



Narrabri Coal Pty Ltd

ABN: 76 107 813 963

Noise Monitoring Program

for the

Narrabri Coal Mine

Including a

Noise Monitoring Protocol



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ACRONYMS USED THROUGHOUT THIS REPORT

AEMR	-	Annual Environmental Management Report
CCC	-	Community Consultative Committee
CHPP	-	Coal Handling and Preparation Plant
DECC (EPA)	-	Department of Environment and Climate Change (Environment Protection Authority)
DOP	-	Department of Planning
DPI-MR	-	Department of Primary Industries - Mineral Resources
EA	-	<i>Environmental Assessment</i>
EMS	-	Environmental Management Strategy
ENCM	-	Environmental Noise Control Manual
INP	-	Industrial Noise Policy
ISO	-	International Standards Organisation
NCPL	-	Narrabri Coal Pty Ltd
NMP	-	Noise Management Program
NSC	-	Narrabri Shire Council
PA	-	Project Approval

1 INTRODUCTION

The Narrabri Coal Mine ("the mine") is located approximately 30km south-southeast of Narrabri, and 10km north-northwest of Baan Baa (see **Figure 1**). The mine is being developed by Narrabri Coal Pty Ltd (NCPL) as an underground mining operation.

The mine lies within a 5 213ha area covered by a mining lease ("the mine site"), with a 255ha section of the lease designated for surface activities of the mine and referred to throughout this document as "the Pit Top Area".

Project Approval (PA) 05_0102 was granted for the mine by the Minister for Planning on 13 November 2007. The approved mine will involve the following activities, identified as either site establishment or operations.

Site Establishment

- Construction of a box cut, transport drift, conveyor drift and ventilation drift to provide access and ventilation to the underground workings.
- Establishment of a Pit Top Area incorporating surface infrastructure such as offices, workshops, amenities, crushing, stockpiling and train loading.
- Construction of an upgraded intersection between the Kamilaroi Highway and Kurrajong Creek Road, an upgraded rail crossing and a Site Access Road between the Kamilaroi Highway and the Pit Top Area.
- Establishment of the Pit Bottom Area.
- Construction of evaporation ponds for containment of dewatered mine inflows of groundwater.

Operations

- Mining of coal using underground continuous miner methods at a maximum rate of 2.5Mtpa for Stage 1 operations.
- Transportation of the mined coal to the Run-of-Mine (ROM) stockpile via conveyor.
- Crushing and sizing of the ROM coal through the crushing plant and stockpiling on the product stockpile.
- Loading of product coal onto train via the rail load out bin for transportation to Port Newcastle.

It is recognised that the operation of the mine has the potential to increase noise levels received at residences on and neighbouring the mine site. In order to manage the potential impacts on local air quality, and in compliance with *Condition 3(14)* of PA 05_0102, the following Noise Monitoring Program (NMP) has been prepared.

