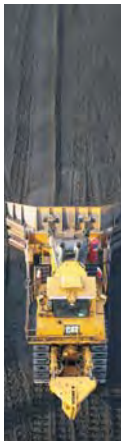
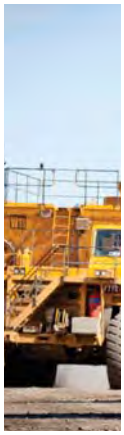
DURALIECOAL
Part of the Yancoal Australia Group

Duralie Open Pit Modification
Environmental Assessment





APPENDIX A

NOISE AND BLASTING ASSESSMENT

YANCOAL
兖煤澳大利亚有限公司

Resource Strategies

global environmental solutions

Duralie Modification

Noise and Blasting Assessment

Report Number 610.06173.00200-R1

9 July 2014

Duralie Coal Pty Ltd
c/- Resource Strategies Pty Ltd
Suite 2, Level 2
24 McDougall Street
MILTON QLD 4064

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Duralie Modification

Noise and Blasting Assessment

PREPARED BY:

SLR Consulting Australia Pty Ltd
ABN 29 001 584 612
2 Lincoln Street Lane Cove NSW 2066 Australia

(PO Box 176 Lane Cove NSW 1595 Australia)
T: 61 2 9428 8100 F: 61 2 9427 8200
E: sydney@slrconsulting.com www.slrconsulting.com

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1 INTRODUCTION

1.1 Background

Duralie Coal Pty Ltd (DCPL), a wholly owned subsidiary of Yancoal Australia Limited (Yancoal), owns and operates the Duralie Coal Mine (DCM). DCM is located approximately 10 kilometres (km) north of the village of Stroud and approximately 20 km south of Stratford in the Gloucester Valley in New South Wales (NSW).

Coal production commenced at Duralie in 2003 using conventional open cut mining methods, operating 24 hours a day. The Duralie Extension Project (DEP) was approved under Project Approval (08_0203) on 10 November 2011, with a maximum Run-of-Mine (ROM) coal mining rate of 3 million tonnes per annum (Mtpa). Sized Duralie ROM coal is loaded and railed to the Stratford Coal Mine (SCM) for coal washing before being transported on the North Coast Railway to the port of Newcastle.

1.2 The Modification

DCPL is seeking modification to Project Approval (08_0203) (the Modification) to facilitate the following changes:

- Increase in the maximum depth of the Clareval open pit.
- A minor increase in the *extent* of surface development of the DCM of approximately 2.5 hectares, resulting from:
  - a reduction in low wall angles of the Clareval open pit and the removal of a pillar between the Clareval and Weismantel open pits to improve geotechnical stability; and
  - associated relocation of the upstream diversion to the west of the Clareval open pit.
- Revised mining sequence (i.e. progression of mining in the Clareval and Weismantel open pits).
- Increased height of the central portion of the waste rock emplacement from approximately 110 metres Australian Height Datum (m AHD) to 135 m AHD.

SLR Consulting Australia Pty Ltd (SLR) has been engaged by DCPL to evaluate and assess the potential noise and blasting impacts associated with the Modification with particular focus on any incremental noise impacts by comparison with the existing mining operations and approved noise limits.

In preparing this assessment SLR has considered several documents including the following:

- *Duralie Coal Mine Noise Monitoring Program* (NMP-R02-E) (DCPL, June 2013);
- *Duralie Coal Mine Blast Monitoring Program* (BLMP-R02-B) (DCPL, May 2013);
- *Duralie Extension Project Noise and Blasting Impact Assessment* (DEP NIA) (Heggies, 2010);
- *Duralie Extension Project Supplementary Operational Noise Assessment* (DEP Supplementary *Noise Assessment*) (Heggies, 2010);
- *Stratford Extension Project Noise and Blasting Impact Assessment* (SEP NIA) (SLR, 2012);
- *Duralie Coal Mine Annual Review 2012* (DCMAR 2012) (Carbon Based Environmental, 2012);
- *Duralie Coal Mine Annual Review 2013* (DCMAR 2013) (Carbon Based Environmental, 2013);
- *Environmental Quarterly Survey July 2013 Compliance Survey* (VIPAC, July 2013);
- *Environmental Quarterly Survey October 2013 Compliance Survey* (VIPAC, October 2013); and
- *Environmental Quarterly Survey January 2014 Compliance Report* (VIPAC, February 2014).

1.3 Assessment Requirements

The noise and blasting impact assessment procedures for the Modification have been guided by the requirements presented in **Table 1**.

Table 1 Impact Assessment Procedure Guidelines

Assessment Guideline	Criteria	Impact
Operating Noise Guided by the requirements of the NSW *Industrial Noise Policy* (INP) (Environment Protection Authority [EPA], 2000) and associated Application Notes dated 12 June 2013 in relation to setting acceptable project specific noise levels (PSNLs) and assessing any impacts.	**Section 5**	**Section 7**
Noise Amenity Cumulative Guided by the requirements of the INP in relation to existing and successive industrial development by setting acceptable (and maximum) cumulative equivalent continuous noise level ($L_{Aeq[period]}$) amenity levels for all industrial (ie non-transport related) noise in a receiver area.	**Section 8**	**Appendix H**
Blast Emission Guided by the requirements of the Australian and New Zealand Environment Council's (ANZEC) *Technical basis for guidelines to minimise annoyance due to blasting overpressure and ground vibration* (ANZEC, 1990) in relation to setting acceptable blast emission levels which cause human discomfort.	**Section 9**	**Section 9**

The Modification would not change the DCM rail movements or road transport movements, and therefore, no consideration of the NSW *Rail Infrastructure Noise Guidelines* or NSW *Road Noise Policy* is required.

1.4 Other Approved or Proposed Resource Projects

Other approved or proposed resource projects in the Gloucester Valley are summarised in **Table 2**.

Table 2 Other Approved or Proposed Resource Projects in the Gloucester Valley

Proponent	Project	Status
AGL Gloucester LE Pty Ltd (AGL)	Approved AGL Gloucester Gas Project	Project Approval dated 22 February 2011.
Gloucester Resources Ltd (GRL)	Proposed Rocky Hill Coal Project	Project Application (SSD-5156) currently being assessed by the DP&E.
Stratford Coal Pty Ltd (SCPL)	Approved Stratford Mining Complex comprising Stratford and the Bowen Road North Open-cut (BRNOC)	Stratford Development Consent (DA 23-98/99) dated 5 February 1999; and BRNOC Development Consent (DA 39-02-01) dated 25 July 2001.
Stratford Coal Pty Ltd (SCPL)	Proposed Stratford Extension Project	Project Application (SSD-4966) currently being assessed, with draft Development Consent issued by the Department of Planning and Environment (DP&E).

Note: The approved Gloucester Gas Project and proposed Rocky Hill Coal and Stratford Extension projects are considered cumulatively for operational noise (refer to **Section 8**) in this assessment.

2 EXISTING DURALIE

2.1 Overview

DCM has an approved ROM coal mining rate of 3 Mtpa operating 24 hours a day. Mining operations are supported by existing on-site facilities including an infrastructure area, water management storages and rail loading facilities.

DCM mining of ROM coal involves conventional drill and blast, truck and shovel open cut extractive methods with on-site coal sizing. Sized DCM ROM coal is loaded and railed to SCM (under the DCM Project Approval) where it is blended with SCM coal and washed in the SCM Coal Handling and Preparation Plant (under the SCM development consent).

DCM derived product coal is transported on the North Coast Railway to the port of Newcastle (under the SCM development consent).

2.2 Land Ownership and Land Zoning

The Land Ownership Plan (**Appendix B1**) identifies the nearest privately owned and mine owned receivers together with the Land Ownership Details (**Appendix B2**) including a list of property ID numbers, landowners and dwelling co-ordinates. The Great Lakes Council Local Environmental Plan 2014 Land Zoning Map (Sheet LZN_004) shows the land use zones in the vicinity of DCM being dominated by Rural Landscape zoning.

2.3 Approvals

With respect to operating noise, rail noise and blasting, DCPL has approval to operate in accordance with the following project approval and licence conditions:

- Project Approval (08_0203) dated 10 November 2011 (as modified) dated November 2012, with the relevant sections attached as **Appendix A1**.
- EPA Environment Protection Licence (EPL) No 11701 anniversary date 4 September with the relevant sections attached as **Appendix A2**.

The existing Project Approval (08_0203) includes conditions relating to acquisition upon request, mitigation upon requests and noise impact assessment criteria (ie the Project Approval noise limits). The existing Project Approval noise limits are reproduced below:

Table 2: Noise Criteria (dBA)

Location	***Day***	***Evening***	***Night***	
	$L_{Aeq(15\ minute)}$	$L_{Aeq(15\ minute)}$	$L_{Aeq(15\ minute)}$	$L_{Aeq(1\ minute)}$
172 – Lyall	*35*	*39*	*40*	*45*
126 – Hamann Pixalu PL	*35*	*35*	*39*	*45*
123 – Oleksiuk & Carmody				
173 – Trigg & Holland	*35*	*36*	*37*	*45*
116 – Weismantel	*35*	*35*	*37*	*45*
127 – Fisher-Webster				
131 (1) – Relton				
180 (1) – Thompson	*35*	*36*	*36*	*45*
95 – Smith & Ransley	*35*	*35*	*36*	*45*
144 – Wielgosinki	*35*	*36*	*35*	*45*
169 – Williams				
177 – Thompson				
All other privately-owned land	*35*	*35*	*35*	*45*

The landowners that have (unexercised) acquisition upon request rights in Project Approval (08_0203) are as follows: 117 Holmes, 118 Moylan, 122 White, 128 Hare Scott. The landowners that can request additional noise mitigation measures (such as double glazing, insulation, and/or air conditioning) are as follows: 123 Oleksiuk & Carmody, 126 Hamann Pixalu P/L and 172 Lyall.

DCPL has entered into private compensation agreements with the following landowners: 117 Holmes, 120 Mahony, 128 Hare Scott and 131(1) Relton.

2.4 Noise Management and Compliance

2.4.1 DP&E 2013 Compliance Audit

The DP&E conducted an audit of the DCM operations in November 2013. In regard to noise, the DP&E *Review of Duralie Coal Mine with Reference to PA 08_0203 and related Management Plans* found:

> *"All conditions of the PA relating to noise were found to be compliant".*

2.4.2 Noise Management Plan

The *Duralie Coal Mine Noise Management Plan* (NMP) (DCPL, 2013) describes the current noise management and monitoring regime. The NMP is currently under revision in consultation with the DP&E and EPA.

The program comprises operator-attended noise emission monitoring at a range of locations together with continuous real-time noise monitor and an on-site Automatic Weather Stations (AWS) as shown on the Blast and Noise Monitoring Sites **Appendix C1**. In accordance with the NMP, operator-attended noise monitoring is used for demonstrating compliance with the relevant noise limits (refer **Appendix A1** and **A2)**. Continuous real-time noise monitoring is used as a noise management tool to assist DCPL to take pre-emptive noise management actions.

Real-time noise investigation triggers set at levels below the Project Approval noise limits and are specified in the NMP. An exceedance of the real-time noise investigation triggers results in an investigation into the potential noise source, and implementation of management measures (eg relocation or temporary stand-down of equipment) as required to prevent an exceedance of the Project Approval noise limits.

A summary of the noise monitoring locations, and associated monitoring frequency, are presented in **Table 3** together with a cross reference to the Land Ownership Details presented in **Section 2.2**.

Table 3 Current Operational Noise Monitoring Locations

Receiver Type	Monitoring Sites[1]	Parameter	Frequency
Privately owned dwellings	175 Thomas (Former Woodley) (AAAS1/NM1), 120 Mahony (NM3), 127 Fisher-Webster (NM4),	Operator-attended monitoring	Routine every 3 months
	101 Holloway, 194 Kellehear	Operator-attended monitoring	Complaint based monitoring
DCPL owned dwellings	19(j1) DCPL (Former Zulumovski) (NM2),	Operator-attended monitoring	Routine every 3 months
	19(k1) DCPL (124 Bailey) (RTMN1)	Real-time noise monitoring	Continuous

Source: DCPL

Note 1: Refer to Noise and Blasting Monitoring Locations **Appendix C1**.

2.4.3 Operator-attended Noise Compliance Results 2012

As described in the *Duralie Coal Mine Annual Review 2012* (DCMAR 2012) (Carbon Based Environmental, 2012), operator-attended noise monitoring was undertaken on a quarterly basis (ie July 2011, October 2011, February 2012 and May 2012) for the 12 month reporting period to June 2012. In addition, DCPL installed a Sentinex real-time noise monitor to assist DCPL to take pre-emptive noise management actions to avoid potential non-compliances.

Based on the findings of the DCMAR 2012, there were no recorded non-compliances of the relevant intrusive $L_{Aeq(15minute)}$ and or $L_{Aeq(1minute)}$ noise limits at privately owned receivers during the 2012 reporting period.

2.4.4 Operator-attended Noise Compliance Results 2013

As described in the *Duralie Coal Mine Annual Review 2013* (DCMAR 2013) (Carbon Based Environmental, 2013), operator-attended noise monitoring was undertaken on a quarterly basis (ie July 2012, October 2012, January 2013 and April 2013) for the 12 month reporting period to June 2013. The Sentinex real-time noise monitor remained in place to assist DCPL to take pre-emptive noise management actions to avoid potential non-compliances.

Based on the findings of the DCMAR 2013, no non-compliances of the relevant intrusive $L_{Aeq(15minute)}$ and or $L_{Aeq(1minute)}$ noise limits at privately owned receivers were recorded during the 2013 reporting period.

2.4.5 Operator-attended Noise Compliance Results 2014

As described in the Environmental Quarterly Noise Compliance Survey Reports (VIPAC) operator-attended noise monitoring was undertaken on a quarterly basis (ie July 2013, October 2013 and January 2014). The Sentinex real-time noise monitor remained in place to assist DCPL to take pre-emptive noise management actions to avoid potential non-compliances.

Based on the findings of VIPAC, no non-compliances of the relevant intrusive $L_{Aeq(15minute)}$ and or $L_{Aeq(1minute)}$ noise limits at privately owned receivers were recorded up to January 2014.

2.5 Blast Management and Compliance

2.5.1 DP&E 2013 Compliance Audit

In regard to blasting, the DP&E 2013 Compliance Audit found:

> *"All conditions of the PA relating to blast management were found to be compliant, with the exception of Condition 8, Schedule 3. Details of the noncompliance are provided in Table 3.*
>
> *...*
>
> *An exceedance of overpressure was reported to DP&I from a blast 18 October 2013 recorded 121.2 at Mahony Property. It was stated that a private agreement was agreed at this time and the operation is currently reviewing alternative locations for monitoring".*

As noted by the DP&E 2013 Compliance Audit, DCPL has entered into a private agreement with the owner of the Mahony property. As such, the approved *Duralie Coal Mine Blast Monitoring Program* (BLMP) has been updated to reflect blast monitoring site at an alternative privately-owned property (ie alternative to the Mahony property), and DCPL is currently seeking an EPL variation to reflect this.

2.5.2 Blast Management Plan

The BLMP (DCPL, May 2013) describes the current blast management regime, which comprises blast emission monitoring at a range of locations as presented in **Table 4** and shown on the Blast Monitoring Locations **Appendix C1**. The BLMP is currently being revised in consultation with the DP&E.

In accordance with BLMP, blast emission monitoring is used for demonstrating compliance with relevant ground vibration and airblast limits (refer **Appendix A1** and **A2**).

Table 4 Current Blast Monitoring Locations

Monitoring Parameter	Monitoring Sites[1]	Parameter	Frequency
Privately owned dwellings	168 Schultz (AB1), 120 Mahony (AAAB2), 127 Fisher-Webster (AAAB3)	Ground vibration and airblast	Routine
DCPL owned sensitive sites	19(n1) Weismantels Inn,	Ground vibration	Routine

Source: DCPL

Note 1: Refer to Noise Monitoring Locations **Appendix C1** and Blast Monitoring Locations **Appendix C1**.

2.5.3 Blast Emission Compliance Results 2012

Based on the *Duralie Coal Mine Annual Review 2012* (DCMAR 2012) (Carbon Based Environmental, 2012), the information presented in **Table 5** relates to blast emission monitoring and management during the 12 month reporting period to June 2012.

Table 5 Blast Emission Monitoring Results Summary 2012

	168 Schultz (AB1)		120 Mahony (AAAB2)		127 Fisher-Webster (AAAB3)		145 Edwards	
	Vibration[1] (mm/s)	Airblast[2] (dBLpk)	Vibration[1] (mm/s)	Airblast[2] (dBLpk)	Vibration[1] (mm/s)	Airblast[2] (dBLpk)	Vibration[1] (mm/s)	Airblast[2] (dBLpk)
Maximum	0.4	105	2.7	112	1.0	108	1.1	102
Minimum	0.3	96	0.5	85	0.3	97	0.8	100
50% Exceedance	0.3	98	1.2	101	0.4	101	0.9	101
5% Exceedance	0.3	105	2.2	108	0.9	107	1.0	102
Vibration criterion	*5*	-	*5*	-	*5*	-	*5*	-
Airblast criterion	-	*115*	-	*115*	-	*115*	-	*115*
	19(c1) Hattam P/L		**19(k1) Bailey (AAS3)**		**19(f1) Mammy Johnsons Grave**		**19(n1) Weismantels Inn**	
	Vibration[1] (mm/s)	Airblast[2] (dBLpk)	Vibration[1] (mm/s)	Airblast[2] (dBLpk)	Vibration[1] (mm/s)	Airblast[2] (dBLpk)	Vibration[1] (mm/s)	Airblast[2] (dBLpk)
Maximum	7.1	118	2.6	112	1.3	112	2.2	115
Minimum	0.3	101	0.3	86	0.1	88	0.3	92
50% Exceedance	1.3	108	0.7	103	0.5	98	0.6	105
5% Exceedance	5.3	113	2.0	109	1.1	111	1.3	112
Vibration criterion	*5*	-	*5*	-	*5*	-	*5*	-
Airblast criterion	-	*115*	-	*115*	-	*115*	-	*115*

Source: DCPL

Note 1: Peak Particle Velocity (PPV) Vibration (mm/s).

Note 2: Airblast (dBLpk re 20 µPa).

Based on the findings of the DCMAR 2012, there were no recorded exceedances of the relevant ground vibration and airblast limits at privately owned receivers during the 2012 reporting period.

2.5.4 Blast Emission Compliance Results 2013

Based on the *Duralie Coal Mine Annual Review 2013* (DCMAR 2013) (Carbon Based Environmental, 2013), the information presented in **Table 6** relates to blast emission monitoring and management during the 12 month reporting period to June 2013.

Based on the findings of the DCMAR 2013, there were no recorded exceedances of the relevant ground vibration and airblast limits at privately owned receivers during the 2013 reporting period.

Table 6 Blast Emission Monitoring Results Summary 2013

	168 Schultz (AB1)		120 Mahony (AAAB2)		127 Fisher-Webster (AAAB3)		19(n1) Weismantels Inn	
	Vibration[1] (mm/s)	Airblast[2] (dBLpk)	Vibration[1] (mm/s)	Airblast[2] (dBLpk)	Vibration[1] (mm/s)	Airblast[2] (dBLpk)	Vibration[1] (mm/s)	Airblast[2] (dBLpk)
Maximum	0.6	105	4.4	118	1.0	114	2.1	119
Minimum	0.2	92	0.3	91	0.2	87	0.1	90
50% Exceedance	0.3	96	1.1	107	0.4	97	0.6	110
5% Exceedance	0.5	104	2.3	113	0.9	112	1.7	117
Vibration criterion	*5*	-	*5*	-	*5*	-	*5*	-
Airblast criterion	-	*115*	-	*115*	-	*115*	-	*115*

Source: DCPL

Note 1: Peak Particle Velocity (PPV) Vibration (mm/s).

Note 2: Airblast (dBLpk re 20 µPa).

2.5.5 Blast Emission Compliance Results 2014

Based on the blast emission results provided by DCPL, the information presented in **Table 7** relates to blast emission monitoring and management during the 12 month reporting period to June 2014.

Based on the blast emissions results presented in **Table 7**, there were no recorded exceedances of the relevant ground vibration and airblast limits at privately owned receivers during the 2014 reporting period except at 120 Mahony (AAAB2). At 120 Mahony (AAAB2), the airblast maximum limit of 120 dBLpk was marginally (1 decibel [dB]) exceeded on the 18 October 2013 and was subsequently reported to the DP&E and the EPA in accordance with the requirements of the BLMP. Similarly, the airblast (5% exceedance) limit of 115 dBLpk was marginally (1 dB) exceeded for the 2014 reporting period. It should also be noted that 120 Mahony (AAAB2) has a private agreement with DCPL in accordance with Project Approval (08_0203).

Table 7 Blast Emission Monitoring Results Summary 2014

	168 Schultz (AB1)		120 Mahony (AAAB2)		127 Fisher-Webster (AAAB3)		19(n1) Weismantels Inn	
	Vibration[1] (mm/s)	Airblast[2] (dBLpk)	Vibration[1] (mm/s)	Airblast[2] (dBLpk)	Vibration[1] (mm/s)	Airblast[2] (dBLpk)	Vibration[1] (mm/s)	Airblast[2] (dBLpk)
Maximum	0. 5	112	4.4	121	1.0	110	3.3	-
Minimum	0.2	88	0. 1	95	0.2	87	0.1	-
50% Exceedance	0.3	97	1.2	109	0.4	94	0.7	-
5% Exceedance	0.4	105	3.0	116	0.8	106	2.0	-
Vibration criterion	*5*	-	*5*	-	*5*	-	*5*	-
Airblast criterion	-	*115*	-	*115*	-	*115*	-	*115*

Source: DCPL

Note 1: Peak Particle Velocity (PPV) Vibration (mm/s).

