposed to close the section of road from the intersection with the existing 132 kV regional power line to the south to the limit of the mining area at the northern end of Kevin's Corner.

It is proposed to align the road opening adjacent to the regional power line to the north east where it will intersect the Alpha-Clermont road. A northern deviation will be constructed from the Alpha-Clermont Road, about 7 km north of the turnoff to Wendouree, to rejoin the Jericho-Degulla road at a point to the north of the proposed Kevin's Corner mining area. This section of road will include a crossing over the proposed rail spur to the Alpha mine and the rail spur to Kevin's Corner, as well as a crossing over Sandy Creek at the northern edge of the Project site.

The design basis for these new sections of road includes a two coat bitumen seal with a 7 m wide pavement in a 9 m formation to the Kevin's Corner Spur crossing, and compacted unsealed formation to the lease boundary. Table drains will ensure the integrity of the road is not adversely affected during heavy rainfall. Topsoil will be removed and stockpiled separately and unsuitable material will be removed and stockpiled before backfilling with select fill. An impact roller will be used to prepare the sub-grade before a pavement of 0.3 m of imported crushed rock is placed. Finished road height will generally be above grade. The roads will be finished with signage, road furniture and line marking in accordance with the Council standards and the roads will be fenced with a five strand barbed wire stock fence.

Road access will be for local and non-industrial traffic.

Mine Site Roads

Site roads are shown on Figure 2-5.

Traffic separation of heavy and light vehicles will be maximised for safety reasons wherever possible and practicable on the Mine site. From the main security gate at the entrance to the MIA and CHPP areas, all light vehicles and general heavy freight vehicles will be restricted to the sealed access road on-site unless otherwise specifically authorised by the Senior Site Executive (SSE) for unusual freight, where upon mine site vehicle escorts will be deployed.

MIA Roads

Roads connecting the MIAs will be constructed to both sealed and unsealed standards as appropriate, suitable for up to B-Double sized traffic. Heavy vehicle roads within the MIA will be constructed to the same standard as the site haul roads. Pavement design for the LV MIA roads will be as for the Site access road.

Wherever practical, light vehicles and delivery vehicles will be separated from heavy mining equipment by the provision of separate light vehicle service roads to each of the MIA areas. For entry into the stripping and mining areas light vehicles will use a separate unsealed access road which will also provide maintenance access to the overland conveyor and services corridor. Strict limitations and procedures will be in place to control the movements of light vehicles on heavy vehicle haul roads.

Separation and / or specific controls and procedures are required at the following locations:

- Heavy equipment erection sites;
- LIA/MIA areas;
- Creek crossing;
- Intersections;
- Haul roads;
- Stripping areas; and
- Mine bridge access.

Dragline Construction and Site Access Road

The dragline and shovel erection site will be located in the western part of the LIA. Typically maintenance shut downs for draglines will be carried out in the field, or near the open cut.

Coal Haul Road Corridor

The layout of the coal haul roads has been driven primarily by the mine plan and the location of the pit access ramps combined with the selected location of the remote ROM areas, plus constraints with maintaining so far as possible, natural water courses. However, the final design of the ramp grades and the vertical and horizontal curves will be determined by safety, visibility and the most economical grades to achieve the most effective balance between construction capital costs and the ongoing operating costs influence by cycle times and fuel burn. Current mine designs have considered factors, although some changes in ramp locations may be required as mining conditions dictate.

Coal haulage will be to ROM stations connected to the ROM coal conveyor system.

2.6.2.2 Rail

The proposed rail loop has been located to facilitate alignment with the Alpha rail line while avoiding excessive cuts and/or filled embankments. The alignment is suitable for freight trains and allowing for aircraft flight path envelope.

The current proposed alignment allows the train load-out bins to be located in suitable alignments with the out-loading conveyors from the product coal stockpiles at the CHPP area.

Loaded trains will then travel approximately 18 km from the rail loop, along the spur line to join the Alpha to Abbot Point rail line at chainage 31 km. Approximately 2 km of the spur is off the mine-lease. The Alpha to Abbot Point preferred rail alignment will then be followed to connect to the Abbot Point Terminal 3 unloading station.

2.6.2.3 Transport of Materials

All materials and equipment during initial construction will be transported to the site by road, other than those sourced onsite from borrow pits. The proposed site access route for road transport is via Gladstone along the Capricorn Highway to Alpha and the Alpha to Clermont Road to the proposed new Mine access road off Degulla Road.

It is proposed that most of the trucks and parts for the construction of the draglines and shovels will come into the region via Brisbane, Mackay or Gladstone or Townsville before being transferred by road to the Mine site. The Alpha to Clermont Road is a state-controlled road with a current traffic load of around 74 vehicles per day of which 24% are heavy vehicles.

During the construction phase, a large volume of heavy articulated truck-loads of materials and equipment, including escorted wide loads, will be delivered to the Mine. Later phases of construction may be able to utilise the rail freight services depending on the configuration of the port facilities as determined by North Queensland Bulk Ports.

2.6.2.4 Air Transport

A contract FIFO charter air service provider will be used to transport employees working at the Kevin's Corner Mine to and from work at the start and finish of their roster cycle. The charter operators will be required to provide suitable aircraft to fly up to 110 people per flight each way at change of roster. Spare cargo services may also be utilised, thereby reducing road traffic.

2.6.3 Waste Management

2.6.3.1 General Waste

General waste management includes all the general waste from the accommodation village, MIAs, LIAs, CHPP and mining operations including wet and dry waste from the kitchens, crib rooms and offices, packaging material, material off-cuts and used consumable items. While scrap steel and obsolete equipment will be transported offsite by recycling contractors, viability of transporting the normal domestic recyclable materials to a suitable recycling point will need to be examined over time. The majority of the general waste will be disposed of in an onsite landfill designed and managed to the appropriate legislative standards.

It is proposed that domestic and recyclable general waste will be managed by a local contractor who may set up operations in the LIA. The Project is examining methods for further reuse of waste materials to lower land fill requirements.

2.6.3.2 Industrial Waste

All used lubricants and coolants will be retrieved at the maintenance and service facilities and along with other toxic materials, workshop mop material, batteries, chemical residues, and used filters will be disposed of and/or recycled by approved service providers.

Scrap merchants will be contracted to provide onsite bins for collection and recycling of scrap metal and other recyclable materials.

2.6.3.3 Mine Overburden

The Kevin's Corner mine has weathered overburden material in the upper measures. The weathered material that does not require drilling and blasting will be removed by high volume efficient mining equipment, as indicated in Table 2-9. This material is regarded as waste rock as it has no marketable value.

Table 2-9: Indicative total mine overburden 2014 - 2020

Year	2014	2015	2016	2017	2018	2019	2020
Total Overburden (Mbcm)	115	115	115	115	115	115	110

NB – the volumes may change with the final selection of equipment and subsequent schedule.

2.6.4 Water and Wastewater Systems

The Project's annual water demand is estimated to be a maximum of 8,347 mega litres (ML) per annum, and is expected to come from a combination of sources. A clean water pipeline from the Connors River Dam, or suitable alternative, will provide the majority of the water supply, Local groundwater sources will be utilised only when drawdown is already necessary for mining operations, in which case the water will be used for dust suppression and CPP processes. During the estimated peak 8,347 ML net annual water demand, ~ 99% (approximately 8,236 ML) would be for the mine operations and 111 ML would be potable water. Raw water will be stored on-site in two dams and potable water will be treated at a packaged water treatment plant. Net water demand is dependent on the ability to recover water from the TSF and groundwater from mine dewatering.

2.6.4.1 Water Supply

Negotiations for the supply of water are underway with SunWater Ltd. Letters of intent and commercial arrangements are being finalised to guarantee delivery of water at commencement of construction, and long-term delivery of the balance of the mine water demand. The water will be delivered to a dam on the lease, north of the rail line. This water will be suitable for immediate use in the CPP or pumped to the potable water treatment plant.

2.6.4.2 Potable Water Treatment and Reticulation

Potable drinking water will be available on each of the following areas:

- Open-cut MIA;
- Underground MIAs;
- LIA;
- Accommodation village;
- Airport;
- Mobile crib huts;
- Dragline erection pad; and
- CHPP

The water system will include:

- Production of potable water and transfer to potable water tanks around the site as required;
- Pump station;
- Pre-filter, ultra-filtration membrane systems;
- Chlorine dosing system;
- Tanks required for plant automation;
- Raw and potable water storage tanks; and
- Embedded water main piping.

Adequate storage of potable water will be established to cover maintenance periods of the PWTP.

2.6.4.3 Raw and Fire Water Storage and Reticulation

The Project site will have a fire hydrant ring main systems in the following areas:

- Open-cut MIA;
- CHPP;
- Underground MIAs;
- Product stockpiles and train load-out;
- LIA;
- Airport;
- Security Building;
- Dragline Assembly Area;
- Conveyor lines; and
- Accommodation Village

The fire system will use service water supplied directly by the raw water dam. The workshop in each of the MIAs may be required to have a spray suppression system in place to protect major assets. The underground MIAs will each have a turkey's nest dam and fire water tanks for underground fire suppression systems.

The following items will comprise the fire system for each of the areas listed above:

- Pump station, including two diesel driven pumps; one duty, one standby / assist in accordance with AS2419, plus booster pump set;
- Entrenched ring main circuit with hydrants in accordance with AS2419;
- Fire hose reels and extinguishers with isolation valves to AS2419; and
- Suppression system in selected areas such as MIA warehouses, kitchens, etc.

2.6.4.4 Sewage Collection and Treatment

Sewage treatment will be provided to service each of the following areas:

- Open-cut MIA and CHPP;
- Underground MIAs;
- LIA; and
- Accommodation village and Airport.

For buildings in close proximity to each other, sewage will be collected from the open-cut MIA and CHPP and reticulated to sewage treatment plants located nearby via an underground sewerage network.

Similarly, sewage will be collected from the accommodation village and reticulated to a dedicated sewage treatment plant in the LIA.

Sewage from the underground operations and underground MIAs will be treated by a sewage treatment package plant located locally to the underground MIAs, or transport to the SWTP.

The final product will be class-C effluent suitable for recycling in sub-soil irrigation with above ground heavy mulch. Periodical removal of the separated sludge and solids will be required.

Sewage treatment plants will consist of:

- Degradation tank;
- Aeration tanks;
- Sludge storage tanks;
- Clarifying tanks;
- Effluent tank for disinfection;
- All transfer pumps and blowers; and
- All sewerage lines required within the MIAs, accommodation village and construction camp.

2.6.5 Surface Water Management

Overview

The proposed mine water management system (WMS) comprises runoff containment systems for all disturbed (open-cut pits, spoil/overburden dumps) and all mine-affected (MIA, ROM, CHPP, TLO, product stockpile) areas, mine water dams with a range of functions (runoff capture, water transfers and storage) and a network of pipes, pumps and drains to transfer water around the system. In accordance with current best practice management strategies the mine WMS will satisfy the following key objectives:

- Minimise the generation and containment of mine-affected water;
- Provide sufficient system capacity to capture and contain all mine-affected water during significant rainfall events and to reduce the risk of an uncontrolled release into the receiving environment to an acceptable level; and
- Allow for the preferential reuse of mine-affected water in mine operations (CHPP, underground mining operations, dust suppression, industrial uses).

2.6.5.1 Status of Design

The Project design for surface water management is at concept design stage and is based on the pre-feasibility study mine plan prepared by the Proponent. Mine plan and infrastructure optimisation is being undertaken as part of the bankable feasibility study for the Project. As the mine plan is refined, design for surface water management (including flood protection, stream diversions, and mine water infrastructure) will also be refined and developed to detailed design level. The process to refine surface water design elements of the Project will incorporate the findings and mitigation strategies identified in this EIS. Additionally, design of water distribution infrastructure such as pipeline design parameters, above ground facilities and location of pipeline valves and pump-stations, will be conducted once further finalisation of mining infrastructure has occurred.

Although the Project design for surface water management is not finalised, it is considered sufficiently defined to facilitate impact assessment and identify mitigation measures required to protect surface water and associated environmental values. The philosophy adopted was to ensure that concept definition of the surface water management works and operations would be sufficient to demonstrate that environmental impacts can be managed and the required works can be integrated into the Project.

The proposed mine WMS is described in detail in the Site Water Management System and Water Balance Technical Report (Volume 2, Appendix M3). Geotechnical and hydro-geological investigations for the mine water dam sites are to be undertaken as part of detailed design to confirm the suitability of the dam locations and to develop the dam designs and mitigation (safety) measures to the standards required for Regulated Dams.

2.6.5.2 Proposed Segregation of Mine Waters

In accordance with current best practice mine water management practices it is proposed to segregate water within the WMS based on its predicted quality in order to optimise the storage and reuse of mine water and to minimise capture and storage of non-mine affected water. The concept for the WMS is illustrated on Figure 2-19.

The mine WMS will be limited to disturbed and mine affected areas (disturbed catchments, contaminated water sources and contaminating processes). Clean waters (runoff and stream flow) from undisturbed areas on the site and upstream catchments will be diverted to passively flow to downstream waterways. It is envisaged that during the course of the mine life, progressive rehabilitation of available (no longer needed) disturbed areas will be undertaken and once established and demonstrated to produce acceptable quality runoff, these areas will be diverted away from the mine water management system through clean water bypass drains.

The following classifications have been nominated for the site:

- **Non-mine affected water management system** – See below for detail;
- **Mine affected water system** – See below for detail;
- **Process water management system** – management of all water used in the CHPP, tailings storage facility and the tailings decant and return water system. These waters are expected to contain elevated salinity, potentially elevated sulphate concentrations and have relatively neutral pH; and
- **Groundwater management system** – this includes all groundwater pumped from the underground mines as well as any water extracted from the bore field.

Non-Mine Affected Water Management System

Runoff generated from undisturbed catchments within the Project site as well as non-mine affected (NMA) water entering the Project area from undisturbed catchments upstream will be diverted around the mine WMS. The NMA water system will comprise of the following elements:

- Provision of a diversion channel and system of levees to divert flows in Little Sandy Creek and Rocky Creek around the central open-cut pit and into Middle Creek and a system of levees along Sandy Creek and Well Creek to prevent inundation of the open-cut pits and critical mine infrastructure. The diversion channel will be designed to conform with the natural creek system with flood protection levees designed to the 1:1,000 Annual Exceedance Probabilities (AEP) flood event (plus freeboard). Further design details of the levees and creek diversion are described in Volume 1, Section 11.3.10 and in the Flooding Technical Report Volume 2, Appendix M2;
- NMA water catch drains will, wherever practicable, direct runoff from undisturbed catchments around the mine WMS. This will include a system of upslope NMA water catch drains to minimise the catchments reporting to constructed the proposed mine water and raw water dams;
- Diversion around the WMS of runoff originating from approved rehabilitated areas. As rehabilitation of the spoil dumps progresses and runoff from these areas reaches an acceptable quality for release they will removed from the mine WMS;
- High wall dams and levees upslope of the open-cut pits to reduce peak runoff inflows and velocities from undisturbed or approved rehabilitated catchments. The location and design of high wall dams has not been considered at this concept level but will be further refined during detailed design;
- Raw water dam to store imported raw water; and

- A system of pumps and pipelines to transfer raw water to various onsite demands including:
  - The CHPP for coal washing;
  - MIA use (workshop, washdown);
  - Haul road dust suppression;
  - Water treatment plant (for potable applications); and
  - ROM dump/pad dust suppression.

