

Narrabri Mine Modification 5

Environmental Assessment

APPENDIX D Noise Assessment

26 August 2015

WM Project Number: 15165
Our Ref: NCO060815 NG_Narrabri Mod5
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Re: Narrabri Mine Modification 5 - Noise Assessment

1 INTRODUCTION

The Narrabri Mine is an underground coal mining operation located approximately 28 kilometres (km) south-east of Narrabri and approximately 65 km north-west of Gunnedah in the Gunnedah Basin, New South Wales (NSW).

The Narrabri Mine is operated by Narrabri Coal Operations Pty Ltd (NCOPL) on behalf of the Narrabri Joint Venture, which consists of Whitehaven Coal Limited's subsidiary Narrabri Coal Pty Ltd (70 percent [%]), Upper Horn Investments (Australia) Pty Limited (7.5%), J-Power Australia Pty Limited (7.5%), EDF Trading Australia Pty Limited (7.5%), and Daewoo International Narrabri Investment Pty Limited and Kores Narrabri Pty Limited (7.5%).

Stage 1 of the Narrabri Mine was originally approved under Part 3A of the NSW *Environmental Planning and Assessment Act, 1997* (EP&A Act) in 2007 and involved initial site establishment activities and continuous miner mining operations.

Project Approval (08_0144) for Stage 2 of the Narrabri Mine was issued in 2010 and allowed the mine to convert to a longwall mining operation. The approval allows for 26 longwall panels each with a face width of approximately 295 metres (m).

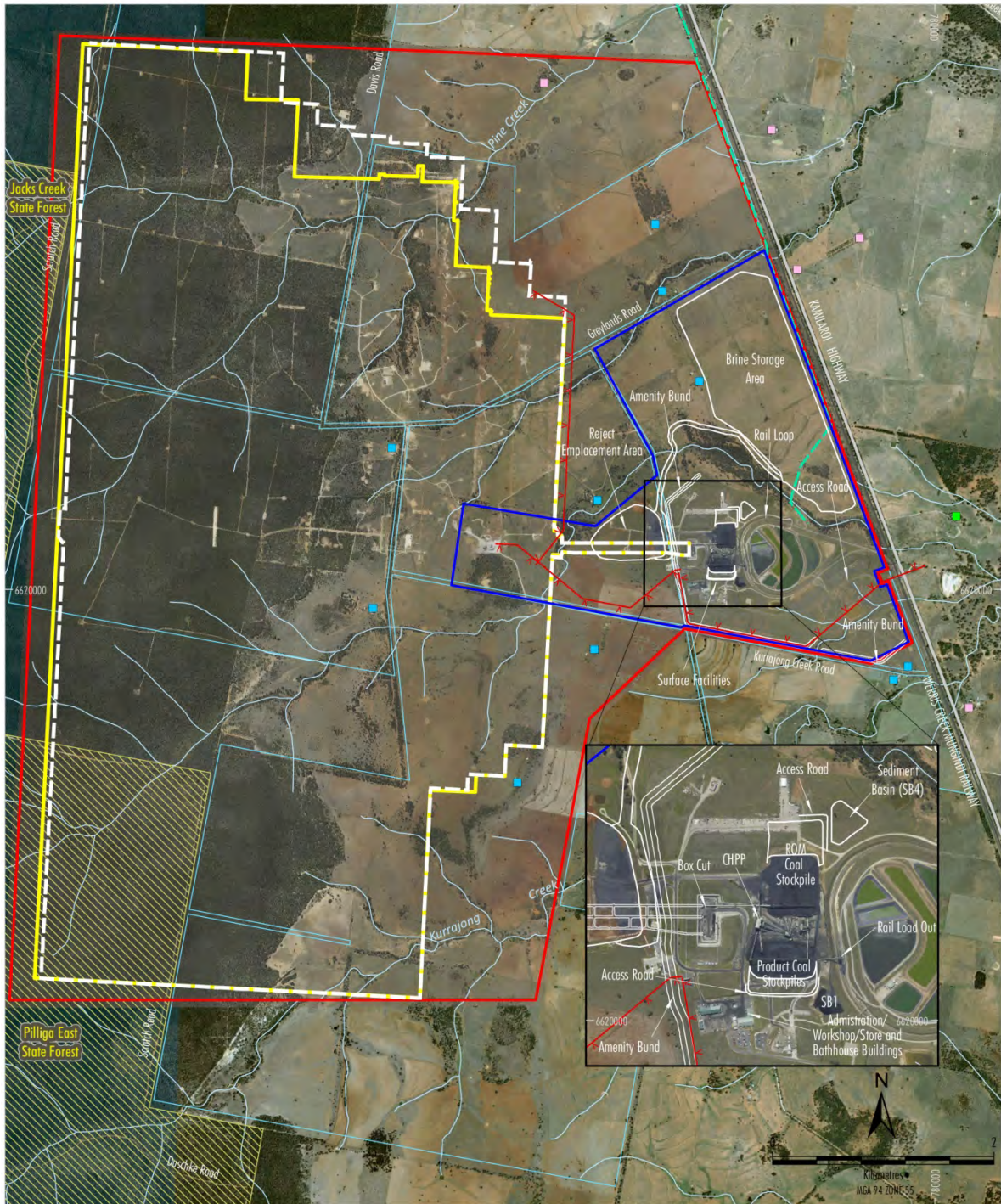
Project Approval (08_0144) allows for the production and processing of up to 8 million tonnes per annum (Mtpa) of run-of-mine (ROM) coal for a period of 21 years. ROM coal is processed at the Narrabri Mine to produce thermal and Pulverised Coal Injection product coal. Product coal is transported from the Narrabri Mine by rail to Newcastle.