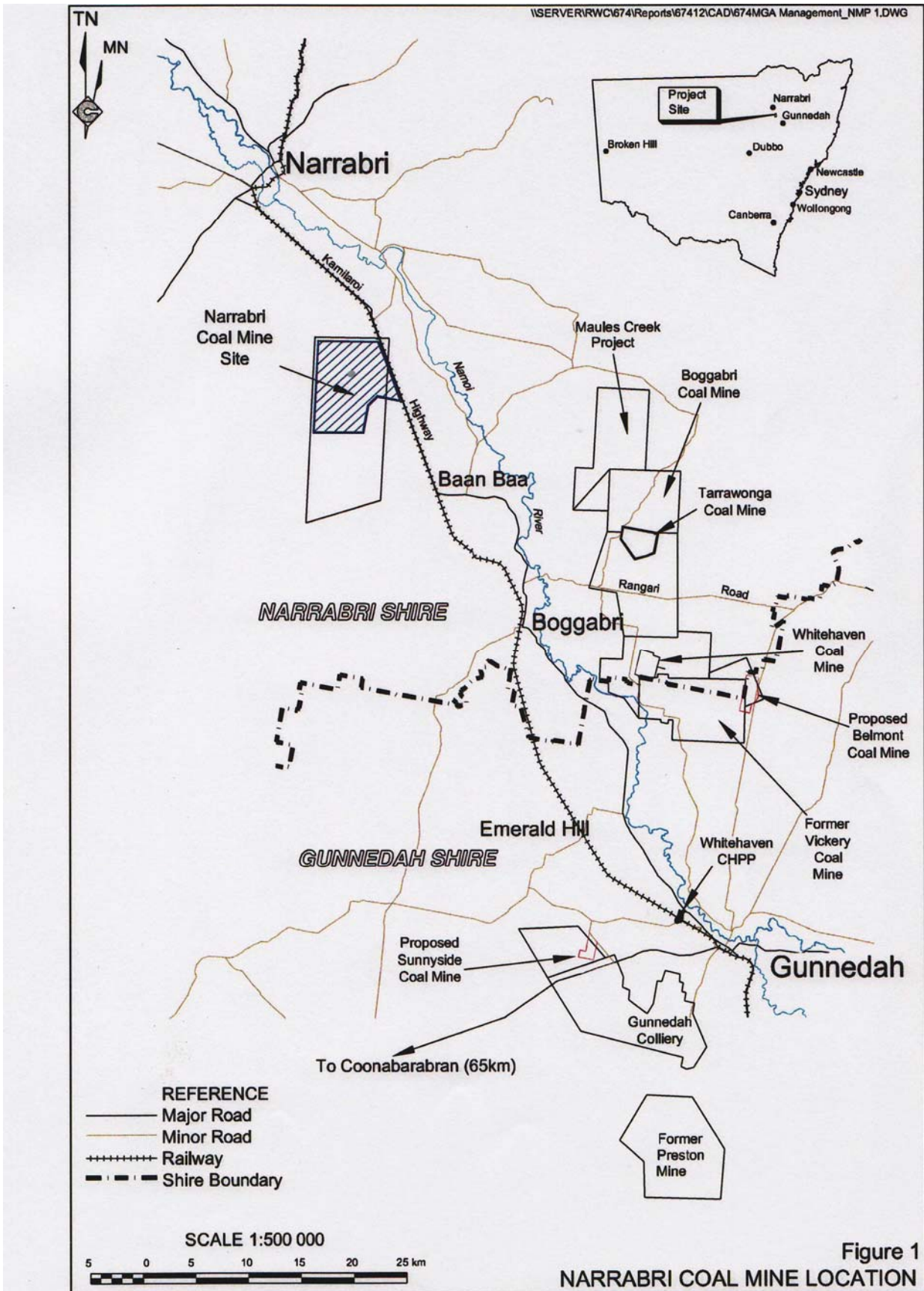


Figure 1
 NARRABRI COAL MINE LOCATION

Condition 3(14) of PA 05_0102 is as follows.

“The Proponent shall prepare and implement a Noise Monitoring Program for the project to the satisfaction of the Director-General. This Program must:

- a) be submitted to the Director General for approval prior to the commencement of construction activities;*
- b) be prepared in consultation with the DECC;*
- c) use attended noise monitoring measures to monitor the performance of the project;*
- d) include a protocol to establish whether the project is complying with the noise impact assessment criteria in Table 1.”*

In accordance with *Condition 3(14(d))*, the NMP includes a Noise Management Protocol, which is presented as **Appendix 1**. The noise impact assessment criteria referred to in *Condition 3(14(d))* are presented in Section 2. In effect, the NMP:

- identifies the noise impact assessment criteria for the mine;
- records the measures which will mitigate the environmental effects of noise from the above activities on surrounding neighbours;
- proposes noise monitoring programs to assess and report the levels of impact; and
- provides a mechanism whereby any noise complaint can be dealt with quickly and effectively.

The NMP has been prepared with reference to relevant legislation and guidelines, is consistent with the commitments in the following documentation which was prepared prior to the granting of development consent.

- Noise and Vibration Assessment – included as Volume 2 (Part 7) of the Specialist Consultant Studies Compendium accompanying an *Environmental Assessment* for the Narrabri Coal Mine.
- *Environmental Assessment* – specifically Section 4B.9 and Section 5 (14).
- Final Statement of Commitments – specifically commitments 15.1 to 15.13.

The NMP applies to both the site establishment and operations phases of the Narrabri Coal Mine.