Note 2: Airblast (dBLpk re 20 µPa).

In addition, an exceedance of the airblast limit of 120 dBL at property 120 (Mahony), for which DCPL has entered into a private compensation agreement. The exceedance was predicted prior to the blast occurring, and the DP&E, EPA and DRE were notified by DCPL of the expected exceedance and that a private compensation agreement is in place.

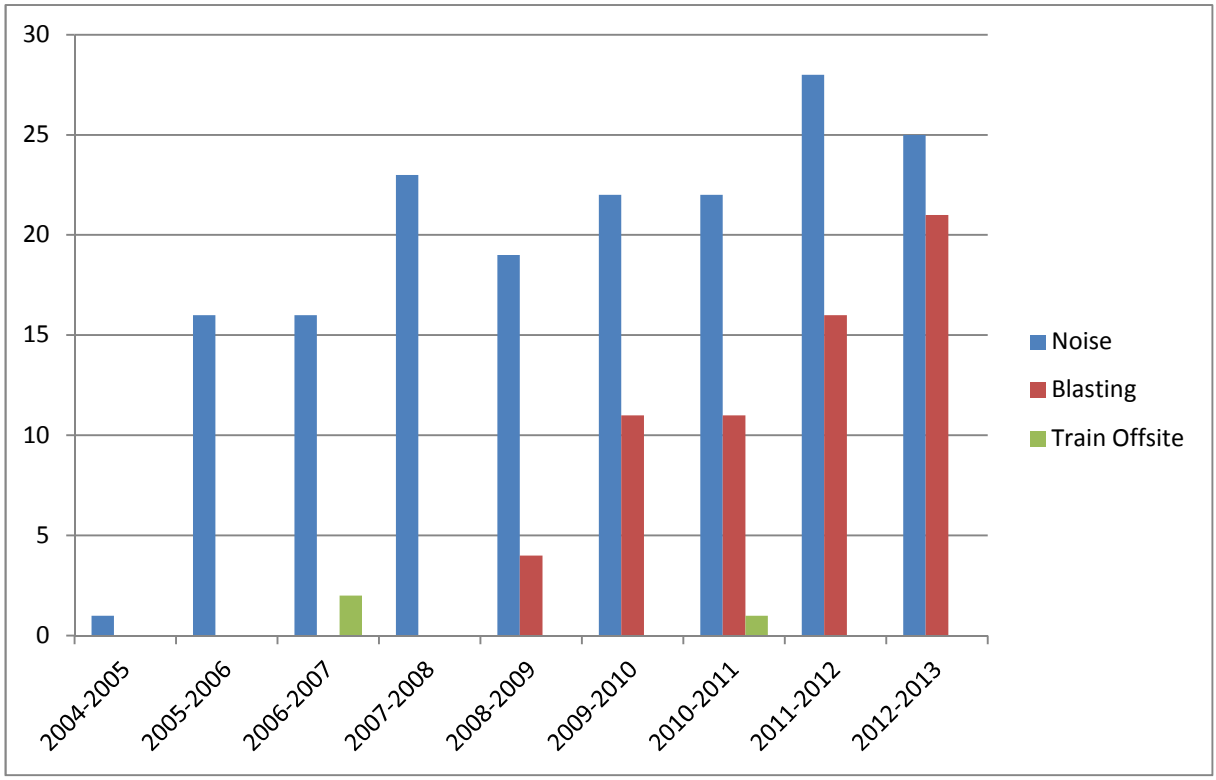
2.6 Noise and Blasting Complaints Summary

DCPL maintains a complaints register in accordance with Project Approval (08_0203). A summary of the complaint records from 2005 to 2013 are presented in **Figure 1** including operating noise, blasting and off-site train noise complaints. **Figure 1** shows the number of noise related complaints has ranged between 16 and 28 complaints per year from 2005 onwards.

All noise related complaints received by DCPL were responded to and investigated in accordance with the Complaint Response Protocol detailed in the NMP-R02-E. Where appropriate, following each noise related complaint the source of the noise was investigated and, in some instances, mining operations were altered in response. However, there were no reportable environmental incidents relating to noise in the 2013 reporting period.

Similarly, all blast related complaints were responded to and investigated in accordance with the Complaint Response Protocol detailed in the BLMP.

Figure 1 Relevant Noise, Blasting and Rail Complaints 2005 to 2013



Source: DCPL

3 PROPOSED MODIFICATION

3.1 Approved and Proposed Hours of Operation

There would be no change in the approved operating hours of DCM due to the Modification as presented in **Table 8**.

Table 8 Approved DCM and Proposed Modification Hours of Operation

Operation	Description	Currently Approved[1]	Modification
On-Site Operation	Periodic Civil Construction works	Generally daytime (0700 hours to 1800 hours, 7 days per week)	Unchanged
	Mine maintenance, operation, coal handling	24 hours, 7 days per week	Unchanged
	Blasting Operations	0900 hours to 1700 hours 1 blast per day; and 3 blasts per week on average over any 12 month period	Unchanged
Off-Site Operation	Despatch Shuttle Train Receive Shuttle Train[2]	0600 hours to 2200 hours, 7 days per week 0600 hours to 0000 hours, 7 days per week	Unchanged
	Road Traffic	Duralie main access road off The Bucketts Way 24 hours, 7 days per week	Unchanged

Note 1: As per Project Approval (08_0203) dated 10 November 2011 (as modified) refer **Appendix A1**.

Note 2: Only operate shuttle train between 0000 hours and 0100 hours in exceptional circumstances.

3.2 General Operation

The indicative Modification Stage Plans for 2015 and 2018 are attached as **Appendices D1 and D2**. 2015 is representative of a year where waste rock emplacement would occur at approximately 135 m AHD (i.e. a key change proposed for the Modification), with mining operations occurring in the Clareval open pit. By 2018, waste rock emplacement (i.e. backfill of the open pits) would be occurring below 135 m AHD and mining operations would be occurring in the Weismantel open pit.

3.3 On-site Blasting

The method of overburden material removal at DCM is by drill and blasting techniques. A mixture of ammonium nitrate and fuel oil (ANFO) (dry holes) and emulsion blends (wet holes) are used at an average powder factor of approximately 0.8 kilograms per bank cubic metre (kg/bcm).

There would be no change to the range of blast sizes (which typically range from 50,000 bank cubic metres (bcm) up to 250,000 bcm) at DCM for the Modification. However, potential impacts associated with blasting in the areas of the minor incremental extensions to the existing open cut pits as shown in **Appendix D3** are assessed in this report. Blasting would continue to occur within approved hours (refer **Table 8**).

3.4 Off-site Road Transport

There would be no change in the approved DCM daily road traffic generation due to the Modification and off-site road transport is not further considered in this report.

3.5 Off-site Rail Transport

There would be no change in the approved DCM daily rail traffic generation or hours of operation due to the Modification and off-site rail transport is not further considered in this report.

4 EXISTING METEOROLOGICAL AND NOISE ENVIRONMENT

4.1 Meteorological Environment

As discussed in **Section 2.4.2**, DCPL maintains an on-site Automatic Weather Station (AWS) as shown on the Blast and Noise Monitoring Sites **Appendix C1**. Relevant assessment meteorological conditions for DCM were established in accordance with the INP for the DEP NIA. An assessment of site specific wind velocities derived from the DCM AWS for the period June 2012 to March 2014 did not identify any additional dominant seasonal daytime, evening and night-time wind velocities. It was therefore considered appropriate that the meteorological environment assessments (previously established in the DEP NIA in accordance with the INP) be adopted for the Modification (refer **Appendix E1**).

4.1.1 Site Specific Winds

Section 5.3 of the INP provides the following regarding wind effects:

> *"Wind effects need to be assessed where wind is a feature of the area. Wind is considered to be a feature where source to receiver wind speeds (at 10 m height) of 3 m/s or below occur for 30 percent of the time or more in any assessment period in any season."*

The prevailing winds less than (or equal to) 3 metres per second (m/s) with a frequency of occurrence greater than (or equal to) 30 percent (%) and considered to be relevant to Duralie in accordance with the INP are presented in **Table 9**.

Table 9 Prevailing Wind Conditions in accordance with the INP

Season	Winds ±45 degrees (^{o}) 3 m/s with Frequency of Occurrence 30%		
	Daytime	Evening	Night-Time
Annual	Nil	NNW	NNW
Summer	Nil	NNE	N
Autumn	Nil	NNW	NNW
Winter	Nil	NW	NNW
Spring	Nil	NNW	NNW

4.1.2 Temperature Inversions and Drainage Flows

Section 5.2 of the INP, Temperature Inversions, states:

> *"Assessment of impacts is confined to the night noise assessment period (10.00 pm to 7.00 am), as this is the time likely to have the greatest impact - that is, when temperature inversions usually occur and disturbance to sleep is possible."*
>
> *"Where inversion conditions are predicted for at least 30% (or approximately two nights per week) of total night-time in winter, then inversion effects are considered to be significant and should be taken into account in the noise assessment".*

The frequency of occurrence of atmospheric stability classes are presented in **Table 10**, together with estimated Environmental Lapse Rates (ELR). In accordance with the INP, the frequency of occurrence of moderate (ie 1.5 to 4.0 degrees Celsius [^{o}C]/100 m) winter temperature inversions is greater than 30% during the combined evening and night-time period and therefore requires assessment.

Table 10 Atmospheric Stability Frequency of Occurrence - Winter Evening and Night-Time

Stability Class	Frequency of Occurrence					Estimated ELR[1] °C/100 m	Qualitative Description
	Annual	Summer	Autumn	Winter	Spring		
A	0%	0%	0%	0%	0%	<-1.9	Lapse
B	0%	0%	0%	0%	0%	-1.9 to -1.7	Lapse
C	0%	0.0%	0%	0%	0%	-1.7 to -1.5	Lapse
D	40%	48%	35%	34%	44%	-1.5 to -0.5	Neutral
E	15%	16%	15%	15%	15%	-0.5 to 1.5	Weak inversion
F	40%	31%	45%	48%	37%	1.5 to 4	Moderate inversion
G	5%	6%	5%	3%	4%	>4.0	Strong inversion

Note 1: °C = degrees Celsius.

In addition, the INP Section 5.2 *Temperature Inversions* also states:

> *"The drainage-flow wind default value should generally be applied where a development is at a higher altitude than a residential receiver, with no intervening higher ground (for example, hills). In these cases, both the specified wind and temperature inversion default values should be used in the noise assessment for receivers at the lower altitude."*

Accordingly, north-northwest down valley drainage flow has been applied to receivers with no intervening higher topography.

4.1.3 Noise Model Meteorological Parameters

The Environmental Noise Model (ENM) noise modelling meteorological parameters are presented in **Table 11** where the DCM weather conditions are characterised by prevailing evening and night-time northerly winds. Moderate temperature inversions are also a feature of the area coinciding with the "down valley" drainage flows particularly during winter. The observed meteorological conditions are also generally consistent with the default parameters presented in Section 5 of the INP.

Table 11 Calm (neutral) and Noise Enhancing Meteorological Modelling Parameters

Period	Meteorological Parameter	Air Temperature	Relative Humidity	Wind Velocity	Temperature Gradient
Daytime	Calm	18°C	60%	0 m/s	0°C/100 m
Evening	Calm	14°C	70%	0 m/s	0°C/100 m
	Wind only	14°C	70%	NW 3 m/s, NNW 3 m/s, NNE 3 m/s	0°C/100 m
Night-time	Calm	10°C	90%	0 m/s	0°C/100 m
	Wind only	10°C	90%	NNW 3 m/s, N 3 m/s,	0°C/100 m
	Temperature Inversion only	10°C	90%	0 m/s	3°C/100 m
	Inversion plus Drainage flow[1]	10°C	90%	NNW 2 m/s	3°C/100 m

Note 1: North-northwest down valley drainage flow applicable to receivers with no intervening higher topography.

4.2 Noise Environment

Given the existing operation of DCM, it is appropriate to review the pre-mine background noise data (from 1995) to determine the relevant Rating Background Levels (RBLs) and noise amenity levels ($L_{Aeq(period)}$) in accordance with the INP procedures. In addition, more recent (supplementary) ambient noise monitoring was conducted in November 2007 coinciding with DCM operations.

4.2.1 Background Noise

Comprehensive background noise surveys to characterise and quantify the pre-mine noise environment in the area surrounding Duralie were conducted in August 1995 for the Duralie Coal Environmental Impact Statement (EIS) (DCPL, 1996).

Supplementary noise surveys to quantify ambient noise levels (i.e. all noise sources) and to estimate industrial noise only (i.e. in the absence of transport, natural and domestic noise) were also conducted in November 2007 in relation to the Duralie Extension Project. The measurement methodology and analysis procedures are described in the DEP NIA together with operator-attended daytime, evening, and night-time monitoring results and unattended logger 24-hour noise profiles at four receiver locations.

In view of the foregoing, the RBLs and noise amenity levels ($L_{Aeq(period)}$) are presented in **Table 12**, which form the basis of establishing the PSNLs in **Section 5.1**.

Table 12 Background Noise and Amenity Levels for Assessment Purposes (dBA re 20 µPa)

Receiver Area	Property Name	Estimated RBL[1] All Noise Sources			Estimated $L_{Aeq(period)}$[1, 2] Industrial Noise Only		
		Daytime	Evening	Night-time	Daytime	Evening	Night-time
Privately Owned	All residential receivers	30	30	30	<44	<39	<34

Note 1: Estimated RBLs and noise amenity levels in the absence of DCM operation.

Note 2: Daytime 0700 hours to 1800 hours, Evening 1800 hours to 2200 hours and Night-time 2200 hours to 0700 hours.

5 NOISE ASSESSMENT CRITERIA

The DCM operates in accordance with the Project Approval noise limits (**Section 2.3**). Notwithstanding, in accordance with the INP Application Notes, PSNLs for the DCM determined in accordance with the INP are described below.

5.1 Intrusive and Amenity Project Specific Noise Levels

The EPA has regulatory responsibility for the control of noise from "scheduled premises" (ie DCM is a scheduled premises) under the *Protection of the Environment Operations Act, 1997*. In implementing the INP, the EPA has two broad objectives:

- Controlling intrusive noise levels in the short-term; and
- Maintaining noise amenity levels for particular land uses over the medium to long-term.

The INP prescribes detailed calculation routines for establishing PSNLs (ie $L_{Aeq[15minute]}$ intrusive criteria and $L_{Aeq[period]}$ amenity criteria) at potentially affected receivers for an industrial development. Ideally, the intrusive noise level should not exceed the background level by more than 5 dBA. Similarly, the noise amenity level should not exceed the specified INP "acceptable" or "maximum" noise level appropriate for the particular land use. The applicable acceptable and maximum noise amenity levels for receivers in the vicinity of DCM are shown in **Table 13**.

Table 13 INP Acceptable and Maximum Noise Amenity Levels (dBA re 20 µPa)

Locality	LEP Zone[1]	INP Noise Amenity Zone	Amenity $L_{Aeq(period)}$[2] Acceptable			Amenity $L_{Aeq(period)}$[2] Maximum		
			Day	Evening	Night	Day	Evening	Night
Privately Owned Land	Rural Landscape	Rural Residential	50	45	40	55	50	45
Any	Rural Landscape	School[3]	External 45 when in use			External 50 when in use		
Any	Rural Landscape	Church, Hall	External 50 when in use			External 55 when in use		
Any	National Parks and Nature Reserves	Passive Recreation	External 50 when in use			External 55 when in use		

Note 1: LEP = Local Environmental Plan.

Note 2: Daytime 0700 hours to 1800 hours, Evening 1800 hours to 2200 hours, Night-time 2200 hours to 0700 hours.

Note 3: External criteria equivalent to internal criteria plus 10 dBA.

In addition, the DP&E has previously advised noise impacts on vacant land are assessed on a "case by case" basis. For assessment purposes in this report vacant land is defined as a lot which may be permitted to have (but does not yet have) a dwelling and is therefore a potentially sensitive receiver in accordance with the INP. In the absence of a specific dwelling (or a known approved building Development Application) noise impacts are determined where exceedances are predicted over 25% of the vacant land area.

In accordance with the INP's Chapter 2 Industrial Noise Criteria and associated Application Notes (12 June 2013), the PSNLs for the residential and other localities in the vicinity of DCM are presented **Table 14** for both intrusive noise and amenity. These criteria are nominated for the purposes of assessing potential noise impacts from DCM incorporating the Modification.

Table 14 Project-specific Noise Levels and Assessment Criteria (dBA re 20 µPa)

Locality	Land Use	Intrusive $L_{Aeq(15minute)}$[1]			Amenity $L_{Aeq(period)}$[1]		
		Day	Evening	Night	Day	Evening	Night
Privately Owned Land	Rural Residential[2]	35	35	35	50	45	40
	Rural Vacant Land[3]						
Any	School[4]	Intrusive noise criteria not applicable			External 45 when in use		
Any	Church, Hall	Intrusive noise criteria not applicable			External 50 when in use		
Any	Passive Recreation	Intrusive noise criteria not applicable			External 50 when in use		

Note 1: Daytime 0700 hours to 1800 hours, Evening 1800 hours to 2200 hours, Night-time 2200 hours to 0700 hours.
Note 2: At the most-affected point within 30 m of the residential area.
Note 3: Where exceedances are predicted over 25% of the vacant land area.
Note 4: External criteria equivalent to internal criteria plus 10 dBA.

The intrusiveness criterion is met if the $L_{Aeq(15minute)}$ is less than or equal to the RBL plus 5 dBA, where the RBL is described in **Section 4.2.1**. Thus, the most stringent PSNLs for DCM incorporating the Modification at rural residential receivers (and vacant land) would be the intrusiveness criterion (ie 35 dBA $L_{Aeq(15minute)}$) for daytime, evening and night-time periods.

The Privately Owned Land amenity criteria nominated in **Table 14** are reflective of the general Rural Landscape zoning consistent with the Great Lakes Council Local Environmental Plan 2014 Land Zoning Map. However, as the INP acceptable noise level sets the maximum total noise level from all industrial noise sources, cumulative impacts from Duralie incorporating the Modification are assessed against the amenity $L_{Aeq(period)}$ acceptable noise levels specified in **Table 13**.

The INP states that the PSNLs are based on preserving the amenity of at least 90% of the population living in the vicinity of industrial noise sources from the adverse effects of noise for at least 90% of the time. Provided the PSNLs are achieved, then most people would consider the resultant noise levels acceptable. In those cases where the PSNLs are not achieved, it does not automatically follow that all people exposed to the noise would find the noise unacceptable. In subjective terms, exceedances of the PSNLs can be described as follows:

- Negligible noise level increase <1 dBA - not noticeable by all people.
- Marginal noise level increase 1 dBA to 2 dBA - not noticeable by most people.
- Moderate noise level increase 3 dBA to 5 dBA - not noticeable by some people but may be noticeable by others.
- Appreciable noise level increase >5 dBA - noticeable by most people.

5.2 Low Frequency Noise Modifying Factor Adjustments

In accordance with the INP's Chapter 4 Modifying factor adjustments, where a noise source contains certain characteristics, such as dominant low frequency content, the INP states that there is evidence to suggest that it can cause greater annoyance than other noise at the same noise level. The modifying factors (if applicable) are to be applied to the measured or predicted noise level at the receiver and then assessed against the PSNLs. In the case of low frequency (20 hertz [Hz] to 250 Hz) noise, the INP requires a 5 dB correction to be applied to the measured or predicted noise levels where the difference between the A and C weighted level is 15 dB (or more) at the receiver.

Six of the nearest privately owned receivers to DCM incorporating the Modification were selected for low frequency analysis and associated calculation of the C weighted intrusive $L_{Ceq(15minute)}$ noise level for the comparison with the corresponding predicted A weighted intrusive $L_{Aeq(15minute)}$ noise level (refer **Section 7.2** for the A weighted intrusive $L_{Aeq(15minute)}$ noise level). The resulting differences between the A and C weighted intrusive noise levels less than 15 dB.

Hence, a 5 dB correction to the predicted A weighted intrusive noise levels would not be triggered under the INP. Given the degree of compliance at the nearest privately owned receivers with the low frequency assessment criterion (ie a difference up to 15 dB) and their proximity to other receivers, it is reasonable to anticipate similar compliance outcomes at other locations. It is concluded that DCM incorporating the Modification noise emissions do not contain "dominant low frequency content" in accordance with the INP's assessment procedures.

5.3 Sleep Disturbance Noise Levels

The EPA's INP Application Notes dated 12 June 2013 (refer **Appendix F2**) recognise that the current $L_{A1(1minute)}$ sleep disturbance criterion of 15 dBA above the prevailing $L_{A90(15minute)}$ level is not ideal. The assessment of potential sleep disturbance is complex and not fully understood; however the EPA believes that there is insufficient information to determine a suitable alternative criterion.

Appendix B (Technical Background to Road Traffic Noise Criteria) of the *Environmental Criteria for Road Traffic Noise* (EPA, 1999) contains a comprehensive review of research into to sleep disturbance and traffic noise. The review has been more recently updated in The NSW Road Noise Policy (Department of Environment, Climate Change and Water [DECCW], 2011) (Section 5.3 Sleep Disturbance) however the EPA's conclusion remains unchanged as follows:

- Maximum *internal* noise levels below 50 to 55 dBA are unlikely to cause awakening reactions; and
- One or two noise events per night, with maximum *internal* noise level of 65 to 70 dBA, are not likely to affect health and wellbeing significantly.