In 2011, NCOPL submitted two minor applications to modify Project Approval (08_0144) under Section 75W of the EP&A Act to update subsidence management conditions in Project Approval 08_0144 and to allow for the one-off road transport of coal to the Tarrawonga Coal Mine. A third application to modify Project Approval (08_0144) under Section 75W of the EP&A Act submitted in 2012 was withdrawn.

In April 2015, NCOPL submitted an application to modify Project Approval (08_0144) under Section 75W of the EP&A Act to increase the capacity of the existing ROM and product coal stockpiles (the Stockpile Extension Modification). The Stockpile Extension Modification is currently being assessed by the Department of Planning and Environment. Notwithstanding, the Stockpile Extension Modification has been assumed to have been approved for the purposes of this Noise Assessment.

NCOPL is proposing a modification to change the approved underground mine geometry (Figure 1-1) and to increase the ROM coal production rate (Modification 5 [the Modification]).

This report presents the results of a noise assessment conducted for the proposed Modification, which relies on our review of the modelling and assessment contained in the *Noise Assessment Narrabri Mine Stockpile Extension Modification* (Spectrum Acoustics, 2015a). The Spectrum Acoustics report has been reviewed by the Environment Protection Authority (EPA) with no comments affecting the predictions and conclusions. We have also been provided with a description of the proposed operational changes associated with the Modification by NCOPL. The report uses the same format and much of the content of the previous Spectrum Acoustics (2015a) report where the information is still valid.



	State Forest		Mine-owned Dwelling
	Mining Lease Boundary (ML 1609)		Private Dwelling
	Pit Top Area		Private Dwelling - NCOPL Agreement
	Approved Underground Mine Footprint		Mine Owned Land
	Approved Surface Development (Not Constructed)		
	Modified Underground Mine Footprint		
	Electricity Transmission Line (Constructed)		
	Namoi River Water Pipeline		

Source: Orthophotos - Whitehaven Coal (March 2015) and Google Earth (Feb 2015); R.W. Corkery & Co Pty Ltd (2009), NSW Trade & Investment (2015) and NCOPL (2015)


NARRABRI MINE
 Existing/Approved and Modified
 Underground Mine Footprint

Figure 1-1

2 EXISTING NARRABRI MINE NOISE MANAGEMENT & MONITORING

Project Approval (08_0144) for the Narrabri Mine outlines conditions specific to noise management including impact assessment criteria, acquisition and additional mitigation upon request criteria, noise mitigation measure requirements and monitoring requirements.

2.1 Impact Assessment Criteria

Condition 1, Schedule 4 of Project Approval (08_0144) and Condition L3 of Environment Protection Licence (EPL) 12789 outline the noise impact assessment criteria for the Narrabri Mine. Noise at the Narrabri Mine must not exceed 35 A-weighted decibels (dB[A]), $L_{eq(15 \text{ mins})}$ at a privately owned residence or at 25% of a private landholders land during the day, evening or night.

Condition 1, Schedule 4 of Project Approval (08_0144) and Condition L3 of EPL 12789 also includes a sleep disturbance noise criteria of 45 dB(A), $L_{1(1 \text{ min})}$ during the night.

The impact assessment criteria do not apply during the following meteorological conditions:

- wind speeds greater than 3 metres/second (m/s) at 10 m above ground level;
- temperature inversions of 1.5 to 4 degrees Celsius ($^{\circ}\text{C}$)/100 m^1 and source to receiver wind speed greater than 2 m/s at 10 m above ground level; or
- temperature inversions of greater than 4 $^{\circ}\text{C}$ /100 m^2 .

NSW Industrial Noise Policy

The *NSW Industrial Noise Policy* (INP) requires the consideration of intrusiveness, assessed over a 15-minute period such that the L_{Aeq} noise levels do not exceed the background noise levels by more than 5 dB(A) (as per the criteria above). Where the character of noise is not “broadband” there is the need to consider modifying factors for unpleasant characteristics such as impulsiveness or tonality.

There is also a need to consider “amenity” which is assessed as an $L_{Aeq,period}$ over the day (7.00 am to 6.00 pm), evening (6.00 pm to 10.00 pm) and night time (10.00 pm to 7.00 am) periods and considers cumulative noise from all industrial sources. For rural receivers, the recommended and “maximum” limits are shown in Table 2-1.

Table 2-1 INP Amenity Criteria

Period	Recommended $L_{Aeq,period}$	Maximum $L_{Aeq,period}$
Day	50	55
Evening	45	50
Night	40	45

¹ Condition L3.4 of EPL 12789 excludes “Stability category F temperature inversion conditions” rather than “temperature inversions of 1.5 to 4 $^{\circ}\text{C}$ /100 m”.

² Condition L3.4 of EPL 12789 excludes “Stability category G temperature inversions” rather than “temperature inversions of greater than 4 $^{\circ}\text{C}$ /100 m”.

2.2 Acquisition & Additional Mitigation Measures Criteria

Condition 2, Schedule 4 of Project Approval (08_0144) requires NCOPL to acquire land upon the written request of the relevant landholder, if the noise generated by the Narrabri Mine at the landholders residence or at 25% of the landholders land exceeds 40 dB(A), $L_{eq(15 \text{ mins})}$ during the day, evening or night. Conditions 5 to 7, Schedule 7 of Project Approval (08_0144) outline additional procedures for potential land acquisitions triggered by Condition 2, Schedule 4 of Project Approval (08_0144).

