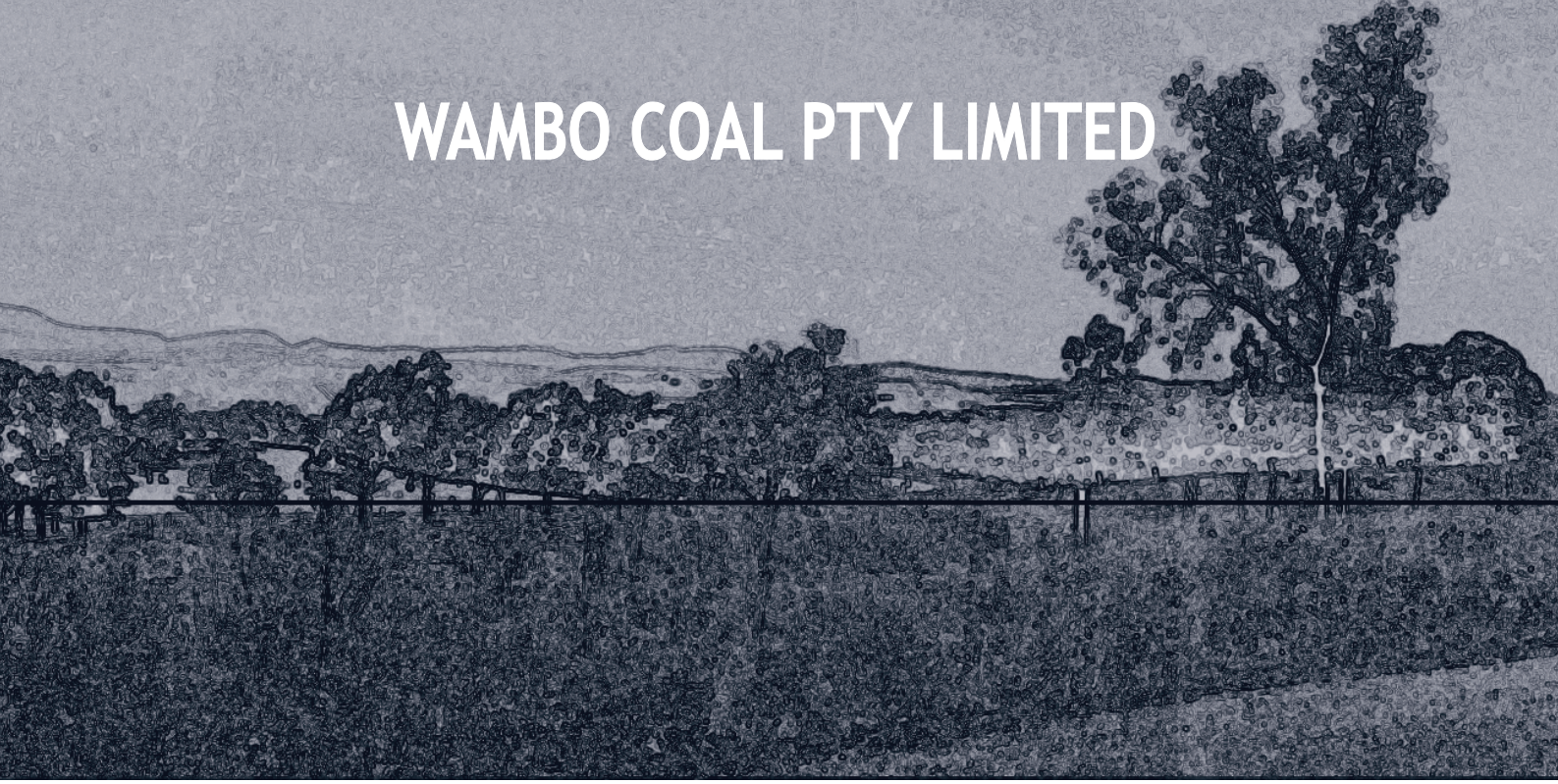

WAMBO COAL PTY LIMITED

# SOUTH WAMBO UNDERGROUND MINE MODIFICATION

# ENVIRONMENTAL ASSESSMENT

## APPENDIX H

Noise Review

Peabody ENERGY

# South Wambo Underground Mine Modification

# Noise Review

Report Number 610.08374.00200-R1

18 March 2016

Wambo Coal Pty Limited

PMB 1

SINGLETON NSW 2330

Version: Revision 1

# South Wambo Underground Mine Modification

# Noise Review

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**DOCUMENT CONTROL**

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# 1 INTRODUCTION

## 1.1 Background

Wambo Coal Pty Limited (WCPL), a subsidiary of Peabody Energy Australia Pty Limited (Peabody), owns the Wambo Coal Mine (Wambo), which operates in accordance with Development Consent DA 305-7-2003 (as modified). The existing open cut and underground mining operations are located approximately 15 kilometres (km) west of Singleton, near the village of Warkworth, New South Wales (NSW). Wambo has a maximum approved run-of-mine (ROM) coal production rate of 14.7 million tonnes per annum (Mtpa) and product coal is transported from Wambo by rail.

In view of recent exploration results, WCPL has reviewed mine planning for the approved South Wambo Underground Mine and identified a modified mine arrangement which can be operated more efficiently and economically than the approved mine arrangement. The underground mine ROM coal production rate would increase from 7.5 to 9.75 Mtpa, while the approved total ROM coal production rate of 14.7 Mtpa would remain unchanged.

This proposed rearrangement of South Wambo Underground Mine is referred to as the South Wambo Underground Mine Modification (the Modification) and would result in an extension of the approved mine life by 7 years (ie to 2032). The Modification would also include an extension of approved open cut mining operations by 3 years (ie up to and including 2020). The Modification would not include any change to the approved total open cut ROM coal production limit.

SLR Consulting Australia Pty Ltd (SLR) has been engaged by WCPL to review the potential noise impacts associated with the Modification.

## 1.2 Assessment Requirements

The review of noise impacts for the Modification has been guided by the NSW Department of Planning and Environment's (DP&E) Secretary's Environmental Assessment Requirements (SEARs) for the Modification, dated 23 October 2015, as presented in **Table 1**.

**Table 1 DP&E Secretary's Environmental Assessment Requirements**

| SEARs Specific Issues | Report Reference |
|---|---|
| The Environmental Assessment (EA) must address the following specific issues: **Noise** - including: | |
| • an assessment of the likely operational noise impacts of the development (including construction noise) in accordance with the *NSW Industrial Noise Policy*, paying particular attention to the obligations in chapters 8 and 9 of the policy; | **Section 4.1** |
| • if a claim is made for specific construction noise criteria for certain activities, then this claim must be justified and accompanied by an assessment of the likely construction noise impacts of these activities under the *Interim Construction Noise Guideline*; | **Section 4.2** |
| • an assessment of the likely road noise impacts of the development under the *NSW Road Noise Policy*; and | **Section 4.3** |
| • an assessment of the likely rail noise impacts of the development under the *Rail Infrastructure Noise Guideline*; | **Section 4.4** |
| **Environmental Planning Instruments, Policies, Guidelines & Plans**<br>• NSW Industrial Noise Policy (INP) (Environment Protection Authority [EPA], 2000);<br>• Interim Construction Noise Guideline (ICNG) (EPA, 2009);<br>• NSW Road Noise Policy (RNP) (Department of Environment, Climate Change and Water, 2011);<br>• Rail Infrastructure Noise Guideline (RING) (EPA, 2013); and<br>• Voluntary Land Acquisition and Mitigation Policy: For State Significant Mining, Petroleum and Extractive Industry Developments (NSW Government, 2014). | |

# 2 EXISTING WAMBO OPERATIONS

## 2.1 Existing Approvals

With respect to noise emissions, WCPL has approval to operate in accordance with the following approval requirements:

- Wambo Development Consent DA 305-7-2003 (as modified), with the relevant sections attached as **Appendix A1**.
- Environment Protection Licence (EPL) No. 529 (version dated 13 July 2015). The EPL noise criteria are the same as those presented in Development Consent DA 305-7-2003.
- Wambo Rail Loop Development Consent DA 177-8-2004 (as modified), with the relevant sections attached as **Appendix A2**.

In addition, NSW Work Cover Dangerous Goods Licences and/or Occupational Health and Safety legislation describe noise specifications for individual equipment, for health and safety purposes.

## 2.2 Existing Operations

Mining operations under Development Consent DA 305-7-2003 (as modified) commenced in March 2004 and currently both open cut and underground mining operations are conducted at Wambo. Underground mining operations are conducted 24 hours per day, seven days per week.

Open cut mining operations at Wambo involve the extraction of coal from the Whybrow, Redbank Creek, Wambo and Whynot Seams. The open cut is bounded by the United Colliery and the Golden Highway to the north, Wollombi Brook to the east and by uneconomic strip ratios to the south and west. The open cut mining fleet includes excavators, dozers, front end loaders, haul trucks, water trucks, service trucks, graders and drills.

Three underground mines are approved to a maximum ROM coal mining rate of 7.5 Mtpa, as follows:

- North Wambo Underground Mine (Wambo Seam);
- South Bates Underground Mine (Whybrow and Wambo Seams); and
- South Wambo Underground Mine (Arrowfield and Bowfield Seams).

Longwall extraction at the North Wambo Underground Mine was completed in January 2016.

Development of the South Bates Underground Mine commenced in October 2014 and longwall mining commenced in the South Bates (Whybrow Seam) Underground Mine (ie Longwalls 11 to 13) in February 2016. Subsequently, mining operations will progress to the South Bates (Wambo Seam) Underground Mine, scheduled to commence in September 2017.

Mining at the approved South Wambo (Arrowfield and Bowfield Seams) Underground Mine is planned to commence after completion of mining the South Bates Underground Mine.

## 2.3 Nearest Residential Receiver Areas

The nearest residential receiver areas in the vicinity of Wambo are shown on the Noise Monitoring Location Plan (refer **Appendix B**). The nearest privately-owned receivers, relative to the Modification, are located to the south near the village of Bulga, to the east in the village of Warkworth, and to the northwest near the village of Jerrys Plains.

## 2.4 Previous Noise Assessments

Report 10-2470-R1 Wambo Development Project Construction, Operating and Transportation Noise and Blasting Impact Assessment (Wambo Development Project NIA) dated 11 April 2003 (Richard Heggie Associates, 2003) was prepared for the Wambo Development Project. The Wambo Development Project NIA included noise modelling prepared in accordance with the EPA's INP.

## 2.5 Noise Management Strategy

WCPL has adopted an Environmental Management Strategy (EMS) which establishes the overarching framework for environmental management and monitoring of activities undertaken at Wambo. The EMS has been prepared in accordance with the Development Consent DA 305-7-2003 (as modified) and provides the strategic framework for environmental management at Wambo. Accordingly, WCPL has prepared and implemented the Noise Management Plan (NMP) in accordance with the EMS.

### 2.5.1 Noise Control and Management Measures

WCPL implements a range of noise control and management measures at Wambo that includes operational controls, engineering controls, a real-time response protocol, meteorological forecasting and continuous improvement, as described in the NMP, to identify and manage noise impacts aimed to achieve compliance with the approved noise limits.

