Section 2
Description of the Longwall Project

This section introduces the Proponent's objectives for the progression of the Narrabri Coal Mine from a 2.5Mtpa continuous miner operation (Stage 1) to an 8Mtpa longwall mining operation (Stage 2).

The local geology and coal resource within the Mine Site is described and the proposed Stage 2 longwall mining operations and sequence ("the Longwall Project") are described. This section also describes the proposed coal processing and product coal transport activities, hours of operation, infrastructure and services, safety management, waste management and progressive and final rehabilitation associated with the Project, with emphasis placed on any modification to the approved activities of Project Approval (PA) 05_0102.

The Longwall Project is described in sufficient detail to provide the reader with an overall understanding of the nature and extent of the activities proposed, how the various activities would be undertaken and to enable an assessment of the potential impacts on the surrounding environment. The boundaries of the various components described throughout this section are indicative. Where dimensional information is provided, it needs to be recognised as indicative only.

Details of the safeguards and management measures that the Proponent proposes to implement to minimise or negate the potential impacts on surface water, groundwater, soil, noise, air quality, Aboriginal heritage, flora and fauna and other components of the local environment are provided in Section 4B of this document.

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2.1 INTRODUCTION

2.1.1 Objectives

The Proponent's objectives for the proposed development and operation of the Stage 2 longwall mining project at the Narrabri Coal Mine are to:

i) develop and safely operate a productive longwall mine producing up to 8 million tonnes of low ash, thermal coal each year;

ii) progress to the elevated production levels, ie. greater than the approved 2.5Mtpa, at the earliest possible date to maintain the Proponent's coal production levels in the Gunnedah Basin;

iii) continue to supply international markets for the coal produced;

iv) develop and operate the mine in a manner that complies with all statutory requirements;

v) undertake all activities in an environmentally responsible manner, employing a level of control and integrating safeguards that would ensure compliance with appropriate criteria/goals and/or reasonable community expectations at all times;

vi) design and construct additional surface infrastructure that would minimise surface disturbance and would serve the mine for the foreseeable future;

vii) monitor and manage surface subsidence to ensure impacts on the local environment are minimised;

viii) monitor and manage mine ventilation to ensure a safe working environment is maintained and impacts on the local environment are minimised;

ix) maintain and increase the stimulus to the local economies of Narrabri, Boggabri and Gunnedah and their surrounding districts through employment and service supply opportunities related to the operation of the coal mine;

x) achieve the above objectives in a cost-effective manner and thereby ensure the ongoing viability of the proposed mining operation; and

xi) provide for ongoing monitoring of local environmental parameters such as groundwater, air quality and noise to ensure adverse impacts are minimised.

2.1.2 Overview of the Longwall Project

The Proponent proposes to convert the approved Narrabri Coal Mine from a continuous miner operation with an approved annual production rate of 2.5Mtpa to a longwall mining operation with a maximum annual production rate of 8Mtpa. **Figures 2.1** and **2.2** identify the critical surface and underground components of the proposed longwall mining operation. **Figures 2.1** and **2.2** differentiate between those activities or infrastructure already approved for the Stage 1 operations and those proposed for the Stage 2, longwall operations.

Longwall Mining

Longwall mining would involve the sequential development of sets of heading gate roads approximately 305m apart oriented north-south from the main mine headings ("West Mains") and developed for the full distance to the northern and southern boundaries of ML 1609 (up

to 4.1km). Once each set of dual roadways are fully developed, the longwall equipment would be installed and the coal recovered as the longwall unit retreats back between the two sets of roadways towards the West Mains. All coal would be conveyed back to the Pit Bottom Area for transfer to the surface via the approved conveyor drift.

The longwall unit would recover 4.2m of coal from the lower part of the Hoskissons Coal Seam (leaving up to 5.2m of lesser quality coal in-situ) retreating at a rate of approximately 15m per day. At this rate, each longwall panel would take approximately 1 year to complete. Based on the proposed mining schedule, there could be up to three longwall panels being prepared (gate road development) or mined (longwall unit retreat) at any one time.

Mine Ventilation and Gas Drainage

The gas composition of the Hoskissons Coal Seam (which has a measured gas content range from $3.5m^3/t$ to $7.5m^3/t$) is predicted to vary considerably, however, for planning purposes and subject to further data becoming available, it is assumed to be an average of 90% CO_2 and 10% CH_4. The porous coarse grained sandstone floor of the Hoskissons Coal Seam would also be a source of gas within the underground workings.