Condition 3, Schedule 4 of Project Approval (08_0144) requires NCOPL to undertake reasonable and feasible noise mitigation measures at a residence upon the written request of the relevant landholder, if the noise generated by the Narrabri Mine at the landholders residence is equal to or exceeds 38 dB(A), $L_{eq(15 \text{ mins})}$ during the day, evening or night.

2.3 Noise Management & Mitigation Measures

Noise management at the Narrabri Mine is conducted in accordance with the Noise Management Plan (NMP) (NCOPL, 2015) prepared in accordance with Condition 4, Schedule 4 of Project Approval (08_0144).

NCOPL is required to manage noise levels from the Narrabri Mine in accordance with the noise impact assessment criteria specified in Project Approval (08_0144) using reasonable and feasible mitigation measures. The following reasonable and feasible mitigation measures are implemented at the Narrabri Mine (Spectrum Acoustics, 2015a):

- Activities are conducted within the approved hours (eg. construction activities are restricted to between 7.00 am and 10.00 pm).
- The rotary breaker is fully enclosed.
- The coal handling and preparation plant (CHPP) is enclosed and 50% of the internal surface is lined with acoustic insulation.
- Ventilation fans are banded when located in the vicinity of a receiver.
- Surface drills operating over LW 1 to LW 3 and LW 24 to LW 26 will be attenuated to achieve a sound power level of 109 dB(A).
- Dozers are not used on the reject emplacement area during evening and night periods during temperature inversion conditions.
- Truck movements to the reject emplacement area are restricted to one load per 15 minutes during temperature inversion conditions.
- All reversing alarms on equipment are broadband frequency types (i.e. high frequency reversing alarms are not permitted).
- Equipment used on-site is regularly serviced so that sound power levels remain the same.
- When selecting new/replacement equipment, equipment with a lower sound power level is selected where feasible.

2.4 Noise Monitoring & Compliance

The NMP includes a noise monitoring program in accordance with Condition 4, Schedule 4 of Project Approval (08_0144). The NMP also addresses EPL 12789 noise monitoring requirements. The noise monitoring program includes attended noise monitoring and real time (unattended) noise monitoring.

2.4.1 Attended Monitoring

The attended noise monitoring is conducted monthly during the cooler months (ie. May to September) and quarterly during the warmer months (ie. December and March). The five noise monitoring locations are (Figure 2-1):

- N1 "Bow Hills".
- N5 "Oakleigh".
- N6 "Newhaven".
- N7 "Belah Park" (monitoring is conducted at nearby "Merriman" at the request of the landholder).
- N8 "Haylin View".

A summary of the noise monitoring results during the three and half year period 2012 to July 2015 is provided in Table 2-2.

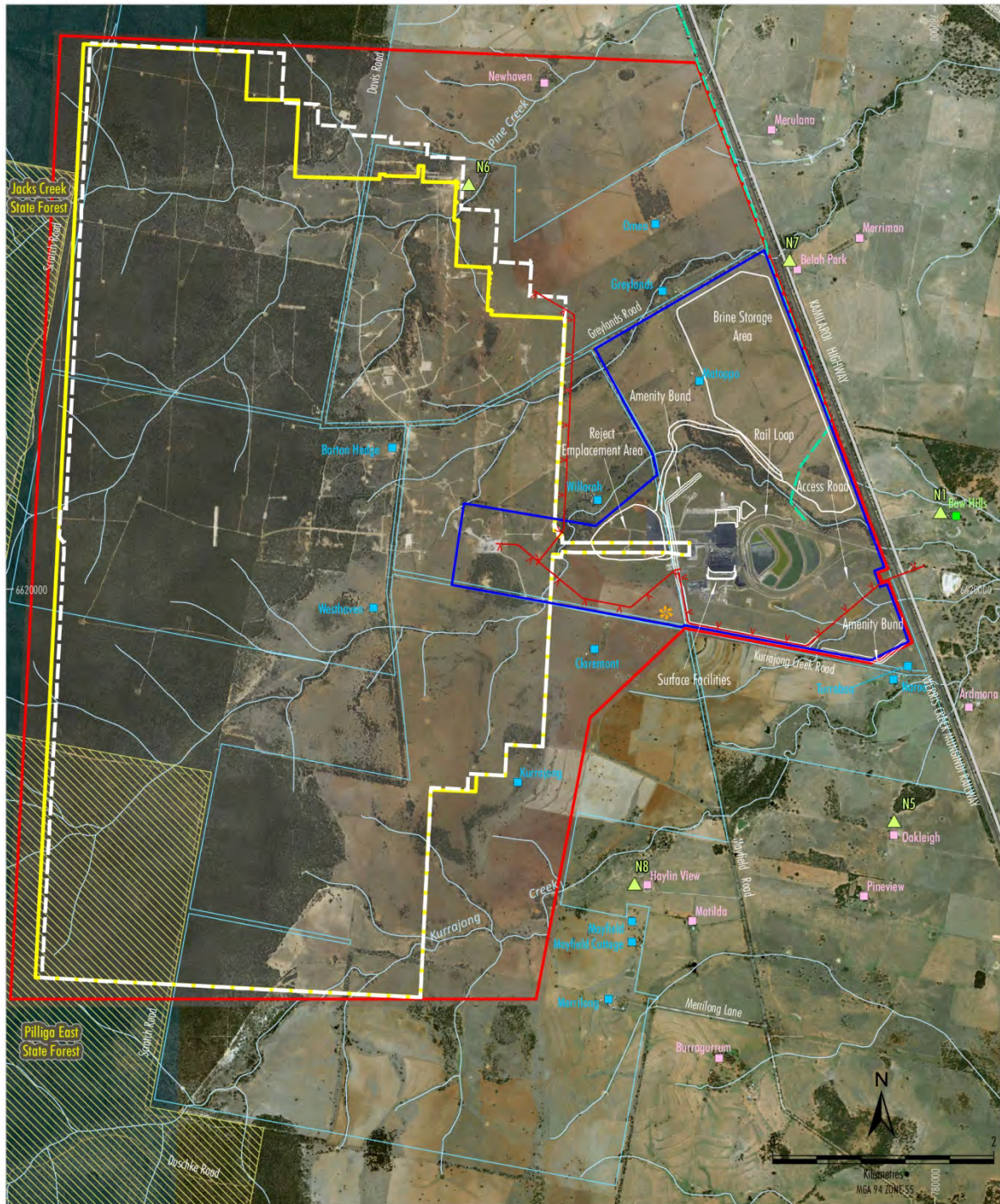
The results in Table 2-2 show three exceedances at "Bow Hills", three exceedances at "Naroo", three exceedances at "Oakleigh", and three exceedances at "Merriman" during the past three and a half years (Figure 2-1). "Naroo" is mine-owned and "Bow Hills" has entered into an agreement with NCOPL, which includes the installation of additional noise mitigation measures.