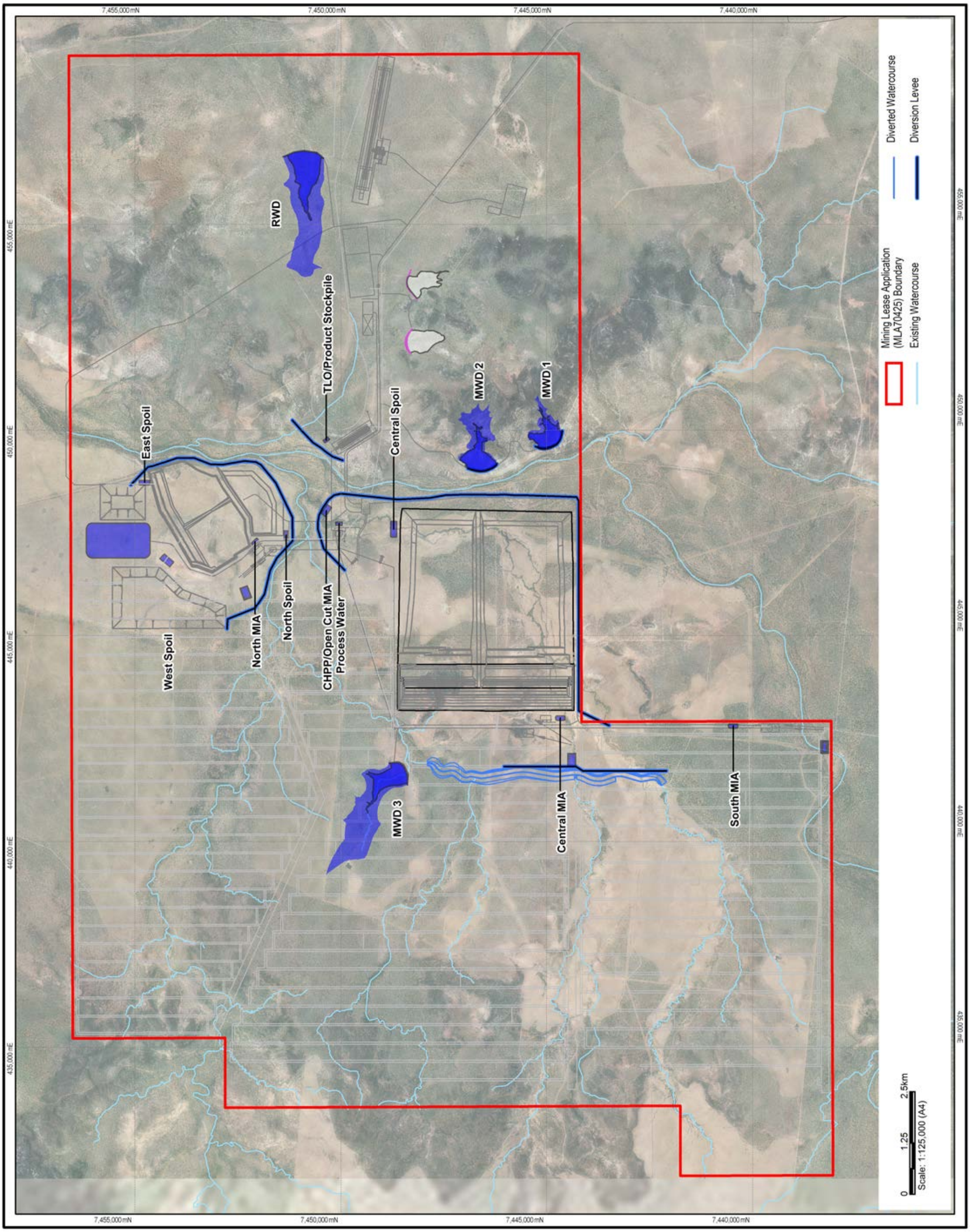
2.6.5.3 Mine Affected Water Management System

Water originating from a variety of potentially contaminating sources including dewater from the open-cut and underground mines, runoff from all active spoil and overburden dumps and runoff from various mine process areas will be carefully managed to minimise the volumes of water requiring capture and storage. The MA water system will encompass management of water from the following sources:

- Dewatering of the open-cut pits;
- Dewatering of the underground mines;
- Runoff originating from all ROM pads and dumps, MIAs, CHPP, TLO and product stockpile; and
- Runoff originating from all active spoil and overburden dump areas.

Water within the MA water system will be preferentially sourced for a variety of uses including process water in the CHPP and for dust suppression. This will ensure the sites MA water inventory is optimised and of the demand for raw water is minimised. The MA water system will comprise the following elements:

- Open-cut pit sumps to collect local runoff from the pit floor, ramps, high, low and end walls;
- Open-cut pit dewatering pumps and pipelines to transfer water from the central pit sump to either MWD 1 or 3 and from the northern pit sump to MWD 2;
- Underground mine water collection system;
- Underground mine pumps and pipelines to transfer water from each collection system to the associated adit pit dams and then on to MWD 3;
- Appropriate runoff interception and conveyance systems to capture runoff originating from the potentially contaminating mine process areas (MIAs, CHPP, TLO, product stockpile);
- A pump and pipeline system to transfer water from each process area dam to the nearest mine water dam;
- Appropriate runoff interception and conveyance systems to capture runoff originating from the active areas of the spoil and overburden dumps;
- A pump and pipeline system to transfer water from each spoil dam to nearest mine water dam; and
- A return water pump and pipeline system from each mine water dam to deliver stored water to:
  - A water fill station (for haul road dust suppression, MWD 2 and 3 only);
  - The process water dam (to supply the CHPP); or
  - Another mine water dam for the purpose of managing inventory levels during prolonged wet or dry periods.



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CONCEPT MINE WMS - STORAGE LOCATIONS

Job Number | 4262 6660
Revision | B
Date | 12-09-2011

Figure: 2-19

File No: 42626660-g-1137.wor

2.6.5.4 Estimated Mine water Demands

Various water demands exist for the Project and consist of:

- CHPP make-up water;
- Haul road and hardstand dust suppression;
- Underground mine operations;
- Vehicle washdown and workshop; and
- Potable/sanitation.

CHPP make-up water requirements, net of tailings return water, are provided in Table 2-10. The CHPP water make-up demands roughly equates to 190L per tonne of ROM coal and is comparable to estimates for other coal mines with water efficient operations.

Table 2-10 CHPP make-up water demands

Year	ROM Coal Processed (Mtpa)	CHPP Make-up Water Demand (MLpa)
5	27.4	5,454
10	35.6	6,677
30	26.1	4,974

Total estimated water demand for dust suppression (haul road, ROM dump/stockpile and hardstand) is shown in Table 2-11.

Table 2-11 Total dust suppression water demands

Year	Total Dust Suppression Water Demand (MLpa)
5	1,011
10	1,011
30	1,011

Water will be required to sustain underground mining operations as detailed in Table 2-12 below.

Table 2-12 Underground mine operations water demand

Year	Underground Mine Water Demand (MLpa)
5	570
10	544
30	528

Water is required for washdown of plant and equipment at each MIA. Table 2-13 shows the total estimated demand for washdown. MA mine water will be unsuitable for this purpose with demand sourced directly from the raw water dam.

Table 2-13 Mine Infrastructure Area (MIA) raw water demand

Year	MIA Raw Water Demand (MLpa)
5	3.6
10	3.6
30	3.6

Treated raw water will be required to meet the various potable and sanitation water demands. Demand will be sourced from the raw water dam prior to treatment by the onsite WTP. Table 2-14 details the estimated raw water potable demand.

Table 2-14 Raw water potable demand estimates

Year	Potable Raw Water Demand (MLpa)
5	142
10	111
30	95

A summary of the total Project water demands is shown in Table 2-15.

Table 2-15 Project water demand summary

Year	CHPP Make-up Water (MLpa)	Dust Suppression (MLpa)	Underground Mine Ops (MLpa)	MIA (MLpa)	Potable Water (MLpa)	Total Site Demand (MLpa)
5	5,454	1,011	570	3.6	142	7,181
10	6,677	1,011	544	3.6	111	8,347
30	4,974	1,011	528	3.6	95	6,612

2.6.6 Water Balance Modelling

Water balance modelling of the proposed mine WMS using 110 years of climate data indicates that the system has sufficient storage capacity to limit the potential for an uncontrolled discharge to less than 1:100 AEP. Water balance modelling also indicates that the mine will generally operate with a water deficit and will have to import water to make-up the balance. The estimated required raw water make-up is shown in Table 2-16.

Table 2-16 Estimated raw water make-up for a 10th percentile dry year

Year	Estimated Imported Raw (MLpa)
5	655
10	3639
30	3037

2.6.7 Stream Diversions

The diversion of Little Sandy Creek, Rocky Creek and Middle Creek will be required for the Project to gain unimpeded access to coal reserves that would otherwise be inaccessible. To supplement the stream diversion channels, flood protection levee banks will be required to protect the mine from flooding. The locations of the creek realignment (diversion) channel and the flood levees are listed below and shown on Figure 2-20.

2.6.7.1 Creek Diversions, Levees and Crossings

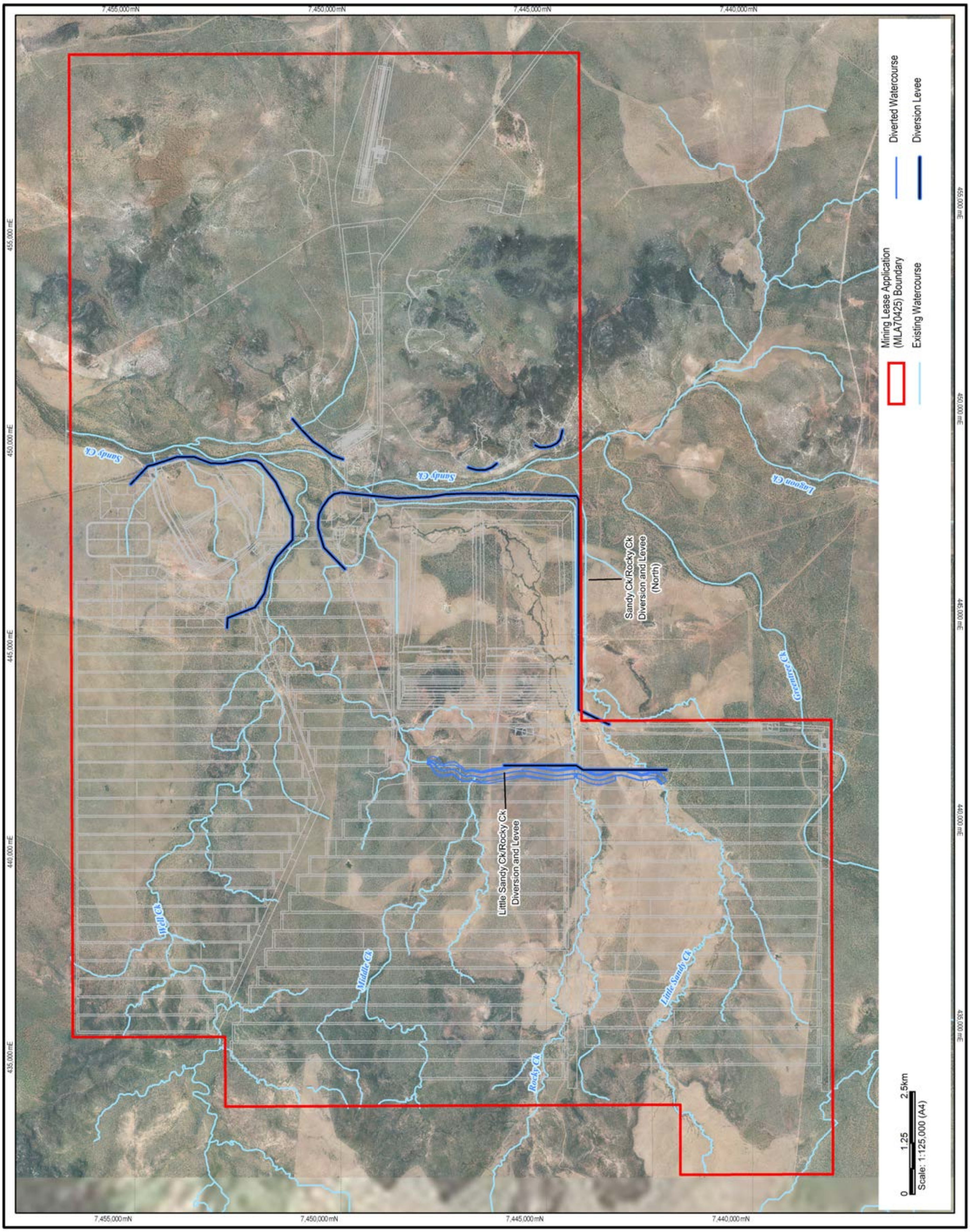
The objective for the hydraulic design of the new Little Sandy Creek, Rocky Creek, and Middle Creek diversion was to establish a hydraulic behaviour that is similar to that of the existing creek system, to ensure that the diverted channel is stable and supportive of revegetation, and to protect the upstream and downstream reaches from any detrimental changes in creek hydraulics.

The selected diversion alignment was determined by the constraints provided by the local topography, the existing channel geometry from each creek, the location of the proposed underground mine longwall mine panels, and the location of the flood protection levee.

2.6.7.2 Flood Protection Levee Banks

Flood levee banks will be required along northern, southern, and eastern perimeter of the open-cut operation to protect the area from flooding from Well Creek, Greentree Creek, and Sandy Creek respectively. A levee bank will also be required along the Western boundary of the main open-cut mine operation to provide flood protection from the diverted Little Sandy Creek, Rocky Creek, and Middle Creek. Flood protection for the initial Northern open-cut mine operation and tailings storage facility (TSF) will be provided via a levee bank which will be constructed along the Southern perimeter. An additional levee bank will be provided along the Eastern side of Sandy Creek to protect the proposed rail loop from flooding from Sandy Creek.

Flood protection levee banks are proposed to protect the mine open-cut and infrastructure areas from flooding up to the 1:1,000 AEP flood event in accordance with a risk based approach. The nominal 1:1,000 AEP level of flood protection will be further reviewed as part of detailed design and subject to a detailed risk assessment including various consequences that may arise from different methods to recover the mine pit(s) in the event of an extreme flood.



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DIVERTED WATERCOURSES

Job Number | 4262 6660
Revision | C
Date | 12-09-2011

Figure: 2-20

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2.6.8 Drainage

2.6.8.1 Stormwater

To protect the environmental values of downstream water the Project SWM system has been designed to:

- Divert clean stormwater runoff away from areas disturbed by mining activities;
- Progressively rehabilitate spoil stockpiles;
- Contain runoff within disturbed areas; and
- Maximise the reuse of water.

2.6.8.2 Water Storage and Recycling

Run-off from roofed buildings will be captured and reticulated to storage tanks for re-use to irrigate garden areas around MIAs, LIA, Accommodation Centre and Airport. Similarly waste water will utilise BioCycle Systems to a level at which it can be used for garden areas around the mine infrastructure, or for local dust suppression.

2.6.8.3 Road Drainage

Generally, roads will be built up above the level of the existing natural surface to ensure high rainfall events do not adversely affect the integrity of the roads. Within the Mine area, the MIA and the CHPP area, all drains will be directed to sediment dams to allow the majority of suspended solids to settle out rather than be discharged directly to local watercourses. Drainage will be designed to impact natural surface water flows as little as possible.

2.6.8.4 Dams

Sediment Dams

Various sediment catchment dams will be located throughout the site as mining progresses to ensure turbidity levels in adjacent creeks are not increased disproportionately for water designated as “NMA water”. Mine water from dewatering systems will also flow to sediment dams for re-use.

Water Storage Dams

It is proposed that the raw water supply will come from the SunWater Connor’s River Dam pipeline into a raw water dam proposed to have a capacity of at least 1,010 ML of water.

Tailings

Out-of-pit tailings storage in a purpose-built Tailings Storage Facility (TSF) will proceed for the first 5 years of the Project whereupon disposal will continue in-pit in the Northern open-cut mine. Water decanted from both the purpose-built and in-pit TSF will be returned, via a system of pipes and pumps to the process water dam from where the CHPP will reuse the water coal processing operations.

It is understood that decant water from the TSF will be of a quality suitable for use in the CHPP and will satisfy a significant proportion of total CHPP water demand. Inflows of TSF decant water back into the mine WMS are related to production levels and as such remain relatively constant. The TSF and decant dam will be classified as Regulated (Hazardous) Dams and designed, built and operated to the standards required for Regulated dams including sufficient storage to limit the probability of overflow. The seepage interception system and decant dam will have monitoring and maintenance requirements defined in the mandatory operations plan for the TSF and be included in the annual inspection of the TSF.

2.6.9 Energy

The mine will have a connected capacity of approximately 250 MW. Actual usage will not exceed this figure and will vary depending on final fleet configuration. Energy will be sourced from the Powerlink Galilee Transmission Project's 275 kV power grid, which is to be extended from Lilyvale to the Project site. An option to develop a new power station adjacent to the mine site, based on low value and waste coal and opportunity to supply surplus power to adjacent mining operations, is also to be examined and would be considered as a separate stand-alone project.

2.6.9.1 Construction Power Supply

Negotiations for the supply of power are underway with Government owned corporation Powerlink Queensland. Letters of intent and commercial arrangements are being finalised to establish power at commencement of construction, ideally from the grid, but depending on timing, supplemented by on-site diesel generation.

2.6.9.2 Operational Power Supply, Reticulation and Lighting

Power supply to the Surbiton South Substation is via 275 kV overhead lines. Then there will be 132 kV transmission to the light industrial area distribution switch yard from where the power will be transformed to meet the requirements of the Mine, CHPP, LIA, Airport and Accommodation centres.

2.6.10 Communications

On-site communications will be provided in a number of ways. A dedicated fibre optic connection will be provided from either existing network infrastructure located at the township of Alpha, or fibre optic options which typically run along the electricity supply lines. A new dedicated fibre optic link via the rail loop integrated with the port to mine site system will provide communication for the rail signalling system.

Initially, during construction, communications will be via microwave and/or satellite links, depending on the availability of mobile wireless data services, these will also be considered depending on availability at time of construction. During operation of the mine, communication systems will be optical fibre. Underground communication systems will also be established.

2.7 Decommissioning and Rehabilitation

A preferred rehabilitation strategy has been developed with a view to minimising the amount of land disturbed at any one time. Rehabilitation will be progressively undertaken on areas that cease to be used for mining or mine-related activities within two years of becoming available. This will not only reduce the amount of disturbed land at any one time, it will also minimise the amount of contact water to be managed on-site. Results of progressive rehabilitation will be used to refine rehabilitation methods for future application such as the selection of appropriate drainage measures and plant species for re-establishment.

A detailed discussion on the decommissioning and rehabilitation strategy proposed for the Project can be found in Volume 1, Section 26 of this EIS.

04 Geology

Section 04 Geology

The Proponent is developing the Kevin's Corner Project through its Hancock Galilee Pty Ltd (HGPL) subsidiary. HGPL proposes to establish a mine in the Galilee Coal Basin, Central Queensland, to service international export energy markets for thermal coal. The project will consist primarily of three underground longwall operations, supplemented in the early years with two opencast pits. It is planned that the Project will link in with the rail line currently being proposed by the Alpha Coal Project.