It is noteworthy that conditions of approval generally include external noise limits. The internal noise levels (presented above) can be conservatively transposed to an external noise level by adding 10 dBA (or 12.5 dBA when measured 1 m from the dwelling facade). It follows, that an external $L_{A1(1minute)}$ noise criteria of 60 dBA would appear to be consistent with the current research in relation to this matter.

The EPA continues to review research on sleep disturbance as it becomes available and in the interim, the EPA suggests that the $L_{A1(1minute)}$ level of 15 dBA above the RBL is a suitable screening criterion for sleep disturbance for the night-time period. This approach is generally consistent with the Project Approval (08_0203) (**Appendix A1**). The Modification night-time $L_{A1(1minute)}$ Sleep Disturbance Noise Levels (SDNLs) are presented in **Table 15** together with the comparable approved $L_{A1(1minute)}$ noise limit.

Table 15 Night-time $L_{A1(1minute)}$ Sleep Disturbance Criteria (dBA re 20 µPa)

Locality	Duralie Project Approval $L_{A1(1minute)}$ Night-time[1] Limit	Modification $L_{A1(1minute)}$ Night-time[1] Criteria
Privately Owned Land	45	45

Note 1: Monday to Saturday 2200 hours to 0700 hours; Sundays and Public Holidays 2200 hours to 0800 hours.

Night-time operations would involve a larger proportion of the mobile equipment being operated in repeatable routines and a relatively smaller proportion of continuous fixed plant. Noise emissions from the mobile equipment are typically variable, whereas fixed plant noise emissions are relatively continuous (or steady) levels. When mobile equipment and fixed plant operate simultaneously, some noise sources (including the operation of trains on the rail loop) have the potential to emerge audibly above the overall mine noise.

The quarterly operator-attended noise monitoring reports discussed in **Section 2.4** have been examined to determine the mean difference between the intrusive $L_{Aeq(15minute)}$ and the corresponding $L_{A1(1minute)}$ noise levels. The results of night-time noise monitoring for the 30 month period ending January 2014 are summarised in **Table 16** including the measured mean (mine-contributed) intrusive $L_{Aeq(15minute)}$ and the $L_{A1(1minute)}$ noise levels.

Table 16 Measured Night-time $L_{Aeq(15minute)}$ and $L_{A1(1minute)}$ Noise Levels (dBA re 20 µPa)

Receiver ID[1]	Landowner (Site)	Mean $L_{Aeq(15minute)}$	Mean $L_{A1(1minute)}$	Mean Difference
175	Thomas (Former Woodley) (NM1)	25 dBA	32 dBA	6 dBA
19(j1)	DCPL (125 Zulumovski) (NM2)	30 dBA	36 dBA	7 dBA
120	Mahony (NM3)	29 dBA	35 dBA	6 dBA
127	Fisher-Webster (NM4)	28 dBA	35 dBA	7 dBA
19(c1)	DCPL (149 Hattam P/L)	35 dBA	38 dBA	5 dBA
189	Gillard	25 dBA	31 dBA	6 dBA
19(k1)	DCPL (124 Bailey)	33 dBA	36 dBA	3 dBA
101	Holloway	31 dBA	40 dBA	9 dBA
Overall		**32 dBA**	**38 dBA**	**6.1 dBA**

Note 1: Refer to **Appendix B2** Land Ownership Details.

The measurement results show a mean difference of up to 7 dBA between the (mine-contributed) intrusive $L_{Aeq(15minute)}$ and the $L_{A1(1minute)}$ noise levels and are therefore consistent with similar mining operations where the difference is typically <10 dBA. Hence, if the intrusive PSNLs (refer **Section 5.1** ie RBL plus 5 dBA) are achieved, then the SDNLs (ie RBL plus 15 dBA) would also be met. This relationship enables the noise assessment process to focus on the setting and assessment of INP-based intrusive noise and amenity levels which aim to minimise annoyance at noise sensitive receiver locations.

Notwithstanding the foregoing, the predicted $L_{A1(1minute)}$ night-time noise levels are presented in **Section 7.2** together with an assessment of potential sleep disturbance impacts from DCM incorporating the Modification.

5.4 Modification and Cumulative Mine Noise Impact Assessment Methodology

5.4.1 Assessment Criteria

In view of the foregoing, **Table 17** presents the methodology for assessing the operating noise levels of DCM incorporating the Modification against the intrusive and amenity PSNLs (**Table 14**) and the $L_{A1(1minute)}$ SDNLs (**Table 15**) together with cumulative amenity noise levels (**Table 13**) for assessing operating noise levels from existing, approved and proposed mining developments in the vicinity of DCM .

Table 17 Modification & Cumulative Mine Noise Impact Assessment Methodology (dBA re 20 µPa)

Assessment Source	Assessment Parameter	Assessment Criteria	Noise Management Zone[1]		Noise Affectation Zone
			Marginal	Moderate	
Project	PSNL Intrusive	RBL plus 5 dBA	1 to 2 dBA above assessment criteria	3 to 5 dBA above assessment criteria	> 5 dBA above assessment criteria[2]
	PSNL Amenity	INP acceptable			
	SDNL $L_{A1(1minute)}$	RBL plus 15 dBA			
Mine Developments	Cumulative Amenity	INP acceptable	1 to 2 dBA above assessment criteria	3 dBA above assessment criteria	> 3 dBA above assessment criteria[3]

Note 1: Depending on the degree of predicted exceedance of the relevant assessment parameter potential noise impacts in the noise management zone could range from marginal to moderate (in terms of the perceived noise increase).

Note 2: Exposure to Project noise levels greater than 5 dBA above the relevant PSNL and or SDNL may be considered unacceptable by some landowners.

Note 3: Exposure to cumulative mine noise levels greater than 3 dBA above the relevant INP acceptable noise level may be considered unacceptable by some landowners.

For the purposes of assessing any potential noise impacts from DCM incorporating the Modification, the noise management and affectation zones are further defined as follows.

5.4.2 Noise Management Zone

Depending on the degree of predicted exceedance of the PSNL and or SDNL (1 to 5 dBA), potential noise impacts in the noise management zone could range from marginal to moderate (in terms of the perceived noise increase). In addition to the noise mitigation measures included in the predictive modelling (**Section 6.1**), noise management procedures would include:

- Noise monitoring on-site and within the community.
- Prompt response to any community issues of concern.
- Refinement of on-site noise mitigation measures and operating procedures where practicable.
- Implementation of reasonable and feasible acoustical mitigation at receivers (which may include measures such as enhanced glazing, insulation and/or air-conditioning) at receivers where noise monitoring shows mine noise levels are 3 to 5 dBA above the relevant criteria.

5.4.3 Noise Affectation Zone

Exposure to project noise levels greater than 5 dBA above the relevant PSNL and or SDNL may be considered unacceptable by some landowners. Management procedures for the Noise Affectation Zone would include:

- Discussions with relevant land owners to assess concerns and define responses.
- Implementation of reasonable and feasible acoustical mitigation at receivers (which may include measures such as enhanced glazing, insulation and/or air-conditioning) at receivers where noise monitoring shows mine noise levels are >5 dBA above the relevant criteria.
- Negotiated agreements with land owners where required.

6 NOISE MODELLING METHODOLOGY

6.1 Noise Mitigation and Management Measures

DCPL is obligated to manage noise levels from DCM in accordance with the noise limits specified in Project Approval (08_0203) using reasonable and feasible mitigation measures. An appreciable level of effort has been applied by DCPL to identify and implement reasonable and feasible on-site noise controls since the commencement of mining, particularly to minimise the impact of night-time noise emissions. This includes the replacement of mobile plant with attenuated (eg XQ) plant for haul trucks.

In addition to the existing reasonable and feasible mitigation measures, for the Modification DCPL would construct earth bund walls up to 10 m above ground elevation on the southern and western sides of the evaporator units which form part of the approved irrigation practices, which are operating on the waste rock emplacement. In addition, newer model evaporator units would be attenuated.

6.1.1 Mobile Equipment and Fixed Plant Sound Power Levels

The potential for machinery to emit noise is quantified as the sound power level (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_{eq}) assessment parameter has introduced greater mathematical rigour to the prediction of received noise levels as it enables the use of L_{eq} SWL as noise model inputs. In general terms, any variation in mine site L_{eq} SWL would produce a similar variation in the $L_{eq(15minute)}$ SPL at the receiver.

Equipment SWLs at DCM are the subject of ongoing measurements in accordance with NMP-R02-E and DCPL have refined the SWLs for individual fleet items. Comparative equipment fleets are presented in **Table 18,** together with the overall mine site L_{eq} SWLs from DCM as predicted in the Duralie Coal Project NIA, DEP NIA and the Modification. As shown in **Table 18**, the overall maximum SWL of the Modification (133 dBA) remains consistent with the Duralie Coal EIS and DEP NIA (133 dBA).

Later in the mine life, the fleet would reduce consistent with the mine production rate (refer to Section 3 of the main text of the Modification EA) and the overall SWL would reduce accordingly.

Table 18 Approved DCM and Modification Plant and Equipment SWLs (dBA re 1ρW)[1]

Equipment Description	Duralie Coal Project Up to 1.8 Mtpa		DEP Supplementary Year 5 Up to 3.0 Mtpa		DEP Supplementary Year 3 & 8 Up to 2.5 Mtpa		Modification Year 2015 Up to 3.0 Mtpa		Modification Year 2016-2019 Up to 2.5 Mtpa	
	No. of Items	SWL (dB re 1 pW)	No. of Items	SWL (dB re 1 pW)	No. of Items	SWL (dB re 1 pW)	No. of Items	SWL (dB re 1 pW)	No. of Items	SWL (dB re 1 pW)
Drills	1	116	1	115	1	115	3	120	2	118
Low Noise Drill	0	-	1	112	1	112	-	-	-	-
Excavator Liebherr R9400 (350t)	3	121	1	121	1	121	2	124	2	124
Excavator R9250, EX2500 (250t)			1	119	1	119	1	119	-	-
Low Noise Excavator PC1600 (160t)	0	-	1	117	1	117	1	117	1	117
Standard Haul Truck (CAT 789)	9	131	2[1]	125	2[1]	125	1	122	1	122
Low Noise Haul Truck (CAT XQ 789)	0	-	16[2]	127	11[2]	125	4	123	4	123
Low Noise Haul Truck (CAT XQ 785)							11	125	8	124
Dozer (CAT D10)	2	121	3	126	2	124	2	125[3]	1	122[3]
Low Noise Dozer(CAT D10XQ)	0	-	1	119	1	119	2	119[3]	2	119[3]
Loaders	2	118	1	113	1	113	1	113	1	113
Graders							1	113	1	113
Low Noise Grader	0	-	1	110	1	110	1	110	1	110
Water Cart	2	121	2	121	2	121	2	121	2	121
Scraper							-	-	-	-
Evaporators (45kw)	-	-	-	-	-	-	2	122	2	122
Evaporators (55kw)	-	-	-	-	-	-	2	122	2	122
Attenuated Evaporators (75kw)	-	-	-	-	-	-	2	118	2	118
Pumps	-	-	-	-	-	-	6	118	6	118
Rotary Breaker	0	-	1	114	1	114	1	113	1	113
Coal Preparation Plant	1	122	0	-	0	-	0	-	0	-
Rail Loadout Bin	1	114	1	115	1	115	1	110	1	110
Locomotive							2	114	2	114
Total SWL	**-**	**133**	**-**	**132**	**-**	**131**	**-**	**133**	**-**	**132**

Note 1: The daytime operational haul truck fleet includes the use of two existing CAT 789 haul trucks.

Note 2: The evening/night-time operational fleet includes up to sixteen low noise CAT 785XQ haul trucks only.

Note 3: Limited to 2nd gear.

dB = decibel.

6.2 DCM Noise Model Validation

The noise model for DCM was prepared using RTA Software's Environmental Noise Model (ENM for Windows, Version 3.06), a commercial software system developed in conjunction with the NSW EPA. The acoustical algorithms utilised by this software have been endorsed by the ANZEC and all State Environmental Authorities throughout Australia as representing one of the most appropriate predictive methodologies currently available. ENM has been used for all major noise assessments at DCM including the Duralie Coal Project NIA and DEP NIA.

SLR reviewed the operator-attended noise measurement results (refer **Section 2.4**) to update and validate the Duralie noise model and reflect as-built noise emissions, as follows:

- On-site noise measurements to determine fixed plant SWLs installed since the DEP NIA;
- The digital terrain was altered to accommodate the Modification mine plans and the mobile equipment fleet noise sources were relocated accordingly; and
- Far-field operator-attended noise measurement results over the past 3 years were compared to the predicted mine noise emissions presented in the DEP NIA.

The outcome of the validation exercise resulted in a noise model calibration factor (of negative 0.5 dBA) which has been included in the Modification assessment. The operational noise modelling scenario (described below) includes all existing and proposed plant items operating concurrently to simulate the overall maximum energy equivalent (ie $L_{Aeq(15minute)}$) intrusive noise level, and is therefore considered to be conservative.

6.3 Noise Modelling Scenarios

The Modification description was reviewed to determine representative scenarios to assess potential changes in currently approved noise impacts due to the Modification.

The main change associated with the Modification relevant to potential changes in noise impacts is the increased waste emplacement height (ie from 110m AHD to 135 m AHD), as the minor changes in surface development extent of the open pits would have no material change to potential noise impacts. Therefore, 2015 was chosen for the noise modelling scenario as this year includes:

- Maximum fleet operations for the remainder of the DCM mine life;
- Waste rock emplacement at a height of 135 m AHD.

Later in the mine life waste rock emplacement (ie backfill of the open pits) would occur below 135 m AHD. Given this, and given the mobile fleet would reduce in the later years of the mine life, additional noise modelling was not considered.

7 OPERATING NOISE IMPACT ASSESSMENT

7.1 Daytime and Evening Operating - Intrusive Noise Levels

The predicted daytime and evening operating $L_{Aeq(15minute)}$ intrusive levels for the 2015 operating scenario are presented in **Table 19** for privately owned and DCPL owned receivers together with the relevant PSNLs and approved noise limits (**Appendix A1)**.

Table 19 Daytime and Evening Year 2015 Intrusive $L_{Aeq(15minute)}$ Noise (dBA re 20 µPa)

ID No	Landholder	Predicted Noise Levels			Project Approval Noise Limit		Noise Criteria
		Day	Evening				
		Calm	Calm	Wind	Day	Evening	PSNL
Privately owned Receivers							
74	Melmeth	19	18	15	35	35	35
84(1)	Hart	19	18	15	35	35	35
84(2)	Hart	19	18	15	35	35	35
87	PPI Ltd	21	20	18	35	35	35
93	Howard	23	23	19	35	35	35
94	Howard	28	28	25	35	35	35
95	Ransley	27	26	23	35	35	35
96	Turnbull	19	19	16	35	35	35
97(1)	Davis	20	19	16	35	35	35
97(2)	Davis	22	21	18	35	35	35
98(1)	Partelle & Ramsay	19	19	16	35	35	35
98(2)	Partelle & Ramsay	19	18	15	35	35	35
100	Richards	26	25	23	35	35	35
101	Holloway	24	23	21	35	35	35
103	Macedo	21	20	18	35	35	35
105	Edwards	14	14	13	35	35	35
106	James	25	25	21	35	35	35
107	Spencer	11	11	11	35	35	35
108	Tersteeg	14	13	14	35	35	35
112	Hogeveen	20	20	18	35	35	35
113	Edwards	22	22	20	35	35	35
115(1)	Moylan & Newton	24	23	24	35	35	35
115(2)	Moylan & Newton	26	26	24	35	35	35
115(3)	Moylan & Newton	24	23	25	35	35	35
116	Weismantel	28	28	24	35	35	35
117[2,3]	Holmes & Holmes	33	33	29	n/a	n/a	35
120[3]	Mahony	28	28	28	35	35	35
123[4]	Oleksiuk & Carmody	28	27	24	35	35	35
126[4]	Hamann - Pixalu P/L	27	27	24	35	35	35
127	Fisher-Webster	29	29	26	35	35	35
128[2,3,4]	Hare-Scott	32	32	32	n/a	n/a	35
131[3]	Relton	27	27	25	35	35	35
133	Gorton	15	15	16	35	35	35
134	Duzmen P/L	12	12	13	35	35	35
135	Ayliffe	14	14	16	35	35	35
136	Pickles	14	14	16	35	35	35
137	Lord	15	15	20	35	35	35
140	Bennett & Stark	11	11	12	35	35	35
142	Madden	27	27	30	35	35	35
143	Madden	26	26	30	35	35	35

ID No	Landholder	Predicted Noise Levels			Project Approval Noise Limit		Noise Criteria
		Day	Evening				
		Calm	Calm	Wind	Day	Evening	PSNL
144	Wielgosinski	27	26	35	35	36	35
145	Edwards	29	29	32	35	35	35
146	Bragg	26	25	30	35	35	35
147	Edwards	22	22	26	35	35	35
148	McAndrew	24	24	33	35	35	35
150	Rumbel	15	15	29	35	35	35
153	Paul	16	16	19	35	35	35
154	Morgan	21	21	24	35	35	35
155	Guberina	24	24	33	35	35	35
156	Hope	20	20	31	35	35	35
157	Stephenson	20	20	31	35	35	35
159	Waterer	16	16	30	35	35	35
160(1)	Kenney	13	13	32	35	35	35
160(2)	Kenney	13	13	28	35	35	35
164	Gorton Timber Co. Ltd	19	19	31	35	35	35
165	ESOR Nominees P/L	12	11	28	35	35	35
167	Ravagnani	19	19	34	35	35	35
168(1)	Schultz	15	15	31	35	35	35
168(2)	Schultz	18	18	34	35	35	35
168(3)	Schultz	19	19	33	35	35	35
168(4)	Schultz	16	15	31	35	35	35
169	Williams	16	16	34	35	**36**	35
172[4]	Lyall	27	26	**39**	35	**39**	35
173	Trigg & Holland	24	25	35	35	**36**	35
174	Carroll	18	18	31	35	35	35
175	Thomas	17	17	33	35	35	35
176	Thompson	20	20	31	35	35	35
177	Thompson	13	13	29	35	**36**	35
178	Hitchcock & Coldham	12	11	33	35	35	35
179	Mellar	14	13	31	35	35	35
180(1)	Thompson	13	13	34	35	**36**	35
180(2)	Thompson	13	13	31	35	35	35
183	Elfick	11	11	26	35	35	35
185	Raine & Hilleard	9	9	20	35	35	35
186	Farnham	8	8	29	35	35	35
188	Rumbel	11	11	31	35	35	35
189	Gillard	11	11	32	35	35	35
192	Vajda	8	8	31	35	35	35
193	Smith	7	7	30	35	35	35
194	Vajda	23	23	23	35	35	35
198	Aspenview Enterprises P/L	11	11	24	35	35	35
199	Parker	12	11	23	35	35	35
200	Trappel	12	12	22	35	35	35
204	Jones	16	15	31	35	35	35
209	Chapman	19	19	15	35	35	35
211	Irwin	18	18	15	35	35	35
216	Vajda	19	19	19	35	35	35
220	Lindfield & Associates P/L	23	23	26	35	35	35
223	Ferraro	10	10	23	35	35	35
260	Roberts	12	11	31	35	35	35

ID No	Landholder	Predicted Noise Levels			Project Approval Noise Limit		Noise Criteria
		Day	Evening				
		Calm	Calm	Wind	Day	Evening	PSNL
DCPL owned Receivers							
19(a1)	DCPL	34	34	**45**	n/a	n/a	35
19(b1)	DCPL	**38**	**38**	**46**	n/a	n/a	35
19(c1)	DCPL	**37**	**37**	**40**	n/a	n/a	35
19(d1)	DCPL	34	34	**44**	n/a	n/a	35
19(e1)	DCPL	20	20	**38**	n/a	n/a	35
19(f1)	DCPL (Mammy Johnsons)	**44**	**45**	**51**	n/a	n/a	35
19(g1)	DCPL	32	32	33	n/a	n/a	35
19(h1)	DCPL	30	30	29	n/a	n/a	35
19(i1)	DCPL	30	30	33	n/a	n/a	35
19(j1)	DCPL	35	35	31	n/a	n/a	35
19(k1)	DCPL	32	31	29	n/a	n/a	35
19(l1)	DCPL	32	31	28	n/a	n/a	35
19(m1)	DCPL	30	30	30	n/a	n/a	35
19(n1)	DCPL (Weismantels Inn)	31	31	30	n/a	n/a	35
19(o1)	DCPL	**36**	35	32	n/a	n/a	35
19(p1)	DCPL	**43**	**43**	**40**	n/a	n/a	35
19(q1)	DCPL	**38**	**38**	34	n/a	n/a	35
19(r1)	DCPL	**36**	**37**	**45**	n/a	n/a	35
19(s1)	DCPL	34	34	**45**	n/a	n/a	35
19(t1)	DCPL	22	21	19	n/a	n/a	35
19(u1)	DCPL	18	17	15	n/a	n/a	35
19(v1)	DCPL	23	23	20	n/a	n/a	35
19(w1)	DCPL	30	30	29	n/a	n/a	35
19(x1)	DCPL	24	23	21	n/a	n/a	35
19(y1)	DCPL	23	22	20	n/a	n/a	35
19(z1)	DCPL	22	21	17	n/a	n/a	35
19(a2)	DCPL	19	18	15	n/a	n/a	35
19(b2)	DCPL	18	18	14	n/a	n/a	35
19(c2)	DCPL	18	18	15	n/a	n/a	35

Note 1: All predicted noise levels from the worst case meteorological conditions in **Table 11** for each receiver.
Note 2: Unexercised acquisition rights in accordance with Project Approval (08_0203).
Note 3: Landowner Agreement with Yancoal in accordance with Project Approval (08_0203).
Note 4: Request for additional noise mitigation measures in accordance with Project Approval (08_0203).
Note 5: Predicted $L_{Aeq(15minute)}$ noise level complies with the intrusive PSNL.
Note 6: Predicted marginal noise exceedance 1 to 2 dBA above intrusive PSNL.
Note 7: Predicted moderate noise exceedance 3 to 5 dBA above intrusive PSNL.
Note 8 Predicted appreciable noise exceedance > 5 dBA above intrusive PSNL.