**Design Control Measures**

WCPL has designed and implemented a range of mine design features with consideration to the mitigation of noise for its operations. The following is a summary of existing and planned design control measures, including:

- Construction of noise and visual bunds in strategic operational locations, for example:
  - Constructed a noise/visual bund along the southern portion of the product coal stockpile area adjacent to the Coal Handling and Preparation Plant (CHPP); and
  - Constructed a noise/visual bund along the south eastern portion of the rail loop/rail load out area.
- A CHPP with the following design considerations implemented, including:
  - A largely enclosed plant that effectively contains noise generated within the coal processing facility;
  - Conveyor drives that are placed low to the floor level; and
  - Key components for the CHPP were procured with specific noise criteria.
- Minimising the disturbance of vegetation between the north western portion of the approved open cut boundary, providing a vegetative screen to mitigate sound dispersal on sensitive receivers to the north west;
- WCPL owns and manages land around its operation to provide an adequate buffer between sensitive receivers to the south and to the north west (refer **Appendix B**);
- The current open cut mine plan in the Montrose Pit area was specifically designed to utilise existing natural topography to the north and west to mitigate sound propagation to sensitive receivers to the north west;
- Overburden emplacement areas have been designed to minimise noise impact on sensitive receivers to the west and south;
- Overburden emplacement areas will be designed in a manner to enable mining equipment to operate in protected areas during adverse weather conditions which may increase the propagation of noise emission from WCPL;

- WCPL currently, and will continue to implement low level dumping procedures when conditions indicate possible increase noise propagation and/or when real time noise monitor trigger alarms indicate that possible noise propagation is sourced from the mine complex;
- WCPL constructs noise bunds in strategic operational locations;
- WCPL will investigate where appropriate, the installation of appropriate acoustic barriers around work areas where required (WCPL has implemented this for all Exploration drill rigs which are located close to sensitive receivers);
- Both ventilation fans and associated coal conveyors for the North Wambo Underground Mine have been installed inpit; and
- The South Bates Underground Mine ventilation fan and associated conveyors have been installed inpit to mitigate noise propagation.

**Operational Control Measures**

WCPL is committed to implementing best practice noise management measures to minimise noise impacts, particularly low frequency noise and traffic noise from its operations. A number of proactive management measures to minimise noise generation from WCPL operations have been implemented, including:

- Regular maintenance of plant and equipment and pre-start up inspections;
- All machinery and potential noise emitting plant and equipment shall be operated by experienced and appropriately trained personnel;
- The installation of an inaudible horn system ("Hornless Horns") across the entire open cut fleet to eliminate the use of audible horns (Note: In cases of emergency, audible horns may be required);
- The installation of reversing "quakers" to mitigate noise propagation from reversing fleet vehicles shall be fitted;
- Positioning of portable generators and/or machinery to take advantage of barriers to mitigate sound travel and/or positioned at the greatest distance from the noise-sensitive area;
- Plant and equipment is turned off or throttled down when not in use;
- Restricting movement of haul trucks on ridgelines or exposed haul routes where their noise may propagate over a wide area, especially at night;
- Scheduling the use of noisy equipment at the least sensitive time of day;
- Orienting equipment so that noise emissions are directed away from any sensitive areas to achieve the maximum attenuation of noise;
- During adverse conditions, heavy vehicle traffic on exposed haul roads and access tracks where noise can propagate off site and potentially cause a noise risk is restricted;
- Where there are several noisy pieces of equipment, scheduling operations so they are used separately rather than concurrently;
- Haul trucks are parked in pit during Crib Breaks;
- During site inductions employees and contractors are provided information and training on:
    - Potential noise impacts on neighbouring residents;
    - Reporting excessive noise to WCPL management;
    - Carry out quiet work practices; and
    - Appropriate standards of behaviour when driving to and leaving site to minimise traffic noise.
- Conduct specific noise management training and noise monitoring for key operational personnel;

- WCPL internal access roads are limited to a maximum speed of 60 kilometres per hour or lower in some areas;
- All new equipment to site, purchased or hired, will be procured in line with the plant and mobile $L_{Aeq}$ sound power levels (SWLs) specification in the Wambo Development Project NIA for noise emissions to meet noise criteria at the nearest residences;
- Where feasible, examination of engineering controls including noise attenuation for trucks, drills and diggers, on mobile and stationary equipment that potentially generate significant noise and which may impact on sensitive receivers;
- Key operational personnel to monitor WCPL real-time noise monitoring network to assist in identifying when noise criteria levels are approaching or have exceeded their respective criteria so that proactive measures can be implemented;
- Non mine related construction activities will generally be undertaken between 7.00 am and 7.00 pm daily. Construction activities may occur outside these hours when WCPL is satisfied that such activities are inaudible at the nearest private residences by a WCPL appointed acoustic specialist; and
- A predictive weather modelling system is currently being developed and implemented by WCPL and a third party provider. A daily meteorological forecast report shall provide WCPL with an early warning of potential adverse conditions which facilitates proactive management of operational activities to reduce noise and dust generation potential. In the event that unfavourable meteorological conditions are identified, contingency measures (such as discussed above) will be implemented by WCPL to mitigate adverse noise propagation.

**Continuous Improvement**

WCPL is committed to maintaining an awareness of best practice noise mitigation technologies and alternative operating methodologies. WCPL implements noise control and management measures that are found to be feasible, reasonable and effective in the context of a safe and economic mining operation; and where there is a clear community benefit with their application. Available best practice mitigation technologies and alternative operating methodologies are reviewed on an ongoing basis, reported in the Annual Environmental Monitoring Reports (AEMR) and considered from the results of Independent Environmental Audits (IEA).

### 2.5.2 Noise Monitoring Program

The NMP describes the current noise monitoring network, which consists of two off-site operator-attended monitoring sites; two off-site continuous real-time monitoring sites; two off-site operator-attended/real-time monitoring sites; and one on-site Automatic Weather Stations (AWS) (refer **Appendix B**). In accordance with the NMP, operator-attended noise monitoring is used for demonstrating compliance with noise criteria, whilst continuous real-time monitoring is used as a noise management tool to assist WCPL to take pre-emptive noise management actions to avoid potential non-compliances.

A summary of recent noise monitoring locations and associated monitoring frequency are presented in **Table 2** together with a cross reference to the Noise Monitoring Location Plan (refer **Appendix B**).

**Table 2 Recent Noise Monitoring Programme Summary**

| Monitoring Location ID[1] | Noise Management Plan Property | Parameter | Frequency |
|---|---|---|---|
| N01 | 2 - Lambkin | Operator-attended monitoring | Monthly |
| N03 | 19a - Kelly | Operator-attended monitoring | Monthly |
| | | Real-time monitoring | Continuous |
| N16 | 40 - Muller | Operator-attended monitoring | Monthly |
| | | Real-time monitoring | Continuous |
| N20 | 33 - Thelander | Real-time monitoring | Continuous |
| N21 | WCPL (Wambo South Residence) | Real-time monitoring | Continuous |
| N23 | WCPL (Redmanvale Road) | Operator-attended monitoring | Monthly |

Note 1: Refer **Appendix B**.

### 2.5.3 Operator-attended Noise Compliance Results 2013, 2014 and 2015

A review of the AEMR 2013 (WCPL, 2014) and AEMR 2014 (WCPL, 2015) indicates that Wambo noise levels complied with relevant noise limits at all monitoring sites during the operator-attended noise monitoring during 2013 and 2014.

Similarly, a review of the Wambo Coal Mine and Rail Spur - Environmental Noise Monitoring reports for Quarter 1 2015, Quarter 2 2015, July 2015 and August 2015 (Global Acoustics, 2015a-d) indicates that noise levels complied with relevant noise limits at all monitoring sites during the operator-attended noise monitoring.

Furthermore, a review of the Wambo Coal Mine & Rail Loop - IEA Report (Hansen Bailey, 2015) Appendix D (page D-15) indicates that the auditor had reviewed both the operator-attended and continuous real-time noise monitoring results for the audit period (ie December 2011 to October 2014) and confirmed no exceedances of the relevant noise limits.

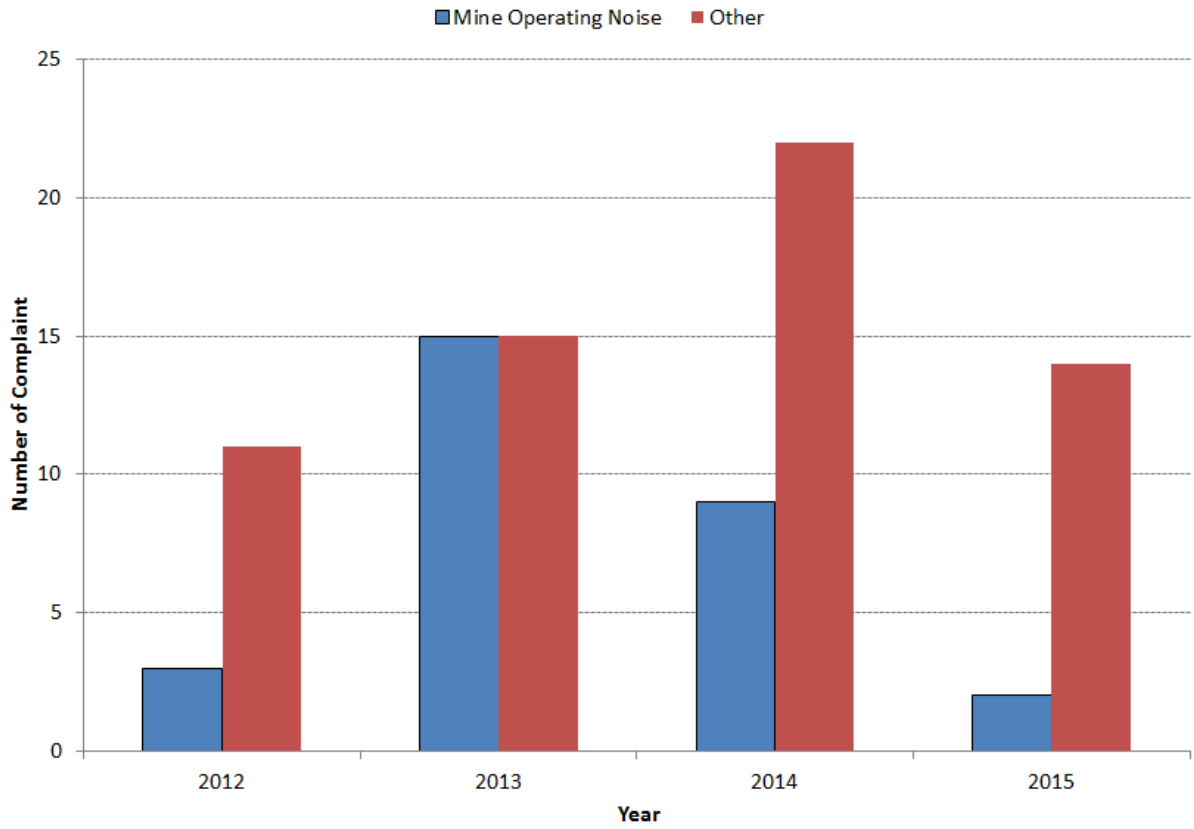
### 2.5.4 Real-time Continuous Noise Monitoring

Real-time noise monitoring is used as a noise management tool (not for compliance purposes). An Exceedance Protocol has been implemented for ongoing performance assessment and to assist in the implementation of pre-emptive management actions to avoid potential non-compliances. The real-time noise monitoring data is reviewed daily in accordance with the Exceedance Protocol presented in Section 5 of the NMP.