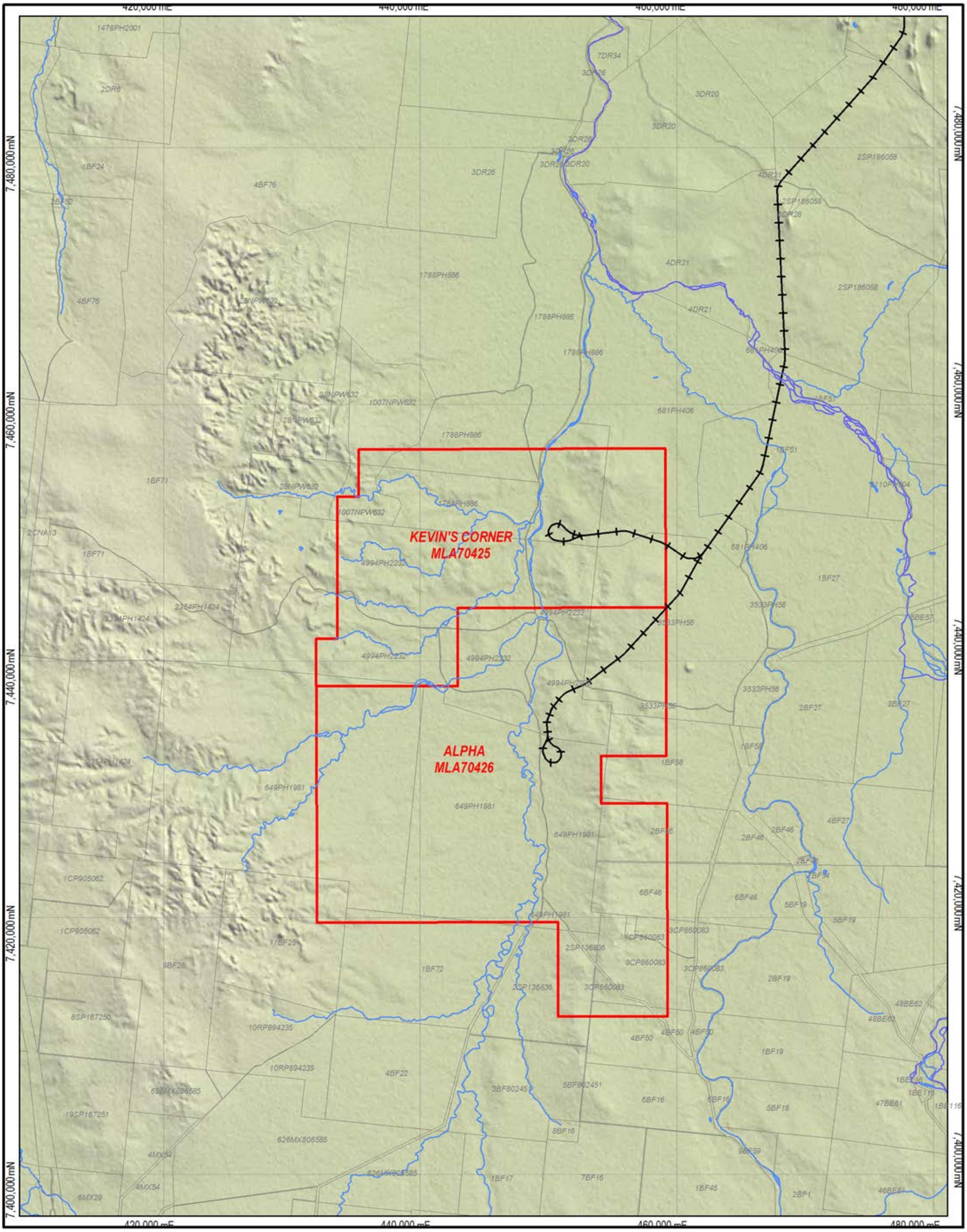
The geology environment associated with the proposed project is discussed in this section.

4.1 Tenure

Kevin's Corner is covered by granted tenure mineral development licence (MDL) 333. The title has been affected to HGPL. MDL 333 was granted on the 27th September 2007, and is due for renewal on the 30th September 2012. In December 2007, the Proponent obtained another exploration permit for coal (EPC) 1210. The MDL 333, a section of the EPC 1210 and the MDL 285 (Alpha Coal Project) have been regrouped to form the new mining leases currently under application. HGPL has applied for mining lease application (MLA) 70425, which is a combination of a portion of EPC 1210 and MDL 333 (Figure 4-1).

Figure 4-2 shows the location of the leases that make up the Kevin's Corner Project plus neighbouring EPCs 1053, 1079, 1040 of Waratah Coal Pty Ltd to the north, west and south, and EPC 1263 of Queensland Thermal Coal Pty Ltd to the east.

MDL 333 is over-pegged by the petroleum exploration permit, ATPA 744, held by Comet Ridge Ltd, as shown in Figure 4-3 below.



Mining Lease Application Boundaries

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COAL TENEMENTS

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Revision	B
Date	12-09-2011

Figure: 4-1

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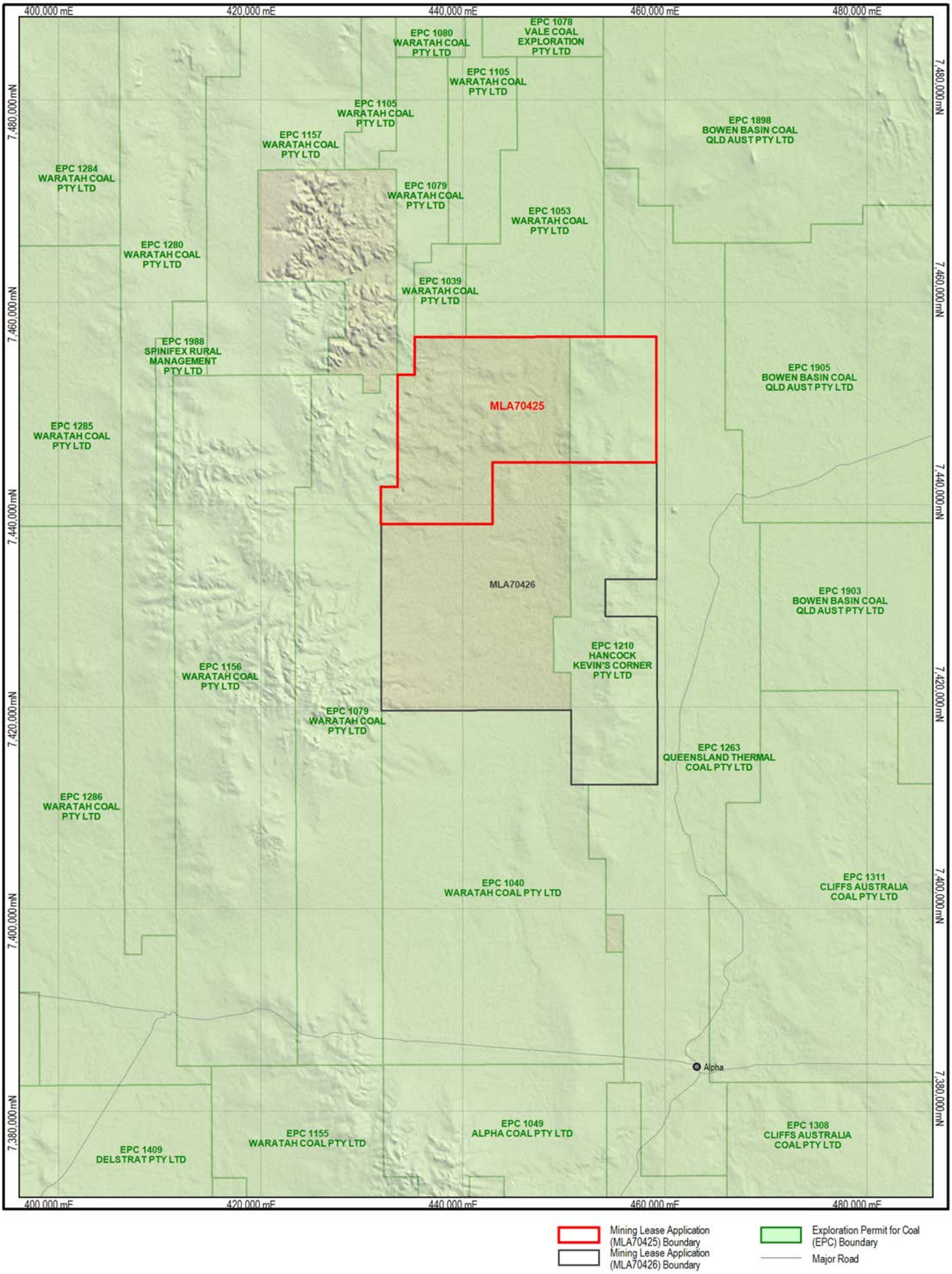

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THE KEVIN'S CORNER PROJECT WITH SURROUNDING EPCs

Job Number	4262 6660
Revision	C
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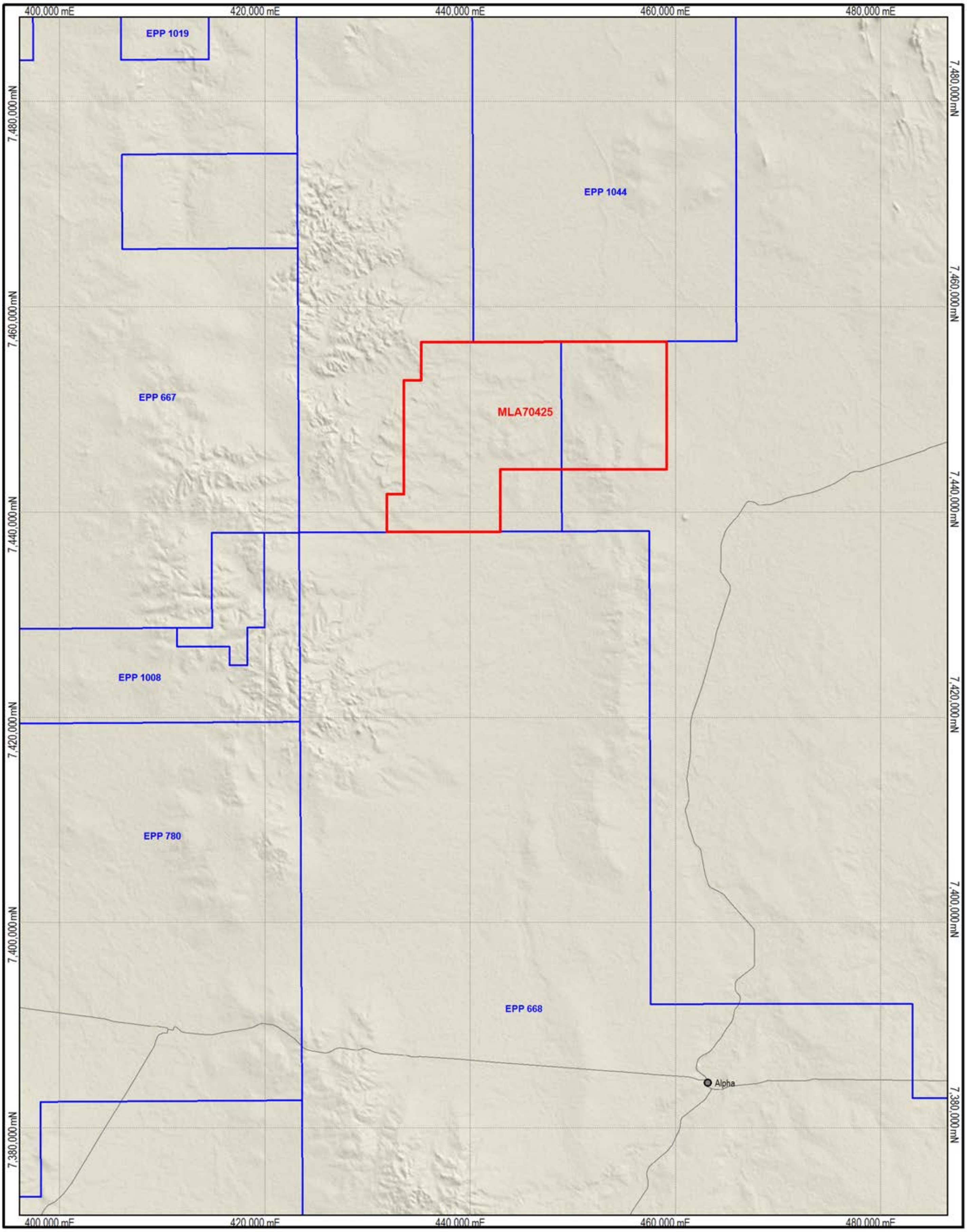
Figure: 4-2

File No: 42626660-g-1092.wor



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THE KEVIN'S CORNER PROJECT WITH OVER-PEGGED ATPs

Job Number	4262 6660
Revision	B
Date	12-09-2011

Figure: 4-3

File No: 42626660-g-1093.wor

4.2 Regional geology

The Kevin's Corner Coal deposits occur within the Galilee Basin, a sequence of Late Permian to Early Triassic sedimentary rocks, exposed in a linear belt between the towns of Pentland in the north and Tambo in the south (Figure 4-4).

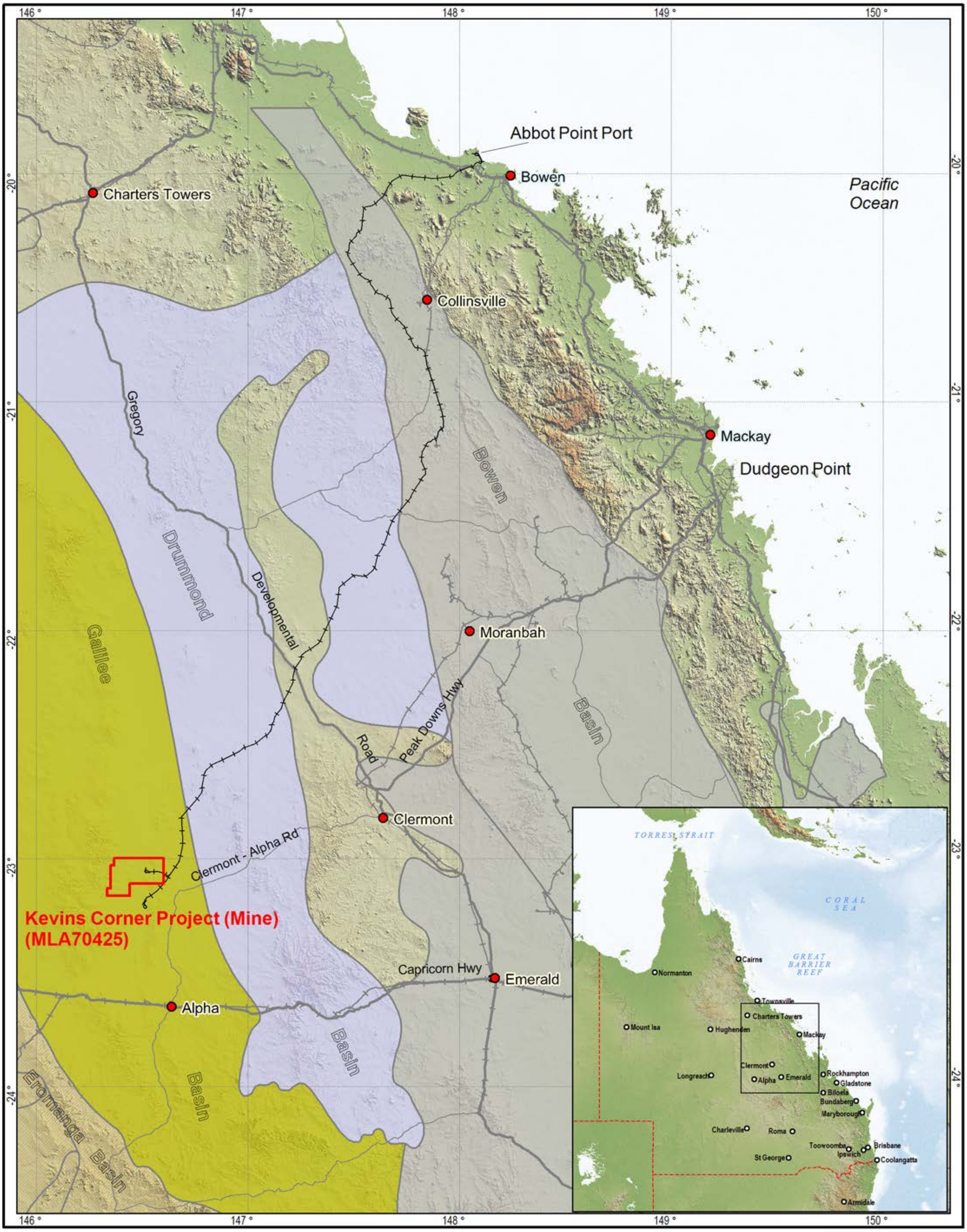
The rocks of the Galilee Basin are of similar age to those of the Bowen Basin (Late Permian), which is exposed to the east of the Drummond Basin (Figure 4-4). The Bowen and Galilee coal basins are separated by a north-trending structural ridge between Anakie and Springsure, referred to as the Springsure Shelf. Much of the western portion of the Galilee Basin is interpreted as occurring beneath Mesozoic sediments of the Eromanga Basin. The Anakie Inlier comprises older Palaeozoic rocks.

Late Permian, coal-bearing strata of the Galilee Basin sub-crop are found in a linear, north-trending Belt in the central portion of the exposed section of the basin and are essentially flat lying (dip 1 to 2° to the west). No major, regional scale fold and fault structures have been identified in regional mapping of the Project area (Golder, 2007a and Bridge Oil, 1994).

The stratigraphy of the Galilee Basin in the Kevin's Corner area is described in Table 4-1.