The recent exceedances (June and July 2015) recorded at "Oakleigh" are the first time exceedances have been recorded at this location (Table 2-2). It is expected that the exceedances were associated with a combination of unusual operating conditions (i.e. all four dozers operating on the ROM and product coal stockpile which were near maximum size) and potentially adverse meteorological conditions.

During the exceedance recorded during June 2015, the meteorological conditions were towards the upper end of the compliant range in accordance with Condition 1, Schedule 4 of Project Approval (08_0144) with a wind speed of 2.0 m/s and inversion of 2.6°C/100 m recorded. It is also noted that the temperature inversion conditions during the mid-July evening and night-time exceedances are unknown and strong (non-compliant) inversion conditions may have been present. At the time of writing, no exceedances at "Oakleigh" were recorded during the latest noise monitoring conducted in late July 2015.

The exceedances recorded at "Merriman" in June 2015 also occurred during unusual operating conditions (i.e. all four dozers operating on the ROM and product coal stockpile). At the time of writing, no exceedances at "Merriman" were recorded during the latest noise monitoring conducted in late July 2015. It should be noted that NCOPL is currently considering a written request to acquire "Merriman" (Section 2.5).

NCOPL is conducting an ongoing investigation into the noise exceedances recorded at "Oakleigh" and "Merriman" in consultation with the EPA.



	State Forest		Mine-owned Dwelling
	Mining Lease Boundary (ML 1609)		Private Dwelling
	Pit Top Area		Private Dwelling - NCOPL Agreement
	Approved Underground Mine Footprint		Mine Owned Land
	Approved Surface Development (Not Constructed)		Meteorological Station
	Modified Underground Mine Footprint		Noise Monitoring
	Electricity Transmission Line (Constructed)		
	Namoi River Water Pipeline		

Source: Orthophotos - Whitehaven Coal (March 2015) and Google Earth (Feb 2015); R.W. Corkery & Co Pty Ltd (2009), NSW Trade & Investment (2015) and NCOPL (2015)


NARRABRI MINE
Noise and Meteorological Monitoring Locations

Figure 2-1

Table 2-2 Summary of Operational Noise Monitoring Results 2012 to July 2015

Monitoring Period	Result
2012	
<i>March</i>	No exceedances recorded.
<i>June</i>	No exceedances recorded.
<i>July</i>	No exceedances recorded.
<i>August</i>	No exceedances recorded.
<i>September</i>	No exceedances recorded.
<i>December</i>	No exceedances recorded.
2013	
<i>March</i>	No exceedances recorded.
<i>May</i>	Exceedance recorded at "Naroo" ¹ .
<i>June</i>	No exceedances recorded.
<i>July</i>	No exceedances recorded.
<i>August</i>	No exceedances recorded.
<i>September</i>	Exceedances recorded at "Bow Hills" ² and "Naroo" ¹ .
<i>December</i>	No exceedances recorded.
2014	
<i>March</i>	No exceedances recorded.
<i>May</i>	Exceedance recorded at "Merriman"³.
<i>June</i>	No exceedances recorded.
<i>July</i>	No exceedances recorded.
<i>August</i>	No exceedances recorded.
<i>September</i>	Exceedances (2) recorded at "Bow Hills" ² .
<i>December</i>	No exceedances recorded.
2015	
<i>March</i>	Exceedance recorded at "Naroo" ¹ .
<i>May</i>	No exceedances recorded.
<i>June</i>	Exceedance recorded at "Oakleigh" and exceedances (2) recorded at "Merriman"³.
<i>Mid July</i>	Exceedances (2) recorded at "Oakleigh"⁴.
<i>Late July</i>	No exceedances recorded.

Source: Spectrum Acoustics (2015a; 2015b; 2015c and 2015d).