## 2.6 Noise Complaints Summary

WCPL maintains a complaints register in accordance with the requirements of the Development Consent (DA 305-7-2003). The IEA Report (Hansen Bailey, 2015) indicates that community concerns are well managed and recorded within the Wambo Complaints Register, which is available on the Wambo website. The IEA Report reported that 75 community complaints have been received by Wambo in the audit period, comprising 14 in 2012, 30 in 2013 and 31 in 2014. During the audit period, the majority of complaints from the community received were in relation to noise and blasting impacts. The number of complaints received during 2015 reduced to 16, with only 2 relating to mine operating noise (WCPL, 2015). A summary of the complaint records from 2012 to 2015 are presented in **Figure 1**.

**Figure 1 Community Complaints Register Summary 2012 to 2015**




*Source: WCPL (2015) and Hansen Bailey (2015)*

All complaints received by WCPL relating to noise were responded to in accordance with the Community Complaints Response procedure, presented in Section 6 of the NMP. Following each noise related complaint the source and noise levels were determined or verified. In some instances, mining operations were altered in response to a complaint lodged with WCPL during adverse weather conditions. However, there were no reportable environmental incidents (ie reportable non-compliances) relating to noise in the audit period.

# 3 PROPOSED MODIFICATION

## 3.1 South Wambo Underground Mine Operations

The modified Wambo General Arrangement Plan is shown in **Appendix C1**. The Modification would involve changes to the approved layout of the South Wambo (Arrowfield Seam) Underground Mine and mining of the Woodlands Hill Seam rather than the Bowfield Seam.

### 3.1.1 Mine Access and Development Works

Access to the South Wambo Underground Mine would be via the approved CHPP portal box cut and adits (for coal and personnel and materials access) (refer **Appendices C1 and C2**). Construction of the box cut will commence in June 2016 and construction of the adits would commence in December 2016.

### 3.1.2 Longwall Mining Operations

Longwall mining would commence in the South Wambo Underground Mine in 2019 and is anticipated to conclude in 2032 if mined at the maximum proposed underground mining rate. ROM coal would be conveyed to the stockpile area before it would be delivered by haul truck to the CHPP for processing.

Production from the South Wambo Underground Mine would be at a rate of up to 9.75 Mtpa, a proposed increase of the approved underground mining rate of 7.5 Mtpa.

The Modification would involve an extension of the existing mine life by approximately 7 years.

### 3.1.3 Underground Equipment and Mobile Fleet

Components of the existing South Bates Underground Mine and North Wambo Underground Mine equipment and mobile fleet would be used for the Modification.

### 3.1.4 Ventilation System

The Modification would require construction and operation of five ventilation shafts to support the operation of the South Wambo Underground Mine (ie an additional four ventilation shafts compared to the approved South Wambo Underground Mine). There would be one ventilation shaft to the south in Area 3, three ventilation shafts in Area 2 and one ventilation shaft adjacent to the CHPP portal box cut on the eastern side of Area 1 (refer **Appendix C2**).

These ventilation shafts would be staged with the progression of mining and may be used as upcast shafts (including installation of fans) or downcast shafts, depending on the location of mining.

### 3.1.5 Mine Safety Gas Management

#### Gas Drainage

Pre-mining gas drainage, goaf gas drainage and underground in-seam gas drainage would be required for the South Wambo Underground Mine to reduce the gas content in the coal seams to levels suiTable for longwall operations.

Up to four gas drainage boreholes per longwall would be required, consistent with the approved South Wambo Underground Mine. These would generally consist of two pre-drainage and two goaf gas drainage boreholes. Although there would be no change to the number of gas drainage boreholes required per longwall panel, the Modification would result in an increase in the total number of gas drainage boreholes overall due to the increased number of longwall panels.

Gas drainage boreholes and associated infrastructure would be progressively constructed, operated and decommissioned such that a total of six would be established and approximately four operational at any one time.

#### Gas Plants

Up to two centralised gas plants would be required for the Modification to flare gas collected through pre-drainage and goaf gas drainage activities. Each gas plant would consist of an approximate 50 metre (m) by 30 m fully fenced area with flares, pumps, nitrogen tanks and monitoring, water collection and surface pipes. Only one gas plant would be operational at any time.

### 3.1.6 Other Approved Underground Operations

The Modification does not include any alteration to the layout and/or operation of the approved North Wambo Underground Mine or South Bates Underground Mine.

## 3.2 Open Cut Operations

The Modification would not alter the approved open cut mining methods, open cut extent, open cut maximum ROM coal production rates, open cut mine fleet or waste rock management practices. The Modification would include an extension of open cut mining operations by approximately 3 years (ie up to and including 2020) with no change to the currently approved mine fleet.

## 3.3 Coal Handling, Preparation and Product Coal Rail Transport

ROM coal from the South Wambo Underground Mine would be conveyed to the stockpile area before it would be delivered by haul truck to the CHPP for processing. ROM coal may also be transported by overland conveyor directly from the South Wambo Underground Mine to the CHPP should financial circumstances permit. This would replace truck haulage.

The Modification would not alter the CHPP or product coal rail transport operations as there would be no increase in the maximum ROM coal production rate. The Modification would extend these operations by 7 years to 2032.

## 3.4 Infrastructure and Services

The Modification would include additional surface infrastructure and associated works, comprising:

- Construction of the South Wambo Underground Mine infrastructure area (refer **Appendix C2**);
- Construction of an additional access road to facilitate access to the South Wambo Underground Mine infrastructure area (refer **Appendix C2**); and
- Other minor infrastructure.

## 3.5 Construction and Development Works

Construction and development activities required to support the Modification, including modifications to the existing surface infrastructure layout (refer **Appendix C2**), would occur progressively in parallel with ongoing mining operations, including:

- Approved CHPP portal box cut;
- South Wambo Underground Mine infrastructure area;
- Ventilation shafts and ancillary infrastructure;
- Gas management infrastructure; and
- Additional access road.

Additional mobile equipment would be required for short periods during the Modification construction and development activities. The number and type of equipment would be expected to vary depending on the activity being undertaken.

Construction of surface infrastructure would be generally undertaken during daylight hours. Drilling of the shafts would occur 24 hours per day, seven days per week, while the remainder of construction activities associated with the ventilation shafts (eg installation of surface infrastructure) would be generally limited to daytime hours.

## 3.6 Approved and Proposed Hours of Operation

There would be no change in the approved operating hours of Wambo due to the Modification as presented in **Table 3**.

**Table 3 Approved Wambo Coal Mine and Modification Hours of Operation**

| Activity | Description | Currently Approved[1] | Modification |
|---|---|---|---|
| On-Site | Surface infrastructure construction works | Generally daytime[2] (0700 hours to 1800 hours, 7 days per week) | Unchanged |
| | Underground development works | 24 hours, 7 days per week | Unchanged |
| | Underground and open cut operations, coal handling, preparation and stockpiling | 24 hours, 7 days per week | Unchanged |
| Off-Site | Rail Traffic | 24 hours, 7 days per week | Unchanged |
| | Road Traffic | 24 hours, 7 days per week | Unchanged |

Note 1: As per Wambo Development Consent DA 305-7-2003 (as modified) (refer **Appendix A1**).
Note 2: Except construction campaigns for each of the ventilation shafts being 24 hours per day, seven days per week.

### 3.7 Workforce

The Modification would not result in any additional demand for employees and contractors. The existing Wambo workforce currently comprises:

- Approximately 230 underground mine personnel;
- Approximately 290 open cut mine personnel; and
- Approximately 150 CHPP, management, administration and support personnel.

The Modification involves continuation of the open cut workforce to approximately 2020. The total Wambo workforce would fluctuate with the completion of open cut mining and any increase in production in the underground operations, however is not anticipated to exceed the existing Wambo workforce.

## 4 REVIEW OF POTENTIAL NOISE IMPACTS

### 4.1 Operational Noise

Potential noise impacts of the Modification would be associated with the following:

- Changes to the South Wambo Underground Mine ROM coal handling activities; and
- Operation of five ventilation shafts to support the operation of the South Wambo Underground Mine.

The Modification would not alter the open cut mining, other underground, CHPP, or product coal rail transport operations and therefore no significant change to existing/approved noise emissions/impacts from these operations are expected as a result of the Modification. The potential noise impacts described above are discussed below.

#### 4.1.1 ROM Coal Handling Activities

ROM coal from the South Wambo Underground Mine is approved to be conveyed to the ROM coal stockpile or directly to the CHPP for processing.

For the Modification, ROM coal from the South Wambo Underground Mine would be conveyed to the stockpile area before it would be delivered by haul truck to the CHPP for processing. A summary of the modified South Wambo Underground Mine ROM coal handling activities is provided in **Table 4** together with the associated sound power levels (SWLs).

**Table 4 Modification ROM Coal Handling Activities' SWLs (dBA[1] re 1ρW[2])**

| Component | Type | Number of Items | SWL per Item |
|---|---|---|---|
| **Pit Conveyor** | | | |
| Conveyor | 4,000 tph[3] | 1 (114 m) | 112 dBA per 100 m |
| Drive | 200 kW[4] | 1 | 98 dBA per item |
| **Ramp Conveyor** | | | |
| Conveyor | 4,000 tph | 1 (733 m) | 112 dBA per 100 m |
| Drive | 600 kW | 3 | 103 dBA per item |
| **Loading and Haulage** | | | |
| Front-end Loader | CAT 992 | 1 | 121 dBA per item |
| Haul Truck | CAT 789 | 4 | 123 dBA per item |

Note 1: dBA = A-weighted decibels.
Note 2: ρW = picowatt.
Note 3: tph = tonnes per hour.
Note 4: kW = kilowatt.

ROM coal may also be transported by overland conveyor directly from the South Wambo Underground Mine to the CHPP should financial circumstances permit. The transport of ROM coal by overland conveyor directly from the South Wambo Underground Mine to the CHPP would reduce noise emissions and is therefore expected to result in reduced noise impacts compared to truck haulage.

It is noted that ROM coal from the North Wambo Underground Mine is currently transported via internal haul roads to the CHPP. This ROM coal handling method will continue for the South Bates Underground Mine.

### 4.1.2 Ventilation Shafts

The Modification would require construction and operation of five ventilation shafts to support the operation of the South Wambo Underground Mine (i.e. an additional four ventilation shafts compared to the approved South Wambo Underground Mine). There would be one ventilation shaft to the south in Area 3, three ventilation shafts in Area 2 and one ventilation shaft adjacent to the CHPP portal box cut on the eastern side of Area 1 (refer **Appendix C1**).

These ventilation shafts would be staged with the progression of mining and may be used as upcast shafts (including installation of fans) or downcast shafts, depending on the location of mining. A summary of the modified South Wambo Underground Mine ventilation shafts is provided in **Table 5** together with the indicative noise mitigation requirements.

**Table 5 Modification Ventilation System Indicative Noise Mitigated SWLs (dBA re 1ρW)**

| Year | Ventilation Fan | | | | | |
|---|---|---|---|---|---|---|
| | **Shaft No.** | **Mitigation** | **SWL** | **Bleeder No.** | **Mitigation[1]** | **SWL** |
| 2019 | 1 | High performance silencer[1] plus optimised outlet/louver orientation[2] | 105 | n/a | - | - |
| 2023 | 2 | | 105 | 1 | Optimised outlet louver orientation[2] | 125 |
| 2028 | 3 | | 105 | 2 | High performance silencer[1] plus optimised outlet/louver orientation[2] | 105 |

Note 1: Customised high performance silencer to achieve an overall SWL of 105 dBA at maximum fan operating duty.
Note 2: Optimised outlet/louver orientation to achieve at least 8 dBA noise attenuation at the nearest private receivers.