2 NOISE IMPACT ASSESSMENT CRITERIA

Noise impact assessment criteria for the various stages and activities associated with the mine's development were established in the *Environmental Assessment* using relevant DECC guidelines. These criteria have been incorporated in PA 05_0102 *Condition 3(12)* which is reproduced below. Additionally, PA 05_0102 *Condition 3(13)* identifies criteria for ensuring continuous improvement in noise mitigation actions at the mine site.

Noise Limits

3(12) *The Proponent shall ensure that the noise generated by the project does not exceed the levels set out in Table 1 at any privately-owned residence.*

Location	Day LAeq(15 minute)	Evening LAeq(15 minute)	Night	
			LAeq(15 minute)	LA1(1 minute)
All Privately owned Residences	35	35	35	45

Table 1: Impact assessment criteria dB(A)

Notes:

- To determine compliance with the LAeq(15 minute) limit, noise from the project is to be measured at the most affected point within the residential boundary, or at the most affected point within 30 metres of a dwelling (rural situations) where the dwelling is more than 30 metres from the boundary. Where it can be demonstrated that direct measurement of noise from the project is impractical, the DECC may accept alternative means of determining compliance (see Chapter 11 of the NSW Industrial Noise Policy). The modification factors in Section 4 of the NSW Industrial Noise Policy shall also be applied to the measured noise levels where applicable.
- These limits apply under the relevant meteorological conditions outlined in the assessment procedures in Chapter 5 of the NSW Industrial Relations Policy.
- To determine compliance with the LA1(1 minute) noise limits, noise from the project is to be measured at 1 metre from the dwelling façade. Where it can be demonstrated that direct measurement of noise from the project is impractical, the DECC may accept alternative means of determining compliance (See Chapter 11 of the NSW Industrial Noise Policy).
- These limits do not apply if the Proponent has an agreement with the relevant owner/s of these residences to generate higher noise levels, and the Proponent has advised the Department in writing of the terms of this agreement.

Continuous Improvement

3(13) *The Proponent shall:*

- implement all reasonable and feasible best practice noise mitigation measures;*
- investigate ways to reduce the noise generated by the project, including off-site road and rail noise and maximum noise levels which may result in sleep disturbance; and*
- report on these investigations and the implementation and effectiveness of these measures in the AEMR, to the satisfaction of the Director General*

3 MANAGEMENT SAFEGUARDS AND AMELIORATIVE ACTIONS

The following actions or strategies will be implemented to minimise the potential for noise impacts at residential receivers during site establishment and operational phases of the mine.

Site Establishment

Under some meteorological conditions, it is acknowledged that some activities undertaken as part of the site establishment phase may generate noise levels above the noise impact assessment criteria. In order to minimise this potential for exceedance, the following controls will be adopted:

- Prior to being brought onto site, all earthmoving equipment would be required to exhibit sound power levels consistent with the schedules in the noise assessment by Spectrum Acoustics presented below.

Table 2.0

CONSTRUCTION NOISE SOURCES	SOUND POWER LEVEL	
	(LA10)	
- Building fabrication at surface facilities	110	
- Tracked dozer (Clearing/tree felling)	117	
- Front-end Loader	117	
- Topsoil scraper	118	
- Overburden Truck	116	
- Grader	114	
- Pneumatic roller	114	

OPERATIONAL NOISE SOURCES	SOUND POWER LEVEL	
	(LAeq)	(LAmax)
- Conveyors	76dB/metre	80
- Dozer at stockpile ¹	107	114
- Crusher (attenuated) ¹	104	108
- Rail load-out ¹	102	114
- Workshop	95	105
- Ventilation fans (attenuated) ²	102	N/A
- Personnel carrier	102	115
- Locomotives idling on rail loop	102	106

Note 1: Based on measurements taken at Werris Creek Mine

Note 2: As recommended in acoustic assessment. Level on 98dB(A) is likely to be achieved.

- High frequency reversing alarms will not be permitted on any equipment brought onto site. Rather, all reversing alarms should be of the lower / mid range frequency type.
- Construction of the eastern end of the rail loop will not be undertaken at times when temperature inversions are likely, ie. calm and cool mornings with no cloud cover. Conditions will be assessed on a daily basis, and the Mine Manager will ensure regular interaction with the site meteorological station to assess weather

conditions and provide daily advice to the contractor with regard to the suitability of conditions for construction.