7.1.1 Privately owned Receivers – Intrusive Noise Impact Assessment Summary

The predicted 2015 daytime and evening operating $L_{Aeq(15minute)}$ intrusive levels in **Table 19** show:

- No exceedance of the approved daytime/evening intrusive Project Approval noise limits at any privately owned receiver (ie predicted noise levels are lower than, or equal to, those approved for the DEP);
- Moderate exceedance of 3 dBA to 5 dBA above the intrusive PSNL 35 dBA at receiver 172 Lyall;
- No exceedance of the intrusive PSNL 35 dBA at all other privately owned receivers; and

Refer to **Section 7.2.1** for a comparison of noise impacts at properties previously identified in the DEP Supplementary Noise Assessment as being in either the noise management or noise affectation zone.

7.2 Night-time Operating Intrusive and Sleep Disturbance Noise

The predicted night-time intrusive $L_{Aeq(15minute)}$ and sleep disturbance $L_{A1(1minute)}$ levels for the 2015 operating scenario for privately owned and DCPL owned are presented in **Table 20** together with the relevant PSNLs, DSNLs and consented noise limits (**Appendix A1)**.

Table 20 Night-time Year 2015 Intrusive $L_{Aeq(15minute)}$ and $L_{A1(1minute)}$ Noise (dBA re 20 µPa)

ID No	Landholder	Predicted Noise Levels			Project Approval Noise Limit		Noise Criteria	
		Calm	Inversion + Drainage	LA1(1min)	LAeq(15min)	LA1(1min)	PSNL	SDNL
Privately owned Receivers								
74	Melmeth	19	23	29	35	45	35	45
84(1)	Hart	19	24	30	35	45	35	45
84(2)	Hart	19	25	31	35	45	35	45
87	PPI Ltd	21	28	35	35	45	35	45
93	Howard	23	30	36	35	45	35	45
94	Howard	29	35	41	35	45	35	45
95	Ransley	27	35	41	**36**	45	35	45
96	Turnbull	20	23	29	35	45	35	45
97(1)	Davis	20	25	31	35	45	35	45
97(2)	Davis	22	30	36	35	45	35	45
98(1)	Partelle & Ramsay	19	26	32	35	45	35	45
98(2)	Partelle & Ramsay	19	28	34	35	45	35	45
100	Richards	26	34	40	35	45	35	45
101	Holloway	24	27	33	35	45	35	45
103	Macedo	21	25	31	35	45	35	45
105	Edwards	14	11	20	35	45	35	45
106	James	25	29	35	35	45	35	45
107	Spencer	12	10	18	35	45	35	45
108	Tersteeg	14	14	20	35	45	35	45
112	Hogeveen	20	31	38	35	45	35	45
113	Edwards	22	32	38	35	45	35	45
115(1)	Moylan & Newton	24	35	41	35	45	35	45
115(2)	Moylan & Newton	26	35	41	35	45	35	45
115(3)	Moylan & Newton	24	35	41	35	45	35	45
116	Weismantel	29	35	42	**37**	45	35	45
117[2,3]	Holmes & Holmes	33	**39**	45	**n/a**	**n/a**	35	45
120[3]	Mahony	28	34	41	35	45	35	45
123[4]	Oleksiuk & Carmody	28	**36**	42	**39**	45	35	45
126[4]	Hamann - Pixalu P/L	28	**36**	42	**39**	45	35	45
127	Fisher-Webster	29	**36**	42	**37**	45	35	45
128[2,3,4]	Hare-Scott	32	**39**	45	**n/a**	**n/a**	35	45
131[3]	Relton	27	34	40	**37**	45	35	45
133	Gorton	15	15	21	35	45	35	45
134	Duzmen P/L	13	12	19	35	45	35	45
135	Ayliffe	15	15	21	35	45	35	45
136	Pickles	15	15	21	35	45	35	45
137	Lord	15	15	22	35	45	35	45

ID No	Landholder	Predicted Noise Levels			Project Approval Noise Limit		Noise Criteria	
		Calm	Inversion + Drainage	LA1(1min)	LAeq(15min)	LA1(1min)	PSNL	SDNL
140	Bennett & Stark	12	10	18	35	45	35	45
142	Madden	27	30	36	35	45	35	45
143	Madden	27	31	37	35	45	35	45
144	Wielgosinski	27	33	39	35	45	35	45
145	Edwards	29	31	37	35	45	35	45
146	Bragg	26	28	34	35	45	35	45
147	Edwards	22	25	31	35	45	35	45
148	McAndrew	24	31	37	35	45	35	45
150	Rumbel	15	29	35	35	45	35	45
153	Paul	17	18	24	35	45	35	45
154	Morgan	21	23	29	35	45	35	45
155	Guberina	24	31	37	35	45	35	45
156	Hope	20	30	36	35	45	35	45
157	Stephenson	20	30	36	35	45	35	45
159	Waterer	16	30	36	35	45	35	45
160(1)	Kenney	13	28	34	35	45	35	45
160(2)	Kenney	14	27	33	35	45	35	45
164	Gorton Timber Co. Ltd	19	30	36	35	45	35	45
165	ESOR Nominees P/L	12	26	32	35	45	35	45
167	Ravagnani	19	33	39	35	45	35	45
168(1)	Schultz	15	31	37	35	45	35	45
168(2)	Schultz	19	33	39	35	45	35	45
168(3)	Schultz	19	33	39	35	45	35	45
168(4)	Schultz	16	32	38	35	45	35	45
169	Williams	16	34	40	35	45	35	45
172[4]	Lyall	27	**40**	**46**	**40**	45	35	45
173	Trigg & Holland	25	**36**	42	**37**	45	35	45
174	Carroll	18	32	39	35	45	35	45
175	Thomas	17	34	41	35	45	35	45
176	Thompson	20	32	38	35	45	35	45
177	Thompson	13	28	34	35	45	35	45
178	Hitchcock & Coldham	12	30	36	35	45	35	45
179	Mellar	14	30	36	35	45	35	45
180(1)	Thompson	13	34	40	**36**	45	35	45
180(2)	Thompson	13	31	37	35	45	35	45
183	Elfick	11	27	33	35	45	35	45
185	Raine & Hilleard	9	20	26	35	45	35	45
186	Farnham	8	29	35	35	45	35	45
188	Rumbel	11	32	38	35	45	35	45
189	Gillard	11	32	38	35	45	35	45
192	Vajda	9	32	38	35	45	35	45
193	Smith	8	31	37	35	45	35	45
194	Vajda	23	34	40	35	45	35	45
198	Aspenview Enterprises P/L	11	24	30	35	45	35	45

ID No	Landholder	Predicted Noise Levels			Project Approval Noise Limit		Noise Criteria	
		Calm	Inversion + Drainage	LA1(1min)	LAeq(15min)	LA1(1min)	PSNL	SDNL
199	Parker	12	24	30	35	45	35	45
200	Trappel	13	22	28	35	45	35	45
204	Jones	16	32	38	35	45	35	45
209	Chapman	19	25	31	35	45	35	45
211	Irwin	18	25	31	35	45	35	45
216	Vajda	20	22	28	35	45	35	45
220	Lindfield & Associates P/L	24	35	41	35	45	35	45
223	Ferraro	11	22	28	35	45	35	45
260	Roberts	12	32	38	35	45	35	45
DCPL owned Receivers								
19(a1)	DCPL	35	**45**	**51**	n/a	n/a	35	45
19(b1)	DCPL	**39**	**47**	**53**	n/a	n/a	35	45
19(c1)	DCPL	**38**	**43**	**49**	n/a	n/a	35	45
19(d1)	DCPL	35	**44**	**50**	n/a	n/a	35	45
19(e1)	DCPL	20	**39**	45	n/a	n/a	35	45
19(f1)	DCPL (Mammy Johnsons)	**45**	**52**	**58**	n/a	n/a	35	45
19(g1)	DCPL	33	**39**	45	n/a	n/a	35	45
19(h1)	DCPL	30	32	38	n/a	n/a	35	45
19(i1)	DCPL	31	33	39	n/a	n/a	35	45
19(j1)	DCPL	35	**42**	**48**	n/a	n/a	35	45
19(k1)	DCPL	32	**39**	45	n/a	n/a	35	45
19(l1)	DCPL	32	35	41	n/a	n/a	35	45
19(m1)	DCPL	31	**37**	43	n/a	n/a	35	45
19(n1)	DCPL (Weismantels Inn)	31	35	41	n/a	n/a	35	45
19(o1)	DCPL	**36**	**41**	**47**	n/a	n/a	35	45
19(p1)	DCPL	**43**	**47**	**54**	n/a	n/a	35	45
19(q1)	DCPL	**38**	**44**	**50**	n/a	n/a	35	45
19(r1)	DCPL	**37**	**46**	**52**	n/a	n/a	35	45
19(s1)	DCPL	34	**45**	**51**	n/a	n/a	35	45
19(t1)	DCPL	22	30	37	n/a	n/a	35	45
19(u1)	DCPL	18	32	38	n/a	n/a	35	45
19(v1)	DCPL	23	32	38	n/a	n/a	35	45
19(w1)	DCPL	30	**36**	42	n/a	n/a	35	45
19(x1)	DCPL	24	32	38	n/a	n/a	35	45
19(y1)	DCPL	23	32	38	n/a	n/a	35	45
19(z1)	DCPL	22	26	32	n/a	n/a	35	45
19(a2)	DCPL	19	23	29	n/a	n/a	35	45
19(b2)	DCPL	19	24	30	n/a	n/a	35	45
19(c2)	DCPL	19	25	31	n/a	n/a	35	45

Note 1: All predicted noise levels from the worst case meteorological conditions in **Table 11** for each receiver.
Note 2: Unexercised acquisition rights in accordance with Project Approval (08_0203).
Note 3: Landowner Agreement with Yancoal in accordance with Project Approval (08_0203).
Note 4: Request for additional noise mitigation measures in accordance with Project Approval (08_0203).
Note 5: Predicted $L_{Aeq(15minute)}$ noise level complies with the intrusive PSNL.
Note 6: Predicted marginal noise exceedance 1 to 2 dBA above intrusive PSNL.
Note 7: Predicted moderate noise exceedance 3 to 5 dBA above intrusive PSNL.
Note 8 Predicted appreciable noise exceedance > 5 dBA above intrusive PSNL.

7.2.1 Privately owned Receivers - Impact Assessment Summary

The predicted 2015 night-time operating $L_{Aeq(15minute)}$ intrusive levels in **Table 20** show:

- No exceedance of the approved night-time intrusive Project Approval noise limits.
- Marginal exceedance of 1 dBA above the intrusive PSNL 35 dBA at receivers 123 Oleksiuk & Carmody, 126 Hamann - Pixalu P/L, 127 Fisher-Webster and 173 Trigg & Holland.
- Moderate exceedance of 3 dBA to 5 dBA above the intrusive PSNL 35 dBA at receivers 117 Holmes & Holmes, 128 Hare-Scott and 172 Lyall.
- No exceedance of the intrusive PSNL 35 dBA at all other privately owned receivers.
- Marginal exceedance of 1 dBA above the SDNL and consented $L_{A1(1minute)}$ 45 dBA at receiver 172 Lyall.

As discussed in **Section 2.3**, all of the privately owned receivers with predicted exceedances of the PSNLs listed above were previously identified in the DEP Supplementary Noise Assessment as being in either the noise management or noise affectation zone as presented in **Table 21**. As a result of the Modification, there are no additional privately owned receivers predicted to be within the noise management or affectation zones.

Table 21 Comparison of DEP and Modification Noise Impacted Privately Owned Receivers[1]

Exceedance Range	1 to 2 dBA above PSNL	3 to 5 dBA above PSNL	> 5 dBA above PSNL
DEP Supplementary Intrusive Noise $L_{Aeq(15minute)}$	95 Smith & Ransley, 116 Weismantel, 127 Fisher-Webster, 131(1) Relton, 144 Wielgosinski, 169 Williams 173 Trigg & Holland, 177 Thompson, 180(1) Thompson	172 Lyall, 126 Hamann - Pixalu P/L, 123 Oleksiuk & Carmody	117 Holmes & Holmes, 19(j1) DCPL (Former Zulumovski), 19(q1) DCPL (Former Zulumovski), 128 Hare-Scott
Exceedance Range	**1 to 2 dBA above PSNL**	**3 to 5 dBA above PSNL**	**> 5 dBA above PSNL**
Modification Intrusive Noise $L_{Aeq(15minute)}$	123[4] Oleksiuk & Carmody, 126[4] Hamann - Pixalu P/L, 127 Fisher-Webster, 173 Trigg & Holland	117[2,3] Holmes & Holmes, 128[2,3,4] Hare-Scott, 172[4] Lyall,	-

Note 1: Refer to **Appendix B2** Land Ownership Details.
Note 2: Unexercised acquisition rights in accordance with Project Approval (08_0203).
Note 3: Landowner Agreement with Yancoal in accordance with Project Approval (08_0203).
Note 4: Request for additional noise mitigation measures in accordance with Project Approval (08_0203).

As described above, the purpose of this assessment was to assess potential changes in currently approved noise impacts due to the Modification, in particular due to the increased waste rock emplacement elevation. The approved noise levels associated with the DEP (as per the Project Approval noise limits) include approved activities that would not change due to the Modification (and therefore, did not require further assessment), such as the completion of mining in the northern extent of the Weismantel open pit in 2018/2019. Therefore, the existing Project Approval noise limits would be required to be retained for DCM, rather than the predicted noise levels specific to the Modification that considers the scenario where waste rock emplacement would occur at 135 m AHD.

7.3 Privately Owned Vacant Land Impact Assessment

The outer envelope night-time $L_{Aeq(15minute)}$ intrusive noise contour for the 2015 operating scenario Years 2015 is presented in **Appendix G**. The calculation of the noise contours involves numerical interpolation of a noise level array with a graphical accuracy of up to approximately ±2 dBA. This means that in some cases the noise contours will differ slightly from the values in **Table 20**.

As discussed in **Section 5.1**, noise impacts on vacant land are assessed by DP&E on a "case by case" basis.

Table 22 identifies those properties where exceedances of the intrusive $L_{Aeq(15\ minute)}$ noise level is predicted for more than 25% of a vacant (potentially residential) property.

Table 22 Privately Owned Vacant Land[1] with Intrusive $L_{Aeq(15minute)}$ PSNL Exceedances

Period	Noise Management Zone	Noise Affectation Zone
	1 dBA to 5 dBA above PSNL	**> 5 dBA above PSNL**
Daytime	-	122[2] White
Evening	-	122[2] White
Night-time	118[2] Moylan	122[2] White

Note 1: Refer to **Appendix B2** Land Ownership Details.
Note 2: Unexercised acquisition rights in accordance with Project Approval (08_0203).

As discussed in **Section 2.3**, both 118 Moylan and 122 White were previously identified in the DEP Supplementary Noise Assessment as being within the noise affectation zone and therefore hold unexercised acquisition rights in accordance with Project Approval (08_0203).

7.4 Review of Existing DCM Noise Management Plan

It is recommended that the existing NMP (**Section 2.4.2**) be revised for the Modification to include:

- The noise mitigation and management measures included in the Modification noise model.
- Updated operator-attended noise monitoring network to reflect current land ownership.

8 NOISE AMENITY AND CUMULATIVE IMPACT ASSESSMENT

8.1 $L_{Aeq(Period)}$ Noise Amenity Criteria

The INP provides non-mandatory cumulative noise assessment guidelines that address existing and successive industrial development by setting acceptable (and maximum) cumulative $L_{Aeq(period)}$ noise amenity levels for all industrial noise sources only (ie non-transport related) for a particular land use. It is noted that the INP does not set acceptable cumulative $L_{Aeq(15minute)}$ intrusive criteria for all industrial noise sources, but rather seeks to control cumulative noise via the $L_{Aeq(period)}$ noise amenity criterion (refer **Section 5.4**).

8.2 Modification Operating Noise Amenity Levels

The predicted daytime, evening and night-time $L_{Aeq(period)}$ noise amenity levels for the operating scenario in Year 2015 is presented in **Table 23** for privately owned and DCPL owned receivers.

Table 23 Daytime, Evening and Night Noise Amenity $L_{Aeq(period)}$ Year 2015 (dBA re 20 µPa)

ID No	Landholder	Noise Amenity $L_{Aeq(period)}$			PSNL $L_{Aeq(period)}$		
		Day	Evening	Night	Day	Evening	Night
Privately owned Receivers							
74	Melmeth	17	16	19	50	45	40
84(1)	Hart	17	16	20	50	45	40
84(2)	Hart	16	16	20	50	45	40
87	PPI Ltd	18	18	23	50	45	40
93	Howard	21	20	25	50	45	40
94	Howard	26	26	30	50	45	40
95	Ransley	24	24	29	50	45	40
96	Turnbull	18	16	19	50	45	40
97(1)	Davis	18	16	20	50	45	40
97(2)	Davis	19	18	24	50	45	40
98(1)	Partelle & Ramsay	17	16	21	50	45	40
98(2)	Partelle & Ramsay	16	16	22	50	45	40
100	Richards	23	23	28	50	45	40
101	Holloway	22	21	24	50	45	40
103	Macedo	19	18	21	50	45	40
105	Edwards	15	12	17	50	45	40
106	James	24	22	25	50	45	40
107	Spencer	12	10	15	50	45	40
108	Tersteeg	13	13	14	50	45	40
112	Hogeveen	17	18	25	50	45	40
113	Edwards	19	19	26	50	45	40
115(1)	Moylan & Newton	20	22	29	50	45	40
115(2)	Moylan & Newton	23	24	29	50	45	40
115(3)	Moylan & Newton	20	23	29	50	45	40
116	Weismantel	26	25	30	50	45	40
117[2,3]	Holmes & Holmes	31	30	34	50	45	40
120[3]	Mahony	25	26	30	50	45	40
123[4]	Oleksiuk & Carmody	25	25	31	50	45	40

ID No	Landholder	Noise Amenity LAeq(period)			PSNL LAeq(period)		
		Day	Evening	Night	Day	Evening	Night
126[4]	Hamann - Pixalu P/L	25	24	30	50	45	40
127	Fisher-Webster	26	26	31	50	45	40
128[2,3,4]	Hare-Scott	29	30	34	50	45	40
131[3]	Relton	24	25	29	50	45	40
133	Gorton	14	15	16	50	45	40
134	Duzmen P/L	12	12	13	50	45	40
135	Ayliffe	14	14	17	50	45	40
136	Pickles	14	14	17	50	45	40
137	Lord	15	16	20	50	45	40
140	Bennett & Stark	11	10	13	50	45	40
142	Madden	25	27	28	50	45	40
143	Madden	25	28	29	50	45	40
144	Wielgosinski	22	31	30	50	45	40
145	Edwards	27	29	30	50	45	40
146	Bragg	24	27	27	50	45	40
147	Edwards	20	24	24	50	45	40
148	McAndrew	21	29	29	50	45	40
150	Rumbel	13	26	27	50	45	40
153	Paul	15	17	18	50	45	40
154	Morgan	19	22	23	50	45	40
155	Guberina	21	30	30	50	45	40
156	Hope	17	27	28	50	45	40
157	Stephenson	18	28	28	50	45	40
159	Waterer	13	27	27	50	45	40
160(1)	Kenney	10	27	27	50	45	40
160(2)	Kenney	10	24	25	50	45	40
164	Gorton Timber Co. Ltd	17	27	29	50	45	40
165	ESOR Nominees P/L	8	22	23	50	45	40
167	Ravagnani	15	30	30	50	45	40
168(1)	Schultz	12	27	28	50	45	40
168(2)	Schultz	15	30	30	50	45	40
168(3)	Schultz	15	28	29	50	45	40
168(4)	Schultz	12	28	29	50	45	40
169	Williams	13	30	31	50	45	40
172[4]	Lyall	25	37	38	50	45	40
173	Trigg & Holland	23	33	34	50	45	40
174	Carroll	16	29	31	50	45	40
175	Thomas	15	31	32	50	45	40
176	Thompson	18	29	30	50	45	40
177	Thompson	10	25	26	50	45	40
178	Hitchcock & Coldham	9	29	29	50	45	40
179	Mellar	11	27	28	50	45	40
180(1)	Thompson	10	31	32	50	45	40

ID No	Landholder	Noise Amenity LAeq(period)			PSNL LAeq(period)		
		Day	Evening	Night	Day	Evening	Night
180(2)	Thompson	10	28	28	50	45	40
183	Elfick	8	23	24	50	45	40
185	Raine & Hilleard	7	17	18	50	45	40
186	Farnham	6	26	28	50	45	40
188	Rumbel	8	29	30	50	45	40
189	Gillard	9	29	30	50	45	40
192	Vajda	6	28	29	50	45	40
193	Smith	5	28	29	50	45	40
194	Vajda	19	21	28	50	45	40
198	Aspenview Enterprises P/L	7	20	21	50	45	40
199	Parker	9	20	21	50	45	40
200	Trappel	9	19	20	50	45	40
204	Jones	13	28	29	50	45	40
209	Chapman	18	16	20	50	45	40
211	Irwin	15	15	20	50	45	40
216	Vajda	17	18	19	50	45	40
220	Lindfield & Associates P/L	19	23	29	50	45	40
223	Ferraro	6	18	18	50	45	40
260	Roberts	10	29	30	50	45	40
DCPL owned Receivers							
19(a1)	DCPL	31	41	42	50	45	40
19(b1)	DCPL	35	43	44	50	45	40
19(c1)	DCPL	34	37	40	50	45	40
19(d1)	DCPL	31	40	41	50	45	40
19(e1)	DCPL	18	35	36	50	45	40
19(f1)	DCPL (Mammy Johnsons)	43	50	50	50	45	40
19(g1)	DCPL	29	31	34	50	45	40
19(h1)	DCPL	28	28	30	50	45	40
19(i1)	DCPL	28	31	32	50	45	40
19(j1)	DCPL	33	32	37	50	45	40
19(k1)	DCPL	29	29	34	50	45	40
19(l1)	DCPL	30	29	31	50	45	40
19(m1)	DCPL	28	28	32	50	45	40
19(n1)	DCPL (Weismantels Inn)	29	29	31	50	45	40
19(o1)	DCPL	33	33	36	50	45	40
19(p1)	DCPL	42	40	43	50	45	40
19(q1)	DCPL	36	35	39	50	45	40
19(r1)	DCPL	34	44	45	50	45	40
19(s1)	DCPL	30	41	42	50	45	40
19(t1)	DCPL	19	19	25	50	45	40
19(u1)	DCPL	14	15	25	50	45	40
19(v1)	DCPL	20	20	26	50	45	40
19(w1)	DCPL	27	28	32	50	45	40

ID No	Landholder	Noise Amenity $L_{Aeq(period)}$			PSNL $L_{Aeq(period)}$		
		Day	Evening	Night	Day	Evening	Night
19(x1)	DCPL	21	21	26	50	45	40
19(y1)	DCPL	20	20	26	50	45	40
19(z1)	DCPL	20	18	22	50	45	40
19(a2)	DCPL	17	15	19	50	45	40
19(b2)	DCPL	16	15	20	50	45	40
19(c2)	DCPL	16	15	20	50	45	40

Note 1: All predicted noise levels from the worst case meteorological conditions in **Table 11** for each receiver.
Note 2: Unexercised acquisition rights in accordance with Project Approval (08_0203).
Note 3: Landowner Agreement with Yancoal in accordance with Project Approval (08_0203).
Note 4: Request for additional noise mitigation measures in accordance with Project Approval (08_0203).
Note 5: Predicted $L_{Aeq(15minute)}$ noise level complies with the amenity PSNL.
Note 6: Predicted marginal noise exceedance 1 to 2 dBA above amenity PSNL.
Note 7: Predicted moderate noise exceedance 3 to 5 dBA above amenity PSNL.
Note 8 Predicted appreciable noise exceedance > 5 dBA above amenity PSNL.