As shown in **Table 5**, the ventilation system would include noise attenuation to minimise noise emissions. The noise mitigation measures would include customised high performance silencers together with optimised outlet/louver orientation away from the nearest privately owned receivers to achieve compliance with relevant noise criteria at nearby privately owned receivers.

The Wambo Development Project NIA included one ventilation shaft (with a mitigated SWL of 107 dBA) for the South Wambo Underground Mine.

### 4.1.3 Wambo Sound Power Level Review

The potential for machinery to emit noise is quantified as the SWL expressed in dBA re 1 picowatt. At the receiver, the received noise is quantified as the sound pressure level (SPL) expressed in dBA re 20 µPa. The INP's energy equivalent ($L_{Aeq}$) assessment parameter has introduced greater mathematical rigour to the prediction of received noise levels as it enables the use of $L_{Aeq}$ SWL as noise model inputs. In general terms, any variation in mine site $L_{Aeq}$ SWL would produce a similar variation in the intrusive ($L_{Aeq(15minute)}$) SPL at the receiver.

**Appendix D** presents the individual item SWLs for the open cut, underground mining, CHPP and rail loading operations.

The SWL for the modified Wambo operations (including the open cut, South Wambo Underground Mine, CHPP and rail loading operations) has been estimated for three indicative years during the modified mine life (ie 2019, 2023 and 2028) and these are summarised in **Table 6**.

**Table 6** also includes the SWL for the existing (2016) Wambo operations and the Wambo operations assessed in the Wambo Development Project NIA.

**Table 6 Comparative Numbers of Mobile Equipment and Fixed Plant and Total SWLs (dBA re 1ρW)**

| Wambo | NIA Operation[1] | | | Existing (2016) Operation | | | Existing Wambo (2016) plus Modification (2019) | | | Existing Wambo (2016) plus Modification (2023) | | | Existing Wambo (2016) plus Modification (2028) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | No. Mobile | No. Fixed | SWL Total | No. Mobile | No. Fixed | SWL Total | No. Mobile | No. Fixed | SWL Total | No. Mobile | No. Fixed | SWL Total | No. Mobile | No. Fixed | SWL Total |
| **Open Cut Operations** | | | | | | | | | | | | | | | |
| Daytime/Evening /Night-time | 48 | - | **139** | 58 | - | **139** | 57 | - | **138** | - | - | - | - | - | - |
| Relative Difference to NIA Operation[1] | - | - | - | +10 | - | - | +9 | - | -1 | -48 | - | -139 | -48 | - | -139 |
| **Underground Mining, CHPP and Rail Loading System Operations** | | | | | | | | | | | | | | | |
| Daytime/Evening /Night-time | 11 | 18 | **131** | 10 | 15 | **133** | 10 | 18 | **132** | 12 | 19 | **133** | 12 | 19 | **133** |
| Relative Difference to NIA Operation[1] | - | - | - | -1 | -3 | +2 | -1 | - | +1 | +1 | +1 | +2 | +1 | +1 | +2 |
| **Overall Wambo Operations** | | | | | | | | | | | | | | | |
| Daytime/Evening /Night-time | 59 | 18 | **139** | 68 | 15 | **140** | 67 | 18 | **139** | 12 | 19 | **133** | 12 | 19 | **133** |
| Relative Difference to NIA Operation[1] | - | - | - | +9 | -3 | +1 | +8 | - | - | -47 | +1 | -6 | -47 | +1 | -6 |

Note 1: NIA (Richard Heggie Associates, 2003) operation based on unattenuated mobile plant plus attenuated fixed plant.

### 4.1.4 Intrusive and Amenity Noise Levels

The estimated total SWLs for the modified overall Wambo operations for the three scenarios (ie 139 dBA, 133 dBA and 133 dBA) would be lower than the SWL for the existing (2016) Wambo operations (ie 140 dBA). The SWL for the modified Wambo 2019 scenario would be marginally (<1 dBA) higher than the SWL of the Wambo operations assessed in the Wambo Development Project NIA. For the 2023 and 2028 scenarios, the SWL for the modified Wambo would be significantly lower than the SWL of the Wambo operations assessed in the Wambo Development Project NIA.

In view of the foregoing marginal SWL variations arising from the Modification, together with the extent of the existing off-site environmental noise compliance (refer **Section 2.5.2**), it is reasonable to conclude that the Modification would have minimal potential to alter the existing intrusive ($L_{Aeq(15minute)}$) and amenity ($L_{Aeq(period)}$) noise levels at the nearest privately owned receivers in the vicinity of Wambo.

Notwithstanding the above, commencing in 2028 the additional ventilation systems (ie Fan Shaft 3 and Bleeder 2) are located toward the southern extent of the WCPL-owned lands, remote from the majority of other Wambo operations (refer **Appendix C1**) and in the vicinity of privately owned receivers. Therefore, the potential noise impacts of this ventilation system should be considered in more detail.

The daytime, evening and night-time intrusive noise levels ($L_{Aeq(15minute)}$) due to the operation of Fan Shaft 3 and Bleeder 2 at the surrounding privately owned receivers have been predicted using the Wambo Development Project NIA noise model that was prepared in accordance with the EPA's INP. The daytime, evening and night-time intrusive noise levels have been predicted under the relevant calm and adverse meteorological conditions identified in the Wambo Development Project NIA (in accordance with the INP) and are presented in **Table 7**. In addition, the night-time ($L_{Aeq(9hour)}$) amenity noise levels are also presented in **Table 7**, based on subtracting 3 dBA from the predicted intrusive noise levels taking into account variations in the noise over a 9 hour period largely due to weather conditions.

**Table 7 Predicted Modification 2028 Ventilation System Intrusive and Amenity Noise Levels (dBA re 20 μPa)**

| Locality | Development Consent (DA 305-7-2003)/EIS Identifier[1] | Intrusive ($L_{Aeq(15minute)}$) Noise Levels | | | Amenity ($L_{Aeq(9hour)}$) Noise Level |
|---|---|---|---|---|---|
| | | Daytime[2] Fan Shaft 3 plus Bleeder 2 | Evening[3] Fan Shaft 3 plus Bleeder 2 | Night-time[4] Fan Shaft 3 plus Bleeder 2 | |
| Wambo | 25 - Fenwick | <10 | 13 | 12 | <10 |
| | 35a - Brosi | <10 | <10 | <10 | <10 |
| | 35b - Brosi | <10 | 10 | <10 | <10 |
| Bulga | 3 - Birrell | 16 | 15 | 24 | 21 |
| | 6 - Merrick | 19 | 11 | 27 | 24 |
| | 7 - Maizey | 18 | 14 | 29 | 26 |
| | 91 - Bailey | 23 | 17 | 30 | 27 |
| | 246 - Bailey | <10 | <10 | 21 | 18 |
| | 226 - Paka Investments | <10 | <10 | <10 | <10 |
| | 231 - Hearse | <10 | <10 | <10 | <10 |

Note 1: Refer **Appendix A** and **Appendix B**. EIS refers to the Wambo Development Project EIS (WCPL, 2003).

Note 2: Wambo Development Project NIA meteorological conditions - daytime calm.

Note 3: Wambo Development Project NIA meteorological conditions - evening 3 meters per second (m/s) southeast wind.

Note 4: Wambo Development Project NIA meteorological conditions - night-time 3 degrees Celsius ($^{o}$C) per 100 m plus 2 m/s westerly wind.

As shown in **Table 7**, the predicted intrusive noise levels at the nearest privately owned receivers are relatively low and equal to or less than 30 dBA. Similarly, the night-time amenity noise levels at the nearest privately owned receivers are estimated to be relatively low and equal to or less than 27 dBA.

### 4.1.5 Cumulative Mine Operating Noise Levels

The Wambo Development Project NIA included a comprehensive cumulative noise impact assessment of the nearby existing, approved and proposed coal mines including the Warkworth, United, Hunter Valley and Carrington Coal mines. Subsequent to the Wambo Development Project NIA, there have been several significant project approvals (and associated supporting documents) in the vicinity of Wambo, including the Hunter Valley Operations South Coal Project Environmental Assessment (Environmental Resources Management 2008), the Bulga Coal Complex Optimisation Project Environmental Impact Statement (Umwelt 2013), the Mount Thorley Operations Environmental Impact Statement (EMGA Mitchell McLennan [EMM] 2014a) and the Warkworth Continuation 2014 Environmental Impact Statement (EMM 2014b).

More recent amendments to the Wambo Development Consent DA 305-7-2003 (as modified) (refer **Appendix A1**) Schedule 4, Noise, Operating Conditions 8(f) and Noise Management Plan 9(e), specify requirements in relation to minimising the potential cumulative noise impacts from these nearby mines (including Hunter Valley Operations South, Hunter Valley Operations North and Mt Thorley Warkworth mines).

Given the Modification would have minimal potential to alter the existing amenity ($L_{Aeq(period)}$) noise levels ($L_{Aeq(15minute)}$) at the nearest privately owned receivers in the vicinity of Wambo, it is expected that the Modification would not alter existing cumulative noise impacts at the nearest residential receiver areas as presented in Warkworth Continuation Noise and Vibration Study (refer to Table 11.1 Cumulative Noise at Properties) (EMM, 2014c).

Notwithstanding the above and as discussed in **Section 4.1.4**, commencing in 2028 the additional ventilation systems (ie Fan Shaft 3 and Bleeder 2) are located toward the southern extent of the WCPL-owned lands remote from the majority of other Wambo operations (**Appendix C1**) in the vicinity of privately owned receivers and therefore the potential noise impacts of this ventilation system should be considered in more detail.

As presented in **Table 7**, the night-time amenity ($L_{Aeq(9hour)}$) noise levels due to the operation of Fan Shaft 3 and Bleeder 2 at the nearest potentially affected privately owned receivers in Bulga, in particular 6 - Merrick, 7 - Maizey and 91 - Bailey, range between 24 dBA to 27 dBA under adverse weather conditions. The Warkworth Continuation Noise and Vibration Study (Table 11.1) (EMM, 2014c) indicates that night-time cumulative noise amenity levels (in the absence of the Modification), range between 34 dBA to 40 dBA at the nearest potentially affected privately owned receivers in Bulga, in particular 3 - Birrell, 6 - Merrick and 7 - Maizey. It is anticipated that the noise amenity levels from the Modification (ie Fan Shaft 3 and Bleeder 2) would be approximately 10 dBA below the cumulative night-time noise amenity levels presented in the Warkworth Continuation Noise and Vibration Study (EMM, 2014c) and therefore it is expected that the Modification would not alter existing cumulative noise impacts and the noise levels are at the receivers in Bulga are likely to remain acceptable.

## 4.2 Construction Noise

Construction and development activities required to support the Modification, including modifications to the existing surface infrastructure layout (refer **Appendices C1 and C2**), would occur progressively in parallel with ongoing mining operations, including:

- Approved CHPP portal box cut;
- South Wambo Underground Mine infrastructure area;
- Ventilation shafts and ancillary infrastructure;

- Gas management infrastructure; and
- Additional access road.

All construction activities would be conducted inside existing Wambo Mining Leases.

Additional mobile equipment would be required for short periods during the Modification construction and development activities. The number and type of equipment would be expected to vary depending on the activity being undertaken.

All construction activities would be generally undertaken during daylight hours with the exception of the drilling of the ventilation shafts. Drilling of the ventilation shafts would occur 24 hours per day, seven days per week.

It is expected that the shafts would be constructed using the 'blind bore' method. Using this method, the drilling would take place in advance of development workings, with material from the excavation being removed from the top of the shaft. The construction campaigns for each of the ventilation shafts would be limited to a period of approximately 12 weeks.