Table 4-1: Galilee Basin Stratigraphy – Kevin's Corner Area

Era	Period	Basin	Unit	Rock Types
Cainozoic	Quaternary	-	-	Alluvium
	Tertiary	-	-	Argillaceous sandstone and clay
Mesozoic	Triassic		Rewan Formation	Green-grey mudstone, siltstone and labile sandstone
Paleozoic	Permian	Galilee	Bandanna Formation	Coal seams A and B, labile sandstone, siltstone, and mudstone
			Colinlea Sandstone	Coal seams C, D, E, and F, labile and quartz sandstone
	Late Carboniferous to Early Permian		Joe Joe Formation	Mudstone, labile sandstone, siltstone, shale and thin carbonaceous beds
	Early Carboniferous	Drummond		



Drummond Sedimentary Basin	Galilee Sedimentary Basin	Mining Lease Application (MLA70425) Boundary
Bowen Sedimentary Basin	Eromanga Sedimentary Basin	Proposed Alpha Project Rail Line

Source: See Copyright Details below and for full disclosure Please Refer to the EIS *Volume 1 - References*

0 25 50km
Scale 1:2,500,000 (A4)
Projection: Geographic (GDA94)

Datum: GDA94, MGA Zone55

N W E S

HANCOCK GALILEE PTY LTD

Kevin's Corner Project
Environmental Impact Statement

GALILILEE BASIN
CENTRAL QUEENSLAND

Job Number 4262 6660
Revision B
Date 12-09-2011

Figure: 4-4

File No: 42626660-g-1094.wor

The site lithostratigraphy, including the site-specific coal seam information, is presented in Table 4-2.

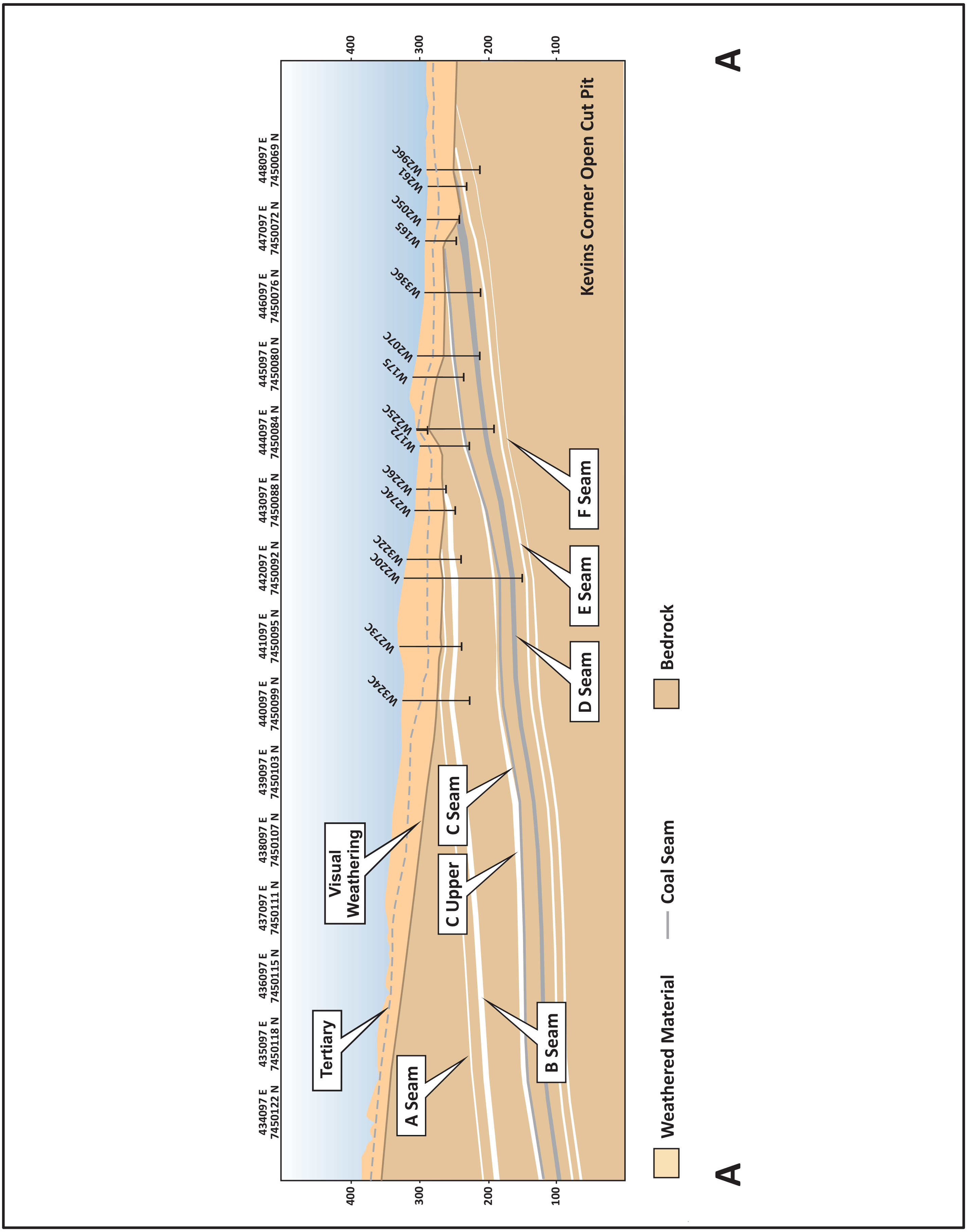
Table 4-2: Late Permian Coal Measure Stratigraphy - Galilee Basin

Age	Lithology	Stratigraphic Unit	Thickness	Comments
Quaternary	Sand, fine gravel, clay		Average 40 m	Alluvium
Tertiary	Saprolite, laterite and remanent red mudstone and white / beige sandstone		5 - 60 m	Clay-rich
Triassic	Green brown-purple mudstone, siltstone and labile sandstone	Rewan Formation	175 m	In far west
Late Permian	Sandstone	Bandanna Formation	30–50 m	Increasingly argillaceous
	Coal Seam A. Seam contains thin stone bands that thicken from south to north		1 - 2.5 m	
	Labile sandstone, siltstone and mudstone		10 m	
	Coal Seam B. Seam contains numerous dirt bands that constitute between 15 and 30% of seam. Variable in quality.		6 - 8 m	
	Siltstone and mudstone		60–70 m	
	Coal Seam C. Inferior C upper seam C Seam	Colinlea Sandstone	 2 - 5 m 3 – 4 m	Increasingly arenaceous
	Siltstone and sandstone		2 – 20 m	
	Coal Seam D. Stone bands present with seam thickening westward, upper section splits off main seam to north west		4.5 - 6 m	
	Sandstone		30 m	
	Coal Seam E		0.5 m	
	Sandstone		15 – 20 m	
	Coal Seam F		1 - 3 m	
	Sandstone		Unknown	
Early Permian	Labile and quartz sandstone	Undefined	Transition to Joe Joe Formation	

A diagrammatic cross-section is presented in Figure 4-5 indicating the coal seams within the project area.

4.3 Project Specific Geology

The Kevin's Corner Coal Deposit (MDL 333) occurs within the Galilee Basin (Figure 4-6), a sequence of Late Permian to Early Triassic age. The geology consists mainly of sediments dipping 1 - 2° westward, which is unconformably overlain by Tertiary and Quaternary sediments (Table 4-2). The thickness of Tertiary and Quaternary sediments varies from 5 m to 60 m (average 40 m) across MDL 333. There are six coal seams in the project (mine) area designated as A, B, C, D, E, and F.



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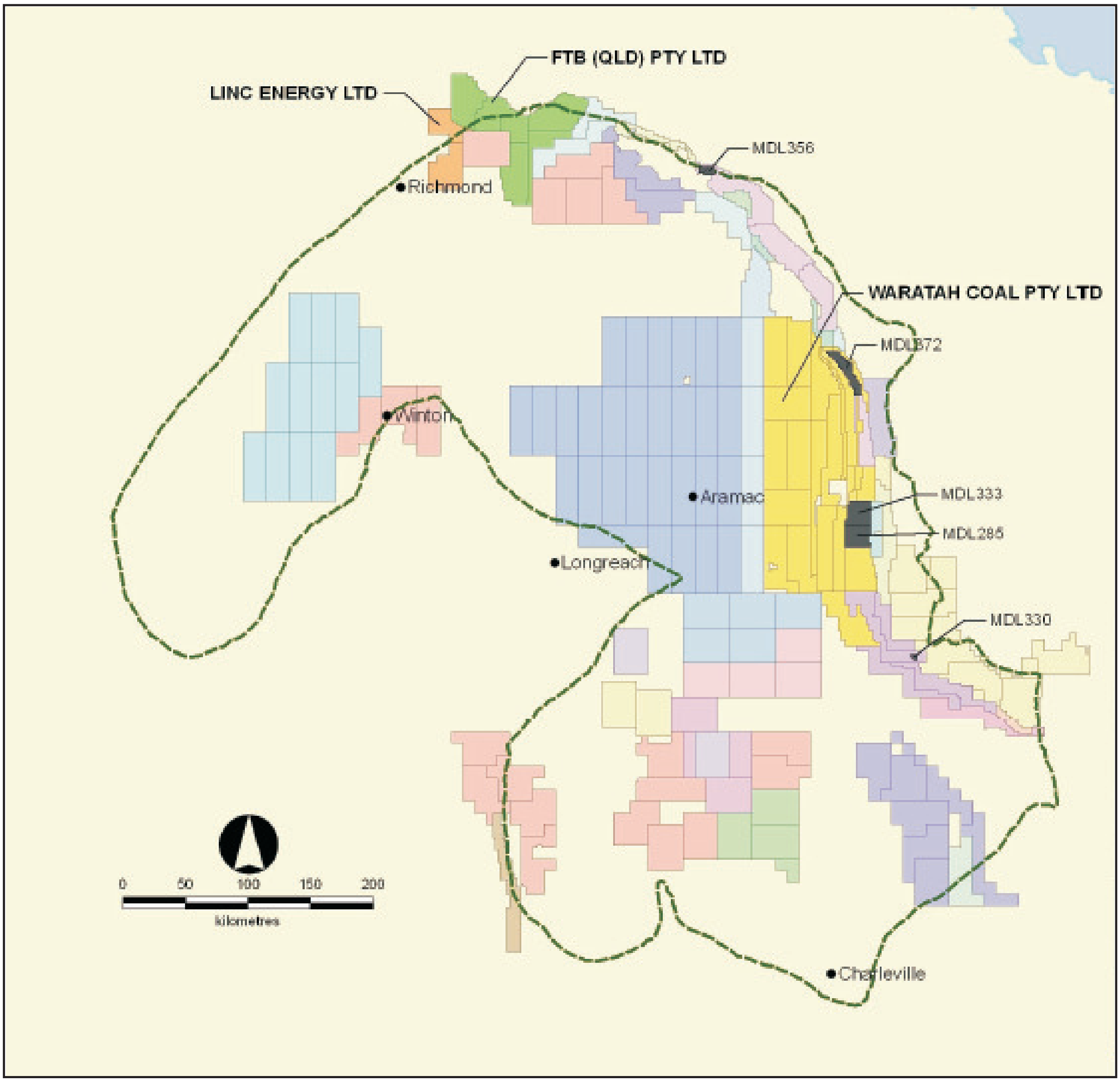
HANCOCK GALILEE PTY LTD Kevin's Corner Project Environmental Impact Statement	DIAGRAMMATIC WEST-EAST CROSS-SECTION THROUGH THE PROJECT AREA	Job Number 4262 6660 Revision B Date 12-09-2011 Figure: 4-5

File No: 42626660-g-1095.cdr



Source: RLMS

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HANCOCK GALILEE PTY LTD

Kevin's Corner Project
Environmental Impact Statement

PROJECT LOCATION
WITHIN THE GALILEE BASIN

Job Number	4262 6660
Revision	B
Date	12-09-2011

Figure: 4-6

File No: 42626660-g-1095.cdr

4.3.1 Cainozoic

A sequence of sand, fine gravel and minor clay horizon covers the project study area. This cover has an average thickness of 40 m, thickest in the eastern and central regions and thinning towards the high-lying areas to the west (< 5 m thick). Saprolite and lateritic horizons are recorded along with mottled clay paleosols. Minor localised perched groundwater was recorded on the clay saprolite during exploration drilling within the Cainozoic.

The Cainozoic unconformably overlies the Triassic Rewan Group and Permian units.

Weathering of the Mesozoic / Palaeozoic occurs at the base of the Cainozoic. The depth to the base of weathering in the Mesozoic is enlarged at Kevin's Corner due to the accumulation of a recent Cainozoic layer over the top of the ancient weathered layers.

Tertiary intrusive and extrusive rocks (e.g. Tertiary basalts) have not been encountered on site.

4.3.1 Rewan Group

The Rewan Group outcrops only in the far west of MDL 333. This group comprises mudstone, siltstone, and lithic sandstone of fluvial, lacustrine, and aeolian origin, and is of low porosity and permeability (Butcher, 1984). The maximum encountered thickness of the Rewan Group is 1,363 m in the Bowen Basin (DME, 1997) but it is suspected that the Rewan Group can reach a maximum thickness of 3,500 m. Exploration drilling in the area immediately surrounding MLA 70425 indicates an average horizontal thickness of 175 m (Table 4-2).

The base of the Rewan Formation is located some 30 to 50 m above the uppermost A seam coal ply.

The confined aquifers of the Great Artesian Basin (GAB) are bounded below by the Rewan Group (Habermehl, 2000), indicating that the proposed Kevin's Corner mining activities will occur in older formations below and to the east of the GAB and separated from the oldest GAB aquifer, the Clematis Sandstone, by the thick Rewan Group, which is a regional aquitard.

4.3.2 Permian

The Permian is represented by the Bandanna Formation and Colinlea Sandstone.

The Bandanna Formation comprises grey siltstone, sandstone, mudstone, and hosts the A and B coal seams.

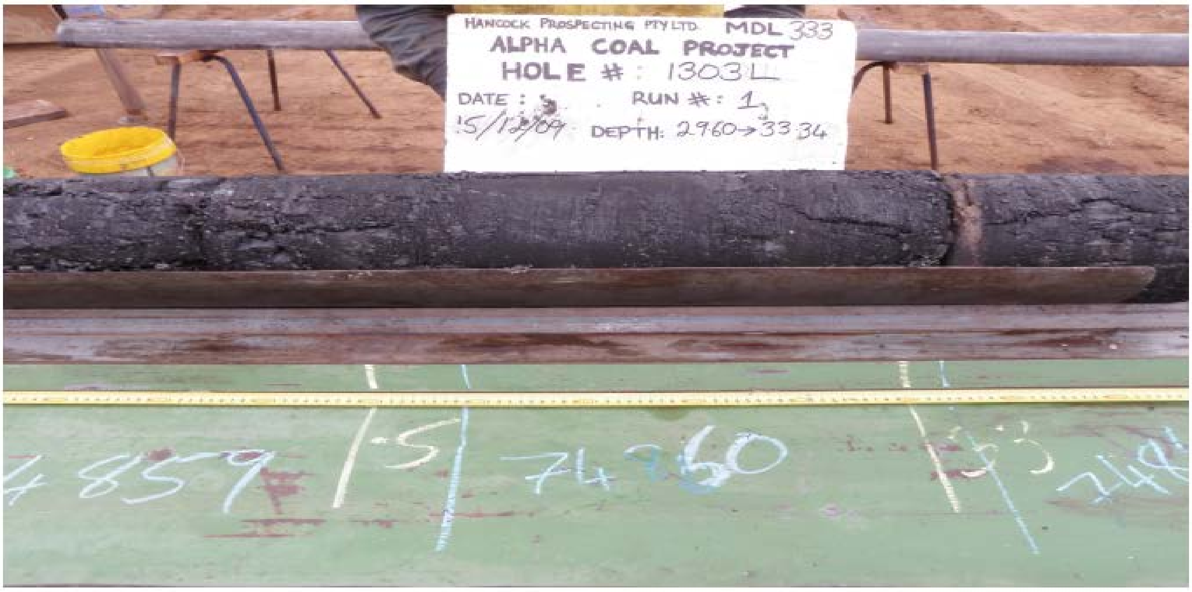
The Colinlea Sandstone contains the C to F coal seams (Figure 4-5). The unit is dominated by medium to coarse sandstone, which is labile and displays a clayey matrix in places. The seams are conformable and dip (1 - 2º) to the west.

A Coal Seam

The A Seam has an average thickness of 2.5 m within the project area and is described as a dull to bright coal (Plate 1). The A seam comprises three plies, A1, A2 and A3. The combined A seam can produce good quality coal with a minimum of 10% raw ash but in general the full seam ranges between 15% and 20% of raw ash. The A seam sits below the Rewan Formation or Cainozoic cover (where missing) and 15 to 25 m above the B seam.

Plate 4-1: A coal seam

Figure 3.2.3_2
Hancock Galilee Pty Ltd
Kevin's Corner Project
Borehole 1303L A seam mid-section



B Coal Seam

The B seam composes six plies (B1 to B6), which are consistent and correlatable in MDL 333. In terms of coal quality, the B3-B4 plies have an average raw ash of about 25%. The upper plies (B1 and B2) have higher ash contents, greater than 30%. B5 and B6 are both of high ash. The coal plies are separated by soft tuffaceous claystone (Plate 2).

Plate 4-2: B coal plies

Figure 3.2.3_4
Hancock Galilee Pty Ltd
Kevin's Corner Project
Borehole 1303L B seam B1-B2 banding

B-C Interburden

The interburden between the B and C coal seams is generally greater than 80 m. The sediments above the C Seam comprise labile sandstone with a clayey matrix and subordinate siltstone. Drilling has intersected an area of puggy claystone or clay matrix sandstone mid way down into the C Seam interburden. The coal quality of the C and D Seams is generally much better than that of the A and B.