- Until the excavator can be operated at below natural surface topography, construction of the conveyor drift box cut would not occur under temperature inversion conditions or when winds less than 3 m/s occur from the sector between the south and east (bearing 90° to 225°).
- Noise monitoring would be undertaken at the residences most likely to be affected by site establishment noise.

Operational Noise Controls

- The ventilation fan located within the Ventilation Drift will be enclosed to reduce the sound power level of the fan to 102dB(A).
- The approved hours of operation (of PA 05_0102) will be adhered to.
- Site personnel will be required to pay due attention to site weather conditions and modify or stand down from operational activities if directed by mine management.
- Monitoring of emitted noise levels will be undertaken during mining operations to verify compliance with noise criteria and to assess the need, if any, for additional noise attenuation measures.

Transport Noise Controls

- The site access road will be sealed and regularly maintained.
- Strict adherence to the approved hours of operation for transport activities will be enforced by mine management.
- All project employees and contractors will be instructed to enter and exit the mine site in a courteous manner and without undue traffic noise.
- All access roads will be signposted and speed limited to minimise transport noise.

Other Noise Controls

- Equipment with lower sound power levels will be used in preference to more noisy equipment.
- All equipment used on site will be regularly serviced to ensure the sound power levels remain at or below the levels used in the modelling to assess generated noise levels and compliance with the criteria.
- The on-site road network will be well maintained to limit body noise from empty trucks travelling on internal roads.
- NCPL will maintain dialogue with neighbours and the local community to ensure any concerns in relation to construction, operational or transport noise are addressed.

4 MANAGEMENT OF COMMUNITY CONSULTATION

Community Consultation

Community consultation was an important element throughout the planning and investigation stages into the Narrabri Coal Mine. This program will continue throughout the life of the mine, with NCPL addressing any concerns raised by the local community in a timely and efficient manner.

Within 3 months of the date of PA 05_0102 being granted (ie by 13 February 2008), a Community Consultation Committee (CCC) will be established to address any concerns raised by local members of the community. The CCC will be comprised, and meetings conducted, in accordance with *Condition 4(9)* of PA 05_0102, which as follows:

“Within 3 months of this approval, the Proponent shall establish a Community Consultative Committee for the project to the satisfaction of the Director General, in general accordance with the Guideline for Establishing and Operating Community Consultative Committees for Mining Projects (Department of Planning, 2007), or its latest version.

Complaints Handling and Monitoring

NCPL will:

- establish and maintain a system for recording complaints with respect to construction and mining activities. A publicly advertised telephone complaints line will be utilized to receive complaints during operating hours and record complaints at other times;
- ensure that all complaints are entered into a log book or similar database;
- ensure that an initial response is provided within 24 hours of receipt of a complaint except in the event of complaints recorded when the mine is not operational; and
- provide a report of complaints received every 12 months to DoP, NSC, GSC, DECC, DPI (Mineral Resources) and the CCC through the AEMR.

The NCPL complaints record will include the following details for noise complaints.

- The date and time of complaint.
- Any personal details the complainant wishes to provide or if no such details are provided a note to that effect.
- The nature of the noise that led to the complaint, including the time of the noise and its duration.
- The action taken by NCPL in relation to the complaint, including any follow-up contact with the complainant.
- If no action was taken by NCPL, the reason why no action was taken.

Contingency Measures When Noise Complaints are Received

If noise levels of any item of plant or machinery exceed the levels outlined in Section 2, or if noise levels at any residence exceed the levels outlined in *Condition 3(12)*, the noise producing plant or machine will be measured by an independent acoustic consultant. Sound attenuation measures will be installed to plant and equipment where necessary to ensure that noise emissions comply with the relevant noise levels in Section 3. Alternatively, the equipment will be stood down or removed from site.

Best Practice Methodology

There are no specific noise mitigation measures in the *Environmental Assessment* that require engineering design. The NMP incorporates best practice techniques of identifying potential noise related impacts, avoiding certain adverse times and weather conditions and field verification of predicted noise levels early in the life of the project. The community liaison program, complaints register and response methods and regular monitoring as identified in Section 6 and **Appendix 1** in this document are all best practice procedures in the mining industry.