Pre-drainage of the coal seam would need to be undertaken to reduce the gas content to less than $5.0m^3/t$ for the management of outbursts and rib emission prior to the development of each longwall panel. Pre-drainage would be undertaken using Surface to In-Seam boreholes drilled from the surface and / or conventional underground boreholes.

As the three mine drifts, dual gate road headings and longwall panels are developed, the mine ventilation system would be progressively upgraded to prevent gas build-up within the underground workings, thereby providing for safe working conditions and minimising the risk of outburst or spontaneous combustion.

As the longwall unit retreats, and the remaining section of the seam collapses, the gas accumulating in the goaf would also be drained. Goaf gas drainage would be completed either by re-using the SIS system used for pre-draining the gas from the panel to be developed, or by the development of additional bores from surface into the collapsed panel, with the gas drawn out the goaf by the installation and operation of a mobile vacuum plant at the top of each bore.

Mine Dewatering and Management

As groundwater seeps into the underground workings, it would be diverted to underground sumps from where it would be pumped to the surface into Dam A1 of the water management area within the rail loop (**Figure 2.2**). A proportion of this 'raw' groundwater, which is expected to be saline (Total Dissolved Solids (TDS) of up to 8 000mg/L), would be pumped from Dam A1 for use within the Pit Top Area, ie. coal washing and dust suppression. Water would also be required for use underground, ie. dust suppression and equipment cooling, with fresh water (TDS≤500mg/L) required for these activities. In order to improve the water quality for use underground, the approved Water Conditioning Plant (incorporating both micro-filtration and reverse osmosis processes) would be constructed and operated. Water discharged into Dam A1 would be pumped to the Water Conditioning Plant, with the treated water ("raffinate") discharged to Dams C and D. The waste 'brine', which is expected to have a salinity approximating that of seawater, would be pumped to Dams A2, A3 and B for initial storage.

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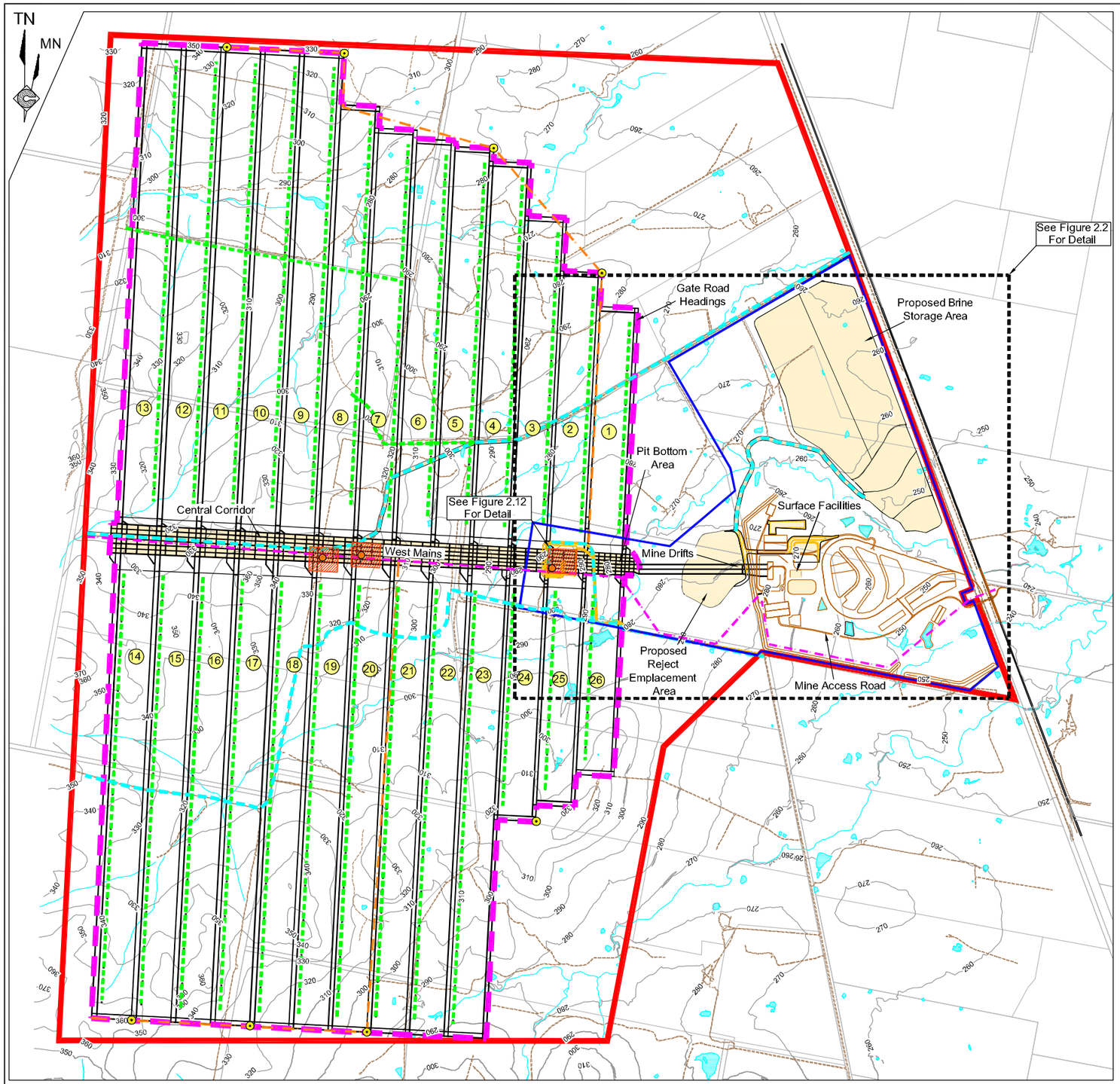