C Coal Seam

The C Seam is made up of two distinct zones:

The C Upper Unit (CU) is characterised by interbedded stony coal, puggy clays and carbonaceous shale. The majority of this coal is not economic due to inferior coal and ash content greater than 70%. In addition, this coal seam sequence includes puggy clays, which reduces economic value. This coal seam is not considered as part of the current resource for Kevin's Corner.

- The *Lower C Seam* (C Seam) comprises dull to dull banded coal with some claystone partings. It is generally greater than 20% ash, but in places it can contain plies of less than 10% ash. The C Seam splits into 3 separate plies (C1, C2, and C3). The cumulative thickness is generally between 2 and 3 m and is best developed in the central-south of MDL 333 (Plate 3).

Plate 4-3: C Seam

C-D Interburden

The interburden between the C and D Seams is generally composed of competent sandstone, interlaminated with silty bands and carbonaceous wisps, with occasional coaly traces and in places can grade into siltstone.

D Coal Seam

The D Seam comprises four correlatable seam plies:

- The *D Upper Seam* (DU), a dull to dull and bright ply of coal, ranging from 0.3 to 2 m thick. It is commonly separated from the rest of the D Seam by a layer of coaly shale and sits contiguously on top of the other plies of the D Seam.
- The *DLM1 ply* is a low ash (approximately 13%) ply of dull coal to coaly shale. It is often < 1 m thick.
- The *DLM2 ply* is a consistently thick (2.5 – 3 m) section of dull to dull and bright coal. It is consistently underlain by a band of siltstone/sandstone that separates it from the DLL (D Lower) ply. It has an average raw ash of 21%.
- The *DLL* (D Lower) commonly has a raw ash of 25% and an average thickness of approximately 2 m.

D-E Interburden

The D to E interburden can range from a fine to course sandstone and becomes pebbly toward the top of the E seam. The interburden and is 5 to 30 m (average 14 m) thick.

E and F Coal Seams

The E Seam is present as two 0.2 m thick clean coal bands (E1 and E2) below the D Seam. The F Seam displays patchy development and the full geological section can reach in excess of 5 m in isolated areas. However, excessive banding with non-coal parting, excessive separation (high incremental ratio) and poor coal quality makes the F Seam sub-economic. The F Seam sits around 30 m below the D Seam floor.

No resource potential by current practices and economy is currently attributed to either E or F Seams within MDL 333.

4.4 Proposed mining method

4.4.1 Underground

Three underground longwall operations are proposed in three independent mines. Each longwall panel will have an independent set of mains for access, coal clearance and ventilation.

The Northern Underground will be developed first, being the shallowest access point and having the shortest initial panel length. The Southern and then Central Underground will be developed sequentially (on the basis of depth of access and available reserves), with access construction occurring immediately following completion of the previous mine's access drifts.

4.4.2 Open-cut

The open-cut mine layout consists of 2 pit areas, extending over a total strike length of 11 km. Mining will commence at the seam sub-crop, and progress down dip. The open-cut operation commences as a truck-shovel operation, after which it will evolve into a dragline stripping operation. The pre-strip fleet will mine all of the weathered tertiary overburden. At peak production, there will be 2 draglines operating, and up to 5 waste truck-shovel / excavator fleets. Almost all of the waste will be used to backfill the pit, although an initial out-of-pit dump will be required for the box cut. The maximum backfill height will be around 30 m above the natural surface.

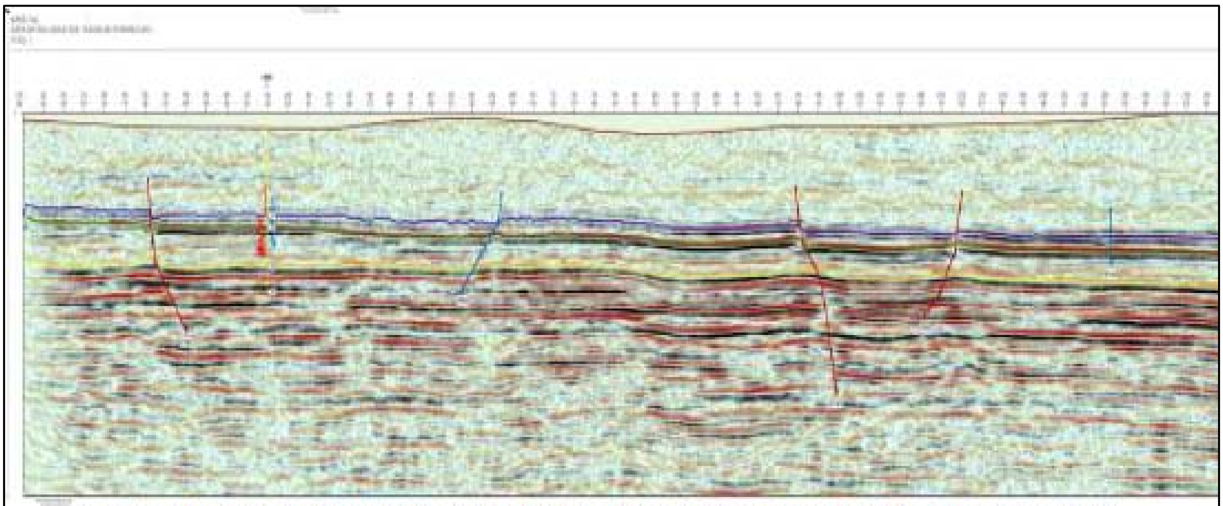
4.5 Geological structures within the area of disturbance

Minor and localised faults have been identified in exploration core, with the presence of calcitic healed faults, small breccia zones, and small scale fault offsets. On a regional scale, drilling within MDL 333 does not indicate any major fold and fault structures. There is little seam conflict to indicate the presence of large scale faulting.

Although the seam structure has been defined in terms of parent seams and plies (Section 4.3), the plies are a continuous feature over the whole deposit, colloquially known as a “layer cake”.

A trail 2D seismic survey was conducted in the south-west of Kevin’s Corner to assess underlying geological structures. The seismic exploration covered a distance of 6 km and suggests probable and possible faults (Figure 4-7).

Figure 4-7: Trail 2D Seismic stack



Velseis trial seismic, south western Kevin's Corner (December 2009), blue= possible fault, red= probable fault

The presence of broken seismic reflectors (as recognised in Figure 4-7) and the record of fault indicators in the exploration drilling core indicates the existence of faults at Kevin’s Corner. The seismic data suggests 2 to 3 km spacing of faults with throws up to 3 times the seam height.

4.5.1 Slope stability

During the historical geotechnical investigations some bedding parallel shear zones were detected in the sediments overlying the C seam. These appear to be persistent. It is noted that the dip of the strata will be into the walls at a low angle, which is a more favourable orientation for the shears in terms of slope stability.

Some weathering and erosion effects are expected on slopes containing these overburden materials, however, they are not expected to unduly affect the stability of the landform.

4.6 Geological factors that may influence ground stability

4.6.1 Geology

The Permian coal seams dip gently to the west at an angle of 1 to 2°. Six seams have been intersected in the actual mining lease (MDL 333): the A, B, C, D, E and F Seams. The D Seam is the most economic target at Kevin's Corner as the D Seam contains good quality thermal coal. For export coal, all coal will require washing prior to export.

Tertiary and Quaternary deposits overlie the coal seams (Figure 4-5). Of significance is the depth of weathering (average 40 m) and the relatively soft Tertiary deposits which, although generally soft and diggable, often contain harder, iron-cemented, laterite bands. These are significant because they may prevent the economic use of a bucket wheel excavator and may provide resistance to ripping.

The Tertiary strata and some of the Permian deposit contain mudstone, claystone and sandstone, which have a clayey matrix. Sections of the sequence are prone to slaking and thus often rapidly degrade on exposure to weathering conditions. Below these sections, the rock grades into more sandy and generally more competent rock types towards the top of the C Seam.

4.6.2 Roof Behaviour

Strata Control Technology (SCT) undertook assessments including but not limited to the D Seam roof behaviour to assess primary support requirements for the proposed underground mine, stress field characterisation, caving characterisation, and secondary support requirements.

Roadway stability on development, in unstructured roof, is expected to be good in the shallower areas of the mine. Roof stability is expected to be maintained until the horizontal stress exceeds ~ 5 MPa. Above this stress level increased roof movement would be anticipated and roof stability reduced. This can occur in roadways developed "across" the maximum horizontal stress at depths beyond ~ 150 to 200 m. Roof bolts will be required to maintain roof integrity in these areas.

Structural features, such as local faults, are expected to locally reduce the stability of the roof such that increased roof deformation will be initiated at lower stress levels.

Good caving conditions are expected for longwall operations.

4.6.3 Groundwater

The depth of the groundwater table varies between 10 and 75 m, with a gradient from south-south-west to north-north-east. Air lift flow rates during exploration have been found to be generally low. It is anticipated that groundwater ingress into the underground workings will be considerable[1], based on the aquifer potential of the sandstone units and increased inter-aquifer connection due to goaf. The groundwater will be handled using dewatering schemes within the mine (EIS Volume 1 Section 12).

[1] Predictive modelling indicates a volume of 125 GL over the 30 year life of mine, some 11 ML/day (127 L/s)

Coal mining operations will be carried out below the groundwater table and some wet blast holes are anticipated. It is also noted that blast hole stability will be variable, with stability issues in the Quaternary/Tertiary and some swelling rocks within the Permian sequence.

Inflows

Groundwater inflows into the underground mine can occur through:

- The C-D sandstone aquifer, which has the potential for extensive inflows where coarse sands occur in the hanging wall; and
- The foot wall floor from the D-E sands aquifer.

Predictive groundwater numerical modelling predicts that an average pumping rate of 127 L/s will be required to manage, dewater and depressurise the D-E sands aquifer to a level below the D coal seam, i.e. an active dewatering system ahead of mining is required to reduce the pressure and risks associated with pit floor ingress.

4.6.4 Subsidence

The potential subsidence characteristics resulting from the proposed longwall mining at Kevin's Corner was assessed by SCT Operations Pty Ltd (SCT). The preliminary assessment (SCT, 2010) indicates that the proposed longwall panels at the Kevin's Corner Project are of supercritical width in subsidence engineering terms with maximum subsidence developed over the central part of each panel.

Maximum subsidence is expected to be generally less than 2.9 m in the majority of the proposed mining area with 2 m maximum subsidence expected in the north beyond the D Seam split.

Cracks are expected to be temporary (self heal in the clay-rich Tertiary) and generally less than 100 mm at 300 m overburden depth and 300 mm at 100 m overburden depth. The largest potential cracks are expected to develop parallel to the longwall face at the start of each panel.

The proposed longwall mining is expected to cause fracturing of the overburden strata above most of each longwall panel. The hydraulic conductivity of the fracture network developed depends on the particular characteristics of the overburden stratigraphy and individual units within it. In general, a significant increase in hydraulic connectivity with the surface is typical of fully subsided tertiary overburden strata and would be expected at this site.

4.7 Geochemical information for the area to be mined

4.7.1 Coal quality testing

Coal quality data stored into an Oracle based Minescape GDB database has been composited to a seam basis. Since some of the samples were analysed on a parent seam rather than split basis, the data has been processed to validate the parent seam quality to each of its splits, in order to create a quality model on the same basis as the structural model (Salva, 2010).

Coal quality data consists of:

- Raw Proximate Analysis, Specific Energy, Total Sulphur and Relative Density; and
- Float 1.50 and float 1.60 product proximate analyses.

Drill hole statistics for key raw parameters are listed in Table 4-3.

The total sulphur content of the target coal is typically around 0.6%, which is similar to that found at the Alpha Coal Project, where approximately half (0.3%) was present as pyritic sulphur. Geochemical information on coal and mining wastes and environmental management strategies for these materials are described in Volume 2 Section 16.

Table 4-3: Drill hole statistics raw coal quality (Salva, 2010)

Seam	IM % ad				Ash % adb				RD g/cc adb				GCV kcal/kg adb				TS % adb			
	No.	Minimum	Maximum	Mean	No.	Minimum	Maximum	Mean	No.	Minimum	Maximum	Mean	No.	Minimum	Maximum	Mean	No.	Minimum	Maximum	Mean
A1	7	6.8	10.7	8.3	11	15.5	69.22	36.94	6	1.43	2.3	1.71	5	3240	5525	4502	6	0.17	0.54	0.32
A12	2	11.1	11.3	11.2	2	15.9	17.2	16.55	2	1.45	1.46	1.46	0	-	-	-	1	0.41	0.41	0.41
A2	9	6.8	12.8	9.38	15	13.5	79.71	42.61	11	1.43	2.3	1.84	7	2053	5630	4453	7	0.17	0.57	0.35
A23	1	10.9	10.9	10.9	1	13.1	13.1	13.1	1	1.42	1.42	1.42	1	5733	5733	5733	1	0.78	0.78	0.78
A3	18	6.7	13.7	10.33	18	8.4	38.8	18.04	15	1.38	1.69	1.47	12	3666	6180	5400	14	0.3	0.58	0.4
A	35	4.26	12.3	8.44	37	8.3	57.83	23.99	37	1.35	2.3	1.56	5	5259	6130	5746	5	0.31	0.63	0.41
B1	58	4.6	10.8	7.83	61	20.67	64.7	38.21	54	1.51	1.94	1.68	17	1486	4593	3440	19	0.12	0.66	0.33
B2	59	3.3	11.92	7.81	64	17.4	68.58	35.9	56	1.42	2.06	1.65	17	1262	5793	3655	20	0.18	1.07	0.36
B3	64	1.6	23.6	8.29	70	16.7	79.45	33.28	63	1.45	2.3	1.64	16	2210	5422	4087	18	0.15	0.59	0.4
B41	5	9.2	10.4	10.1	7	19.6	61.3	36.97	5	1.47	1.79	1.55	5	2722	5303	4607	5	0.22	0.46	0.36
B42	4	8.2	9.9	9.3	7	26.5	62.5	40.58	4	1.52	1.8	1.6	4	2911	4765	4277	4	0.36	0.5	0.46
B43	2	9.2	10	9.6	3	25.2	38.77	30.49	2	1.52	1.54	1.53	1	4667	4667	4667	2	0.39	0.46	0.42
B4	63	5.1	11.5	8.33	67	16.8	71.48	32.18	63	1.46	2.3	1.63	10	3184	5425	4553	13	0.27	0.61	0.43
B5	8	6.3	10.4	8.78	12	26.3	75.98	48.69	10	1.54	2.3	1.83	6	1950	4708	3609	8	0.25	0.76	0.43
B6	2	8.6	9.6	9.1	2	40.9	59.36	50.13	2	1.7	1.97	1.83	1	1950	1950	1950	2	0.39	0.76	0.57
C1	20	5.2	11.3	8.19	24	19.2	78.66	33.42	19	1.46	2.3	1.64	15	2511	5736	4709	14	0.42	1.48	0.65
C12	2	7.1	8.1	7.6	3	23.5	63.67	43.52	2	1.53	1.72	1.63	2	1068	5160	3114	2	0.34	0.66	0.5
C	48	2.2	9.7	6.81	49	9.9	64.29	29.36	39	1.38	2.04	1.63	5	1825	5382	3499	8	0.25	0.74	0.49
C2	22	4.45	11.3	7.85	25	17.4	66.2	34.64	21	1.46	2.3	1.68	17	1434	5736	4353	16	0.21	0.76	0.53
C3	25	5	11.3	7.95	27	12.6	80.03	32.79	24	1.42	2.3	1.63	21	1434	6046	4545	19	0.21	1.61	0.59
DU	80	4	12.2	7.07	89	5.5	67.33	28.53	80	1.34	2.3	1.61	24	3623	6453	5260	28	0.36	1.07	0.6
DLM1	77	2.69	13.9	8.41	78	6.1	42.8	13.08	70	1.31	1.7	1.42	23	4691	6453	5973	22	0.36	1.2	0.72
DLM	21	5.7	10.4	8.18	21	12.7	33.3	20.58	21	1.4	1.61	1.49	16	1907	6233	5080	18	0.41	1.03	0.59
DL	1	9	9	9	1	20.5	20.5	20.5	1	1.52	1.52	1.52	1	5253	5253	5253	0	-	-	-
DLM2	87	2.4	12.3	7.53	92	8.2	80	21.17	82	1.38	2.3	1.53	21	3085	5846	5424	21	0.4	1.82	0.79
DL1	34	3.6	9.7	6.86	36	14.2	80	26.07	33	1.45	2.3	1.59	11	4413	5752	5080	10	0.38	1.39	0.65
DLL	80	2.38	11.3	7.08	84	9.2	61.41	24.91	75	1.42	2.3	1.58	25	1888	6240	4744	27	0.26	0.99	0.54

IM – Inherent Moisture

RD – Relative Density

GCV – Gross Calorific Value

TS – Total Sulphur

4.7.2 Coal quality

The Kevin's Corner mine ROM coal consists of coal from the A, B, C and D seams in an approximate ratio of 1/3/4/92. The quality of the ROM coal is as follow

- A Seam: 24% ash
- B Seam : 35% ash
- C Seam : 34.7% ash
- D Seam : 21.9% ash

The D seam is the most economically attractive seam in the deposit as described above with product ash below 10% at F1.6.

Mean total sulphur levels in the product are approximately 0.55% (air dried basis).