8.2.1 Privately owned Receivers Impact Assessment Summary

No exceedance of the amenity PSNLs are predicted at any privately owned receivers during the daytime, evening or night-time in 2015.

8.3 Existing, Approved and Proposed Industrial Developments

The estimated mine operating evening and night-time $L_{Aeq(period)}$ noise amenity levels from each of the developments in **Table 2** have been established by reviewing the environmental assessments (where available).

No exceedance of the noise amenity levels are predicted at any privately owned receivers due to potential cumulative impacts.

Further detail is provided in **Appendix H**.

9 BLASTING IMPACT ASSESSMENT

9.1 Blasting Assessment Criteria

9.1.1 Australian Standard Criteria

AS 2187: Part 2-2006 "*Explosives - Storage and Use - Part 2: Use of Explosives*" provides guidance in assessing blast-induced ground (and structural) vibration and airblast effects on buildings and their occupants and details are presented in Appendix J of AS 2187.

Recommended vibration limits are based on international standards (or studies) as presented in Appendix J Tables J4.5(A) and J4.5(B) of AS 2187, for human comfort and structural building damage respectively. Similarly, recommended human comfort and structural damage airblast limits are presented in Appendix J Tables J5.4(A) and J5.4(B) AS 2187, respectively.

The guideline *"Assessing Vibration: A Technical Guideline"* (Department of Environment and Conservation, 2006) specifically does not consider blasting-induced vibration and, therefore, this guideline is not discussed further.

9.1.2 Human Comfort Noise and Vibration Criteria

Ground vibration and airblast levels which cause human discomfort are lower than recommended structural damage limits. Therefore, compliance with the lowest applicable human comfort criteria generally ensures that the potential to cause structural damage is negligible. The Office of Environment and Heritage currently adopts the ANZEC *Technical Basis for Guidelines to Minimise Annoyance due to Blasting Overpressure and Ground Vibration* dated September 1990 for assessing potential annoyance from blasting during daytime hours, as follows:

- The recommended maximum level for airblast is 115 dB Linear.
- The level of 115 dB Linear may be exceeded on up to 5% of the total number of blasts over a period of 12 months. The level should not exceed 120 dB Linear at any time.
- The recommended maximum for ground vibration is 5 mm/s, Peak Vector Sum (PVS) vibration velocity.
- The PVS level of 5 mm/s may be exceeded on up to 5% of the total number of blasts over a period of 12 months. The level should not exceed 10 mm/s at any time.

The ANZEC criteria are generally consistent with AS 2187: Part 2-2006 Appendix J Tables J4.5(A) and J5.4(A) with respect to vibration and airblast human comfort respectively.

9.1.3 Livestock Comfort Noise and Vibration Criteria

In a study (*"Responses of Farm Animals to Sonic Booms"* [Casaday and Lehmann, 1967]) animal installations were selected for observations on animal behaviour under sonic boom conditions. The number of animals observed in this study included approximately 10,000 commercial feedlot beef cattle, 100 horses, 150 sheep and 320 lactating dairy cattle. Booms during the test period were scheduled at varying intervals during the morning hours Monday to Friday of each week.

Results of the study showed that the reactions of the sheep and horses to sonic booms were slight. Dairy cattle were little affected by sonic booms (125 dB to 136 dB). Only 19 of 104 booms produced even a mild reaction, as evidenced by a temporary cessation of eating, rising of heads, or slight startle effects in a few of those being milked. Milk production was not affected during the test period, as evidenced by total and individual milk yield. The researchers developed a summary by species and farms indicating that the few abnormal behavioural changes observed were well within the range of activity variation within a group of animals. They defined these changes as horses jumping up and galloping around the paddock, bellowing of dairy cattle, and increased activity by beef cattle (Casaday and Lehmann, 1967). In order to provide for a conservative assessment, the lowest airblast exposure studied (125 dB) was adopted as a criterion for the purposes of assessment of livestock impacts.

Similarly, an investigation (Heggies, 2006) was conducted to determine the vibration levels experienced by cattle during typical short-term road transportation together with any vibration-induced health affects as observed by a registered veterinary surgeon. The study concluded that cattle are commonly exposed to vibration levels in excess of 200 mm/s during road transportation with no adverse effects on the cattle's health including levels of stress and contentment. It was consequently presumed that there would only be an effect on the cattle's health at vibration levels well in excess of 200 mm/s.

9.1.4 Building Damage Airblast Criteria

In relation to building damage airblast criteria, AS 2187: Part 2-2006 Appendix J J5.4(B) recommends a maximum airblast of 133 dB Linear Peak.

9.1.5 Building Damage Vibration Criteria

The applicable building damage vibration criteria AS 2187: Part 2-2006 Appendix J J4.5(B) is derived from British Standard 7385: Part 2-1993 *Evaluation and Measurement for Vibration in Buildings Part 2. Guideline to damage levels from ground borne vibration*. The standard sets guideline values for building vibration based on the lowest vibration levels above which damage has been credibly demonstrated. These levels have been established to give a minimum risk of vibration-induced damage, where minimal risk for a named effect is usually taken as a 95% probability of no effect.

Sources of vibration which are considered in the standard include blasting (carried out during mineral extraction or construction excavation), demolition, piling, ground treatments (e.g. compaction), construction equipment, tunneling, road and rail traffic and industrial machinery.

The recommended limits (guide values) for transient vibration to ensure minimal risk of cosmetic damage to residential and industrial buildings are presented numerically in **Table 24** and graphically in **Figure 2**.

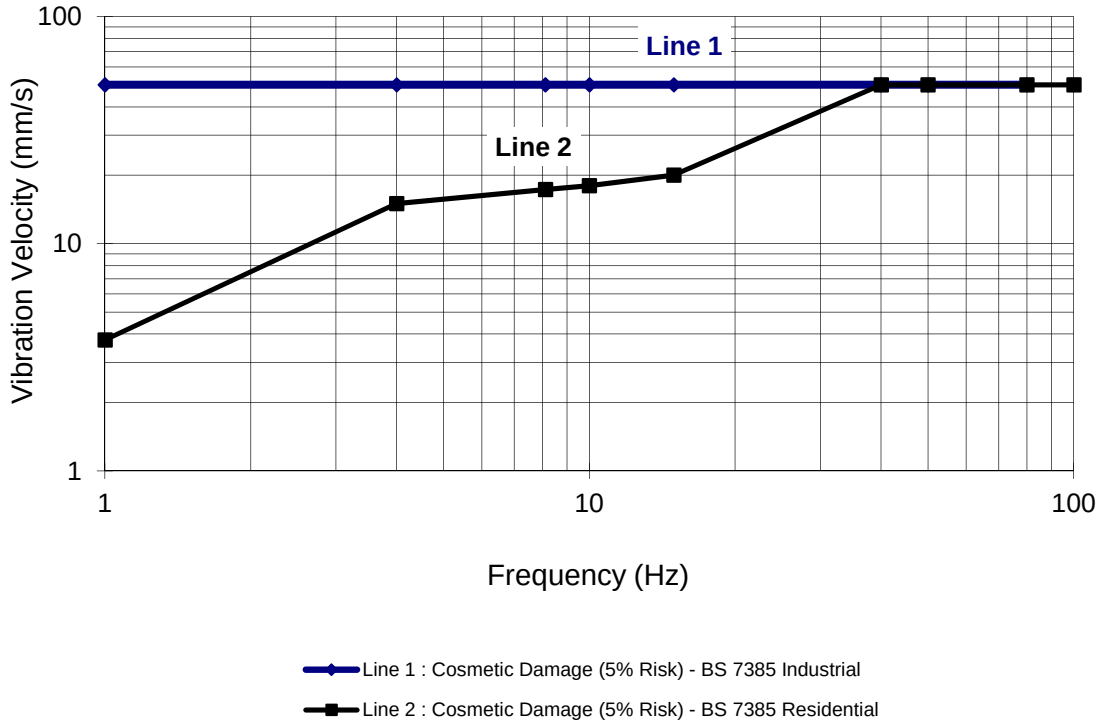
Table 24 Transient Vibration Guide Values - Minimal Risk of Cosmetic Damage

Line	Type of Building	PCPV in Frequency Range of Predominant Pulse[1, 2]	
		4 to 15 Hz	15 Hz and Above
1	Reinforced or framed structures Industrial and heavy commercial buildings	50 mm/s at 4 Hz and above	-
2	Unreinforced or light framed structures Residential or light commercial type buildings	15 mm/s at 4 Hz increasing to 20 mm/s at 15 Hz	20 mm/s at 15 Hz increasing to 50 mm/s at 40 Hz and above

Note 1: Peak Component Particle Velocity (PCPV).
Note 2: Hertz (Hz).

The standard states that the guide values in **Figure 2** relate predominantly to transient vibration which does not give rise to resonant responses in structures, and to low-rise buildings.

Figure 2 Graph of Transient Vibration Guide Values for Cosmetic Damage



The standard goes on to state that minor damage is possible at vibration magnitudes which are greater than twice those given in **Table 24** and major damage to a building structure may occur at values greater than four times the tabulated values. It is noteworthy that extra to the guide values nominated in **Table 24**, the standard states that:

> *Some data suggests that the probability of damage tends towards zero at 12.5 mm/s peak component particle velocity. This is not inconsistent with an extensive review of the case history information available in the UK.*

Also that:

> *A building of historical value should not (unless it is structurally unsound) be assumed to be more sensitive.*

The former Weismantels Inn is owned by DCPL [ID 19(n1)] and located outside of the Modification disturbance area but within approximately 600 m of the open pit operations. Based on the foregoing, a conservative ground vibration damage criterion of 10 mm/s (peak component particle velocity) would be applicable to the Weismantels Inn and at all other privately owned residential receivers.

9.1.6 Archaeological/Geological Vibration Damage Criteria

There are no regulatory criteria nominated in Australia for the assessment of damage to archaeological/geological structures from vibration. Research, however, has been undertaken by the US Army Corps of Engineers into the effects of large surface blasts on the dynamic stability of nearby unlined tunnels of various diameters in sandstone and granite (*Blast Vibration Monitoring and Control* [Dowding, 1985]). The results of the research indicated that intermittent rock fall or observable damage was not observed until vibration levels exceeded 460 mm/s.

An Aboriginal site of significance known as Mammy Johnson's Grave is located over 3 km from the Modification disturbance area. Both the Project Approval (08_0203) and EPL No 11701 nominate very conservative ground vibration limits of 5 mm/s which appear to be derived from the human comfort criteria discussed in the **Section 9.1.2**.

9.1.7 Roadway/Pavement Vibration Damage Criteria

There are no regulatory criteria nominated in Australia for the assessment of damage to roadways or concrete pavements. A recent SLR literature review associated with concrete pavements concluded that none of the United States, Swedish, Canadian or United Kingdom blasting studies, including those achieving 125 mm/s to 250 mm/s ground vibration, found cases of slab and or pavement cracking. Asphalt roadways are relatively more flexible and less susceptible to cracking by comparison to concrete pavements.

The Bucketts Way is located approximately 550 m from the northern extension of the Clareval North West open pit. Accordingly, consideration has been given to potential vibration effects on such infrastructure and conservative roadway damage criteria of 125 mm/s (PCPV) would apply to The Bucketts Way for the Modification.

9.1.8 Railway Line and Transmission Line Vibration Damage Criteria

The German Standard DIN 4150-3:1999 *Structural Vibration Part 3: Effects of vibration in structures* provides guideline values for evaluating the effect of vibration on buried infrastructure (ie steel pipework). The values are based on the assumption that the infrastructure (ie pipework) has been manufactured and laid using current technology. Additional considerations may be required at junctions. The recommended short-term vibration limits to ensure minimal risk of damage are presented in **Table 25**.

Table 25 Guideline Values for Vibration - Effects of Short-Term Vibration on Buried Pipework

Pipe Material	PCPV Vibration Measured on the Pipe[1]
Steel (including welded pipes)	100 mm/s
Clay, concrete, reinforced concrete, pre-stressed concrete, metal (with or without flange)	80 mm/s
Masonry, plastic	50 mm/s

Note 1: Peak Component Particle Velocity (PCPV).

The North Coast Railway is located approximately 1 km from Modification disturbance area. Accordingly, consideration has been given to potential vibration effects on such infrastructure and the conservative railway line damage criteria of 100 mm/s (PCPV) would apply to The North Coast Railway for the Modification. Similarly, a safe blast design vibration criterion of 60 mm/s (PCPV) would apply to a transmission line with a vibration limit of 100 mm/s (PCPV) for the Modification.

9.2 Proposed Open Pit Blasting Practices

Assessment of the potential ground vibration and airblast emissions arising from overburden (ie waste rock) blasting has been based on the indicative DCM blast design parameters presented in **Table 26** which generally represent a continuation of the currently approved blasting practices that would also be employed for the Modification. As discussed in **Section 3.3**, blast sizes would generally remain unchanged by the Modification. However, potential blast impacts associated with the minor incremental extensions to the existing open pits (**Appendix D3)** are assessed.

Table 26 Indicative Project Blast Design Parameters

Parameter	Typical Ranges
Bench Height	Typically 15 to 25 m
Burden and Spacing	Shallow 5.0 m x 6.0 m, Deep 6.0 m x 7.0 m
Stemming	Typically 4 m (aggregate)
Hole Diameter	Typically 150 to 230 mm
Number of Holes	Typically 800 to 1,300 holes
Charge Mass per Hole	Typically 100 to 800 kilograms (kg)
Holes per Delay	Typically 1 to 5 holes
Maximum Instantaneous Charge (MIC)	Typically 3,000 kg (5% exceedance)
Explosive Type	Wet product - Fortis Coal (Powergel) Moist/Dry - Fortan Coal (Energan - Heavy ANFO) Dry – ANFO
Effective Powder Factor	Typically 0.3 to 0.6 kg/m^3

To determine the blasting emissions levels at the nearest potentially affected receivers, the measured ground vibration and airblast levels from the DCM blasting monitoring programme were collated and analysed. The data was distilled to determine the 50% and 5% exceedance ground vibration and airblast site laws, as follows:

$$PVS\ (50\%) = 6*(R/Q^{1/2})^{-0.46}$$
$$PVS\ (5\%) = 18*(R/Q^{1/2})^{-0.46}$$
$$SPL\ (50\%) = 128 - 10*(\log(R) - \tfrac{1}{3}\log(Q))$$
$$SPL\ (5\%) = 136 - 10*(\log(R) - \tfrac{1}{3}\log(Q))$$

where,

PVS = Vibration velocity (mm/s)
SPL = Peak airblast noise level (dB Linear)
R = Distance between charge and receiver (m)
Q = Charge mass per delay (kg)

9.3 Predicted Ground Vibration and Airblast Levels

Using the ground vibration and airblast site laws described above, ground vibration and airblast emissions were predicted at the nearest potentially affected receivers, as presented **Table 27**, for the Modification extension areas (refer **Appendix D3**) for a typical overburden blast designs ranging from MIC 400 kg to MIC 3,000 kg.

Table 27 Peak Vector Sum (PVS) Ground Vibration (mm/s) and Airblast (dBLpk re 20 µPa)

ID	Landowner	Ground Vibration[1] (mm/s)		Airblast[1] (dB re 20 µPa)		Ground Vibration[1] (mm/s)		Airblast[1] (dB re 20 µPa)	
		MIC 400 kg		MIC 400 kg		MIC 3,000 kg		MIC 3,000 kg	
		50%	5%	50%	5%	50%	5%	50%	5%
Privately owned Receivers									
120[3]	Mahony	1.0	3.1	107	115	1.6	4.9	110	118
142	Madden	1.0	2.9	106	114	1.5	4.6	109	117
143	Madden	0.9	2.7	106	114	1.4	4.3	109	117
117[2,3]	Holmes & Holmes	0.9	2.6	105	113	1.4	4.2	108	116
115(2)	Moylan & Newton	0.8	2.4	105	113	1.3	3.8	107	115
144	Wielgosinski	0.8	2.3	104	112	1.2	3.7	107	115

ID	Landowner	Ground Vibration[1] (mm/s)		Airblast[1] (dB re 20 µPa)		Ground Vibration[1] (mm/s)		Airblast[1] (dB re 20 µPa)	
		MIC 400 kg		MIC 400 kg		MIC 3,000 kg		MIC 3,000 kg	
		50%	5%	50%	5%	50%	5%	50%	5%
115(1)	Moylan & Newton	0.8	2.3	104	112	1.2	3.7	107	115
115(3)	Moylan & Newton	0.8	2.3	104	112	1.2	3.6	107	115
145	Edwards	0.8	2.3	104	112	1.2	3.6	107	115
128[2,3,4]	Hare-Scott	0.7	2.2	104	112	1.2	3.5	107	115
194	Vajda	0.7	2.2	104	112	1.2	3.5	107	115
146	Bragg	0.7	2.1	103	111	1.1	3.4	106	114
127	Fisher-Webster	0.7	2.1	103	111	1.1	3.3	106	114
220	Lindfield & Associates P/L	0.7	2.0	103	111	1.1	3.2	106	114
147	Edwards	0.7	2.0	103	111	1.1	3.2	106	114
123[4]	Oleksiuk & Carmody	0.6	1.9	103	111	1.0	3.1	105	113
126[4]	Hamann - Pixalu P/L	0.6	1.9	102	110	1.0	3.0	105	113
113	Edwards	0.6	1.9	102	110	1.0	3.0	105	113
95	Ransley	0.6	1.9	102	110	1.0	3.0	105	113
216	Vajda	0.6	1.9	102	110	1.0	3.0	105	113
112	Hogeveen	0.6	1.8	102	110	1.0	2.9	105	113
116	Weismantel	0.6	1.8	102	110	1.0	2.9	105	113
131[3]	Relton	0.6	1.8	102	110	0.9	2.8	105	113
94	Howard	0.6	1.8	102	110	0.9	2.8	105	113
100	Richards	0.6	1.8	102	110	0.9	2.8	105	113
106	James	0.6	1.8	102	110	0.9	2.8	105	113
101	Holloway	0.5	1.6	101	109	0.9	2.6	104	112
148	McAndrew	0.5	1.6	101	109	0.9	2.6	104	112
93	Howard	0.5	1.6	101	109	0.9	2.6	104	112
133	Gorton	0.5	1.6	101	109	0.8	2.5	103	111
211	Irwin	0.5	1.5	100	108	0.8	2.4	103	111
154	Morgan	0.5	1.5	100	108	0.8	2.4	103	111
153	Paul	0.5	1.5	100	108	0.8	2.4	103	111
97(2)	Davis	0.5	1.5	100	108	0.8	2.4	103	111
168(3)	Schultz	0.5	1.5	100	108	0.8	2.4	103	111
136	Pickles	0.5	1.5	100	108	0.8	2.3	103	111
155	Guberina	0.5	1.5	100	108	0.8	2.3	103	111
135	Ayliffe	0.5	1.5	100	108	0.8	2.3	103	111
168(2)	Schultz	0.5	1.4	100	108	0.8	2.3	103	111
167	Ravagnani	0.5	1.4	100	108	0.8	2.3	103	111
134	Duzmen P/L	0.5	1.4	100	108	0.8	2.3	103	111
137	Lord	0.5	1.4	100	108	0.8	2.3	103	111
97(1)	Davis	0.5	1.4	100	108	0.8	2.3	103	111
103	Macedo	0.5	1.4	100	108	0.7	2.2	103	111
156	Hope	0.5	1.4	100	108	0.7	2.2	103	111
157	Stephenson	0.5	1.4	100	108	0.7	2.2	102	110
140	Bennett & Stark	0.5	1.4	99	107	0.7	2.2	102	110
107	Spencer	0.5	1.4	99	107	0.7	2.2	102	110