Noise levels during construction of the ventilation shaft would be managed through the implementation of a number of noise mitigation and management measures, including:

- Implementation of noise mitigation measures (eg enclosing the drilling activities in a temporary acoustic shed and/or erection of temporary noise barriers) in consultation with landowners at relevant receiver locations and/or enter into agreements with landowners at relevant receiver locations;
- Require construction workers to undergo briefings in regard to operating equipment in ways that minimise noise; and
- Ensure that equipment is appropriately maintained and is turned off when not in use.

In addition, WCPL would consult with the landowners at relevant receiver locations prior to works commencing. This consultation would include notification of the works expected to occur, their duration and the noise management measures that would be implemented, as well as the provision of WCPL contact details.

Noise monitoring would be conducted during 24 hour per day construction activities. If the monitored noise levels are greater than anticipated following the above mitigation measures, construction activities would be further modified until the construction noise reduces to acceptable levels.

All construction and development works would occur within the existing Wambo Mining Leases, and while some of the works would involve short term activities, the application of the EPA's ICNG is not considered appropriate, and any construction related noise would be assessed concurrently with ongoing mining operations. Consequently, a full quantitative assessment of the construction activities in accordance with the EPA's ICNG is not considered necessary.

The majority of the construction activities associated with the Modification would be conducted during the daytime and the potential noise impacts associated with these activities would be minor compared to surrounding operations at Wambo. It is expected that the proposed noise mitigation measures would appropriately minimise any potential construction noise impacts associated with the drilling of the ventilation shafts.

### 4.3 Road Traffic Noise

A Road Transport Assessment (GTA Consultants, 2016) has been prepared for the Modification and it concluded that the Modification would result in the continued generation of vehicle trips to and from Wambo for an additional 7 years from 2025 to 2032 and that the traffic generated during the additional operating years would be expected to be similar to that currently generated.

Therefore, other than an extension of duration, any road traffic noise impacts remains generally unaltered by the Modification. Given the above, no specific road noise assessment in accordance with the EPA's RNP is considered necessary.

Wambo Development Consent DA 305-7-2003 (as modified) (refer **Appendix A1**) Schedule 4, Condition 8(a) (Operating Conditions) sets out requirements in relation to minimising the traffic noise impacts in the vicinity of Wambo. In accordance with the consent conditions, the NMP, Section 3.2 (Operational Control Measures) includes staff inductions, driver behaviour standards and quiet work procedures specifically in relation to the minimising potential traffic noise impacts.

### 4.4 Rail Traffic Noise

As discussed in **Section 3.3**, the Modification would not alter the CHPP or product coal rail transport operations as there would be no increase in the maximum ROM coal production rate. The Modification would extend these operations by 7 years to 2032. So other than an extension of duration, any rail traffic noise impacts remains generally unaltered by the Modification. Given the above, no assessment in accordance with the EPA's RING is considered necessary for the Modification.

Wambo Development Consent DA 177-8-2004 (as modified) (refer **Appendix A2**) Schedule 4, Condition 6 (Rail Noise) and Condition 7 (Noise Monitoring), sets out requirements in relation to minimising the rail noise impacts in the vicinity of Wambo. In accordance with the consent conditions, the NMP, Section 3.2.1 (Rail Noise) and Section 5.1 (Noise Monitoring Network) include approved rail noise monitoring and management procedures. These rail noise monitoring and management procedures would continue to be implemented for the Modification.

## 5 SUMMARY OF FINDINGS

This noise review focuses on the proposed rearrangement of South Wambo Underground Mine when compared to the approved and operating Wambo Coal Mine. The proposed Modification would involve changes to the approved layout of the South Wambo (Arrowfield Seam) Underground Mine and mining of the Woodlands Hill Seam rather than the Bowfield Seam.

Longwall mining would commence in the South Wambo Underground Mine in 2019 and is anticipated to conclude in 2032 if mined at the maximum proposed underground mining rate. ROM coal would be conveyed to the stockpile area before it would be delivered by haul truck to the CHPP for processing. The Modification would involve an extension of the existing mine life by approximately 7 years.

Construction and development activities required to support the Modification, including modifications to the existing surface infrastructure layout (refer **Appendices C1 and C2**), would occur progressively in parallel with ongoing mining operations. The majority of the construction activities would be conducted during the daytime and the potential noise impacts associated with these activities would be minor compared to surrounding operations at Wambo. It is expected that the proposed noise mitigation measures would appropriately minimise any potential construction noise impacts associated with the short term drilling campaigns of the ventilation shafts 24 hours per day, seven days per week.

The need for ventilation system noise mitigation was identified in the Wambo Development Project NIA, which included one ventilation shaft for the South Wambo Underground Mine. The Modification would require construction and operation of five ventilation shafts to support the operation of the South Wambo Underground Mine (ie an additional four ventilation shafts compared to the approved South Wambo Underground Mine) (refer **Appendix C1**) and include noise attenuation to minimise noise emissions. The Modification ventilation system noise mitigation measures would include customised high performance silencers together with optimised outlet louver orientation away from the nearest private receivers (refer **Table 5**) where appropriate.

The sound power levels (inclusive of the above ventilation system noise mitigation measures) for the modified Wambo operations has been estimated for three indicative years during the modified mine life (ie 2019, 2023 and 2028) and these are summarised in **Table 6** together with the SWLs for the existing (2016) Wambo operations and those assessed in the Wambo Development Project NIA. Based on only marginal SWL variations arising from the Modification, together with the extent of the existing off-site environmental noise compliance (refer **Section 2.5.2**), it is reasonable to conclude that the Modification would have minimal potential to alter the existing intrusive noise levels ($L_{Aeq(15minute)}$) at the nearest privately owned receivers in the vicinity of Wambo.

Given the Modification would have minimal potential to alter the existing intrusive noise levels ($L_{Aeq(15minute)}$) at the nearest privately owned receivers in the vicinity of Wambo, it is expected that the Modification would not alter existing cumulative noise impacts at the nearest residential receiver areas. It is anticipated that the noise amenity levels from the Modification would be approximately 10 dBA below the cumulative night-time noise amenity levels presented in the Warkworth Continuation Noise and Vibration Study (EMM, 2014c) and therefore it is expected that the Modification would not significantly alter existing cumulative noise impacts and the noise levels are at the receivers in Bulga are likely to remain acceptable.

Similarly, other than an extension of duration, any road and rail traffic noise impacts remains generally unaltered by the Modification.

Notwithstanding the above outcomes of this noise review, it recommended that WCPL update the NMP to include a requirement for a ventilation system acoustical design review prior to the construction of the ventilation system (Fan Shaft 3 and Bleeder 2 only).

# 6 REFERENCES

Department of Environment, Climate Change and Water, 2011, *NSW Road Noise Policy.*

EMGA Mitchell McLennan, 2014a, *Mount Thorley Operations Environmental Impact Statement*.

EMGA Mitchell McLennan, 2014b, *Warkworth Continuation 2014 Environmental Impact Statement.*

EMGA Mitchell McLennan, 2014c, *Warkworth Continuation Noise and Vibration Study.*

Environment Protection Authority, 2000, *NSW Industrial Noise Policy.*

Environment Protection Authority, 2009, *Interim Construction Noise Guideline*.

Environment Protection Authority, 2013, *Rail Infrastructure Noise Guideline.*

Environmental Resources Management, 2008, *Hunter Valley Operations South Coal Project Environmental Assessment.*

Global Acoustics, 2015a, *Wambo Coal Mine and Rail Spur - Environmental Noise Monitoring Report Quarter 1 2015.*

Global Acoustics, 2015b, *Wambo Coal Mine and Rail Spur - Environmental Noise Monitoring Report Quarter 2 2015.*

Global Acoustics, 2015c, *Wambo Coal Mine and Rail Spur - Environmental Noise Monitoring Report July 2015.*

Global Acoustics, 2015d, *Wambo Coal Mine and Rail Spur - Environmental Noise Monitoring Report August 2015.*

GTA Consultants, 2016, *South Wambo Underground Mine Modification - Road Transport Assessment.*

Hansen Bailey, 2015, *Wambo Coal Mine & Rail Loop - Independent Environmental Audit Report*.

New South Wales Government, 2014, *Voluntary Land Acquisition and Mitigation Policy: For State Significant Mining, Petroleum and Extractive Industry Developments.*

Richard Heggie Associates, 2003, *Wambo Development Project Construction, Operating and Transportation Noise and Blasting Impact Assessment*.

Umwelt, 2013, *Bulga Coal Complex Optimisation Project Environmental Impact Statement.*

Wambo Coal Pty Limited, 2003, *Wambo Development Project Environmental Impact Statement*.

Wambo Coal Pty Limited, 2014, *Annual Environmental Monitoring Report 2013*.

Wambo Coal Pty Limited, 2015, *Annual Environmental Monitoring Report 2014*.

## SCHEDULE 4
## SPECIFIC ENVIRONMENTAL CONDITIONS

### ACQUISITION UPON REQUEST

1. Upon receiving a written request for acquisition from the landowner of the land listed in Table 1, the Applicant shall acquire the land in accordance with the procedures in conditions 9-11 of schedule 5:

*Table 1: Land subject to acquisition upon request*

| | |
|---|---|
| 2 – Lambkin | 23A & B - Kannar |
| 13C - Skinner | 31A,B,C & D - Fisher |
| 19A & B – Kelly | 51 – Hawkes |
| 22 – Henderson | 56 - Haynes |

*Note: For more information on the numbering and identification of properties used in this consent, see Attachment 1 of the EIS for the Wambo Development Project.*

### [1]NOISE

#### Noise Impact Assessment Criteria

6. The Applicant shall ensure that the noise generated by the Wambo Mining Complex does not exceed the noise impact assessment criteria presented in Table 9.

*Table 9: Noise impact assessment criteria dB(A))*

| Day $L_{Aeq(15\ minute)}$ | Evening/Night $L_{Aeq(15\ minute)}$ | Night $L_{A1(1\ minute)}$ | Land Number |
|---|---|---|---|
| 35 | 41 | 50 | 94 – Curlewis |
| | | | 3 – Birrell |
| | | | 4B – Circosta |
| | | | 15B - McGowen/Caslick |
| 35 | 40 | 50 | 16 – Cooper |
| | | | 23C – Kannar |
| | | | 25 – Fenwick |
| | | | 28A & B – Garland |
| | | | 33 -Thelander/O'Neill |
| | | | 39 – Northcote |
| | | | 40 – Muller |
| | | | 254A – Algie |
| 35 | 39 | 50 | 5 – Strachan |
| | | | 6 - Merrick |
| | | | 7 - Maizey |
| | | | 37 - Lawry |
| | | | 48 - Ponder |
| 35 | 38 | 50 | 1 - Brosi |
| | | | 17 - Carter |
| | | | 18 - Denney |
| | | | 38 - Williams |
| | | | 49 - Oliver |
| | | | 63 - Abrocuff |
| | | | 75 - Barnes |
| | | | 91 - Bailey |

[1] Incorporates EPA GTAs

| Day $L_{Aeq(15\ minute)}$ | Evening/Night $L_{Aeq(15\ minute)}$ | Night $L_{A1(1\ minute)}$ | Land Number |
|---|---|---|---|
| 35 | 37 | 50 | 27 - Birralee |
| | | | 43 - Carmody |
| | | | 137 - Woodruff |
| | | | 163 - Rodger/Williams |
| | | | 246 - Bailey |
| 35 | 36 | 50 | 13B - Skinner |
| | | | 178 - Smith |
| | | | 188 - Fuller |
| | | | 262A, B & C - Moses |
| 35 | 35 | 50 | All other residential or sensitive receptors, excluding the receptors listed in condition 1 above |

*Notes:*

- *Noise generated by the Wambo Mining Complex is to be measured in accordance with the relevant requirements, and exemptions (including certain meteorological conditions), of the NSW Industrial Noise Policy*

**Land Acquisition Criteria**

7. If the noise generated by the Wambo Mining Complex exceeds the criteria in Table 10, the Applicant shall, upon receiving a written request for acquisition from the landowner, acquire the land in accordance with the procedures in conditions 9-11 of schedule 5.