The coal present is a high moisture, high volatile (> 40% DAF) and low to medium rank thermal coal. The average air dried moisture is estimated to be approximately 8.34%.

4.7.3 Coal quality and environmental characterisation

4.7.3.1 Mineralogy

The mineralogy of 2,972 samples from 32 bores on site was undertaken using visible, near infrared, short wavelength infrared (vis-NIR-SWIR) reflectance measurements using the HyChips system. The minerals observed included kaolinite, montmorillonite (Al smectite), nontronite (Fe smectite), and white mica.

In addition the study considered iron oxide intensity. Both hematite and goethite were observed in the samples in distinct intervals down the holes. Iron oxide intensity drops markedly at depth in all holes. This may be associated with the base of weathering or a redox boundary.

4.7.3.2 Geochemical characterisation

Geochemical assessment of geological units underlying the proposed mining area allowed for the determination of the potential for:

- Release of salinity;
- Generation of acid and metalliferous drainage (AMD); and
- Dispersivity.

Samples representative of overburden, raw and product coal, and coal washery wastes (coarse rejects and fine tailings) were characterised. In addition, an extensive range of static and kinetic reference (geochemical) data from the adjacent Alpha Coal Project was available for similar test materials.

Overburden

Static test results indicate that the bulk overburden material is non acid forming (NAF) and a minor amount of overburden typically associated with economic and uneconomic coal seams may be potentially acid forming (PAF), although most is likely to have a low capacity to generate acid. Overburden materials with a significant capacity to generate acid will require environmental management strategies to prevent acid generation as described in Volume 2 Section 16. Neutral waters contacting the bulk overburden would remain circum-neutral. Salinity release would be expected to occur over the short term and diminish with time. Metal and metalloid concentrations of waters contacting the bulk overburden are not expected to increase significantly.

Dispersivity test results indicate that for overburden, the claystone, mudstone, and clay rock types are dispersive pr potentially dispersive. The fresh siltstone and sandstone are slightly dispersive and is more amenable for use along with topsoil in rehabilitation activities.

Coal and Coal Washery Waste

Raw and product coal is currently geochemically classified as uncertain, but based on comparable Alpha Coal Project data and kinetic leach column tests some may have a very low capacity to generate acid.

The coal washery coarse reject waste is expected to be PAF and the fine tailing is currently classified as uncertain. Based on comparable Alpha Coal Project data some may have a low capacity to generate acid. The coarse rejects will require measures to prevent or control acid generation involving compaction, lime amendment, and encapsulation in NAF overburden materials.

Implications

The bulk overburden can be managed as NAF material. However, a small amount of overburden typically associated with economic and uneconomic coal seams may be PAF, although most is likely to have a low capacity to generate acid. Overburden materials with a significant capacity to generate acid will require environmental management strategies to prevent acid generation as described in Volume 2 Section 16. Precautions will be taken to prevent water flow over the dispersive materials of overburden dumps by avoiding placement at the final top surface of the outer slopes and batters.

Coarse reject material are expected to be PAF and will require measures to prevent or control acid generation involving compaction, lime amendment, and encapsulation in NAF overburden materials as described in Volume 2 Section 16. Coal and fine tailings will require management to control the pH of any contained contact water with application dependent upon ongoing geochemical and water quality monitoring test data.

Management of any poor quality runoff from overburden emplacements, coal stockpiles, coarse reject storage areas and the tailings storage facility, and disturbed areas is detailed in EIS Volume 2 Section 11 and Section 16.

4.7.3.3 Spontaneous Combustion Propensity

A preliminary investigation of the spontaneous combustion propensity of coal from the study area was conducted by the University of Queensland's Spontaneous Combustion Testing Laboratory (UQSCTL) using an adiabatic oven test procedure that is routinely used by the coal industry to obtain the R70 self-heating rate of the coal. This test also produced a value for the relative ignition temperature of the coal. A large database of R70 and relative ignition temperature values is held by UQSCTL, therefore comparisons between the Project and other previous studies was used to obtain a relative indication of the propensity of the coal to spontaneously combust.

The samples tested in the adiabatic oven indicated that the R70 values are 3.55 ºC/h and 6.70 ºC/h for ash contents of 25.9% and 18.7%, respectively, on a dry basis. In addition, the relative ignition temperatures range between 132 ºC and 110 ºC. These values indicate the coal has a high intrinsic spontaneous combustion propensity based on Queensland conditions. While these results are not ideal, spontaneous combustion can be managed successfully by using appropriate mining planning techniques.

4.8 Summary of exploration process

The following description of the historical exploration of the Kevin's Corner project is partially sourced from Golder (2007a).

4.8.1 1970 to 1979

Coal exploration commenced in the area in the 1970s, during which time four exploration permits were explored. Three of these covered the Kevin's Corner and Alpha tenements and the fourth covered an area a short distance to the north (Figure 4-8).

Available historical data suggests that intensive exploration was undertaken within EPC 245 (Alpha), covering the current extent of MDL 285. Work concentrated on the evaluation of thermal coal reserves.

Initial coal exploration was undertaken by the Queensland Department of Mines (QDM) from 1971 to 1972, with results for three drill holes reported in 1973. The drilling indicated the presence of a substantial resource of non-coking, sub-bituminous coal in structurally simple rocks of Late Permian age. The coal resources were identified below a thick Tertiary cover (up to 47 m).

EPC 136 was explored by Dampier Mining Company Limited (Dampier) and Queensland Coal Mining Company Ltd (Queensland Coal), both subsidiaries of BHP Limited. Some 148 drill holes were completed by BHP. Five seams were intersected and considered to occur within the Bandanna (A and B) Formation and Colinlea (C, D, E) Sandstone. Minor coal seams were also identified in deeper, older rocks assigned to the Late Carboniferous Joe Joe Formation. Coal resources identified during exploration of EPC 136 were considered to be uneconomic by Queensland Coal at the time the tenement was relinquished (14 February 1975).

EPC 137 was granted to a joint venture between Shell Development (Aust) Pty Ltd (Shell) and Western Mining Corporation Ltd (WMC) for three years on 15 February 1974. The exploration permit was relinquished at the end of the second year of tenure upon completion of some fifty drill holes, including five large diameter cored holes. Five seams were identified in the permit area and assigned by Shell geologists to the Late Permian Colinlea and Bandanna Formations. The coal intersected was classified as sub-bituminous, low sulphur, moderate ash (15.5% to 25.8%) coal, with moderate specific energy (22.4 MJ/kg). Bedding was interpreted to dip at between one and two degrees to the west and no major faults were proposed within the Project area. An Indicated Resource of 4.7 billion tonnes was estimated to a maximum depth of 250 m, with little coal being present within 90 m of surface due to the presence of thick Tertiary cover.

EPC 244 was granted to the Proponent in 1978. Some 82 of the 148 holes drilled by BHP under EPC 136 occur within EPC 244, providing a substantial technical basis for selection and initial exploration of the area. The coal measure stratigraphy defined in the Golder Associates report (Golder, 2007a), supplemented with a description of the individual coal seams by BHP.

Exploration in the 1970s focused on establishing the 300 m depth structure contour for the floor of Seam D in order to focus on the evaluation of resources potentially amenable to open-cut and shallow underground mining.

EPC 245 was granted to Bridge Oil Limited over 230 sub-blocks for three years on 14 December 1978. The EPC was subsequently reduced in area by relinquishment to 150 sub-blocks on 14 December 1979 and to 120 sub-blocks on 14 December 1980. A further twenty sub-blocks were relinquished on 14 December 1982, at which time EPC 245 was renewed for a further three years.

4.8.2 1980 to 1989

Limited coal exploration occurred during this decade. AP17CR was a retention authority granted to Bridge following the conditional surrender of EPC 245 on 14 December 1988. This was subsequently converted to EPC 484 following the introduction of new Queensland mining legislation in 1990.

Bridge Oil Limited (Bridge) explored EPC 245 until June 1981 when it entered into a Joint Venture with Australian subsidiaries of Cogema, Total and Charbonnage de France, with Bridge continuing as the Project Manager. The French partners withdrew from the Joint Venture in July 1992 and Bridge resumed sole ownership of the project.

4.8.3 1990 to 1999

Coal exploration in the Galilee Basin continued to be subdued during the 1990s with the only activity remaining focused on the Alpha MDL area. EPC 484 was relinquished by Bridge on 5 September 1993 (Bridge, 1993). Bridge concluded at this time that a large scale thermal coal mine developed on the site could not compete with mines being developed in the Bowen Basin, further to the east, with better access to coal haulage railway infrastructure and closer to coal export terminals on the coast.

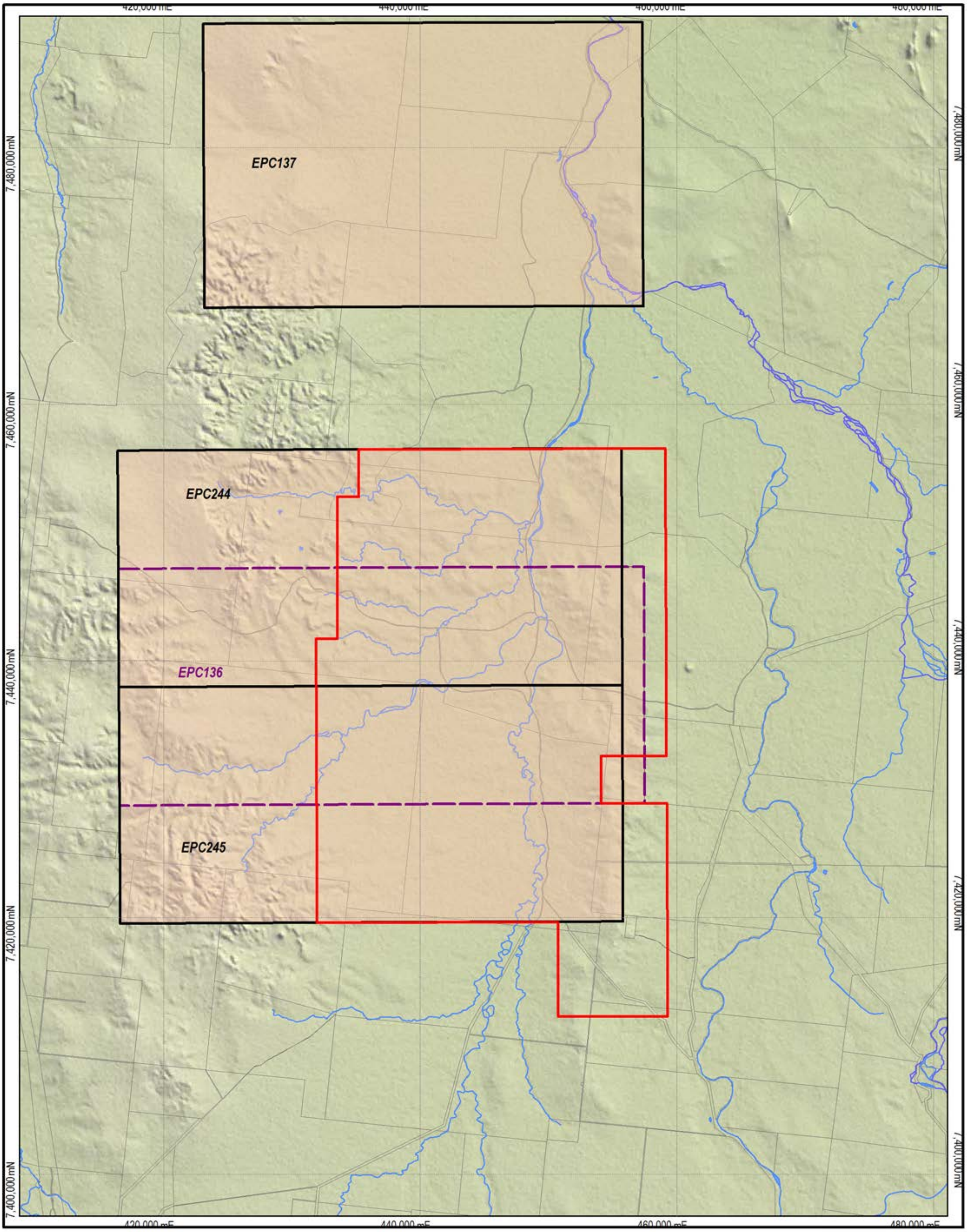
EPC 570, the precursor title to MDLA285, was subsequently granted to Hancock over a similar, slightly larger area (Figure 4-9).

4.8.4 2000 to Present

There has been a rapid upsurge in Galilee Basin coal exploration in recent years. Most emphasis has been placed on coal resources to the north of the Capricorn Highway and along the southern edge of the Galilee Basin.

EPC 854 was granted to Linc Energy (Linc) in August 2004. The exploration target in EPC 854 is reported to be coal forming the A and B seams. A MDL application has been lodged by Linc for land within EPC 854.

Waratah Coal Inc. (Waratah) holds significant tenure in the Galilee taking up three coal exploration permits, and a multiple adjacent applications in the mid 2000's. Waratah holds EPC 1039, EPC 1079 (Figure 10) and EPC 1053 (Table 4-4) on the northern and western boundaries of Kevin's Corner. Public announcements by Waratah included total resources of approximately 5Bt with 0.98Bt bordering with the Kevin's Corner tenure.



Extent of Hancock Prospecting Tenements - December 2008

Exploration Permit - Coal (1970-1979)

Exploration Permit - Coal (1970-1979)

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0 3.75 7.5km
Scale: 1:400,000 (A4)

Datum: GDA94, MGA Zone55

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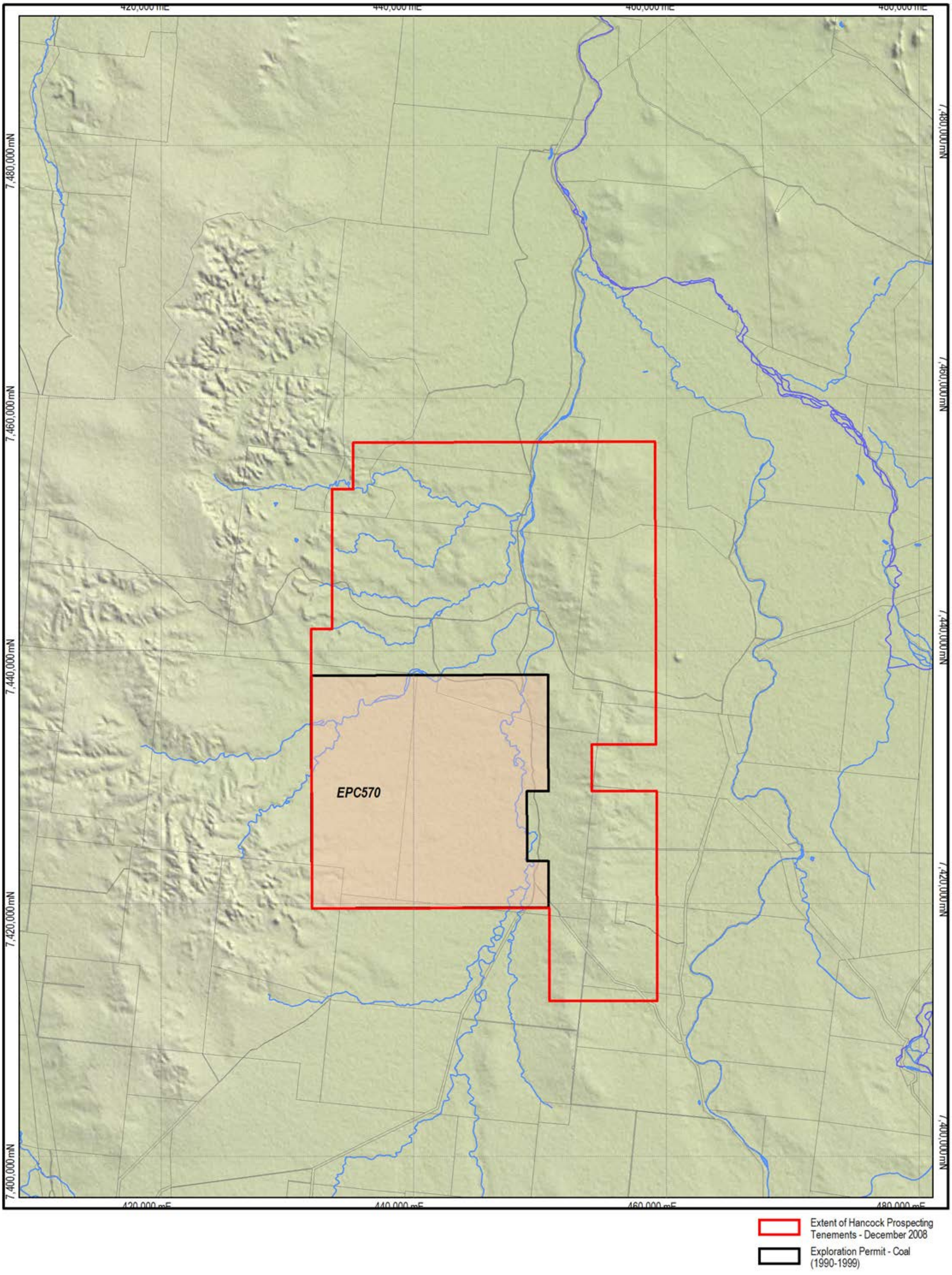
COAL EXPLORATION PERMITS
1970 - 1979

Job Number	4262 6660
Revision	B
Date	12-09-2011

Figure: 4-8

File No: 42626660-g-1097.wor



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Scale: 1:400,000 (A4)