ID	Landowner	Ground Vibration[1] (mm/s)		Airblast[1] (dB re 20 µPa)		Ground Vibration[1] (mm/s)		Airblast[1] (dB re 20 µPa)	
		MIC 400 kg		MIC 400 kg		MIC 3,000 kg		MIC 3,000 kg	
		50%	5%	50%	5%	50%	5%	50%	5%
209	Chapman	0.5	1.4	99	107	0.7	2.2	102	110
96	Turnbull	0.5	1.4	99	107	0.7	2.2	102	110
98(1)	Partelle & Ramsay	0.5	1.4	99	107	0.7	2.2	102	110
74	Melmeth	0.4	1.3	99	107	0.7	2.1	102	110
159	Waterer	0.4	1.3	99	107	0.7	2.1	102	110
98(2)	Partelle & Ramsay	0.4	1.3	99	107	0.7	2.1	102	110
164	Gorton Timber Co. Ltd	0.4	1.3	99	107	0.7	2.1	102	110
108	Tersteeg	0.4	1.3	99	107	0.7	2.1	102	110
165	ESOR Nominees P/L	0.4	1.3	99	107	0.7	2.1	102	110
87	PPI Ltd	0.4	1.3	99	107	0.7	2.1	102	110
84(2)	Hart	0.4	1.3	99	107	0.7	2.1	102	110
84(1)	Hart	0.4	1.3	99	107	0.7	2.1	102	110
105	Edwards	0.4	1.3	99	107	0.7	2.1	102	110
160(2)	Kenney	0.4	1.3	99	107	0.7	2.1	102	110
169	Williams	0.4	1.3	99	107	0.7	2.1	102	110
172[4]	Lyall	0.4	1.3	99	107	0.7	2.0	102	110
177	Thompson	0.4	1.3	99	107	0.7	2.0	102	110
223	Ferraro	0.4	1.3	98	106	0.7	2.0	101	109
160(1)	Kenney	0.4	1.2	98	106	0.7	2.0	101	109
180(2)	Thompson	0.4	1.2	98	106	0.7	2.0	101	109
168(1)	Schultz	0.4	1.2	98	106	0.7	2.0	101	109
168(4)	Schultz	0.4	1.2	98	106	0.7	2.0	101	109
204	Jones	0.4	1.2	98	106	0.6	1.9	101	109
178	Hitchcock & Coldham	0.4	1.2	98	106	0.6	1.9	101	109
173	Trigg & Holland	0.4	1.2	98	106	0.6	1.9	101	109
175	Thomas	0.4	1.2	98	106	0.6	1.9	101	109
180(1)	Thompson	0.4	1.2	98	106	0.6	1.9	101	109
150	Rumbel	0.4	1.2	98	106	0.6	1.9	101	109
174	Carroll	0.4	1.2	98	106	0.6	1.9	101	109
183	Elfick	0.4	1.2	98	106	0.6	1.9	101	109
179	Mellar	0.4	1.2	98	106	0.6	1.9	101	109
198	Aspenview Enterprises P/L	0.4	1.2	98	106	0.6	1.9	101	109
199	Parker	0.4	1.2	98	106	0.6	1.9	101	109
200	Trappel	0.4	1.2	98	106	0.6	1.9	101	109
176	Thompson	0.4	1.2	98	106	0.6	1.8	101	109
185	Raine & Hilleard	0.4	1.2	98	106	0.6	1.8	101	109
188	Rumbel	0.4	1.1	98	106	0.6	1.8	101	109
186	Farnham	0.4	1.1	98	106	0.6	1.8	100	108
192	Vajda	0.4	1.1	98	106	0.6	1.8	100	108
189	Gillard	0.4	1.1	97	105	0.6	1.8	100	108
260	Roberts	0.4	1.1	97	105	0.6	1.8	100	108
193	Smith	0.4	1.1	97	105	0.6	1.8	100	108

ID	Landowner	Ground Vibration[1] (mm/s)		Airblast[1] (dB re 20 µPa)		Ground Vibration[1] (mm/s)		Airblast[1] (dB re 20 µPa)	
		MIC 400 kg		MIC 400 kg		MIC 3,000 kg		MIC 3,000 kg	
		50%	5%	50%	5%	50%	5%	50%	5%
DCPL owned Receivers									
19(p1)	DCPL	1.5	4.6	111	119	2.4	7.3	114	122
19(n1)	DCPL (Weismantels Inn)	1.3	3.9	109	117	2.1	6.2	112	120
19(i1)	DCPL	1.2	3.7	109	117	2.0	5.9	112	120
19(h1)	DCPL	1.2	3.5	108	116	1.9	5.6	111	119
19(o1)	DCPL	1.2	3.5	108	116	1.9	5.6	111	119
19(q1)	DCPL	1.1	3.2	107	115	1.7	5.1	110	118
19(j1)	DCPL	0.9	2.8	106	114	1.5	4.4	109	117
19(k1)	DCPL	0.8	2.5	105	113	1.3	3.9	108	116
19(l1)	DCPL	0.8	2.4	105	113	1.3	3.9	108	116
19(c1)	DCPL	0.7	2.2	104	112	1.2	3.6	107	115
19(g1)	DCPL	0.7	2.1	103	111	1.1	3.4	106	114
19(m1)	DCPL	0.7	2.1	103	111	1.1	3.3	106	114
19(w1)	DCPL	0.7	2.0	103	111	1.1	3.2	106	114
19(d1)	DCPL	0.6	1.8	102	110	1.0	2.9	105	113
19(s1)	DCPL	0.6	1.8	102	110	0.9	2.8	105	113
19(a1)	DCPL	0.6	1.8	102	110	0.9	2.8	105	113
19(x1)	DCPL	0.5	1.6	101	109	0.8	2.5	103	111
19(z1)	DCPL	0.5	1.5	100	108	0.8	2.4	103	111
19(y1)	DCPL	0.5	1.5	100	108	0.8	2.4	103	111
19(b1)	DCPL	0.5	1.5	100	108	0.8	2.4	103	111
19(f1)	DCPL (Mammy Johnsons)	0.5	1.5	100	108	0.8	2.4	103	111
19(v1)	DCPL	0.5	1.5	100	108	0.8	2.3	103	111
19(t1)	DCPL	0.5	1.4	100	108	0.8	2.3	103	111
19(r1)	DCPL	0.5	1.4	100	108	0.7	2.2	102	110
19(a2)	DCPL	0.4	1.3	99	107	0.7	2.1	102	110
19(b2)	DCPL	0.4	1.3	99	107	0.7	2.1	102	110
19(c2)	DCPL	0.4	1.3	99	107	0.7	2.1	102	110
19(e1)	DCPL	0.4	1.3	99	107	0.7	2.0	102	110
19(u1)	DCPL	0.4	1.2	98	106	0.6	1.9	101	109

Note 1: Based on the indicative blast parameters presented in **Table 26**.
Note 2: Unexercised acquisition rights in accordance with Project Approval (08_0203).
Note 3: Landowner Agreement with Yancoal in accordance with Project Approval (08_0203).
Note 4: Request for additional noise mitigation measures in accordance with Project Approval (08_0203).
Note 5: Predicted blast emission level complies with the human comfort criteria of 5 mm/s and 115 dBLpk.
Note 6: Predicted blast emission level exceedance of 1 to 2 mm/s or 1 to 2 dB above the human comfort criteria of 5 mm/s and 115 dBLpk.
Note 7: Predicted blast emission level exceedance of 3 to 5 mm/s or 3 to 5 dB above the human comfort criteria of 5 mm/s and 115 dBLpk.
Note 8: Predicted blast emission level exceedance of > 5 mm/s or > 5 dB above the human comfort criteria of 5 mm/s and 115 dBLpk.

9.4 Blasting Impact Assessment

9.4.1 Privately Owned Receivers Impact Assessment

The ground vibration and airblast emissions in **Table 27** show:

- With a blast MIC of 3,000 kg, no exceedance of the relevant ground vibration and or airblast human comfort criterion at any privately owned receiver, except as follows:
    - A moderate exceedance of 3 dB above the airblast human comfort criterion of 115 dBLpk at receiver 120 Mahony. DCPL has entered into a private agreement with the owner of this property.
    - A marginal exceedance of up to 2 dB above the airblast human comfort criterion of 115 dBLpk at receivers 142 Madden, 143 Madden and 117 Holmes and Holmes. DCPL has entered into a private agreement with the owner of property 117.
- With a blast MIC of 400 kg, no exceedance of the relevant ground vibration and or airblast human comfort criterion at any privately owned receiver.

Ground vibration and or airblast predictions are summarised in **Table 28**. Based on the predicted results DCPL would manage the size of blasts (ie reduce them below 3,000 kg) to comply with the Project Approval blast limits.

Table 28 Privately Owned Receivers[1] with Human Comfort Criteria 5% Exceedances

Open Cut	> 5 to 7 mm/s or 116 to 117 dBLpk	8 to 10 mm/s or 118 to 120 dBLpk	11 to 12.5 mm/s or 120 to 133 dBLpk	> 12.5 mm/s or > 133 dBLpk
MIC 400 kg	-	-	-	-
MIC 3,000 kg	117[2,3], 142, 143	120[3]	-	-

Note 1: Refer to **Appendix B2** Land Ownership Details.
Note 2: Unexercised acquisition rights in accordance with Project Approval (08_0203).
Note 3: Landowner Agreement with Yancoal in accordance with Project Approval (08_0203).

9.4.2 DCPL Owned and Heritage Receivers Impact Assessment

DCPL owned and heritage receivers that are predicted to exceed the relevant ground vibration and or airblast criterion are summarised in **Table 29**. It is noted that the predicted (5% exceedance) ground vibration level at the former Weismantels Inn [19(n1) DCPL] of 6.2 mm/s complies with the approved (ie Project Approval (08_0203) and EPL No 11701) criteria of 10 mm/s. Similarly, at the predicted (5% exceedance) ground vibration level at Mammy Johnson's Grave [19(f1) DCPL of 2.4 mm/s complies with the approved criteria of 5 mm/s.

Table 29 DCPL Owned and Heritage Receivers[1] with Human Comfort Criteria 5% Exceedances

Open Cut Blast Design	> 5 to 7 mm/s or 116 to 117 dBLpk	8 to 10 mm/s or 118 to 120 dBLpk	11 to 12.5 mm/s or 120 to 133 dBLpk	> 12.5 mm/s or > 133 dBLpk
MIC 400 kg	19(h1), 19(i1), 19(n1)[2], 19(o1)	19(p1)	-	-
MIC 3,000 kg	19(j1), 19(k1), 19(l1)	19(h1), 19(i1), 19(n1), 19(o1), 19(q1)	19(p1)	-

Note 1: Refer to **Appendix B2** Land Ownership Details.
Note 2: The predicted ground vibration level of 6.2 mm/s at 19(n1) DCPL (Weismantels Inn) complies the blast damage criteria of 10 mm/s.

9.4.3 Infrastructure and Livestock Impact Assessment

The predicted vibration safe blast design distances to roadway, railway and transmission lines are presented in **Table 30** together with livestock vibration and airblast safe blast design distances.

Table 30 Predicted[1] Safe Blast Design Distances to Infrastructure and Livestock

Open Cut Blast Design	Roadway Vibration Criteria 125 mm/s	Railway Vibration Criteria 100 mm/s	Transmission Vibration Criteria 60 mm/s	Livestock Vibration Criteria 200 mm/s	Livestock Airblast Criteria 125 dBLpk
MIC 400 kg	55 m	65 m	92 m	40 m	81 m
MIC 3,000 kg	151 m	177 m	253 m	109 m	159 m

Note 1: Refer to **Appendix B2** Land Ownership Details.

Potential blasting impacts would continue to be managed and monitored in accordance with the requirements of Project Approval (08_0203) and EPL No 11701 and the DCM BLMP.

The management of any flyrock (ie solid material ejected from the blast site) will continue to be managed in accordance with the DCM BLMP with regard to nearby roadway and infrastructure.

9.5 Review of Existing Duralie Blast Management Plan

It is recommended that the existing BLMP (**Section 2.5.2**) be revised for the Modification to include:

- Updated blast emission monitoring network to reflect current land ownership and private agreements.

10 SUMMARY OF FINDINGS

10.1 Modification and Cumulative Mine Operating Noise Impact Assessment

A summary of the exceedances at privately owned receivers and vacant land of the PSNLs, SDNLs and acceptable noise amenity levels is presented in **Table 31** together with the consented noise limits.

Table 31 Summary Privately Owned Receivers[1] and Vacant Land with Criteria Exceedances

Exceedance Range	**Intrusive $L_{Aeq(15minute)}$**	**Sleep Disturbance $L_{A1(1minute)}$**	**Amenity $L_{Aeq(period)}$ (ie school, hall, church)**
Consented Noise Limits	Nil	172[4] Lyall (1 to 2 dBA above consented noise level)	Nil
Exceedance Range	**1 to 2 dBA above PSNL**	**3 to 5 dBA above PSNL**	**> 5 dBA above PSNL**
Intrusive Noise $L_{Aeq(15minute)}$	123[4] Oleksiuk & Carmody, 126[4] Hamann Pixalu P/L, 127 Fisher-Webster, 173 Trigg & Holland	117[2,3] Holmes & Holmes, 128[2,3,4] Hare Scott, 172[4] Lyall	-
Exceedance Range	**1 to 2 dBA above SDNL**	**3 to 5 dBA above SDNL**	**> 5 dBA above SDNL**
Sleep Disturbance $L_{A1(1minute)}$	172[4] Lyall	-	-
Exceedance Range	**1 to 2 dBA above PSNL**	**3 to 5 dBA above PSNL**	**> 5 dBA above PSNL**
Noise Amenity $L_{Aeq(period)}$	-	-	-
Exceedance Range	**1 to 2 dBA above INP Acceptable**	**3 dBA above INP Acceptable**	**> 3 dBA above INP Acceptable**
Cumulative Amenity $L_{Aeq(period)}$	-	-	-
Exceedance Range	**1 to 5 dBA above PSNL**		**> 5 dBA above PSNL**
Vacant Land Intrusive $L_{Aeq(15minute)}$	118[2] Moylan		122[2] White

Note 1: Refer to **Appendix B2** Land Ownership Details.
Note 2: Unexercised acquisition rights in accordance with Project Approval (08_0203).
Note 3: Landowner Agreement with Yancoal in accordance with Project Approval (08_0203).
Note 4: Request for additional noise mitigation measures in accordance with Project Approval (08_0203).

All of the privately owned receivers listed in **Table 31** were previously identified in the DEP Supplementary Noise Assessment as being in either the noise management or noise affectation zone. Hence, as a result of the Modification, there are no additional privately owned receivers predicted to be within the noise management or affectation zones.

It is relevant to note that DCPL has entered into a private agreement with both receiver 117 Holmes & Holmes and 128 Hare-Scott, and the owners of unoccupied properties 118 Moylan and 122 White already hold unexercised acquisition rights in accordance with Project Approval (08_0203). Similarly, receivers 123 Oleksiuk & Carmody, 126 Hamann - Pixalu P/L and 172 Lyall are also entitled to request additional noise mitigation measures in accordance with Project Approval (08_0203).

10.2 Blasting Impact Assessment

Privately owned receivers that are predicted to exceed the relevant ground vibration and or airblast criterion are summarised in **Table 32**.

It is relevant to note that receivers 117 Holmes & Holmes and 120 Mahony already hold Landowner Agreements with Yancoal in accordance with Project Approval (08_0203).

Based on the predicted results DCPL would manage the size of blasts (ie reduce them below 3,000 kg) to comply with the Project Approval blast limits.

Table 32 Privately Owned Receivers[1] with Human Comfort Criteria 5% Exceedances

Open Cut	> 5 to 7 mm/s or 116 to 117 dBLpk	8 to 10 mm/s or 118 to 120 dBLpk	11 to 12.5 mm/s or 120 to 133 dBLpk	> 12.5 mm/s or > 133 dBLpk
MIC 400 kg	-	-	-	-
MIC 3,000 kg	117[2,3], 142, 143	120[3]	-	-

Note 1: Refer to **Appendix B2** Land Ownership Details.
Note 2: Unexercised acquisition rights in accordance with Project Approval (08_0203).
Note 3: Landowner Agreement with Yancoal in accordance with Project Approval (08_0203).

10.2.1 Infrastructure and Livestock Impact Assessment

The predicted vibration safe working distances to roadway, railway line and transmission line are presented in **Table 33** together with livestock vibration and airblast safe working distances.

Table 33 Predicted Safe Working Distances to Infrastructure and Livestock

Open Cut Blast Design	Roadway Vibration Criteria 125 mm/s	Railway Vibration Criteria 100 mm/s	Transmission Vibration Criteria 60 mm/s	Livestock Vibration Criteria 200 mm/s	Livestock Airblast Criteria 125 dBLpk
MIC 400 kg	55 m	65 m	92 m	40 m	81 m
MIC 3,000 kg	151 m	177 m	253 m	109 m	159 m

10.3 Review of Existing Management Measures

It is recommended that the existing NMP (**Section 2.4.2**) and BLMP (**Section 2.5.2**) be revised for the Modification to include:

- The noise mitigation and management measures included in the Modification noise model (ie bunding of evaporator units).
- Updated operator-attended noise monitoring network to reflect current land ownership and private agreements.
- Updated blast emission monitoring network to reflect current land ownership and private agreements.

ACQUISITION UPON REQUEST

1. Upon receiving a written request for acquisition from an owner of the land listed in Table 1, the Proponent shall acquire the land in accordance with the procedures in Conditions 5 - 6 of Schedule 4.

Table 1: Land subject to acquisition upon request

117 - Holmes	125 (1) - Zulumovski
118 - Moylan	125 (2) - Zulumovski
122 - White	128 – Hare Scott

Note: To identify the locations referred to in Table 1, see the figure in Appendix 3.

NOISE

Noise Criteria

2. Except for the land referred to in Table 1, the Proponent shall ensure that the noise generated by the project does not exceed the criteria in Table 2 at any residence on privately-owned land or on more than 25 percent of any privately-owned land.

Table 2: Noise criteria dB(A)

Location	Day	Evening	Night	
	$L_{Aeq(15\ minute)}$	$L_{Aeq(15\ minute)}$	$L_{Aeq(15\ minute)}$	$L_{A1(1\ minute)}$
172 - Lyall	35	39	40	45
126 – Hamann Pixalu PL	35	35	39	45
123 – Oleksiuk & Carmody				
173 – Trigg & Holland	35	36	37	45
116 - Weismantel	35	35	37	45
127 – Fisher-Webster				
131(1) - Relton				
180 (1) - Thompson	35	36	36	45
95 - Smith & Ransley	35	35	36	45
144 - Wielgosinski	35	36	35	45
169 - Williams				
177 - Thompson				
All other privately-owned land	35	35	35	45

Notes:
- *To identify the locations referred to in Table 2, see the figure in Appendix 3; and*
- *Noise generated by the project is to be measured in accordance with the relevant procedures and exemptions (including certain meteorological conditions) of the NSW Industrial Noise Policy.*

However, these criteria do not apply if the Proponent has a written agreement with the relevant landowner to exceed the criteria, and the Proponent has advised the Department in writing of the terms of this agreement.

Noise Acquisition Criteria

3. If the noise generated by the project exceeds the criteria in Table 3 at any residence on privately-owned land or on more than 25 percent of any privately-owned land, then upon receiving a written request for acquisition from the landowner, the Proponent shall acquire the land in accordance with the procedures in Conditions 5 - 6 of Schedule 4.

Table 3: Noise acquisition criteria dB(A) $L_{Aeq\ (15min)}$

Location	Day	Evening	Night
All privately-owned land	40	40	40

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

Additional Noise Mitigation Measures

4. Upon receiving a written request from the owner of any residence:
   (a) on the land listed in Table 1;
   (b) on the land listed as 123, 126, and 172 on the figure in Appendix 3;
   (c) on the land listed as R2, R4-12 on the figure in Appendix 3;
   (d) on privately-owned land where subsequent noise monitoring shows that the noise generated by the project is greater than or equal to LAeq(15 minute) 38 dB(A); or
   (e) on privately owned land between the Stratford and Duralie mines where the maximum passby rail traffic noise from the Project exceeds 85dBA,

   the Proponent shall implement additional noise mitigation measures (such as double glazing, insulation, and/or air conditioning) at the residence in consultation with the owner. These measures must be reasonable and feasible.

   If within 3 months of receiving this request from the owner, the Proponent and the owner cannot agree on the measures to be implemented, or there is a dispute about the implementation of these measures, then either party may refer the matter to the Director-General for resolution.

Rail Noise

5. By the end of December 2011, or as otherwise agreed by the Director-General, the Proponent shall only use locomotives that are approved to operate on the NSW rail network in accordance with the noise limits in the ARTC's EPL (No. 3142).

Operating Conditions

6. The Proponent shall:
   (a) implement best practice noise management, including all reasonable and feasible noise mitigation measures to minimise the operational, low frequency and rail noise generated by the project; and
   (b) regularly assess the real-time noise monitoring and meteorological forecasting data and relocate, modify, and/or stop operations on site to ensure compliance with the relevant conditions of this approval,

   to the satisfaction of the Director-General.