*Table 10: Land acquisition criteria dB(A)*

| Day/Evening/Night $L_{Aeq(15\ minute)}$ | Property |
|---|---|
| 43 | 94 - Curlewis |
| | 23C – Kannar |
| | 254A - Algie |
| 40 | All other residential or sensitive receptor, excluding the receptors listed in condition 1 above |

*Note: Noise generated by the Wambo Mining Complex is to be measured in accordance with the notes presented below Table 9 above.*

**Operating Conditions**

8. The Applicant shall:
   (a) implement best management practice to minimise the operational, low frequency and traffic noise of the Wambo Mining Complex;
   (b) operate a comprehensive noise management system for the Wambo Mining Complex that uses a combination of predictive meteorological forecasting and real-time noise monitoring data to guide the day to day planning of mining operations and the implementation of both proactive and reactive noise mitigation measures to ensure compliance with the relevant conditions of this consent;
   (c) maintain the effectiveness of noise suppression equipment (if fitted) on plant at all times and ensure defective plant is not used operationally until fully repaired;
   (d) ensure that noise attenuated plant (if used) is deployed preferentially in locations relevant to sensitive receivers;
   (e) minimise the noise impacts of the Wambo Mining Complex during meteorological conditions when the noise limits in this consent do not apply;
   (f) co-ordinate the noise management for the Wambo Mining Complex with the noise management at nearby mines (including HVO South, HVO North and Mt Thorley Warkworth mines) to minimise the cumulative noise impacts of these mines and the Wambo Mining Complex,

   to the satisfaction of the Secretary.

**Noise Management Plan**

9. The Applicant shall prepare and implement a Noise Management Plan for the Wambo Mining Complex to the satisfaction of the Secretary. This plan must:
   (a) be prepared in consultation with the EPA, and submitted to the Secretary for approval by the end of June 2013;
   (b) describe the measures that would be implemented to ensure:
      - best management practice is being employed;
      - the noise impacts of the Wambo Mining Complex are minimised during meteorological conditions when the noise limits in this consent do not apply; and
      - compliance with the relevant conditions of this consent;
   (c) describe the proposed noise management system in detail;
   (d) include a monitoring program that:
      - uses a combination of real-time and supplementary attended monitoring measures to evaluate the performance of the Wambo Mining Complex;
      - adequately supports the proactive and reactive noise management system for the Wambo Mining Complex;
      - includes a protocol for determining exceedances of the relevant conditions in this consent;
      - evaluates and reports on the effectiveness of the noise management system for the Wambo Mining Complex;
      - provides for the annual validation of the noise model for the Wambo Mining Complex; and
   (e) include a protocol that has been prepared in consultation with the owners of nearby mines (including HVO South, HVO North and Mount Thorley Warkworth mines) to minimise the cumulative noise impacts of these mines and the Wambo Mining Complex.

**[2]METEOROLOGICAL MONITORING**

10. The Applicant shall establish a permanent meteorological station at a location approved by the EPA, and to the satisfaction of the Secretary, to monitor the parameters specified in Table 11, using the specified units of measure, averaging period, frequency, and sampling method in the table.

*Table 11: Meteorological monitoring*

| Parameter | Units of measure | Averaging period | Frequency | Sampling method[1] |
|---|---|---|---|---|
| *Lapse rate* | *°C/100m* | *1 hour* | Continuous | *Note[2]* |
| *Rainfall* | *mm/hr* | *1 hour* | Continuous | *AM-4* |
| *Sigma Theta @ 10 m* | *°* | *1 hour* | *Continuous* | *AM-2* |
| *Siting* | *-* | *-* | *-* | *AM-1* |
| *Temperature @ 10 m* | *K* | *1 hour* | *Continuous* | *AM-4* |
| *Temperature @ 2 m* | *K* | *1 hour* | *Continuous* | *AM-4* |
| *Total Solar Radiation @ 10m* | *W/m²* | *1 hour* | *Continuous* | *AM-4* |
| *Wind Direction @ 10 m* | *°* | *1 hour* | *Continuous* | *AM-2* |
| *Wind Speed @ 10 m* | *m/s* | *1 hour* | Continuous | *AM-2* |

*[1] NSW EPA, 2001, Approved Methods for the Sampling and Analysis of Air Pollutants in NSW.*
*[2]The Applicant shall calculate lapse rate from measurements made at 2m and 10m.*

[2] Incorporates EPA GTA

WAMBO RAIL LOOP DEVELOPMENT CONSENT DA 177-8-2004 (AS MODIFIED)

## SCHEDULE 4
## GENERAL ENVIRONMENTAL CONDITIONS

### ACQUISITION UPON REQUEST

1. Upon receiving a written request for acquisition from the landowner of the land listed in Table 1, the Applicant shall acquire the land in accordance with the procedures in conditions 1-3 of schedule 5.

*Table 1: Land subject to acquisition upon request*

| | |
|---|---|
| 19 - L Kelly | 55 – E & C Burley |

*Note: For more information on the numbering and identification of properties used in this consent, see Attachment 1A and Attachment 1B of the SEE for the Alterations to the Wambo Development Project – Rail and Train Loading Infrastructure.*

2. While the land listed in Table 1 is privately owned, the Applicant shall implement all practicable measures to ensure that the impacts of the development comply with the predictions in the SEE, and the relevant conditions in this consent, at any residence on this land, to the satisfaction of the Director-General.

### [1]NOISE

#### Noise Impact Assessment Criteria

3. The Applicant shall ensure that noise generated by the development, combined with noise generated by any development in the Wambo Mining Complex, does not exceed the noise criteria provided in Table 2, unless higher noise criteria are specified in the consent for the Wambo Coal Mine (DA 305-7-2003).

*Table 2: Noise impact assessment criteria dB(A)*

| *Day* $L_{Aeq(15\ minute)}$ | *Evening/Night* $L_{Aeq(15\ minute)}$ | *Night* $L_{A1(1\ minute)}$ | *Land Number* |
|---|---|---|---|
| *35* | *35* | *50* | *All private residential or sensitive receptors, excluding the receptors listed in Table 1* |

*Notes:*
- *Noise generated by the project is to be measured in accordance with the relevant requirements, and exemptions (including certain meteorological conditions), of the NSW Industrial Noise Policy.*
- *For this condition to apply, the exceedance of the criteria must be systemic.*

#### Construction Hours

4. The Applicant shall ensure that all construction work is carried out from 7 am to 6 pm Monday to Saturday (inclusive) and 8 am to 6 pm Sundays and Public Holidays.

#### Operating Hours

5. The Applicant shall:
   (a) take all practicable measures to minimise train movements at the development on Friday evening (6 pm-9 pm) and Sunday morning (9 am-12 am);
   (b) report on the implementation and effectiveness of these measures, to the satisfaction of the Director-General.

#### Rail Noise

6. The Applicant shall seek to ensure that its rail spur is only accessed by locomotives that are approved to operate on the NSW rail network in accordance with noise limits L6.1 to L6.4 in RailCorp's EPL (No. 12208) and ARTC's EPL (No. 3142) or a Pollution Control Approval issued under the former *Pollution Control Act 1970*.

#### Noise Monitoring

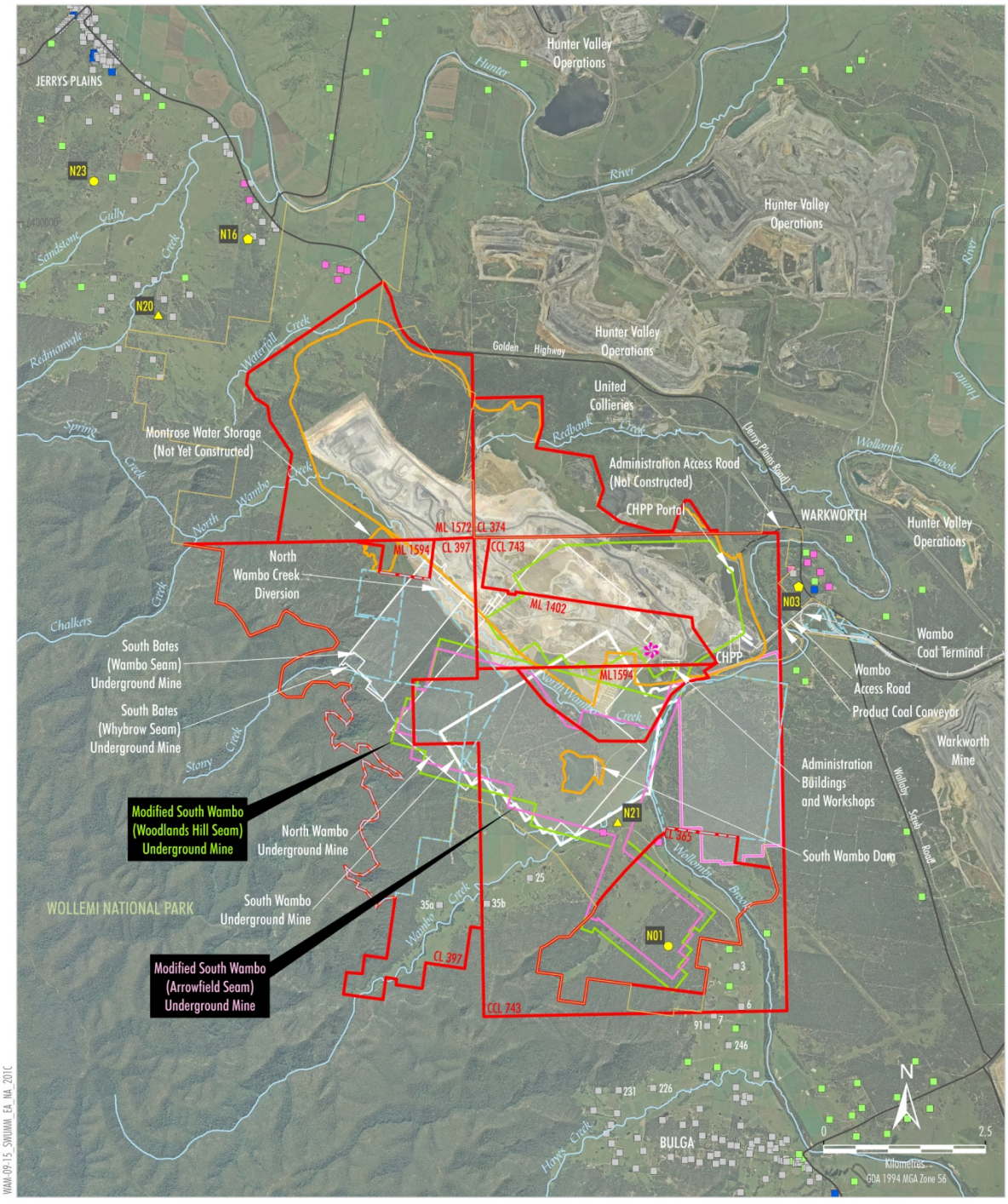
7. The Applicant shall monitor the noise generated by the development, and noise generated by the Wambo Mine, in general accordance with the Noise Management Plan for the Wambo Mining Complex and the *NSW Industrial Noise Policy*.