Datum: GDA94, MGA Zone55

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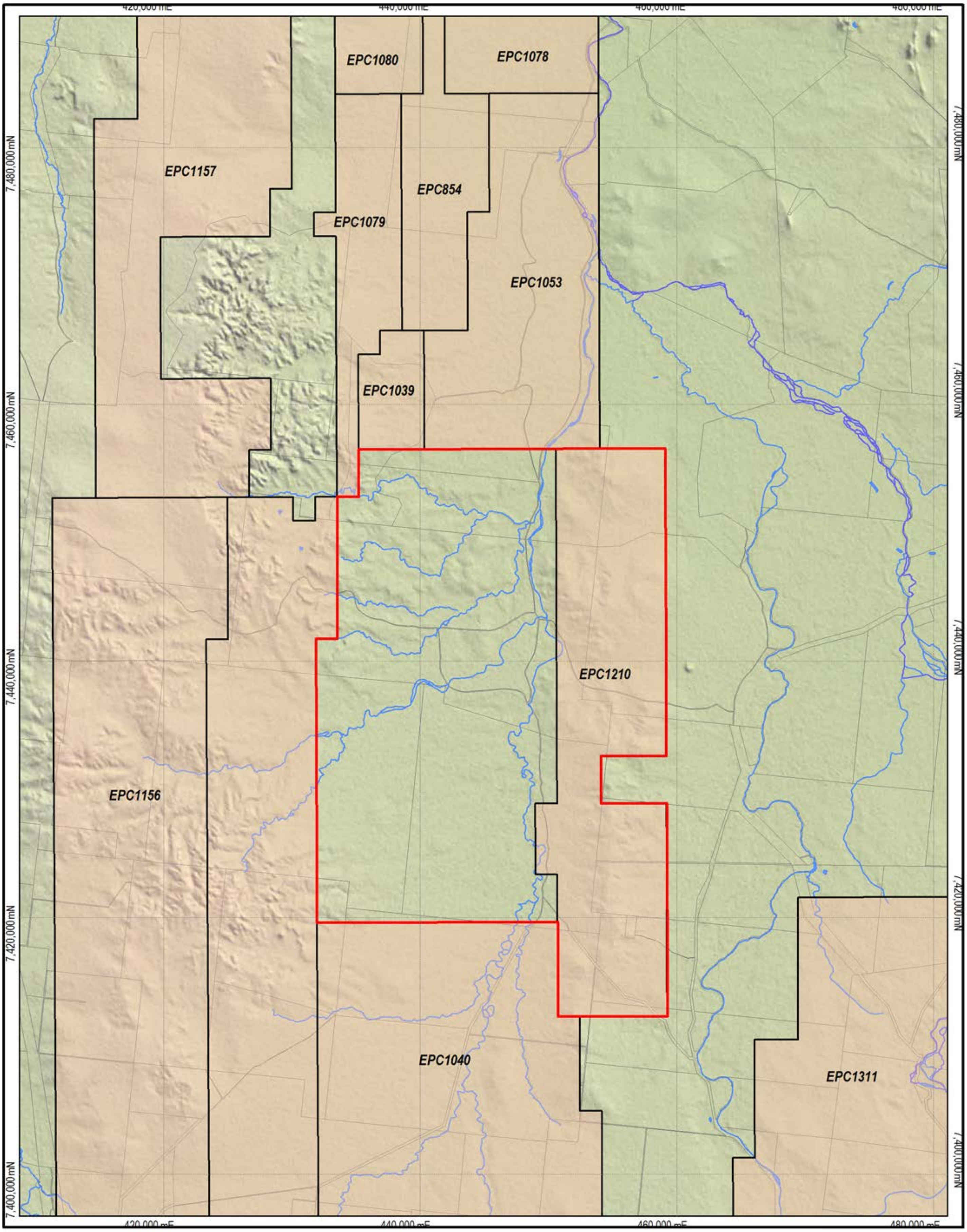
COAL EXPLORATION PERMITS 1990 - 1999

Job Number	4262 6660
Revision	B
Date	12-09-2011

Figure: 4-9

File No: 42626660-g-1098.wor



Extent of Hancock Prospecting Tenements - December 2008

Exploration Permit - Coal (2000-2010)

Source: See Copyright Details below and for full disclosure Please Refer to the EIS *Volume 1 - References*

0 3.75 7.5km
Scale: 1:400,000 (A4)

Datum: GDA94, MGA Zone55

N W E S

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Kevin's Corner Project
Environmental Impact Statement

COAL EXPLORATION PERMITS
2000 - 2010

Job Number 4262 6660
Revision B
Date 12-09-2011

Figure: 4-10

File No: 42626660-g-1099.wor

Table 4-4: Coal Exploration Permit Summary - 2000 to present

Tenement	Name	Holder	Granted	Expired	QDEX Company Reports
EPC854	Galilee	Linc Energy Ltd	30 Aug 2004	29 Aug 2007	44671
EPC1039	Pucky Creek	Waratah Coal Pty Ltd	8 Mar 2007	8 Mar 2012	No company report information available
EPC1040	South Alpha	Waratah Coal Pty Ltd	22 June 2006	21 June 2011	
EPC1048		Linc Energy Ltd	16 Nov 2006	15 Nov 2011	
EPC1053	Alpha North	Waratah Coal Pty Ltd	30 Aug 2007	29 Aug 2012	
EPC1079	Alpha Extended	Waratah Coal Pty Ltd	6 Aug 2006		Application
EPC1080	Laglan	Waratah Coal Pty Ltd	6 Aug 2006		Application

4.8.5 Mineral and Petroleum Exploration

Waratah has lodged a number of minerals exploration permit applications over-pegging coal exploration permits held by both Waratah and competitors surrounding the two Hancock MDLs. Golder Associates (Golder, 2007b) suggests that these tenements have been applied for to remove potential for interference in coal exploration and development activities by third parties.

Most of the remaining permit applications covering the Galilee Basin have been lodged by Drummond Uranium Pty Ltd.

The Hancock MDLs are currently over-pegged by a petroleum exploration permit granted to Tri-Star Petroleum Company (EPP 668) current until 30 April 2019, and a petroleum exploration permit application lodged by Comet Ridge Ltd (EPP 744).

The nearest petroleum well in the area, Jericho 1, drilled in June 1965 and approximately 20 km to the south of Jericho, is more than 50 km from the Hancock MDLs. Only limited seismic surveying has been undertaken in the vicinity of the Hancock MDLs limiting the amount of information available relating to the stratigraphy and structure of the basin in this area.

A single coal seam gas well has been drilled in the area (Splitters Creek 1), approximately 32 km to the east of Aramac.

4.9 Coal resources

4.9.1 Geological Modelling

The Mincom Stratmodel was used for the geological modelling. The model, based on an assessment of geological information, included all available information regarding the coal on site.Coal resource estimation approach

4.9.1.1 JORC Code requirements

The resource estimates are based on the requirements of the JORC Code as described below.

4.9.1.2 JORC Code Requirements

The JORC Code provides minimum standards for public reporting of Resources and Reserves to the investment community. For coal deposits, the JORC Code is supplemented by the Australian Guidelines for Estimating and Reporting of Inventory Coal, Coal Resources and Coal Reserves (referred to as 'the Guidelines').

The Code and the Guidelines provide a methodology which reflects best industry practice to be followed when estimating the quality and quantity of Coal Resources and Reserves. A Coal Resource is defined as that portion of a coal deposit in such form and quantity that there are reasonable prospects for economic extraction. The location, quantity, quality, geological characteristics and continuity of a Coal Resource are known, estimated or interpreted from specific geological evidence and knowledge. Coal Resources are divided into three categories:

- Measured – for which quantity and quality can be estimated with a high degree of confidence. The level of confidence is such that detailed mine plans can be generated, mining and beneficiation costs and wash plant yields and quality specifications can be determined;
- Indicated – for which quantity and quality can be estimated with a reasonable degree of confidence. The level of confidence is such that mine plans can be generated and likely product coal quality can be determined; and
- Inferred – for which quantity and quality can be estimated with a low degree of confidence. The level of confidence is such that mine plans cannot be generated.

Resources are estimated based on information gathered from Points of Observation. Points of Observation include surface or underground exposures, bore cores, geophysical logs, and drill cuttings in non-cored boreholes. It should be noted that Points of Observation for coal quantity estimation need not necessarily be used for coal quality estimation.

The estimate is calculated using the area, thickness and in situ density of the coal seam. The basis from which the in situ density is derived should be clearly stated. It is important to note that in situ density is not the same as the density reported by the standard laboratory measurement.

The Guidelines suggest distances that should be used between Points of Observation when estimating resources:

- Measured – Points of Observation no more than 500 m apart;
- Indicated – Points of Observation no more than 1 000 m apart; and
- Inferred – Points of Observation no more than 4 000 m apart.

4.9.1.3 Coal resource estimation points of observation

Salva Resources have, in May 2010, calculated a resource estimate based on all available exploration drilling data (Salva, 2010). The Points of Observation used to define the Coal Resources at Kevin's Corner are the drill holes with a reliability type of 1, 2, or 3 (Table 4-5).

Table 4-5: Points of Observation categorisation (Salva, 2010)

Type	Point of Observation Description	Value and Use of Point of Observation			
1	Cored and analysed intersection of seam with wireline log, may or may not have lithology log	**TYPES 1-3** Reliable for structure and thickness		**TYPES 1-2** Required for quality confirmation	
2	Cored and analysed intersection of seam without wireline log, may or may not have lithology log				
3	Non cored intersection of seam with wireline log, may or may not have lithology log				**TYPE 3** May support quality
4	Non cored intersection of seam without wireline log, may or may not have lithology log		**TYPE 4** Supportive of structure and thickness		

The drill hole spacing for structure and for quality used to define the coal resources were as follows:

MEASURED - Structure points of observation less than 500 m apart

- Quality points of observation less than 1 000 m apart

INDICATED - Structure points of observation less than 1 000 m apart

- Quality points of observation less than 2 000 m apart

INFERRED - Structure points of observation less than 2 000 m apart

- Quality points of observation less than 4 000 m apart

The distances chosen are in line with those suggested in the guidelines.

The Kevin's Corner Project resource has been classified as containing Measured, Indicated, and Inferred coal resources based on the assessment of geological interpretation and coal quality data.

4.9.1.4 Kevin's Corner Project resource estimate March 2010

The Kevin's Corner resource estimate is outlined in Table 4-6. It is estimated that the total resources for A, B, C, and D seams are 4.269 billion tonnes (Bt), of which 229 million tonnes (Mt) are Measured and 1 040 Bt are Indicated.

These resources are currently being upgraded in the 2010/2011 exploration program due 2nd half 2011. These will not upgrade the quantity of the resource, but categories of measured and indicated will be increased substantially.

Table 4-6: Kevin's Corner coal resources March 2010

Resource category	Value	Seam Group				Tonnes Total (Mt)
		A	B	C	D	
Measured	Volume (Mm3)	7	79	7	67	
	Area (Ha)	284	1 031	569	1 658	
	Thickness (m)	2.5	6.5	1.24	4	
	In situ density (t/m3)	1.33	1.49	1.49	1.42	
	Sub total Tonnes (Mt)	10	114	10	96	229
Indicated	Volume (Mm3)	142	444	36	149	
	Area (Ha)	5 514	7 149	2 342	3 496	
	Thickness (m)	2.5	6.2	1.57	4.2	
	In situ density (t/m3)	1.35	1.50	1.49	1.44	
	Sub total Tonnes (Mt)	190	600	50	200	1 040
Inferred	Volume (Mm3)	279	602	444	874	
	Area (Ha)	10 076	8 663	19 774	18 697	
	Thickness (m)	2.5	6.9	2.2	4.6	
	In situ density (t/m3)	1.37	1.49	1.45	1.43	
	Sub total Tonnes (Mt)	300	900	600	1 200	3 000
Grand Total Tonnes (Mt)						**4 269**

Notes: Volumes, areas and tonnages have been rounded and may not total. Coal masses are in situ estimates based on application of in situ moisture model from ACARP C10042 and Preston Sanders formula to adjust density.

4.9.2 Model Audit

Hancock engaged IMC Pty Ltd (IMC) to undertake a model audit and review. IMC used Mark Briggs from Moultrie Group Pty Ltd to execute the actual audit activity. The audit review took place during March 2010. The audit conclusions were that the JORC resource statements were probably acceptable, but had less confidence in reserve statements. The bulk of the Kevin's Corner estimation is an Inferred resource, which is subject to variation by virtue of data density and quality. This will be upgraded with further drilling.

4.10 Mining

The development of the Project and associated mine plan have been based on a production of up to 42 Mtpa of ROM coal to produce up to 30 Mtpa of thermal coal product.

Table 4-7 details the expected ROM tonnage for each of the mining areas within Kevin's Corner.

4.10.1 Excavation Characteristics (Surface mine)

The excavation characteristics are influenced by the depth of weathering and hence rippable rock that extends to an average of 40 m across the deposit:

- The upper weathered zone is of variable thickness from < 12 m to 65 m (average 35 m), capable of being ripped by large dozers and removed by scrapers. It is currently planned to remove this weathered zone with truck and shovel.
- Drilling and blasting may be required below the weathered zone.
- Weak tertiary materials and the generally soft overburden will permit the use of large blast holes and relatively low powder factors.
- Estimated swell factors are buckets 35% and waste dumps 25%.

Mining is currently planned to commence in the open cast mines by truck and shovel, and this affords considerable flexibility, particularly in respect of external waste dump construction.

Table 4-7: Expected ROM Tonnes

	Year of Operation	Mine Plan Throughput by Source (Mt/a (as))				
		Underground North Mine (ROM)	Underground South Mine (ROM)	Underground Central Mine (ROM)	Open Cut Mine (ROM)	Total Feed
2014	1	35,092	/	/	2,145,853	2,180,945
2015	2	575,287		70,099	4,129,236	4,774,621
2016	3	4,495,745	128,271	794,838	6,251,771	11,670,626
2017	4	8,158,099	922,506	5,025,991	6,748,028	20,854,624
2018	5	9,144,543	3,859,148	9,245,209	3,089,695	25,338,596
2019	6	9,487,804	9,654,289	9,527,297	4,854,644	33,524,034
2020	7	12,890,487	9,500,317	9,663,456	3,766,704	35,820,965
2021	8	11,950,652	9,526,063	9,639,695	3,258,861	34,375,271
2022	9	11,934,890	9,774,432	9,632,971	2,547,026	33,889,320
2023	10	12,616,748	9,221,396	9,690,840	2,584,395	34,113,380
2024	11	12,405,211	9,858,322	9,836,190	2,629,556	34,729,280
2025	12	12,942,478	9,285,119	9,561,022	2,518,175	34,306,794
2026	13	12,746,494	9,374,338	9,619,773	2,582,849	34,323,455
2027	14	12,308,033	9,681,864	9,407,940	2,912,940	34,310,778
2028	15	11,819,427	9,378,623	8,623,349	2,745,662	32,567,061
2029	16	11,635,232	9,545,166	9,456,223	2,939,881	33,576,501
2030	17	12,497,316	9,384,087	9,587,992	3,421,510	34,890,904
2031	18	12,547,962	9,333,523	9,614,910	3,984,758	35,481,153
2032	19	11,453,031	9,782,309	9,565,263	3,638,978	34,439,580
2033	20	10,536,857	9,234,356	9,486,185	3,452,045	32,709,443
2034	21	8,604,148	9,659,877	9,488,075	4,107,170	31,859,270
2035	22	8,555,602	9,271,023	9,366,760	4,862,533	32,055,917
2036	23	8,675,802	8,162,935	9,374,625	4,607,758	30,821,120
2037	24	8,556,851	9,398,188	9,002,126	4,396,348	31,353,512
2038	25	8,450,534	8,994,937	9,325,173	5,606,847	32,377,491
2039	26	7,970,997	9,566,162	9,012,644	5,216,380	31,766,183
2040	27	7,847,072	9,024,301	9,227,995	5,440,373	31,539,741
2041	28	7,188,503	9,508,959	9,246,607	5,613,573	31,557,642
2042	29		9,022,893	9,132,914	4,841,289	22,997,096
					Total	854,205,302

4.10.2 Overburden removal

For the two open cut pits, the topsoil is to be stripped using a front end loader and stockpiled for reuse.

The tertiary and weathered Permian overburden will be excavated by large rope shovels and backhoe excavators. Overburden material will be hauled to out-of-pit dumps. Much of the material will be free-dig but some blasting may be required.

All coal will be exposed by excavator and trucks until shovel, electric rope and draglines are introduced.

In regards with the underground longwall operations minimum amount of topsoil and Cainozoic overburden will be removed within the adit access areas.

4.10.3 Blasting

Blasting will be carried out using ammonium nitrate/fuel oil (ANFO) or emulsion based explosive.

4.10.4 Overburden and waste disposal

All CHPP coarse rejects will be hauled into the designated overburden emplacements by rear-dump trucks.

Rejects

Waste material from the CHPP comprising coarse reject and tailings will be deposited back into the open pit once sufficient space is available. The fine rejects will be pumped to an initial out-of-pit tailings storage facility (TSF) located to the west of the open-cut mining.

Coarse Reject Handling

Haul trucks will transfer coarse rejects to the reject emplacement area.

The proposed reject emplacement area is in the overburden southern pit emplacement area with minor initial coarse rejects being trucked to the northern emplacement areas.

Reject placement will be sequenced such that capping of the reject will be completed progressively as the working face progress's down dip.

Additional details regarding mine waste management is presented in EIS Volume 1 Section 16.

In simple terms for every 100t of ROM coal, the CHPP will on average produce approximately 75t of product coal, 17t of coarse reject and 8t of tailings.