5 MONITORING AND REPORTING

Periodic monitoring of noise levels is required in accordance with *Condition 3(14) of PA 05_0102, which is as follows:*

“The Proponent shall prepare and implement a Noise Monitoring Program for the project to the satisfaction of the Director-General. This Program must:

- a) be submitted to the Director General for approval prior to the commencement of construction activities;*
- b) be prepared in consultation with the DECC;*
- c) use attended noise monitoring measures to monitor the performance of the project; and*
- d) include a protocol to establish whether the project is complying with the noise impact assessment criteria in Table 1.*

Noise Monitoring Programs

Noise compliance monitoring during the site establishment phase of the mine will include attended and unattended monitoring at the residences identified on **Figure 2** and **Table A**. The monitoring will be undertaken on a quarterly basis to monitor compliance with the noise impact assessment criteria identified in Section 2. The noise monitoring during the establishment phase will also target specific activities during construction to ensure noise levels are in fact within ranges predicted in the EA. Activities to be targeted will include construction of the eastern section of the rail loop, extraction of the box cut, and construction of amenity bunds. Monitoring will be undertaken at the most likely affected residence as per Table A below.

Table A
Noise Monitoring Locations¹

RECEIVER NUMBER (AS PER FIGURE 2)	LAND OWNER
N1 – “Bow Hills”	J & R. Steiger
N2 – “Westhaven”	A. Castro
N3 – “Naroo”	M.W Foster
N4 – “Greylands”	M & D White
N5 – “Kurrajong”	M Lennox
Note 1. Other locations may be required by the DECC if initial monitoring indicates that other locations should be included.	

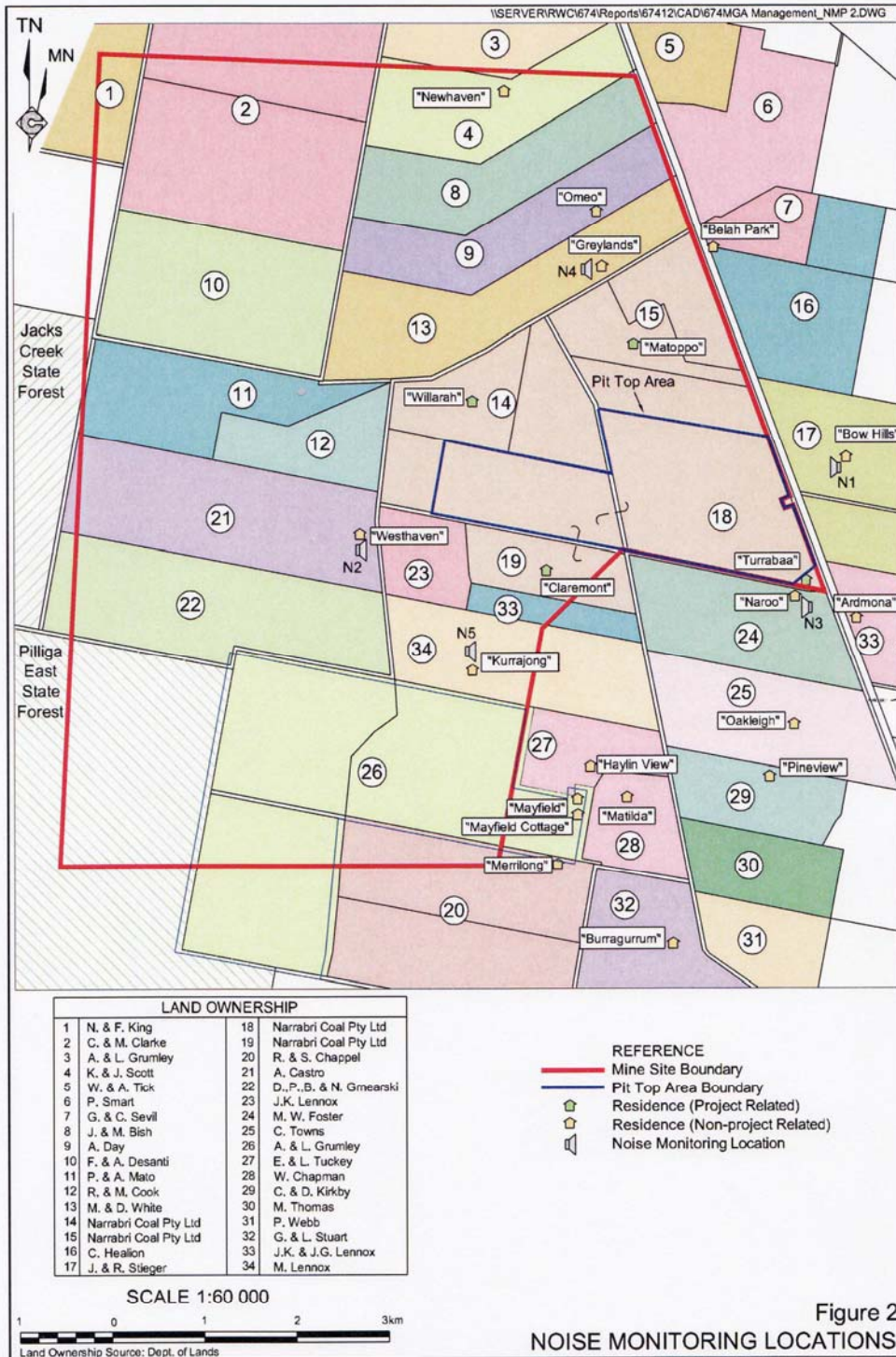
On completion of the site establishment phase, and commencement of mining and coal crushing / screening operations, attended and unattended noise monitoring will be undertaken on a quarterly basis to assess compliance against criteria in section 3(12) of Development Consent 05_0102. The quarterly monitoring events will also be used to confirm (or validate) the predictions made by the *Environmental Assessment* (“the validation monitoring program”). In circumstances where the quarterly monitoring program does not provide conditions conducive to validation monitoring ie. inversions, an additional set of monitoring will be conducted at a time that covers those events.