7A. By 31 May 2012, the Applicant shall review and update the Noise Management Plan for the Wambo Mining Complex, including a noise monitoring protocol for evaluating compliance with the criteria in condition 3 above.

7B. During the first 12 months of operation of the Rail Refuelling Facility, the Applicant must conduct attended noise monitoring at the nearest private receptor during refuelling events, no less often than every three months.

[1] Incorporates OEH GTA

NEAREST RESIDENTIAL RECEIVER AREAS AND NOISE MONITORING LOCATION PLAN




LEGEND

- Mining and Coal Lease Boundary
- WCPL Owned Land
- Existing/Approved Surface Development Area
- Approved Underground Development
- Modified South Wambo (Woodlands Hill Seam) Underground Mine
- Modified South Wambo (Arrowfield Seam) Underground Mine
- Remnant Woodland Enhancement Program (RWEP) Area

Monitoring Sites

- Meteorological Station
- Noise Monitoring Site (Attended)
- Noise Monitoring Site (Real-time)
- Noise Monitoring Site (Attended and Real-time)

Residence Status

- Wambo Owned
- Other Resource Company Owned
- Government Owned
- Private

Peabody ENERGY

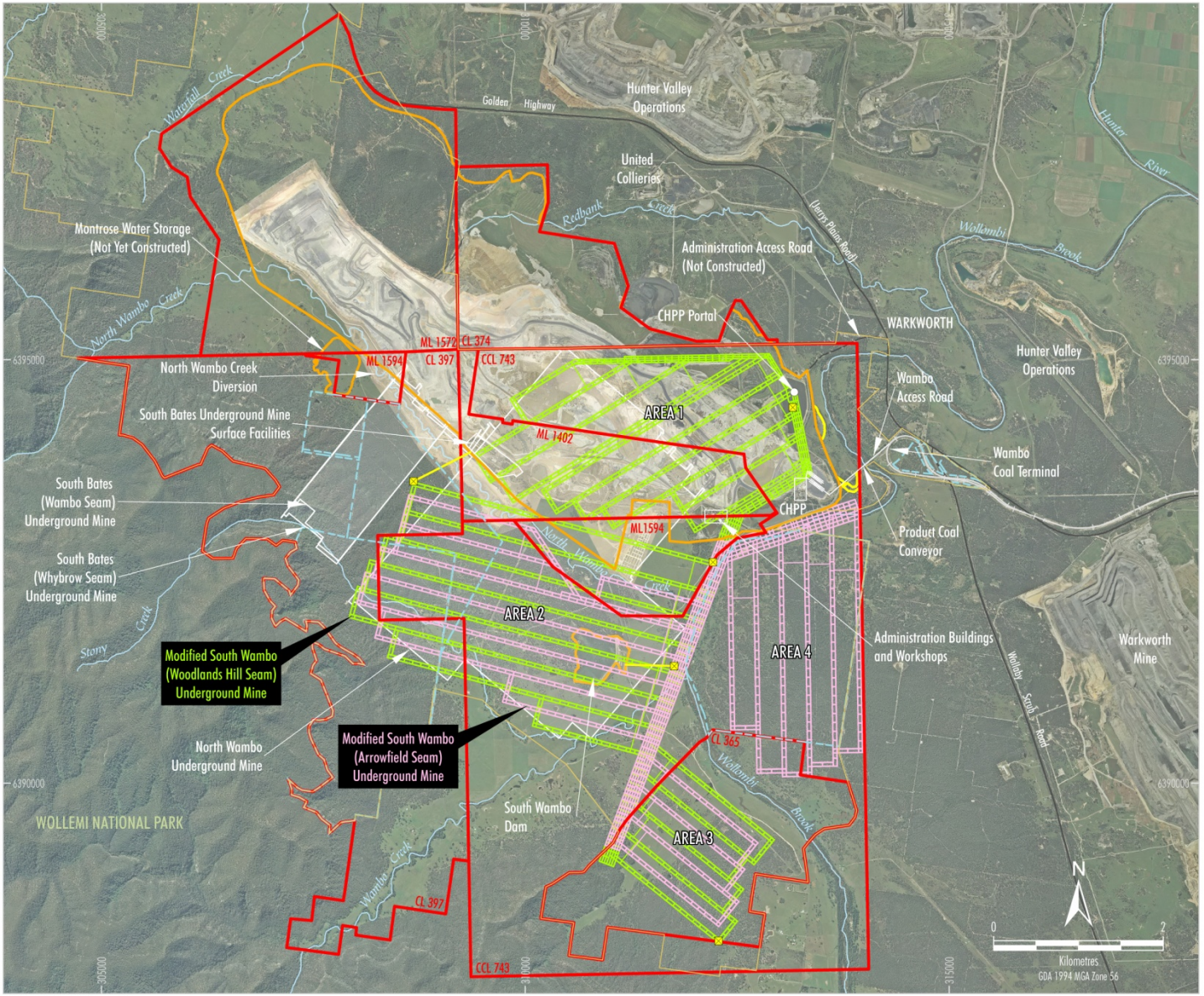
WAMBO COAL MINE

**Locations of Noise and Meteorological Monitoring Sites**

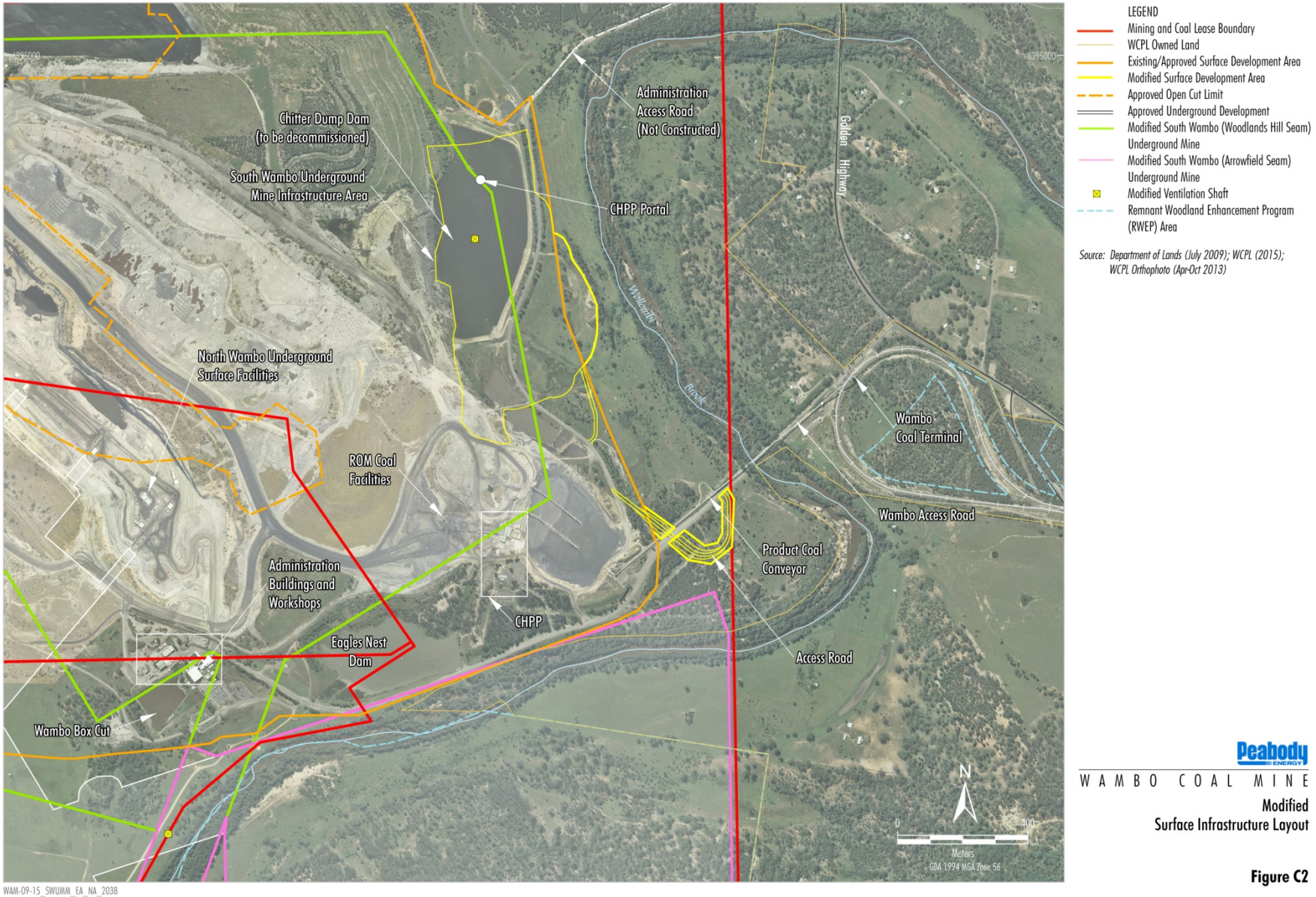
*Source: Department of Lands (July 2009); WCPL (2015); WCPL Orthophoto (Apr-Oct 2013)*