Noise Management Plan

7. The Proponent shall prepare and implement a Noise Management Plan for the project to the satisfaction of the Director-General. This plan must:
   (a) be prepared in consultation with EPA, and submitted to the Director-General for approval within 3 months of the date of this approval, unless otherwise agreed by the Director-General;
   (b) describe the noise mitigation measures that would be implemented to ensure compliance with conditions 2–6 of Schedule 3 of this approval, including:
      - a real-time noise management system that employs both reactive and proactive mitigation measures;
      - a detailed program for the replacement or attenuation of existing plant on site; and
      - the specific measures that would be implemented to minimise the rail noise impacts of the project, and in particular:
        - the braking and train horn impacts of the project; and
        - the use of the shuttle train during the approved night-time hours; and

(c) include a noise monitoring program that:

- uses a combination of real-time and supplementary attended monitoring measures to evaluate the performance of the project;
- includes a program to evaluate the effectiveness of the noise mitigation measures referred to in 7(b) above;
- includes a protocol for determining exceedences of the relevant conditions of this approval; and
- includes a program to monitor the actual sound power levels of the plant on site, compare it with the benchmark levels used in the EA, and evaluate the effectiveness of any attenuation.

Note: The effectiveness of the Noise Management Plan is to be reviewed and audited in accordance with the requirements in Schedule 5. Following this review and audit, the plan is to be revised to ensure it remains up to date (see Condition 4 of Schedule 5).

BLASTING

Blasting Criteria

8. The Proponent shall ensure that the blasting on the site does not cause exceedences of the criteria in Table 4.

Table 4: Blasting criteria

Location	Airblast overpressure (dB(Lin Peak))	Ground vibration (mm/s)	Allowable exceedence
Residence on privately owned land	115	5	5% of the total number of blasts over a period of 12 months
	120	10	0%
Mammy Johnson's Grave	-	5	0%
Former Weismantel's Inn	-	10	0%

However, these criteria do not apply if the Proponent has a written agreement with the relevant landowner to exceed the criteria, and the Proponent has advised the Department in writing of the terms of this agreement.

Blasting Frequency

10. The Proponent shall not carry out more than:
(a) 1 blast a day on site, unless an additional blast is required following a blast misfire; and
(b) 3 blasts a week on site, averaged over any 12 month period.

Property Inspections

11. If the Proponent receives a written request for the owner of any privately-owned land within 2 kilometres of the approved open cut mining pit on site for a property inspection to establish the baseline condition of any buildings and/or structures on his/her land, or to have a previous property inspection report updated, then within 2 months of receiving this request the Proponent shall:
(a) commission a suitably qualified, experienced and independent person, whose appointment has been approved by the Director-General, to:
- establish the baseline condition of the buildings and/or structures on the land, or update the previous property inspection report;
- identify any measures that should be implemented to minimise the potential blasting impacts of the project on these buildings and/or structures; and

(b) give the landowner a copy of the new or updated property inspection report.

Property Investigations

12. If the owner of any privately-owned land claims that the buildings and/or structures on his/her land have been damaged as a result of blasting on site, then within 2 months of receiving this claim the Proponent shall:
    (a) commission a suitably qualified, experienced and independent person, whose appointment has been approved by the Director-General, to investigate the claim; and
    (b) give the landowner a copy of the property investigation report.

    If this independent property investigation confirms the landowner's claim, and both parties agree with these findings, then the Proponent shall repair the damages to the satisfaction of the Director-General.

    If the Proponent or landowner disagrees with the findings of the independent property investigation, then either party may refer the matter to the Director-General for resolution.

Operating Conditions

13. The Proponent shall:
    (a) implement best blasting practice on site to:
        - protect the safety of people and livestock in the surrounding area;
        - protect public or private property in the surrounding area; and
        - minimise the dust and fume emissions from blasting on site; and
    (b) operate a suitable system to enable the public to get up-to-date information on the proposed blasting schedule on site,

    to the satisfaction of the Director-General.

14. The Proponent shall not carry out any blasting within 500 metres of:
    (a) a public road without the approval of Council; and
    (b) the North Coast Railway without the approval of ARTC.

15. The Proponent shall not carry out blasting within 500 metres of any privately-owned land or land not owned by the Proponent unless:
    (a) the Proponent has a written agreement with the relevant landowner to allow blasting to be carried out closer to the land, and the Proponent has advised the Department in writing of the terms of this agreement; or
    (b) the Proponent has:
        - demonstrated to the satisfaction of the Director-General that the blasting can be carried out without compromising the safety of the people or livestock on the land, or damaging the buildings and/or structures on the land; and
        - updated the Blast Management Plan to include the specific measures that would be implemented while blasting is being carried out within 500 metres of the land.

Blast Management Plan

16. The Proponent shall prepare and implement a Blast Management Plan for the project to the satisfaction of the Director-General. This plan must:
    (a) be prepared in consultation with EPA, and submitted to the Director-General for approval within 3 months of the date of this approval, unless otherwise agreed by the Director-General;
    (b) describe the blast mitigation measures that would be implemented to ensure compliance with conditions 8–15 of this Schedule;
    (c) describe the measures that would be implemented to ensure the public can get up-to-date information on the proposed blasting schedule on site or any road closures; and
    (d) include a blast monitoring program to evaluate the performance of the project.

    Note: The effectiveness of the Blast Management Plan is to be reviewed and audited in accordance with the requirements in Schedule 5. Following this review and audit the plan is to be revised to ensure it remains up to date (see Condition 4 of Schedule 5).

METEOROLOGICAL MONITORING

24. During the life of the project, the Proponent shall ensure that there is a suitable meteorological station operating in the vicinity of the site that:
    (a) complies with the requirements in *Approved Methods for Sampling of Air Pollutants in New South Wales* guideline; and
    (b) is capable of continuous real-time measurement of temperature lapse rate in accordance with the *NSW Industrial Noise Policy*.

AUDITING

Independent Environmental Audit

8. By the end of December 2011, and every 3 years thereafter, unless the Director-General directs otherwise, the Proponent shall commission and pay the full cost of an Independent Environmental Audit of the project. This audit must:
    (a) be conducted by a suitably qualified, experienced and independent team of experts whose appointment has been endorsed by the Director-General;
    (b) include consultation with the relevant agencies;
    (c) assess the environmental performance of the project and assess whether it is complying with the requirements in this approval and any relevant EPL or Mining Lease (including any assessment, plan or program required under these approvals);
    (d) review the adequacy of strategies, plans or programs required under the approvals in (c) above; and
    (e) recommend appropriate measures or actions to improve the environmental performance of the project, and/or any assessment, plan or program required under the approvals in (c) above.

    Note: This audit team must be led by a suitably qualified auditor and include experts in any fields specified by the Director-General.

9. Within 6 weeks of the completion of this audit, or as otherwise agreed by the Director-General, the Proponent shall submit a copy of the audit report to the Director-General, together with its response to any recommendations contained in the audit report.

9A. By the end of December 2013, and with every Independent Environmental Audit thereafter, unless the Director-General directs otherwise, the Proponent shall commission and pay the full cost of a Rail Haulage Audit of the project. This audit must:
    (a) be conducted by a suitably qualified, experienced and independent experts whose appointment has been endorsed by the Director-General;
    (b) review the existing rail haulage operations and determine whether all reasonable and feasible measures are being implemented to minimise the:
        - noise and dust impacts of these operations;
        - use of the shuttle train during the approved night-time hours;
        - dispatch of trains from the site between 9.25pm and 1am the following day; and
    (c) recommend appropriate measures or actions to improve the efficiency of these rail haulage operations and minimise their associated impacts; and
    (d) evaluate the use of the exceptional circumstances provision in condition 8 of schedule 2, and the associated reporting on any use of this provision on the Proponent's website (see condition 8A in schedule 2).

9B. Within 6 weeks of the completion of this audit, or as otherwise agreed by the Director-General, the Proponent shall submit a copy of the audit report to the Director-General, together with its response to any recommendations contained in the audit report.

ENVIRONMENT PROTECTION LICENCE 11701 EXTRACT

L4 Noise limits

L4.1 Operational noise from the premises must not exceed:

Location	Day LAEQ (15 minute)	Evening LAEQ (15 minute)	Night LAEQ (15 minute)	Night LA1 (1 minute)
172 - Lyall	35	39	40	45
126 - Harmann Pixalu PL	35	35	39	45
123 Oleksiuk & Carmody	35	35	39	45
176 Trigg & Holland	35	36	37	45
116 - Weismantel	35	35	37	45
127 - Fisher-Webster	35	35	37	45
131(1) - Relton	35	35	37	45
180(1) - Thompson	35	36	36	45
95 - Smith & Ransley	35	35	36	45
144 - Wiegosinski	35	36	35	45
169 - Williams	35	36	35	45
177 - Thompson	35	36	35	45
All other privately owned land	35	35	35	45

Note: To identify the locations referred to in the above table see figure titled 'Figure 5: Land Ownership Plan' and associated list in Appendix 3 – Land Ownership Plan, of the Department of Planning's Project Approval for project 08_0203 dated 26 November 2010. A copy of this plan and list of properties has been filed on EPA file LIC07/10-10.

L4.2 To determine compliance:

a) with the Leq(15 minute) noise limits in condition L3.1, the noise measurement equipment must be located:
· approximately on the property boundary, where any dwelling is situated 30 metres or less from the property boundary closest to the premises; or
· within 30 metres of a dwelling façade, but not closer than 3m, where any dwelling on the property is situated more than 30 metres from the property boundary closest to the premises; or, where applicable
· within approximately 50 metres of the boundary of a National Park or a Nature Reserve.

b) with the LA1(1 minute) noise limits in condition L3.1, the noise measurement equipment must be located within 1 metre of a dwelling façade.

c) with the noise limits in condition L3.1, the noise measurement equipment must be located:
· at the most affected point at a location where there is no dwelling at the location; or
· at the most affected point within an area at a location prescribed by conditions L3.2(a) or L3.2(b).

L4.3 For the purpose of condition L3.1;

· Day is defined as the period from 7am to 6pm Monday to Saturday and 8am to 6pm Sunday and Public Holidays.

· Evening is defined as the period 6pm to 10pm.

· Night is defined as the period from 10pm to 7am Monday to Saturday and 10pm to 8am Sunday and Public Holidays.

L4.4 A non-compliance of condition L3.1 will still occur where noise generated from the premises in excess of the appropriate limit is measured:

· at a location other than an area prescribed by conditions L3.2(a) and L3.2(b); and/or
· at a point other than the most affected point at a location.

L4.5 For the purposes of determining the noise generated at the premises the modification factors in Section 4 of the NSW Industrial Noise Policy must be applied, as appropriate, to the noise levels measured by the noise monitoring equipment.

L4.6 The noise limits listed in L3.1 do not apply if the Licensee has a written agreement with the relevant landowner to exceed these limits, and the Licensee has provided written evidence of this to the EPA.

L4.7 For the purposes of determining the noise generated at the premises a Class 1 or 2 noise monitoring equipment as defined by AS IEC61672.1-2004 and AS IEC61672.2-2004, or other noise monitoring equipment accepted by the EPA in writing, must be used.

L4.8 The noise limits set out in condition L3.1 apply under all meteorological conditions except for the following:

a) Wind speeds greater than 3 metres/second at 10 metres above ground level; or
b) Temperature inversion conditions up to 3°C/100m and wind speeds greater than 2 metres/second at 10 metres above ground level; or
c) Temperature inversion conditions greater than 3°C/100m.

L4.9 Temperature inversion conditions (vertical temperature gradient in degrees C) are to be determined by direct measurement over a minimum 50m height interval as referred to in Part E2 of Appendix E to the NSW Industrial Noise Policy.

Note: This condition does not come into force until Pollution Reduction Program 1 is completed.

L5 Blasting

L5.1 The overpressure level from blasting operations at the premises must not exceed 120dB (Lin Peak) at any time. Error margins associated with any monitoring equipment used to measure this are not to be taken into account in determining whether or not the limit has been exceeded.

L5.2 The overpressure level from blasting operations at the premises must not exceed 115dB (Lin Peak) for more than five per cent of the total number of blasts over each reporting period. Error margins associated with any monitoring equipment used to measure this are not to be taken into account in determining whether or not the limit has been exceeded.

L5.3 Ground vibration peak particle velocity from the blasting operations at the premises must not exceed 10mm/sec at any time. Error margins associated with any monitoring equipment used to measure this are not to be taken into account in determining whether or not the limit has been exceeded.

L5.4 Ground vibration peak particle velocity from the blasting operations at the premises must not exceed 5mm/sec for more than five per cent of the total number of blasts over each reporting period. Error margins associated with any monitoring equipment used to measure this are not to be taken into account in determining whether or not the limit has been exceeded.

L5.5 Ground vibration peak particle velocity from the blasting operations at the premises must not exceed 5mm/sec at any time at Mammy Johnsons Grave or exceed 10mm/sec at the former Weismantel's Inn. Error margins associated with any monitoring equipment used to measure this are not to be taken into account in determining whether or not the limit has been exceeded.

L5.6 Blasting operations at the premises may only take place between 9:00am to 5:00pm Monday to Saturday. (Where compelling safety reasons exist, the Authority may permit a blast to occur outside the abovementioned hours. Prior written (or facsimile) notification of any such blast must be made to the Authority).

L5.7 Blast monitoring locations (cultural heritage site)

The grave site of Mammy Johnson is a noise sensitive receiver and the blast limits specified in conditions L4.1, L4.2 and L4.5 apply at this grave site regardless of ownership, proximity, location or tenure.

M5 Weather monitoring

M5.1 For each monitoring point specified below the licensee must monitor (by sampling and obtaining results by analysis) the parameters specified in Column 1. The licensee must use the sampling method, units of measure and sample at the frequency specified opposite in the other columns.

Parameter	Units of Measure	Frequency	Averaging Period	Sampling Method
Air Temperature	degrees celsius	continuous	1 hour	AM-4
Wind direction	degrees	continuous	15 minute	AM-2 & AM-4
Wind Speed	m/s	continuous	15 minute	AM-2 & AM-4
Sigma Theta	degrees	continuous	15 minute	AM-2 & AM-4
Rainfall	millimetres	continuous	15 minute	AM-4
Relative humidity	%	continuous	1 hour	AM-4
Temperature lapse over a minimum vertical height interval of 50m	degrees celsius	continuous	1 hour	AM-4

Note: This temperature lapse requirement does not come into force until PRP 1 is completed.

M8 Blasting

M8.1 All blast shots must be recorded on video from a position allowing the collars of the shot, and where possible, any face, and/or toe, to be seen on the video. The licensee must retain a copy of this video for at least 12 months after the blast was initiated.

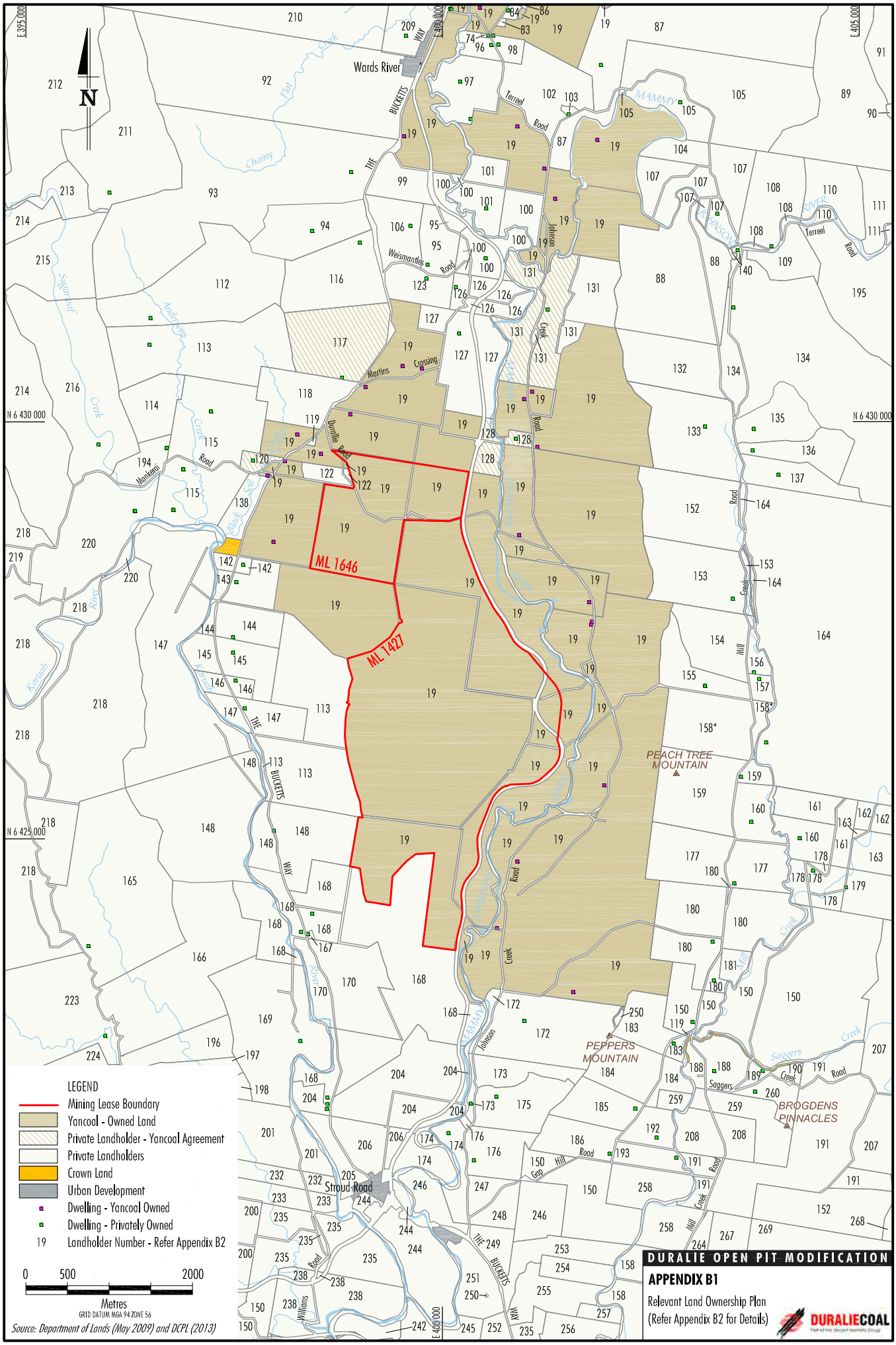
M8.2 The licensee must monitor overpressure level and ground vibration peak particle velocity from blasting undertaken in, or on the premises, at each of the following locations:

a) Land owned by E and V Shultz shown as AB1 on plan titled "EPL11701 Envioronmental Monitoring Locations", a copy of which has been filed on EPA file LIC07/10-14;

b) Land owned by A Fisher-Webster shown as AAAB3 on plan titled "EPL11701 Environmental Monitoring Locations", a copy of which has been filed on EPA file LIC07/10-14;

c) Land owned by M Mahoney shown as AAAB2 on plan titled "EPL11701 Environmental Monitoring Locations", a copy of which has been filed on EPA file LIC07/10-14.

Instrumentation used to measure the airblast overpressure and ground vibration levels must meet the requirements of Australian Standard AS 2187.2-2006.