In circumstances where noise complaints are made relating to operations at the mine site, targeted noise investigations will also be undertaken at those receivers in order to assess and/or validate the complaint.

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Narrabri Coal Mine

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NOISE MONITORING PROGRAM
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Noise Monitoring Locations

All monitoring will be conducted at or near the residential locations presented in **Figure 2** and listed in **Table A**. The frequency of monitoring is nominated in **Table B**.

Noise Monitoring Frequency

The frequency of monitoring for the various noise monitoring programs is nominated in **Table B**. If conditions on the day of monitoring are not suitable (ie. high winds, rain, etc,) then the monitoring event must be rescheduled to ensure ongoing compliance with monitoring frequency. The Noise Model validation may also require additional monitoring events if the quarterly monitoring program does not cover adverse conditions such as inversions and adverse winds. This will be assessed within the first 12 months of noise monitoring.

Table B
Noise Monitoring Summary

Type	Frequency	Responsibility	Comments
Construction Noise			
Attended and Unattended noise surveys	Quarterly during construction phase.	Suitably Qualified Acoustical Consultant.	Noise monitoring methodology provided in Section 5 of NMP
Operational Noise			
Attended and Unattended noise surveys	Quarterly	Suitably Qualified Acoustical Consultant.	Noise monitoring methodology provided in Section 5 of NMP
Noise Model Validation			
Attended and Unattended noise surveys	Undertaken as part of quarterly noise monitoring	Suitably Qualified Acoustical Consultant	Survey will determine if predictions in the Environmental Assessment can be validated.
Construction Equipment and Mobile Mine Equipment Sound Power Levels			
Construction Machinery Noise	During construction and upon request from NCPL Manager	NCPL or qualified Acoustical Consultant	The sound power levels are to be recorded.
Mobile Mine Equipment	Reviewed opportunistically	NCPL Mine Manager and Individual Contractors approved by the Director-General.	The sound power levels are to be recorded.

Noise Monitoring Procedures

Attended noise surveys will be conducted as follows.