¹ "Naroo" is mine-owned.

² NCOPL has entered into an agreement with the landholder which includes the implementation of additional mitigation measures at the "Bow Hills" residence (Section 2.4.1).

³ NCOPL is currently considering a written request from the landholder to acquire "Merriman" (Section 2.5).

⁴ Temperature inversion conditions during these exceedances are unknown.

2.4.2 Real Time Monitoring

Real time (unattended) noise monitoring is conducted using a mobile SentineX real time continuous noise monitor to assist in the management of Narrabri Mine noise impacts (i.e. is not used for compliance monitoring). The real time noise monitor is positioned at a receiver that is most likely to be impacted by Narrabri Mine operations or at a receiver where a noise-related complaint has been received.

During 2014, the real time noise monitor was located at "Merriman" (Figure 2-1) and noise levels above the noise impact assessment criteria were recorded (Spectrum Acoustics, 2015a).

The real time noise monitor does not however provide comparable results to the attended noise monitoring as it includes all noise at the microphone and not just Narrabri Mine noise. Raw (or unprocessed) noise levels from the real time noise monitor were approximately 10 dB(A) higher than noise levels from attended noise monitoring conducted simultaneously at "Merriman". Advitech Environmental (2014) was able to post-process the raw real time noise monitor data to reduce this difference to 1 to 3 dB(A).

As described above, the real time noise monitor is not used for compliance monitoring. Compliance monitoring is conducted using attended monitoring methodology in accordance with Project Approval (08_0144) and EPL 12789.

2.5 Acquisition & Additional Mitigation Measures

In response to noise monitoring results (**Section 2.4**) and consultation with surrounding landholders, NCOPL is currently considering a written request from the landholders to acquire "Merriman" and "Belah Park".

3 PREVIOUS NARRABRI MINE NOISE ASSESSMENTS

The following noise assessments have previously been conducted for the Narrabri Mine:

- *Narrabri Coal Project Noise Impact Assessment* (Spectrum Acoustics, 2006).
- *Narrabri Coal Mine Stage 2 Longwall Project Noise and Vibration Impact Assessment* (Spectrum Acoustics, 2009).
- *Noise Assessment Narrabri Mine Stockpile Extension Modification* (Spectrum Acoustics, 2015a).

A summary of these previous noise assessments is provided below.

3.1 Narrabri Mine Stage 1

Narrabri Mine Stage 1 involved initial mine surface and underground development. Spectrum Acoustics (2006) developed an Environmental Noise Model (ENM) to assess the potential noise impacts associated with the originally approved Narrabri Mine. The noise model was developed in accordance with the INP (EPA, 2000).

3.2 Narrabri Mine Stage 2

Narrabri Mine Stage 2 involved a transition to longwall mining at the Narrabri Mine. Spectrum Acoustics (2009) assessed the potential noise impacts associated with Narrabri Mine Stage 2. The Narrabri Mine Stage 2 noise modelling was based on the existing ENM developed in 2006.

3.3 Narrabri Mine Stockpile Extension Modification

Spectrum Acoustics (2015a) assessed the potential noise impacts associated with the Narrabri Mine Stockpile Extension Modification, which involved the installation of additional ROM and product coal stockpile capacity. The following operational scenarios were modelled (Spectrum Acoustics, 2015a):

- Scenario 1: All surface plant and train loading activities occurring. Goaf drainage pumps above LW 1 and pre-drainage construction above LW 2 and LW 3.
- Scenario 2: All surface plant and train loading activities occurring. Goaf drainage pumps above LW 24 and pre-drainage construction above LW 25 and LW 26.

Site-specific meteorological conditions based on the Narrabri Mine meteorological station data were reviewed for the Stockpile Extension Modification. The following meteorological conditions were considered for the predictive modelling (Spectrum Acoustics, 2015a):

- calm neutral conditions; and
- a 4°C/100m temperature inversion.

The existing ENM software was used to assess the potential noise impacts of the Narrabri Mine Stockpile Extension Modification. Spectrum Acoustics (2015a) reviewed the reliability of the existing ENM and it was found that approximately 96% of the attended noise measurements conducted during relevant meteorological conditions were equal to or less than the predicted ENM noise levels. Spectrum Acoustics (2015a) therefore considered the existing ENM provided a reliable indication of noise impacts associated with the Narrabri Mine.

The additional attended noise monitoring conducted since this review does not significantly change the Spectrum Acoustics (2015a) conclusion and therefore the existing noise model is considered to be fit for purpose to determine the potential noise impacts associated with the Modification.

Table 3-1 shows the predicted Narrabri Mine operational $L_{Aeq(15 \text{ mins})}$ intrusive levels for Scenarios 1 and 2 under calm neutral conditions and a 4 °C/100m inversion at relevant privately owned receivers.