REFERENCE
- Mine Site Boundary
- Pit Top Area Boundary
- Limit of Longwall Mining Area
- (1) Longwall Panel No.
- Underground Gate Road
- Cadastral Boundary
- 260 Contour (m AHD)(Interval = 10m)
- Creek / Drainage Line
- Approved Disturbance within the Pit Top Area
- Area of Proposed Stage 2 Surface Disturbance
- Proposed All Weather Unsealed Access Road
- Proposed Stage 2 Access for Goaf Drainage
- Proposed Power Line
- Proposed Power Line Advancing with Mine
- Ventilation Shaft Area
- Proposed Ventilation Shaft Location
- Proposed Rear of Panel Ventilation Shaft

Figure 2.1
INDICATIVE MINE SITE LAYOUT

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REFERENCE
- Mine Site Boundary*1
- Pit Top Area Boundary
- Contour (m AHD)(Interval = 2m)
- Creek / Drainage Line
- Sealed Road
- Unsealed Road / Track
- Approved Disturbance within the Pit Top Area
- Area of Proposed Longwall Project Surface Disturbance
- Initial Brine Storage Pond*2
- Power Line
- Water Pipeline Route

Notes: 1. Modified from Stage 1 Boundary

2. Initial 3 Brine Storage Ponds (40ha) provide for sufficient Brine Storage for base case (most likely) groundwater in-flow (and therefore brine generation) predictions.

BR5
BR4
BR3
BR2
BR1
Northern Longwall Panels Access Road
Brine Storage Area Access Road
Amenity Bund
Explosives Magazine
Concrete Lined Dirty Water Drain
Kurrajong Creek Tributary 1
Longwall Unit Assembly Area
Clean Water Diversion Drain
Road (20m Wide)
Coal ROM Pad Extension (Height up to 20m)
Containment Bund
Dam A1
Dam A2
Dam A3
Dam B
Dam C
Dam D
Mine Water Evaporation / Storage Dams
Coal Preparation Plant
Product Coal Stockpile - Extra Capacity and Drawpoint
Industrial Hardstand
Admin & Bath-house
Water Conditioning Plant Site
Additional Sediment Basin
Additional Electrical Transformer Facilities
Mine Access Road
Main Power Line
North Western Railway Line
Kamilaroi Highway
Kurrajong Creek Tributary 2
Kurrajong Creek Road
Initial Ventilation Shaft Area
See Figure 2.12
Reject Emplacement Area
See Figure 2.18

SCALE 1:15 000
250 0 250 500 750 m

Figure 2.2
PIT TOP AREA LONGWALL PROJECT COMPONENTS

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The Proponent would process all dewatered groundwater not required for Pit Top Area activities through the Water Conditioning Plant. It is proposed to discharge the excess raffinate to the Namoi River although as indicated above investigations are proceeding into other potential uses. The additional brine, in excess of that which can be stored within Dams A2, A3 and B, would be pumped to and stored within an additional storage facility to be constructed (progressively) to the north of Kurrajong Creek Tributary 2 (Brine Storage Area) (see **Figures 2.1** and **2.2**). The Brine Storage Area would incorporate a series of ponds, which would be constructed as required throughout the life of the Longwall Project. The initial three ponds (BR1, BR2 and BR3 which cover an area of 40ha) have sufficient capacity to store brine generated by the predicted base case (most likely) dewatering requirements of the Longwall Project. The additional area of the Brine Storage Area (BR4 and BR5), would provide additional storage capacity in the event that dewatering requirements exceed those predicted by base case groundwater modelling.