1. All noise investigations will be carried out in accordance with NSW DECC's Industrial Noise Policy, 2000 (INP), Environmental Noise Control Manual (ENCM) and applicable Australian Standards.
2. Noise levels will be measured in one-third octave bands using an instrument with IEC Type 1 characteristics as defined in AS 1259-1990 "Sound Level Meters". The instrument will have current calibration as per manufacturer's instructions and field calibration will be confirmed before and after measurements with a sound level calibrator.

3. The instrument will be set to A-weighting, “fast” response and measurements of $L_{Aeq(15\text{ minute})}$ will be taken at each location in **Table A**. Each measurement will be stored at a sampling rate of no greater than 5 seconds for further analysis.
4. During the site establishment phase, a measurement will be taken at a location nearest to where the activities will be occurring immediately prior to the commencement of those activities. Two further measurements will be taken during those construction activities. If no mine related noise is audible at the monitoring locations and if weather/operating conditions remain unchanged during the same day to record the noise levels attributable to the survey, then only one measurement will be taken at that location.
5. During operations, attended surveys will be conducted during the approved hours of operation with at least three measurements taken during one day at each location in **Table A**, so that noise levels during the full range of operating times (day, evening and night) are monitored. Targeted monitoring will be included to ensure activities of rail loading and transport are assessed against compliance criteria. This will require pre-arranged monitoring to coincide with the occurrence of the activity.
6. Field notes will be taken during each measurement recording the time and duration of noise events, noise sources, instantaneous noise levels and the frequency range of identified site noise sources. Where an obvious noise exceedance is detected, the noise monitor must notify the mine manager of the exceedance and obtain relevant information as to the possible source of the exceedance, ie. malfunctioning equipment, additional activity contributing to noise levels etc to ensure appropriate reporting and action on the exceedance.
7. Extraneous noise sources will be filtered from the measured signal using Bruel & Kjaer Evaluator Software and the $L_{Aeq(15\text{-minute})}$ level attributable to NCPL activities will be identified and compared with the relevant criteria.
8. Details regarding plant configuration, survey interval, weather conditions, extraneous noise sources, monitoring locations and times of measurement will be recorded for inclusion in the noise monitoring report.
9. Unattended noise logging (see Items (a) to (e) below) will be conducted to coincide with the quarterly attended surveys. A noise logger will be deployed at a selected location near to construction works for a three day period spanning from the day before, to the day after the attended survey.

Unattended noise surveys will be conducted as follows.

- (a) IEC Type 1 noise loggers with current calibration as per manufacturer’s instructions will be used.
- (b) The logger(s) will initially be placed at one or more locations selected from **Table A** so that it coincides with a measurement location for the attended surveys. The microphone will be fitted with a matching wind shield and will not be placed under trees or near an extraneous noise source (eg, pool pumps or electrical transformers).
- (c) Levels will be measured continuously over a 3-day period at 15-minute statistical intervals. Noise percentiles recorded shall include L_{Amax} , L_{Aeq} , L_{A1} , L_{A10} , L_{A90} and L_{Amin} .

- (d) Weather data for the unattended noise monitoring period will be interrogated to determine periods of rain or wind speeds over 5 m/s. Corresponding noise data will either be deleted or otherwise highlighted as invalid.
- (e) Logger data will be displayed graphically in the noise monitoring report, with periods of criterion exceedance highlighted. Comments will be given as to the noise source or weather conditions responsible for the exceedances.

The Environmental Officer will review the results of all noise monitoring and in accordance with Conditions 3 and 4 of Schedule 4 of Development Consent 05_0102, report any incident of exceedance in noise criteria within 24 hours of detecting the exceedance to the DoP and DECC. Within 6 days of providing this notification, NCPL will provide those agencies with a written report identifying the date, time and nature of the exceedance, identify the cause or likely cause of the exceedance, describe actions taken in relation to the exceedance, and identify any measures being undertaken to minimise the risk of future exceedance of noise criteria. Any exceedance in noise criteria will also be reported in the Annual Environmental Management Report (AEMR).

The results of the monitoring program will also be made available on NCPL's website and updated on a regular basis as required under consent condition 11 of Schedule 4.