Table 3-1 Stockpile Extension Modification – Predicted Noise Levels dB(A), $L_{eq,15min}$

Receiver	Criterion ¹ dB(A)	Scenario 1		Scenario 2		
		Calm (neutral)	4°C/100m Inversion Conditions	Calm (neutral)	4°C/100m Inversion Conditions	
Privately Owned						
R1	"Bow Hills" ²	35	31	39	31	39
R2	"Ardmona"	35	27	35	27	35
R4	"Oakleigh"	35	24	31	24	31
R5	"Pineview"	35	22	29	22	29
R6	"Matilda"	35	23	32	23	32
R7	"Haylin View"	35	27	35	29	35
R13	"Newhaven"	35	20	<30	20	<30
R16	"Belah Park" ³	35	27	36	27	36
R16B	"Merriman" ³	35	25	33	25	33
R18	"Merulana"	35	22	<30	22	<30
Mine Owned						
--	"Turrabaa"	--	32	39	32	39
R3	"Naroo"	35	31	39	31	39
R8	"Mayfield"	35	25	34	26	34
R9	"Mayfield Cottage"	35	25	33	26	33
R10	"Merrilong"	35	24	31	25	31
R11	"Kurrajong"	35	32	40	36	40
R15	"Greylands"	35	31	37	29	37

Source: Spectrum Acoustics (2015a)

¹ Project Approval (08_0144) and EPL 12789 (refer to Section 2.1).

² NCOPL has entered into an agreement with the landholder which includes the implementation of additional mitigation measures at the "Bow Hills" residence (Section 2.4).

³ NCOPL is currently considering a written request from the landholder to acquire "Merriman" and "Belah Park" (Section 2.5).

In summary, it was predicted that:

- no privately-owned residences³ would be in the noise affectation zone; and
- one privately-owned residence would be in the noise management zone ("Belah Park").

NCOPL is currently negotiating the acquisition of "Belah Park".

³ Privately-owned residences not subject to an existing private agreement with NCOPL.

4 MODIFICATION OVERVIEW

An overview of the Modification is provided in this section. A detailed description of the Modification is provided in the Environmental Assessment.

The Modification would involve:

- An increase in longwall panel widths for LW 107 to LW 120 from 295 m to 400 m (LW 101 to LW 106 unchanged).
- A reduction in the number of longwall panels from 26 to 20.
- An increase in the ROM coal production limit from 8 Mtpa up to approximately 11 Mtpa.
- A western extension of underground mine footprint relative to the existing/approved underground mine footprint of approximately 60 m within ML 1609.
- Continuation of pre-conditioning of the Digby Conglomerate to prevent or minimise the impact of wind blast in the underground workings.
- Minor amendments to the site water management system.
- An increase in the average number of trains from 3 trains/day to 4 trains/day (peak of up to 8 trains would remain unchanged).

There would be no change to the existing underground mine infrastructure, coal handling infrastructure or CHPP. This is because there is spare capacity within the underground mining infrastructure, coal handling infrastructure and CHPP to cater for more production on an annual basis. This infrastructure is designed to include a maximum instantaneous capacity in excess of its long-term average capacity, and the Modification would seek to use this infrastructure at its maximum instantaneous capacity more frequently.

5 SITE OPERATIONAL NOISE ASSESSMENT

The existing Narrabri Mine operational noise sources and associated sound power levels are shown in Table 5-1.

As described in Section 4, the Modification would not change the existing mine fleet, CHPP or coal handling infrastructure. The existing Narrabri Mine reasonable and feasible noise mitigation measures (Section 2.3) would also continue to be implemented for the Modification.

Table 5-1 Modification – Operational Noise Sources & Sound Power Levels (dB)

Noise Sources	No. of Items	Sound Power Level (dB)
Conveyors	-	80 dB/m
Dozer at stockpile	2	117
	2	118
Crusher (attenuated)	1	103
CHPP (attenuated)	1	111
Bypass crusher (attenuated)	1	107
Rail load-out	1	102
Workshop	1	95
Vent fans (attenuated)	1	117
Personnel carrier	1	110
Locos idling on rail loop	1	102
Truck at rejects	1	107
Dozer at rejects	1	107
Water cart	1	105
Gas drainage pumps	>10	102
Drill	2	109
TOTAL sound power	-	125

Source: Spectrum Acoustics (2015a)

5.1 Intrusive and Amenity Noise Levels

The Spectrum Acoustics (2015a) predicted operational $L_{Aeq,15min}$ intrusive levels under inversion conditions (ie. 4°C/100m inversion conditions) were:

- "Belah Park" 36 dB(A) – negligibly exceeds (1 dB[A]) the Project Approval (08_0144) and EPL 12789 impact assessment criteria.
- "Bow Hills" 39 dB(A) – moderately exceeds (4 dB[A]) the Project Approval (08_0144) and EPL 12789 impact assessment criteria.

Although the Modification would include an annual ROM coal production rate increase from 8 Mtpa to up to approximately 11 Mtpa, no additional plant or infrastructure would be required as the existing plant and infrastructure peak capacity would be utilised more often. Since the predictions for intrusive noise are based on a typical worst-case 15-minute period and also considers meteorological enhancement where necessary, then the Modification would not change the intrusive noise levels predicted in Spectrum Acoustics (2015a).

However, with the increased utilisation of the maximum instantaneous capacity of existing plant and infrastructure, it is expected these “typical worst case” predicted noise levels would occur more often as the combination of plant operating at full capacity and enhancing meteorological conditions would increase. This is expected to be confirmed by the ongoing compliance noise monitoring.

Similarly, for potential sleep disturbance impacts, there would be no change in the typical maximum noise levels likely to be experienced. However, with the increased utilisation of plant, it is expected that there would be more 15 minute periods where maximum noise levels would occur.

As discussed above, changes in noise levels are likely to occur, in the assessment of $L_{Aeq,period}$ noise levels used to assess amenity.