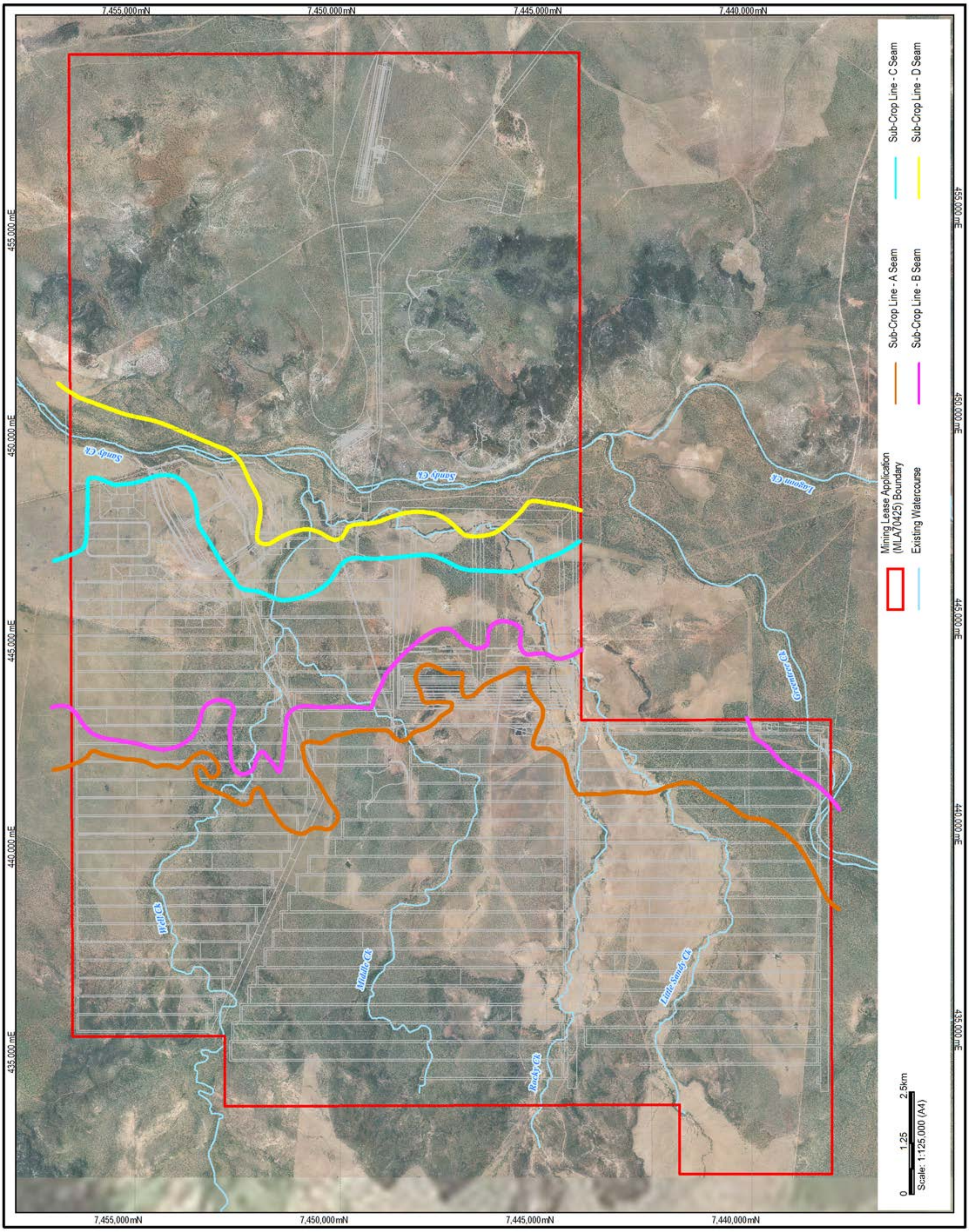
4.11 Infrastructure area geology

Details regarding the mine plan and infrastructure are presented in the Project Description, EIS Volume 1 Section 02. The mine infrastructure is located mainly on non-coal bearing strata, overlying the Colinlea Sandstone immediately to the east of Sandy Creek.

The Joe Joe Formation, further to the east, underlies the LIA, Accommodation Village, Airport, Mine Access Road and Rail spur.

Figure 4-11 indicates the mine plan and coal outcrop. Figure 4-12 presents the mine plan and areas of sterilised coal. It is noted that the majority of coal to be sterilised comprise the uneconomical E and F coal seams.

It is important to note that the C seam coal, although not mined in the current Longwall mining plan, has not been sterilised and could be mined in the future.



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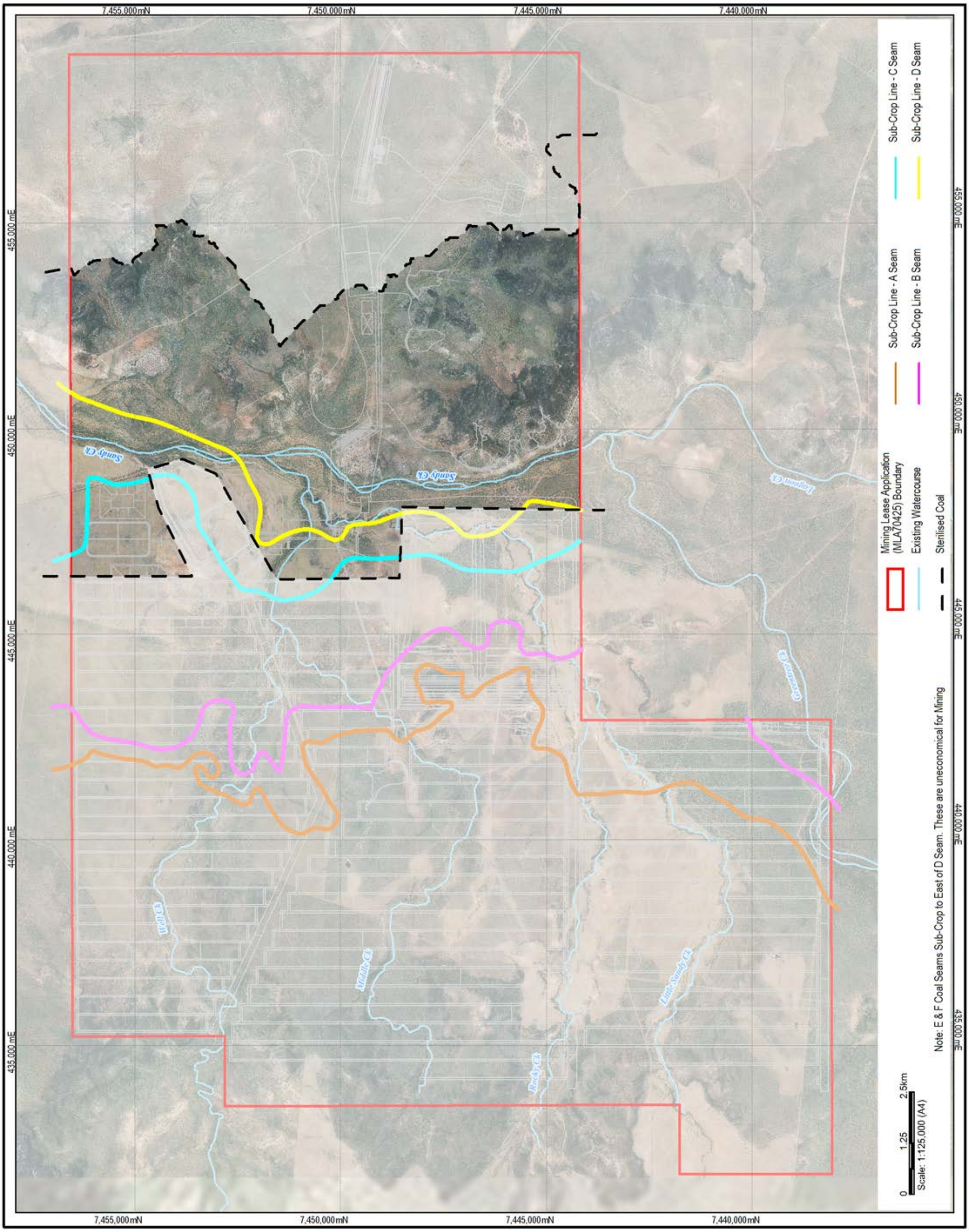
MINE PLAN SHOWING INFRASTRUCTURE AND COAL SUBCROP

Job Number	4262 6660
Revision	B
Date	12-09-2011

Figure: 4-11

File No: 42626660-g-1100.wor



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Environmental Impact Statement

MINE PLAN SHOWING
STERILISED COAL

Job Number	4262 6660
Revision	B
Date	12-09-2011

Figure: 4-12

File No: 42626660-g-1101.wor

4.12 Potential impacts and Mitigation

Based on the compilation and review of available geology data and mining activities, an impact assessment has been conducted. The evaluation of available geological information indicates the potential for environmental impacts associated with the nature and characteristics of the geological resources, these include:

- The D-E sandstone unit below the D Seam;
- The nature of the overburden within the open-cut pits, which may affect Highwall stability;
- The AMD potential of the units;
- The sandstone unit between the C and D coal seams, the C-D aquifer;
- Resource sterilisation due to mine plan and infrastructure;
- The coal seam propensity for spontaneous combustion;
- The potential impacts of blasting using ANFO;
- The management of Fossils;
- The management of fine rejects, tailings; and
- The geological implications for rehabilitation and mine closure planning.

These matters are discussed in more detail below

4.12.1 D-E Sands

The floor of the D Seam comprises relatively competent rock, identified to have rock of medium to high strength. Thus the floor should not pose significant instability concerns. However, aquifer pressures (confined D-E sandstone aquifer) have the potential to cause floor heave.

Mitigation

Active depressurisation of the D-E sands aquifer will be required to reduce the pore pressures and minimise the risk of uncontrolled inflows. Dewatering systems and impacts have been detailed in EIS Volume 1 Section 12).

4.12.2 Highwall interburden stability (open-cut pits)

The thick (60 to 70 m) interburden between the B and C coal seams comprises labile sandstone with a clayey matrix and subordinate siltstone. Puggy claystone or clay matrix sandstone is logged within the interburden.

Geochemical studies indicate that the clay-rich sediments are dispersive or potentially dispersive. In addition, this material can have slaking properties, which effects open pit wall stability. The clayey materials have the potential to slake on exposure.

The slake-prone strata have clays of high to extremely high plasticity; as such these clays are not suitable for road building (pavement construction) and will tend to adhere to machinery and conveyor belts once they have been exposed to the weather.

The B-C interburden material may, therefore, be of importance to highwall and waste stability considerations.

Mitigation

Good surface water drainage control will be essential to prevent ponding of water as well as traffic-ability and handle-ability problems. Consideration of the puggy claystone or clay matrix sandstone within the interburden must be given when considering high wall slope angles.

Precautions should be taken to prevent water flow over the dispersive materials of overburden emplacements.

4.12.3 AMD

Preliminary geochemical assessments regarding the potential for the generation of acid and metaliferous drainage (AMD) have been conducted (EIS Volume 1 Section 16). The preliminary results indicate the potential for acid mine drainage, which has implications in terms of waste management, rehabilitation and backfilling.

Mitigation

The geochemical nature of the coarse and fine rejects has been considered in the Mine Waste section of the EIS. Mitigation and management measures are included in Volume 2 Section 16

4.12.4 C-D Aquifer

An aquifer unit on site within the Bandanna Formation comprises the C coal seam, underlying D coal seam, and interburden sediments, referred to as the C-D sands aquifer (JBT, 2010a). The coal seams and interburden are in hydraulic connection and effectively form one hydrostratigraphic unit.

The C-D sandstone aquifer is recognised, from aquifer tests at the adjacent Alpha Coal Project, to have moderate to high groundwater potential due to variable hydraulic conductivity and relatively high storage (average transmissivity of 4 m^2/day and storage of 1.3×10^{-3}).

Longwall mining will have the potential to impact on the C-D sands aquifer, resulting in induced groundwater migration from the C-D sands into the mine.

Mitigation

In order to ensure a “dry” safe working environment active dewatering will be required within the C-D aquifer, as well as the D-E sands. Dewatering using production bores will be required to remove an average 127 L/s over the life of the mine. EIS Volume 1 Section 12 provides details of the required dewatering.

4.12.5 Resource sterilisation

Resource utilisation

The mine plan is designed to recover between 25 Mtpa and 30 Mtpa of coal to 2042. In this period approximately 900 Mtpa of ROM coal is planned to be mined. Substantial mining reserves will remain after this period, thus the closure planned date of 2042 is only indicative.

The mine can be economically operated as an open-cut operation in the Northern Open pit area. In this surface mine both the C Seam and D Seam will be mined using truck-shovel open pit methods. This coal is too shallow for longwall mining with fresh stable ground being limited in thickness immediately above mining operations.

The area around the Southern Open pit has the ability to be mined by open-cut or underground methods. The C Seam is not an economically recoverable unit in its own right, i.e. it would not be mined without the D Seam. For underground operations the C Seam is unable to be recovered due to its proximity to the D Seam.

For much of the remaining area of the mine longwall reserves have focused on the D Seam. The D Seam can be competitively recovered and washed to an export grade coal. The C Seam is higher in ash with a burden too thin to be mined separately by underground, and strip ratio is too high for economic open cut operations, thus for underground areas of the deposit the C Seam is not recovered and left in-situ.

A and B Seams

The A and B seams exist to the west. The A Seam has low ash coal but the thickness is too thin and variable to mine either by open pit or underground mining (except for an area to the south of the deposit which could be considered for Bord and Pillar operations in the future).

The B Seam is a higher ash coal. It is also too deep to be economically recovered by open cut methods based on current marketability. There is, however, the potential for underground operations in the future should markets be able to accept the higher ash product.

E and F Coal Seams

As per Section 4.3.3 these seams are not economically recoverable and have to be excluded from the JORC RS.

Section 4.3 details the geology underlying the proposed mine area and Figure 4-12, the mine plan, indicates the location of ancillary mine infrastructure. The infrastructure located on the east of Lagoon Creek, on the sub outcrop of the Bandanna Formation and Colinlea Sandstone, are underlain by the E and F coal seams.

The E Seam is present as two 0.2 m thick clean coal bands (E1 and E2). The F Seam displays patchy development and the full geological section can reach in excess of 5 m in isolated areas. However, excessive separation (high incremental ratio) and poor coal quality makes the F Seam sub-economic. No resource potential by current practices and economic is currently attributed to either E or F Seams within the Kevin's Corner Coal Project area (Section 4.11). The sterilised resources are indicated in Figure 4-12.

Petroleum and mineral exploration permits have been granted (over-pegged) on the Hancock MDLs. It is considered that shallow surface mining would not sterilise deep petroleum reserves, should they exist, and that access to these resource would be feasible.

4.12.6 Spontaneous combustion

These coals are known internationally to display spontaneous combustion.

Mitigation

The deposit ROM, product and working places will require appropriate management systems to prevent spontaneous combustion (Salva, 2010). This can include active watering, orientation of stock and waste piles based on wind directions, and wind breaks.

4.12.7 Blasting

Blasting will be carried out using ammonium nitrate/fuel oil (ANFO and HANFO) explosive.

The impacts of blasting using ANFO / HANFO can include increased fracturing and the increase in nitrate concentrations within the groundwater and pit water.

Mitigation

Blast using water tolerant explosives in wet holes to avoid dissolving and dewatering. Groundwater movement will be towards the mine during mining thus preventing ammonia rich groundwater migrating off site. Final voids at Kevin's Corner and Alpha Coal Projects will alter the groundwater flow patterns post mining. These final voids will act as sinks, due to high evaporation compared to ingress (rainfall, groundwater, and runoff), such that groundwater will, on a local scale, drain towards the final voids. Plume migration in groundwater will thus not occur.

4.12.8 Fossils

Based on the age and depositional nature of the sediments located within the proposed mining area, there is the potential for fossil specimens to be uncovered during construction and operations. However, no records of fossils have been recorded in the exploration data.

Management

Should significant fossil specimens be identified within the mine then steps will be taken to secure and protect the fossils. The Queensland Museum will be notified to allow for the identification and correct preservation and removal.

4.12.9 Tailings

Dilution materials in mining operations include mudstone, claystone and sandstone, which have a clayey matrix. These materials, if associated with the coal processed in the CHPP, can result in:

- Increased fine rejects (tailings);
- Reduced volume of coarse material;
- Difficulties in transport and deposition; and
- Reduction in water recovery due to high water takes (interstitial water).

LIMN Sim and additional tests have been carried out to determine tailings characteristics for handling, processing and storage.

Mitigation

EIS Volume 1 Section 16 details the management and disposal of tailings on site. Initial tailings deposition will comprise disposal on an out-of-pit tailings Storage facility (TSF), which overlies the clay-rich weathered Cainozoic sediments. The design and management of the TSF will ensure little or no impacts on the environment. Once sufficient void space is available within the Northern Open pit then tailings will be co-disposed with backfill and coarse rejects.

4.12.10 Rehabilitation and closure

Mining will permanently impact on the geological resources within the MDLs. Coal, interburden, and overburden will be removed and rehabilitation (backfilling) will result in the alteration to the pre-mining geology. Underground operations will permanently subside undermined areas and result in increased hydroconnectivity.

The mine will develop a closure plan to minimise the impacts and rehabilitate the overburden and soils to allow for pre-mining land use.

The details regarding decommissioning and rehabilitation is presented in EIS Volume 1 Section 26.