Additionally, it was identified that as the volume of groundwater to be dewatered increased in the initial years of the mine's operation there was insufficient water make to meet the operational requirements of the mine. The Proponent proposes to source additional sources of water from water licences acquired from the Namoi River, Namoi alluvium and/or the Great Artesian Basin.

At the completion of underground mining, the stored brine would be pumped back into the goaf areas and remaining gate roads of the completed longwall panels and the Brine Storage Area rehabilitated. The Proponent is also investigating the potential to progressively pump the brine into the completed goaf areas of the mine as the direction of mining progresses up-dip (west to east, ie. LW14 to LW26). This would target the transfer of all brine underground by the cessation of mining in approximately 30 years.

Coal Transfer to Surface and Processing

Transportation of the mined coal to the ROM coal stockpile would continue to be via the conveyor drift from the Pit Bottom Area to the box cut within the Pit Top Area. From the box cut excavation, the ROM coal would be transported to the ROM coal stockpile area by conveyor from where it would be sent to the Coal Preparation Plant.

Coal Processing and Reject Management

The ROM coal would be drawn from the ROM coal stockpiles via one of two reclaim valves and tunnels from where it would be fed to a rotary breaker for size reduction. The broken coal would then be transferred to a dry screen with the <16mm coal transferred directly to the product coal stockpile area and the remainder transferred to the Coal Preparation Plant where the coal would be washed and coarse and fine reject screened off. The fine and ultra-fine reject would be dewatered to produce a filter cake which would be disposed of in combination with the coarse coal reject. The washed coal would be transferred to the product coal stockpile area from where it would ultimately be loaded into train wagons for transport from the Mine Site.

The Coal Preparation Plant is expected to remove up to 5% of the total ROM feed as reject, which would be predominantly rock from the floor of the mine workings. Approximately 90% of the reject would be coarse reject and the remainder comprising the filter cake, with both reject streams stockpiled within a reject pile. From the reject pile, the consolidated reject would be transferred to a Reject Emplacement Area on the north-facing side of a low ridge immediately to the west of the box cut. The proposed maximum footprint of the Reject Emplacement Area is approximately 25ha, however, it would be constructed progressively as a

series of elongated (north-south oriented) cells in a westerly direction. The emplacement would be constructed against the slope of the ridge, rising to a maximum of 15m above the natural surface level.

Transportation

The product coal would be drawn from stockpiles via three reclaim valves and tunnels and conveyed to the train load-out bin. The loading of product coal via the drawdown valves and train load-out bin would be fully automated with batches drawn from the stockpiles and loaded into train wagons on the Narrabri Coal Rail Siding.

Rehabilitation

Rehabilitation of the Mine Site would involve activities in five distinct areas.

1. Pit Top Area infrastructure.

   All surface infrastructure, with the exception of the mine access road and rail infrastructure, would be decommissioned, dismantled and removed from the Mine Site. The disturbed areas of the Pit Top Area would be backfilled where appropriate, eg. box cut and underground water storage dams (after dam lining and saline material is removed), profiled, covered with available topsoil and revegetated with either pasture grass species or native tree, shrub and grass species (depending on final landform and land use requirements).

2. Reject Emplacement Area.

   As the permanent 14º batters of each cell of the Reject Emplacement Area are formed, they would be progressively capped with the previously stripped subsoil and topsoil. On completion of each cell to the nominated 15m height, the top surface would be profiled and revegetated with a fast growing cover crop.

3. Water and brine storage ponds.

   Following dewatering of the ponds, the plastic liner of each pond would be removed and transported to a waste disposal facility. Following testing to confirm there have been no breaches in the liner the ponds would be backfilled, profiled, re-topsoiled and revegetated with pasture species to create a landform comparable with the surrounding topography.

4. Ventilation and gas drainage infrastructure.

   The ventilation and gas drainage infrastructure would be rehabilitated in much the same fashion as the Pit Top Area, albeit on a smaller and more widespread scale. When facilities are no longer required, they would be progressively rehabilitated.

5. Surface cracking caused by subsidence.

   The disturbance resultant from any surface cracking caused by subsidence would be progressively rehabilitated. For smaller width cracking, the surface would simply be ripped to allow the cracks to be filled in. In some instances, the surface cracking may be too wide to be effectively in-filled by surface ripping and in these instances, material excavated from within the footprint of the Reject Emplacement Area would be used to in-fill the cracks prior to ripping and revegetation.