Generally, in quieter rural areas the amenity criteria are not as stringent as the intrusive criteria. For a typical mine, taking into account the fluctuation in position of noise sources hour by hour and the effects of meteorological enhancement it would be expected that $L_{Aeq,period}$ noise levels would be typically 5 dB(A) lower than the worst-case 15 minute levels. Some days this may only be 1-2 dB(A), but on others where the wind is blowing away from the residences it could be in excess of 10 dB(A) lower.

It is expected that the Modification would result in an increase $L_{Aeq,period}$ noise levels due to the increased utilisation of existing plant. Based on highest predicted intrusive noise level in Spectrum Acoustics (2015a) (i.e. 39 dBA over a 15-minute period at “Bow Hills”), it is expected $L_{Aeq,period}$ noise levels would be no higher than 35 dB(A), which is 5 dB(A) below the INP night time amenity criterion, thus allowing some headroom for the expected increase in $L_{Aeq,period}$ noise levels associated with the Modification, and allow the Narrabri Mine to continue to comply with the INP amenity criteria.

A more conservative approach would be to assume that the highest predicted intrusive noise level in Spectrum Acoustics (2015a) (i.e. 39 dB(A) over a 15-minute period at “Bow Hills”) occurs during the entire night time period, the $L_{Aeq,period}$ noise level would still remain below the INP night time amenity criterion (i.e. 40 dB[A]). This approach is conservative as the potential for the operations modelled in the intrusive noise modelling scenario to occur for the entire night period is very low.

5.2 Cumulative Site Operational Noise Assessment

As there are currently no existing or approved projects with the potential to generate significant noise in the vicinity of the Narrabri Mine, no assessment of potential cumulative (or amenity) noise impacts is considered necessary.

Notwithstanding the above, the relevant INP amenity noise criteria are less stringent compared to the Narrabri Mine intrusive noise criteria (ie. 35 dB[A], $L_{eq,15min}$ – Section 2.1). Provided that the expected Modification $L_{Aeq,15min}$ noise levels generally comply with the intrusive noise criteria, then $L_{Aeq(Period)}$ noise levels are expected to be sufficiently within the relevant INP amenity criteria to allow some headroom for other industrial noise to be generated at these residences.

6 RAIL TRANSPORT ASSESSMENT

Product coal is transported from the Narrabri Mine to Newcastle by rail. The Narrabri Mine is currently approved for up to 8 trains per day. It is understood that these trains could arrive at anytime (i.e. daytime [7.00 am to 10.00 pm] or night time [10.00 pm to 7.00 am]), however the arrival/departure of trains is generally split approximately 60% at daytime (7.00 am to 10.00 pm) and 40% at night time (10.00 pm to 7.00 am). The current proposal would not change the maximum number of trains per day however would increase the average number of trains per day from 3 to 4, with the increase expected to be in line with the current general 60:40 daytime:night time split.

Since the preparation of the Stage 2 Noise Assessment (Spectrum Acoustics, 2009) which dealt with rail transport noise, a new rail noise policy (*Rail Infrastructure Noise Guideline* [RING]) has been adopted, replacing the *Interim Guideline for the Assessment of Noise from Rail Infrastructure Projects* policy.

The following table summarises the relevant noise trigger levels from the RING.

6.1 Noise Trigger Levels (dB[A])

Type of Development	Noise Trigger Levels dB(A) (External)	
	Day (7.00 am-10.00 pm)	Night (10pm-7am)
Rail Traffic – Generating Developments	65 $L_{Aeq,15hr}$ or 85 L_{AFmax} (95th percentile)	60 $L_{Aeq,9hr}$ or 85 L_{AFmax} (95th percentile)

The Spectrum Acoustics (2009) report provided the following information:

“the nearest property to the North Western Branch Railway Line within several kilometres of the Mine Site (“Ardmona”) is at a distance of approximately 140m. At this distance, more than 17 coal train movements per 24-hour period would cause the DECC “planning” criterion of 55 dB(A), $L_{eq(24\ hour)}$ to be exceeded.

Further south, in Boggabri, coal trains from the Longwall Project would combine with the maximum 3 trains per day from the approved Boggabri Coal Project. The total of eight trains (ie. 16 movements) would produce a level 57 dB(A), $L_{eq(24\ hour)}$ at a distance of 30m from the rail line, if travelling at speed. Since trains are likely to be limited to a speed of 60 km/h in town, noise levels will be approximately 2 to 4 dB lower than when travelling at 80 km/h and the 55 dB(A) criterion is likely to be met at a distance of 20m. No residences have been identified within this distance from the rail line.”

The RING would allow an increase in this number of train movements per day and night time periods as the $L_{Aeq,period}$ noise limits are 10 dB(A) and 5 dB(A) higher.

The Modification would not change the maximum rail noise impacts associated with the peak 8 trains per day.

As a result of the increase from 3 to 4 average trains per day, with the same 60:40 split as the existing situation, the increase in noise is predicted as 1 dB(A) for both daytime and night time periods. The resulting noise levels would still be below 65 dB(A) and 60 dB(A) for the daytime and night time periods, respectively.

7 ROAD TRANSPORT NOISE ASSESSMENT

The Kamilaroi Highway in the vicinity of the Narrabri Mine has the following total traffic volumes:

Period	Traffic Volumes	
	Light	Heavy
Day	1331	589 (30%)
Night	186	94 (34%)

Source: GTA Consultants (2015)

There would be a minor increase in heavy vehicle deliveries associated with the Modification which would travel along the Kamilaroi Highway (no coal is transported by road). We understand that these additional deliveries are most likely to occur in the daytime period consistent with the Statement of Commitments included in Appendix 3 of Project Approval (08-0144).