**Figure B1**

# MODIFIED WAMBO COAL MINE GENERAL ARRANGEMENT PLAN



MODIFIED WAMBO SURFACE INFRASTRUCTURE LAYOUT



COMPARITIVE NUMBERS OF MOBILE EQUIPMENT, FIXED PLANT AND TOTAL SOUND POWER LEVELS

| Description | Equipment | Type/ Capacity | EIS Operation | | | | Existing (2016) Operation | | | | Existing (2016) Operation + South Wambo Mod (2019) | | | | Existing (2016) Operation + South Wambo Mod (2023) | | | | Existing (2016) Operation + South Wambo Mod (2028) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | No. Items | SWL per Item or SWL/100m | Length | Total SWL | No. Items | SWL per Item or SWL/100m | Length | Total SWL | No. Items | SWL per Item or SWL/100m | Length | Total SWL | No. Items | SWL per Item or SWL/100m | Length | Total SWL | No. Items | SWL per Item or SWL/100m | Length | Total SWL |
| Open-Cut Operations | Excavators | Komatsu PC 550 (500 t) | 3 | 121 | | 126 | 3 | 123 | | 127 | 3 | 123 | | 127 | - | - | - | - | - | - | - | - |
| | | Hitachi EX 2500 (250 t) | 2 | 118 | | 121 | 1 | 118 | | 118 | 1 | 118 | | 118 | - | - | - | - | - | - | - | - |
| | | Hitachi EX 1800 (180 t) | 1 | 117 | | 117 | - | - | | - | - | - | | - | - | - | - | - | - | - | - | - |
| | | Liebherr 996 (676 t) | - | | | - | 1 | 123 | | 123 | 1 | 123 | | 123 | - | - | - | - | - | - | - | - |
| | Haul Trucks | Komatsu 830E (240 t) | 12 | 123 | | 134 | - | - | | - | - | - | | - | - | - | - | - | - | - | - | - |
| | | Komatsu 930E (290 t) | - | - | | - | 11 | 122 | | 133 | 11 | 122 | | 133 | - | - | - | - | - | - | - | - |
| | | CAT 785 (150 t) | 12 | 123 | | 134 | - | - | | - | - | - | | - | - | - | - | - | - | - | - | - |
| | | CAT 793 (218 t) | - | - | - | - | 14 | 121 | - | 132 | 14 | 121 | - | 132 | - | - | - | - | - | - | - | - |
| | Wheeled Loader | CAT 994 - 992 | - | - | | - | 2 | 121 | | 124 | 1 | 121 | | 121 | - | - | - | - | - | - | - | - |
| | | CAT980K (31 t) | - | - | | - | 1 | 117 | | 117 | 1 | 117 | | 117 | - | - | - | - | - | - | - | - |
| | | Le Tourneau L1350 (183 t) | - | - | | - | 1 | 124 | | 124 | 1 | 124 | | 124 | - | - | - | - | - | - | - | - |
| | Dozers | CAT D10 | 4 | 121 | | 127 | 6 | 121 | | 129 | 6 | 121 | | 129 | - | - | - | - | - | - | - | - |
| | | CAT D11 | 4 | 123 | | 129 | 4 | 120 | | 126 | 4 | 120 | | 126 | - | - | - | - | - | - | - | - |
| | Graders | CAT 16G | 3 | 115 | | 120 | - | 117 | | - | - | - | - | - | - | - | - | - | - | - | - | - |
| | | CAT 24M | - | - | | - | 1 | 117 | | 117 | 1 | 117 | | 117 | - | - | - | - | - | - | - | - |
| | | CAT 16M | - | | | - | 3 | 117 | | 122 | 3 | 117 | | 122 | 1 | 117 | | 117 | 1 | 117 | | 117 |
| | Water Trucks | CAT 773 | 4 | 120 | | 126 | - | - | | - | - | - | - | - | - | - | - | - | - | - | - | - |
| | | CAT 777 | - | - | | - | 4 | 118 | | 124 | 4 | 118 | | 124 | 1 | 118 | | 118 | 1 | 118 | | 118 |
| | Service Trucks | CAT 773 | - | - | | - | 2 | 120 | | 123 | 2 | 120 | | 123 | - | - | - | - | - | - | - | - |
| | Blast Hole Drills | DK 45/DK 55 | 3 | 116-118 | | 122 | - | - | | - | - | - | | | - | - | - | - | - | - | - | - |
| | | DK40 | - | - | | - | 1 | 118 | | 118 | 1 | 118 | | 118 | - | - | | - | - | - | | - |
| | | SK50 | - | - | | - | 1 | 118 | | 118 | 1 | 118 | | 118 | - | - | | - | - | - | | - |
| | | D75K | - | - | | - | 1 | 118 | | 118 | 1 | 118 | | 118 | - | - | | - | - | - | | - |
| | Tyre Handler | Omega 16-12 (16 t) | - | - | | - | 1 | 112 | | 112 | 1 | 112 | | 112 | - | - | | - | - | - | | - |
| **Total Mobile Plants** | | | **48** | | | **139** | **58** | | | **139** | **57** | | | **138** | **2** | | | **121** | **2** | | | **121** |
| Approved Surface Facilities - South Bates Underground (Whybrow and Wambo Seams) | Whybrow Fans | 60 $m^3/s$ | 1 | 99 | | 99 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| | South Bates Fans | 200 $m^3/s$ | - | - | - | - | 1 | 128 | - | 128 | - | - | - | - | - | - | - | - | - | - | - | - |
| | NWU Ventilation Fans | 200 $m^3/s$ | - | - | - | - | 1 | 104 | - | 104 | - | - | - | - | - | - | - | - | - | - | - | - |
| | Stackout Conveyor | 2500 tph | 1 | 110 | 686 | 118 | 1 | 110 | 686 | 118 | - | - | - | - | - | - | - | - | - | - | - | - |
| | Stackout Conveyor - Drive | 600 kW | 1 | 103 | - | 103 | 1 | 103 | - | 103 | - | - | - | - | - | - | - | - | - | - | - | - |
| | Front-end Loader | CAT 992 (23 t) | 1 | 117 | | 117 | 1 | 121 | | 121 | - | - | - | - | - | - | - | - | - | - | - | - |
| | B-Doubles | Mack Bigfoot (140 t) | 4 | 114 | | 120 | - | - | - | - | | | | | | | | | | | | |
| | Haul Trucks | CAT 789 (180 t) | | | | | 4 | 123 | - | 129 | - | - | - | - | - | - | - | - | - | - | - | - |
| Approved Surface Facilities South Wambo Underground (Arrowfield and Bowfield Seams) | Arrowfield Fans | 350 $m^3/s$ | 1 | 107 | | 107 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

COMPARITIVE NUMBERS OF MOBILE EQUIPMENT, FIXED PLANT AND TOTAL SOUND POWER LEVELS

| Description | Equipment | Type/ Capacity | EIS Operation | | | | Existing (2016) Operation | | | | Existing (2016) Operation + South Wambo Mod (2019) | | | | Existing (2016) Operation + South Wambo Mod (2023) | | | | Existing (2016) Operation + South Wambo Mod (2028) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | No. Items | SWL per Item or SWL/100m | Length | Total SWL | No. Items | SWL per Item or SWL/100m | Length | Total SWL | No. Items | SWL per Item or SWL/100m | Length | Total SWL | No. Items | SWL per Item or SWL/100m | Length | Total SWL | No. Items | SWL per Item or SWL/100m | Length | Total SWL |
| Proposed Modification Surface Facilities South Wambo Underground (Woodlands Hill and Arrowfield Seams) | Shaft Fan | 350 $m^3/s$ | - | - | - | - | - | - | - | - | 1 | 105 | - | 105 | 1 | 105 | - | 105 | 1 | 105 | - | 105 |
| | Bleeder Fan | 350 $m^3/s$ | - | - | - | - | - | - | - | - | - | - | - | - | 1 | 125 | - | 125 | 1 | 103 | - | 103 |
| | Pit Conveyor | 4,000 tph | - | - | - | - | - | - | - | - | 1 | 112 | 114 | 113 | 1 | 112 | 114 | 113 | 1 | 112 | 114 | 113 |
| | Pit Conveyor - Drive | 200 kW | - | - | - | - | - | - | - | - | 1 | 98 | - | 98 | 1 | 98 | - | 98 | 1 | 98 | - | 98 |
| | Ramp Conveyor | 4,000 tph | - | - | - | - | - | - | - | - | 1 | 112 | 733 | 121 | 1 | 112 | 733 | 121 | 1 | 112 | 733 | 121 |
| | Ramp Conveyor - Drives | 600 kW | - | - | - | - | - | - | - | - | 3 | 103 | - | 108 | 3 | 103 | - | 108 | 3 | 103 | - | 108 |
| | Front-end Loader | CAT 992 (23 t) | - | - | - | - | - | - | - | - | 1 | 121 | - | 121 | 1 | 121 | - | 121 | 1 | 121 | - | 121 |
| | Haul Trucks[#] | CAT 789 (180t) | - | - | - | - | - | - | - | - | 4 | 123 | - | 129 | 4 | 123 | - | 129 | 4 | 123 | - | 129 |
| **Total Underground** | | | **9** | | | **124** | **9** | | | **132** | **12** | | | **130** | **13** | | | **131** | **13** | | | **130** |
| Coal Handling and Preparation Plant | Receival Bin/Feeder | 900 tph | 1 | 111 | | 111 | 1 | 111 | | 111 | 1 | 111 | | 111 | 1 | 111 | | 111 | 1 | 111 | | 111 |
| | Raw Coal Conveyor and Drive | 900 tph | 1 | 101 dB/100m. Drive 100 dB | 175 | 105 | 1 | 101 dB/100m. Drive 100 dB | 175 | 105 | 1 | 101 dB/100m. Drive 100 dB | 175 | 105 | 1 | 101 dB/100m. Drive 100 dB | 175 | 105 | 1 | 101 dB/100m. Drive 100 dB | 175 | 105 |
| | Washery - Secondary/Tertiary Crushers | 900 tph | 2 | 110 | | 113 | 1 | | | 120 | 1 | | | 120 | 1 | | | 120 | 1 | | | 120 |
| | Washery - Enclosed Module 1 or 2 | 900 tph | 2 | 107 | | 110 | | | | | | | | | | | | | | | | |
| | Reject Bin and Drive | 300 tph | 1 | 100 | | 100 | 1 | 100 | | 100 | 1 | 100 | | 100 | 1 | 100 | | 100 | 1 | 100 | | 100 |
| | Reject Conveyor | 320 tph | 1 | 97 dB/100m. | 112 | 97 | 1 | 97 dB/100m. | 112 | 97 | 1 | 97 dB/100m. | 112 | 97 | 1 | 97 dB/100m. | 112 | 97 | 1 | 97 dB/100m. | 112 | 97 |
| | Product Conveyor - Skyline 1 | 640 tph | 1 | 100 dB/100m. Drive 100 dB | 336 | 106 | 1 | 100 dB/100m. Drive 100 dB | 336 | 106 | 1 | 100 dB/100m. Drive 100 dB | 336 | 106 | 1 | 100 dB/100m. Drive 100 dB | 336 | 106 | 1 | 100 dB/100m. Drive 100 dB | 336 | 106 |
| | Product Conveyor - Skyline 2 | 640 tph | 1 | 100 dB/100m. Drive 100 dB | 365 | 107 | 1 | 100 dB/100m. Drive 100 dB | 365 | 107 | 1 | 100 dB/100m. Drive 100 dB | 365 | 107 | 1 | 100 dB/100m. Drive 100 dB | 365 | 107 | 1 | 100 dB/100m. Drive 100 dB | 365 | 107 |
| | Front-end Loader | CAT 992 (23 t) | 3 | 117 | | 122 | 1 | 121 | | 121 | 1 | 121 | | 121 | 1 | 121 | | 121 | 1 | 121 | | 121 |
| | Dozers | CAT D11 | 3 | 123 | | 129 | 4 | 120 | | 125 | 4 | 120 | | 125 | 4 | 120 | | 125 | 4 | 120 | | 125 |
| Train Loading System | Reclaim Conveyor | CV102-2500 tph | 1 | 107 dB/100m. Drive 107 dB | 34 | 108 | 1 | 107 dB/100m. Drive 107 dB | 34 | 108 | 1 | 107 dB/100m. Drive 107 dB | 34 | 108 | 1 | 107 dB/100m. Drive 107 dB | 34 | 108 | 1 | 107 dB/100m. Drive 107 dB | 34 | 108 |
| | Train Loadout Conveyor | CV102-2500 tph | 1 | 107 dB/100m. Drive 107 dB | 933 | 117 | 1 | 107 dB/100m. Drive 107 dB | 933 | 117 | 1 | 107 dB/100m. Drive 107 dB | 933 | 117 | 1 | 107 dB/100m. Drive 107 dB | 933 | 117 | 1 | 107 dB/100m. Drive 107 dB | 933 | 117 |
| | Train Loadout Bin | 400 t | 1 | 107 | | 107 | 1 | 107 | | 107 | 1 | 107 | | 107 | 1 | 107 | | 107 | 1 | 107 | | 107 |
| | Locomotive Set | 82 Class | 1 | 111 | | 111 | 1 | 111 | | 111 | 1 | 111 | | 111 | 1 | 111 | | 111 | 1 | 111 | | 111 |
| **Total CHPP & Handling Plants** | | | **20** | | | **130** | **16** | | | **128** | **16** | | | **128** | **16** | | | **128** | **16** | | | **128** |
| **TOTAL MINE SITE** | | | **77** | | | **139** | **83** | | | **140** | **85** | | | **139** | **31** | | | **133** | **31** | | | **133** |

[#] This mobile fleet is used for both open cut and underground operations.