6 RESPONSIBILITIES AND ACCOUNTABILITIES

During the site establishment and operational phases of the development, the Narrabri Coal Mine will be managed by the General Manager – New Projects and Mine Manager respectively. These persons will have overall responsibility for ensuring contractors, employees and service providers comply with all laws, regulations, licences, approvals and conditions of the development consent.

All significant contractors will be required to undertake an environmental risk assessment and undertake site induction training prior to commencing works on site. At this time they will also be instructed in the environmental rules, procedures and processes applicable whilst they are on the site and the requirement for equipment to be fitted with all appropriate attenuation equipment in order to achieve the nominated sound power levels for their items of equipment.

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APPENDIX 1

Noise Monitoring Protocol

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Narrabri Coal Mine – Noise Monitoring Protocol

Control/ Action	Timing / Trigger	Responsibility	Monitoring	Reporting
NCPL and all contractors will provide environmental training on noise control and awareness for all personnel and sub-contractors.	This training will take place before the commencement of work by any employee, contractor, or sub-contractor whose work is likely to create loud noise.	NCPL Manager or nominated representative / Individual Contractors.	This awareness training will be incorporated into site inductions.	The effectiveness of this control will be monitored by the Environmental Officer and will be reported annually in the AEMR.
Potentially affected residents will be notified prior to potentially noisy activities and will be kept informed during the construction phase.	One week prior to potentially noisy phases of activity being undertaken or within a lesser period agreed to by the resident(s).	NCPL Manager / Environmental Officer	The effectiveness of this control can be determined in the community consultation process.	The effectiveness of this control will be reported annually in the AEMR.
Machinery to be used during construction will be required to satisfy maximum sound power levels as specified in Table 2.	On entry to site and on request from NCPL Manager.	NCPL Manager, Individual Contractors	Validation testing. Upon request by NCPL Manager.	Sound power levels of all machinery tested will be recorded.
Mobile mining equipment will be required to satisfy maximum sound power levels as specified in Table 2.	Mobile mining equipment used on site must be certified as compliant with the relevant noise standard and will be tested on site entry	NCPL Manager, Individual Contractors	Mobile mining equipment noise levels will be reviewed opportunistically.	Sound power levels of all mining equipment will be recorded.
Site equipment will be selected so as to have the lowest practical level of sound emission and will be maintained in good order.	This will be a continual process.	NCPL Manager, Individual Contractors.	Noisy equipment is to be highlighted in regular inspections of operations and noise monitoring programs.	The effectiveness of this control will be reported annually in the AEMR.
Due attention will be paid to adverse weather conditions, so that modifications can be made to the work program where necessary. A real time link between meteorological station and operator will be created advising of adverse meteorological conditions.	This will be a continual process.	NCPL Manager, Individual Contractors	On-site meteorological station will highlight adverse conditions. The effectiveness of this will also be determined in the community consultation process.	The effectiveness of this control will be reported annually in the AEMR.
Heavy vehicle reversing alarms will be of the broadband type.	Before use of machinery on site.	NCPL Manager and Individual Contractors.	This control will be monitored in conjunction with the complainant.	The effectiveness of this control will be reported annually in the AEMR.
All complaints will be registered and responded to in accordance with the complaints procedure in the EMS.	Whenever a complaint is received.	NCPL Manager	This control will be monitored in the complaints handling and follow-up process.	The effectiveness of this control will be reported annually in the AEMR.

Narrabri Coal Mine – Noise Monitoring Protocol

Control/ Action	Timing / Trigger	Responsibility	Monitoring	Reporting
Monitoring of emitted noise levels will be undertaken during construction stage to verify compliance with noise criteria and to assess the need for additional noise attenuation measures.	On a quarterly basis.	NCPL Environmental Officer and Mine Manager.	By suitably qualified acoustical consultant or trained NCPL employee approved by the Director-General.	Monitoring results and the effectiveness of any controls used will be reported in the relevant AEMR.
Monitoring of emitted noise levels will be undertaken during operational phase to verify compliance with noise criteria and to assess the need for additional noise attenuation measures.	On a quarterly basis	NCPL Environmental Officer and Mine Manager.	By suitably qualified acoustical consultant or trained NCPL employee approved by the Director-General.	Monitoring results and the effectiveness of any controls used will be reported annually in the AEMR.