Existing: Average of 8 heavy vehicles/day and a peak of 20 heavy vehicles/day.

Modification: Average of 10 heavy vehicles/day and a peak of 25 heavy vehicles/day.

Since the preparation of the Stage 2 Noise Assessment (Spectrum Acoustics, 2009) which dealt with road transport noise, the EPA have released the *Road Noise Policy* (RNP), replacing the *Environmental Criteria for Road Traffic Noise* (ECRTN).

The RNP provides criteria for "land use developments which generate additional traffic on Highways". These are numerically equivalent to the ECRTN used in the previous assessment.

The criteria are summarised in the Table 3 of the RNP which is reproduced below. The relevant part is "Existing residences affected by **additional traffic** on existing freeways/arterial/sub-arterial roads generated by land use developments".

Table 3 – Assessment Criteria for Operational Traffic Noise – Residences

Road Category	Type of Project / Land Use	Assessment Criteria – dBA	
		Day (7am-10pm)	Night (10pm-7am)
	Existing residences affected by noise from new freeway / arterial / sub-arterial road corridors	$L_{Aeq,15hr}$ 55 (external)	$L_{Aeq,9hr}$ 50 (external)
Freeway / arterial / sub-arterial roads	Existing residences affected by noise from redevelopment of existing freeway / arterial / sub-arterial roads	$L_{Aeq,15hr}$ 60 (external)	$L_{Aeq,9hr}$ 55 (external)
	Existing residences affected by additional traffic on existing freeways / arterial / sub-arterial roads generated by land use developments	$L_{Aeq,15hr}$ 60 (external)	$L_{Aeq,9hr}$ 55 (external)

In the event that existing traffic noise levels are already just within or exceed the Assessment Criteria, the RNP indicates that in considering feasible and reasonable mitigation options that "an increase of up to 2 dB represents a minor impact that is barely perceptible to the average person".

Spectrum Acoustics (2009) predicted $L_{Aeq,1hr}$ noise levels (from mine vehicles only) of up to 47 dB(A) at "Ardmona" which is set back 140 m from the Kamilaroi Highway, assuming a conservative worst case scenario where all the heavy vehicles occurred in a 1-hour period coinciding with the night time shift change. This level is below the base criterion of 55 dB(A) at night time.

With reference to the RNP now in place, the assessment period is the whole daytime and night time periods for highways, the additional heavy vehicle movements of an average of 4 movements per day (or 2 deliveries) and up to 10 per day (5 deliveries) is considered negligible in comparison to approximately 600 total heavy vehicles per day currently using the Kamilaroi Highway and well within the 2 dB increase discussed in the RNP.

8 RECOMMENDED NOISE MONITORING PROGRAM

Since this assessment indicates a likely increase in the proportion of time that the “typical worst-case” noise levels would be experienced, following the commencement of increased throughput, and during the first winter period it is recommended that 1 week of noise monitoring is undertaken at the two potentially affected private receivers (i.e. “Ardmona” and “Belah Park⁴”). This monitoring can be used to verify the expected operational noise impacts described in Section 5.2.

Audio should be recorded, such that extraneous noise can be eliminated through post processing, or other methods can be utilised to detect mine noise only or eliminate extraneous noise.

In planning the noise survey, it would be necessary to review prevailing weather conditions and use best endeavours to maximise the coincidence of enhancing conditions. However, the logistics of planning a survey and relying on the weather may be difficult to achieve in practice.

⁴ NCOPL is currently considering a written request from the landholder to acquire “Belah Park” (Section 2.5). If NCOPL has acquired “Belah Park”, an alternative privately owned property should be considered for monitoring (e.g. “Haylin View”).

9 CONCLUSION

- Although the Modification would include an annual ROM coal production rate increase from 8 Mtpa up to approximately 11 Mtpa, no additional plant or infrastructure would be required as the existing plant and infrastructure maximum instantaneous capacity would be utilised more often.
- Consequently, operational L_{Aeq} noise levels assessed on a 15 minute basis would not change.
- As the maximum instantaneous capacity of existing plant and infrastructure would be utilised more often, it is expected these "typical worst case" predicted $L_{Aeq,15min}$ noise levels would occur more often as the combination of plant operating at full capacity and enhancing meteorological conditions would increase.
- Similarly the number of 15 minute periods where the predicted maximum noise levels would occur would also increase.
- It is expected that the Modification would result in an increase $L_{Aeq,period}$ noise levels due to the increased utilisation of existing plant however the Narrabri Mine is expected to continue to comply with the INP amenity criteria.
- The Modification would not change the maximum number of trains, however would increase the average number of trains per day from 3 to 4. Because of this increase in average train movements, the increase in noise is expected to be approximately 1 dB(A) for both daytime and night time. The resulting noise levels would still be below the applicable RING criteria.
- A small increase in heavy vehicle deliveries is also proposed as part of the Modification. The additional heavy vehicle movements of an average of 4 movements per day and up to 10 per day is considered negligible and well within the 2 dB increase discussed in the RNP.
- Following the commencement of increased throughput, and during the first winter period it is recommended that 1 week of noise monitoring is undertaken at the two most potentially affected private receivers.

I trust this information is sufficient. Please contact us if you have any further queries.

Yours faithfully

WILKINSON MURRAY

A handwritten signature in black ink, appearing to read 'N. L. Gross', with a large, stylized flourish underneath.

Neil Gross
Director

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