GCL-14-23_Mod2_Noise_106B

Reference	Land Owner
19	Yancoal Australia Limited
74	D. L. & D. W. Melmeth
83	Cemetery
84	A.W. & C.M. Hart
86	J. Andersen
87	Pacific Property Investments Ltd
88	V. S. Edwards
89	D. J. Robertson
90	W. A. & J. A.Thomson
91	Hunter Water Corporation
92	Sejon No 4 Pty Ltd
93	K. V. & P. M. Howard
94	B. V. & P. O. Howard
95	D. J. Smith & S. Ransley
96	H. T. & M. B. Turnbull
97	S. W. Davis
98	I. D. Partelle & M. M. Ramsay
99	K. MacFarlane
100	K. S. Richards
101	K. M. & D. B. Holloway
102	W. R. Kerslake
103	G. L. Macedo
105	R. M. Edwards
106	R. A. James
107	P. G. Spencer
108	A. G. & M. A. Tersteeg
109	R. J. Bathgate & M. L. Levey
110	G. W. Lewis & A. J. Moore
111	T. J. Somerville & C. D. Martin
112	S. R. Hogeveen
113	C. W. & J. I. Edwards
114	H. Paliokas
115	P. W. M. & B. D. & G. O. & M. J. Moylan & S. C. M. Newton
116	G. R. Weismantel
117	E. D. Holmes and L. M. Holmes
118	P. W. M. Moylan
119	Great Lakes Council
120	M. J. & C. A. Mahony
122	S. White
123	J. L. Oleksiuk & K. P. Carmody
126	H. L. & M. R. Hamann - Pixalu Pty Limited
127	A. J. Fisher-Webster
128	D. R. & B. Hare-Scott
131	W. L. Relton
132	A. T. Gorton
133	R. J. Gorton
134	Duzmen Pty Ltd
135	P. J. Ayliffe
136	D. P. Pickles
137	T. J. Lord
138	P. W. M. Moylan, B. D. Moylan, G. O. Moylan, S. C. M. Newton & M. J. Moylan
140	D. C. Bennett & D. M. Stark
142	P. G. Madden
144	D. J. Wielgosinski
145	C.W. & J. I. Edwards
146	M. A. Bragg
147	S. Edwards
148	D. J. McAndrew
150	R. N. & T. E. Rumbel
152	D. M. Lowrey
153	L. & R. K. Paul
154	J. R. Morgan
155	M. & R. Guberina
156	T. R. J. & B. Hope
157	C. N. & S. D. Stephenson
158	B. Gilbert
159	T. R. Waterer
160	P. & M. E. Kenney
161	D. G. Hutchison
162	L. Partridge
163	M. A. & C. H. Hockings & C. H. Willcox
164	Gorton Timber Co. Limited
165	ESOR Nominees Pty Limited
166	A. J. & A. L. Daniel
167	M. & S. M. Ravagnani
168	V. R. & E. K. Schultz
169	R. D. K. & N. L. Williams
170	I. K. & M. J. Schultz
172	S. J. & J. E. Lyall
173	S. M. Trigg, J. M. Trigg, M. J. Holland, B. J. Holland, M. Trigg & S. C. Trigg
174	D. C. Carroll
175	S. G. Thomas
176	J. D. Thompson
177	W. J. Thompson
178	N. E. Hitchcock & E. E. Coldham
179	I. Mellar
180	K. J. Dennis
181	G. J. Thompson
183	M. H. & E. V. Elfick
184	B. J. & M. C. Gay
185	A. W. Raine & T. Hilleard
186	K. B. & J. N. Farnham
188	T. E. Rumbel
189	H. J. Gillard
190	B. Clayton
191	A. M. Mokeeff
192	S. & A. F. Vajda
193	N. & C. M. Smith
194	J. & C. L. Kellehear
195	Shulgin Investments Pty Ltd
196	E. D. Sanders
197	H. R. & D. A. Moorehouse
198	Aspenview Enterprises Pty Limited
200	G. J .& S. G.Trappel
201	I. G. Wilson
204	M. C. Jones
205	J. S. & K. L. Bratfield
206	M. A. Watkins
207	P. Trenchev
208	C. A. Bowden
209	D. M. Chapman
210	Heatscape Pty Limited
211	B. & B. I. Irwin
212	P. & N. V. Makaroff
213	E. A. & P. Hillard
214	K. G. Sneddon
215	Monkerai Holdings Pty Limited
216	D. M. Matcham
218	D. K. & J. A. Holdings Pty. Limited
219	C. A. Olsen
220	T. G. Lindfield and Associates Pty. Limited
223	F., E., R., D. M. & G. Ferraro
232	I. G. Wilson
233	R. G. Wilson
235	M. J. Bratfield
238	H. R. Kerr
242	M. M. Gorton
244	R. R. & M. J. Lawrence
245	N. Curtis
246	P. & S. A. Margery
247	N. J. Alexander & T. L. Sauerbier
248	R. B. & J. M. Eastoe
249	P. Margery
250	Midcoast County Council
251	B. R. Warner
252	D. K. Pritchard
253	E. & J. A. Allan
254	D. N. & D. T. Young
255	G. W. Bevan & C. A. Bevan
256	M. I. Butler
257	H. Butler
258	G. K. & A. G. Brown
259	C. A. Bowen
260	D. & J. Roberts
264	K. Pepper & S. M. Lyall
267	D. L. & T. L. Fordham
268	Hudrow Pty Limited
269	The Minister for Forestry

Source: DCPL (2014) and Department of Lands (2009)

DURALIE OPEN PIT MODIFICATION

APPENDIX B2

Relevant Land Ownership List

DURALIECOAL

LAND OWNERSHIP DETAILS

Property ID	Landholder Name[1]	MGA Dwelling Co-ordinates		ENM Dwelling Co-ordinates		
		East (m)	North (m)	East (m)	North (m)	Elevation (m)
Privately owned Receivers						
74	D. L. & D. W. Melmeth	400549	6434633	5549	14633	83
84(1)	A.W. & C.M. Hart	400782	6434936	5782	14936	87
84(2)	A.W. & C.M. Hart	400791	6434932	5791	14932	87
87	Pacific Property Investments Ltd	401901	6434280	6901	14280	109
93	K. V. & P. M. Howard	398903	6432994	3903	12994	89
94	B. V. & P. O. Howard	398434	6432288	3434	12288	125
95	D. J. Smith & S. Ransley	399819	6431885	4819	11885	114
96	H. T. & M. B. Turnbull	400584	6434518	5584	14518	83
97(1)	S. W. Davis	400212	6434080	5212	14080	74
97(2)	S. W. Davis	400335	6433632	5335	13632	85
98(1)	I. D. Partelle & M. M. Ramsay	400670	6434525	5670	14525	83
98(2)	I. D. Partelle & M. M. Ramsay	400607	6434633	5607	14633	86
100	K. S. Richards	400517	6431961	5517	11961	86
101	K. M. & D. B. Holloway	400524	6432560	5524	12560	76
103	G. L. Macedo	401513	6433689	6513	13689	87
104	R. S. and R. Mudford	Vacant Land				
105	R. M. Edwards	402853	6433834	7853	13834	81
106	R. A. James	399615	6432349	4615	12349	105
107	P. G. Spencer	403297	6432498	8297	12498	80
108	A. G. & M. A. Tersteeg	403948	6432107	8948	12107	85
112	S. R. Hogeveen	396494	6431244	1494	11244	109
113	C. W. & J. I. Edwards	396482	6430925	1482	10925	105
115(1)	P. W. M. & B. D. & G. O. & M. J. Moylan & S. C. M. Newton	396885	6429431	1885	9431	76
115(2)	P. W. M. & B. D. & G. O. & M. J. Moylan & S. C. M. Newton	397220	6430125	2220	10125	105
115(3)	P. W. M. & B. D. & G. O. & M. J. Moylan & S. C. M. Newton	396770	6428945	1770	8945	77
116	G. R. Weismantel	399007	6432150	4007	12150	106
117[2,3]	E. D. Holmes and L. M. Holmes	398794	6430529	3794	10529	104
118[2]	P.W.M. Moylan	Vacant Land				
120[3]	M. J. & C. A. Mahony	397723	6429536	2723	9536	88
122[2]	S. White	Vacant Land				
123[4]	J. L. Oleksiuk & K. P. Carmody	399806	6431719	4806	11719	116
126[4]	H. L. & M. R. Hamann - Pixalu Pty Limited	400161	6431616	5161	11616	98
127	A. J. Fisher-Webster	400198	6431061	5198	11061	81
128[2,3,4]	D. R. & B. Hare-Scott	400881	6429798	5881	9798	67
131	W. L. Relton	401261	6431347	6261	11347	81
133	R. J. Gorton	403149	6429944	8149	9944	166
134	Duzmen Pty Ltd	403491	6431372	8491	11372	100
135	P. J. Ayliffe	403735	6429916	8735	9916	179
136	D. P. Pickles	403721	6429659	8721	9659	178
137	T. J. Lord	404031	6429367	9031	9367	227
140	D. C. Bennett & D. M. Stark	403541	6432059	8541	12059	78
142	P. G. Madden	397608	6428287	2608	8287	64
143	Madden P.G. & K.A.	397525	6428079	2525	8079	78
144	D. J. Wielgosinski	397485	6427417	2485	7417	85

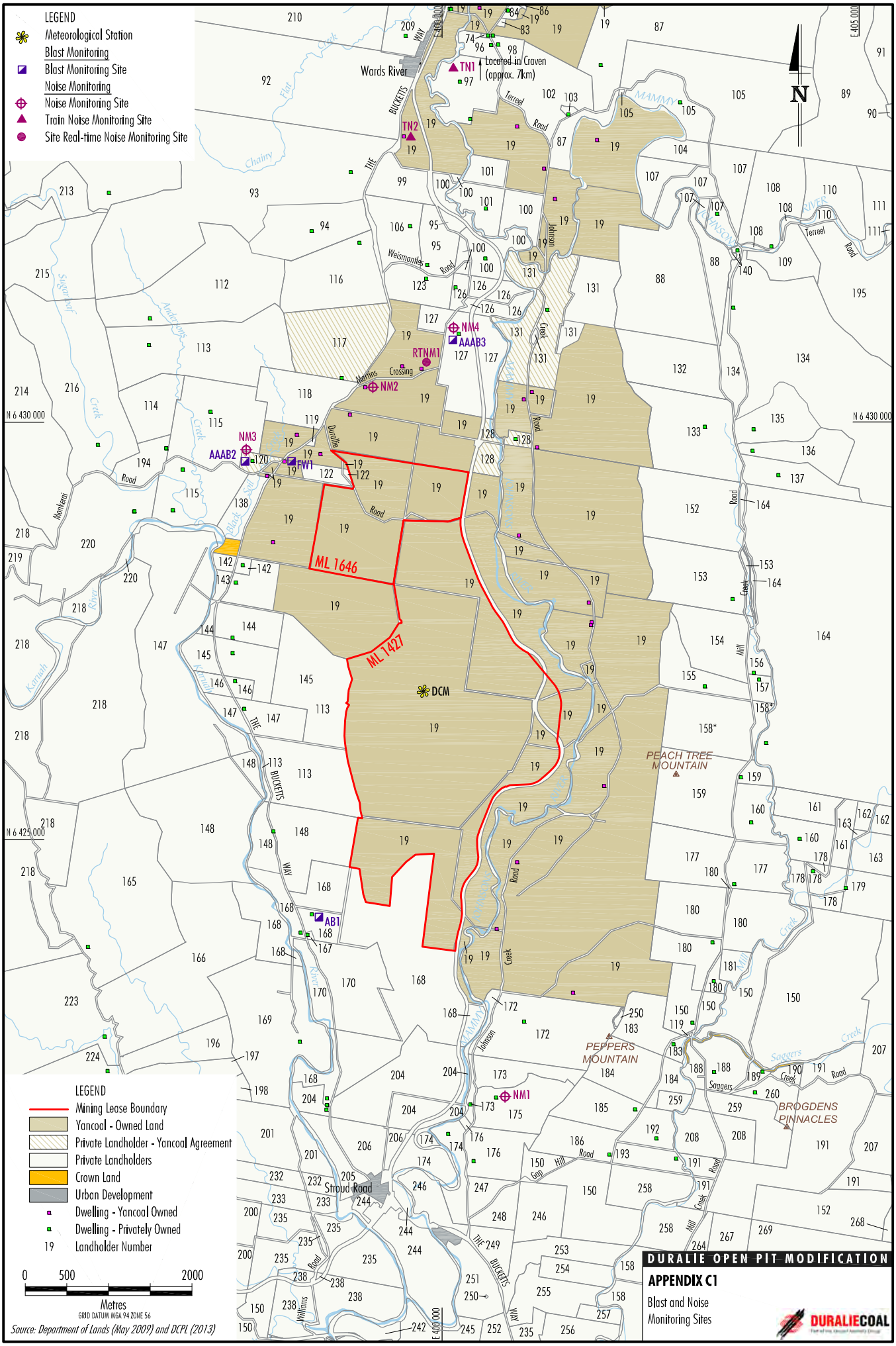
LAND OWNERSHIP DETAILS

Property ID	Landholder Name[1]	MGA Dwelling Co-ordinates		ENM Dwelling Co-ordinates		
		East (m)	North (m)	East (m)	North (m)	Elevation (m)
145	Edwards	397485	6427232	2485	7232	90
146	M. A. Bragg	397516	6426897	2516	6897	70
147	S. Edwards	397624	6426565	2624	6565	55
148	D. J. McAndrew	397976	6425096	2976	5096	70
150	R. N. & T. E. Rumbel	403001	6422804	8001	2804	75
153	L. & R. K. Paul	403480	6427877	8480	7877	123
154	J. R. Morgan	403206	6427193	8206	7193	132
155	M. & R. Guberina	403150	6426834	8150	6834	130
156	T. R. J. & B. Hope	403737	6426997	8737	6997	115
157	C. N. & S. D. Stephenson	403801	6426916	8801	6916	115
158	B. Gilbert	Vacant Land				
159	T. R. Waterer	403583	6425745	8583	5745	156
160(1)	P. & M. E. Kenney	404287	6425008	9287	5008	103
160(2)	P. & M. E. Kenney	403705	6425205	8705	5205	99
164	Gorton Timber Co. Limited	403885	6426156	8885	6156	93
165	ESOR Nominees Pty Limited	395751	6423713	751	3713	177
167	M. & S. M. Ravagnani	398384	6423856	3384	3856	57
168(1)	V. R. & E. K. Schultz	398618	6421897	3618	1897	47.5
168(2)	V. R. & E. K. Schultz	398301	6423883	3301	3883	53
168(3)	V. R. & E. K. Schultz	398435	6424101	3435	4101	60
168(4)	V. R. & E. K. Schultz	398618	6421820	3618	1820	53
169	R. D. K. & N. L. Williams	398294	6422576	3294	2576	55.5
172[4]	S. J. & J. E. Lyall	400982	6422817	5982	2817	77.5
173	S. M. Trigg, J. M. Trigg, M. J. Holland, B. J. Holland, M. Trigg & S. C. Trigg	400337	6421825	5337	1825	50
174	D. C. Carroll	400072	6421472	5072	1472	50
175	R. J. & S. J. Thomas	400646	6421908	5646	1908	100
176	Thompson	400377	6421147	5377	1147	60.5
177	W. J. Thompson	403502	6424466	8502	4466	110
178	N. E. Hitchcock & E. E. Coldham	404447	6424619	9447	4619	100
179	I. Mellar	404839	6424420	9839	4420	110
180(1)	B. R. & G. J. & K. G. & K. J. & W. J. Thompson	403256	6423302	8256	3302	100
180(2)	B. R. & G. J. & K. G. & K. J. & W. J. Thompson	403242	6423767	8242	3767	81
183	M. H. & E. V. Elfick	402775	6422546	7775	2546	84
185	A. W. Raine & T. Hilleard	402313	6421766	7313	1766	93
186	K. B. & J. N. Farnham	402005	6421224	7005	1224	66
188	T. E. Rumbel	403259	6422216	8259	2216	67
189	H. J. Gillard	403840	6422217	8840	2217	72
192	S. & A. F. Vajda	402569	6421417	7569	1417	100
193	N. & C. M. Smith	402805	6421177	7805	1177	57
194	J. & C. L. Kellehear	396691	6429685	1691	9685	84
198	Aspenview Enterprises Pty Limited	396349	6421609	1349	1609	55
199	Parker C.S.	396677	6421390	1677	1390	98
200	G. J .& S. G.Trappel	396737	6421230	1737	1230	85.5
204	M. C. Jones	398611	6421760	3611	1760	54
209	D. M. Chapman	399561	6434630	4561	14630	90.5
211	B. & B. I. Irwin	396001	6432749	1001	12749	130

LAND OWNERSHIP DETAILS

Property ID	Landholder Name[1]	MGA Dwelling Co-ordinates		ENM Dwelling Co-ordinates		
		East (m)	North (m)	East (m)	North (m)	Elevation (m)
216	D. M. Matcham	395870	6429730	870	9730	94
220	T. G. Lindfield and Associates Pty. Limited	396304	6428929	1304	8929	115
223	F., E., R., D. M. & G. Ferraro	395951	6422638	951	2638	79
260	D. & J. Roberts	403751	6421969	8751	1969	94
DCPL owned Receivers						
19(a1)	Gloucester Coal Ltd	401794	6427604	6794	7604	82
19(b1)	Gloucester Coal Ltd	400919	6428643	5919	8643	80
19(c1)	Gloucester Coal Ltd	401758	6427837	6758	7837	81
19(d1)	Gloucester Coal Ltd	401569	6423162	6569	3162	94
19(e1)	Gloucester Coal Ltd	400898	6424727	5898	4727	62
19(f1)	Gloucester Coal Ltd (Mammy Johnson's Grave)	401137	6429698	6138	9698	81
19(g1)	Gloucester Coal Ltd	397899	6429355	2899	9355	85
19(h1)	Gloucester Coal Ltd	397970	6428562	2970	8562	100
19(i1)	Gloucester Coal Ltd	399076	6430419	4076	10419	104
19(j1)	Gloucester Coal Ltd	399519	6430670	4519	10670	89
19(k1)	Gloucester Coal Ltd	399752	6430642	4752	10642	91
19(l1)	Gloucester Coal Ltd	400979	6430273	5979	10273	77
19(m1)	Gloucester Coal Ltd	398109	6429528	3109	9528	91
19(n1)	Gloucester Coal Ltd (Former Weismantels Inn)	398256	6429848	3256	9848	108
19(o1)	Gloucester Coal Ltd	398540	6429619	3540	9619	117
19(p1)	Gloucester Coal Ltd	398894	6430090	3894	10091	107
19(q1)	Gloucester Coal Ltd	400653	6423930	5653	3930	52
19(r1)	Gloucester Coal Ltd	401784	6427569	6784	7569	81
19(s1)	Gloucester Coal Ltd	401856	6433382	6856	13382	78
19(t1)	Gloucester Coal Ltd	402008	6435464	7008	15464	140
19(u1)	Gloucester Coal Ltd	400898	6433544	5898	13544	123
19(v1)	Gloucester Coal Ltd	401076	6430361	6076	10361	80
19(w1)	Gloucester Coal Ltd	401351	6432674	6351	12674	85
19(x1)	Gloucester Coal Ltd	401223	6433038	6223	13038	98
19(y1)	Gloucester Coal Ltd	399541	6433425	4541	13425	80
19(z1)	Gloucester Coal Ltd	400448	6434965	5448	14965	76
19(a2)	Gloucester Coal Ltd	401941	6425641	6941	5641	70
19(b2)	Gloucester Coal Ltd	400089	6434953	5089	14953	75
19(c2)	Gloucester Coal Ltd	400106	6434948	5106	14948	75

Note 1: Refer to **Appendix B1** Land Ownership Plans.
Note 2: Unexercised acquisition rights in accordance with Project Approval (08_0203).
Note 3: Landowner Agreement with Yancoal in accordance with Project Approval (08_0203).
Note 4: Request for additional noise mitigation measures in accordance with Project Approval (08_0203).



DURALIE OPEN PIT MODIFICATION

APPENDIX C1

Blast and Noise Monitoring Sites

DURALIECOAL

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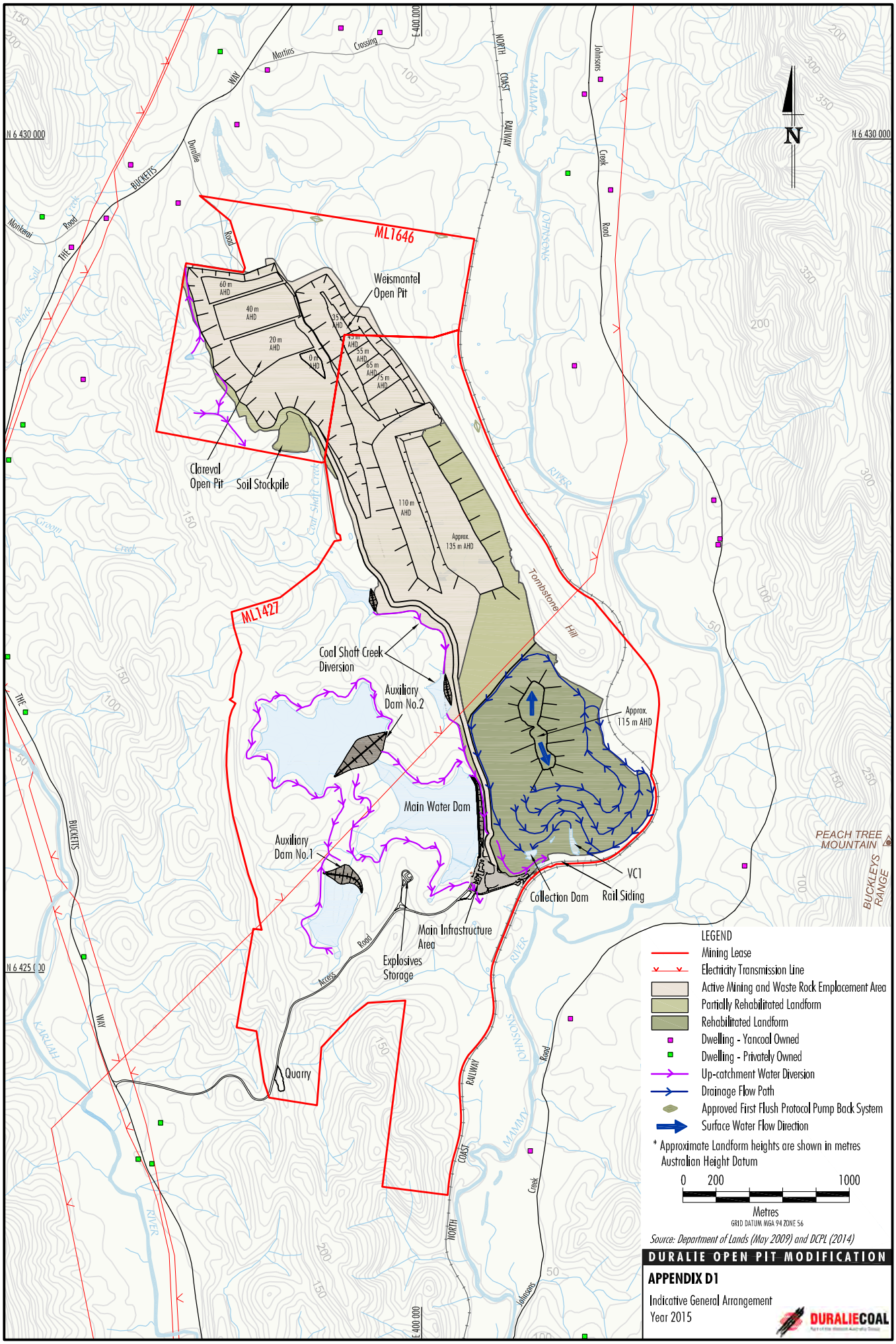

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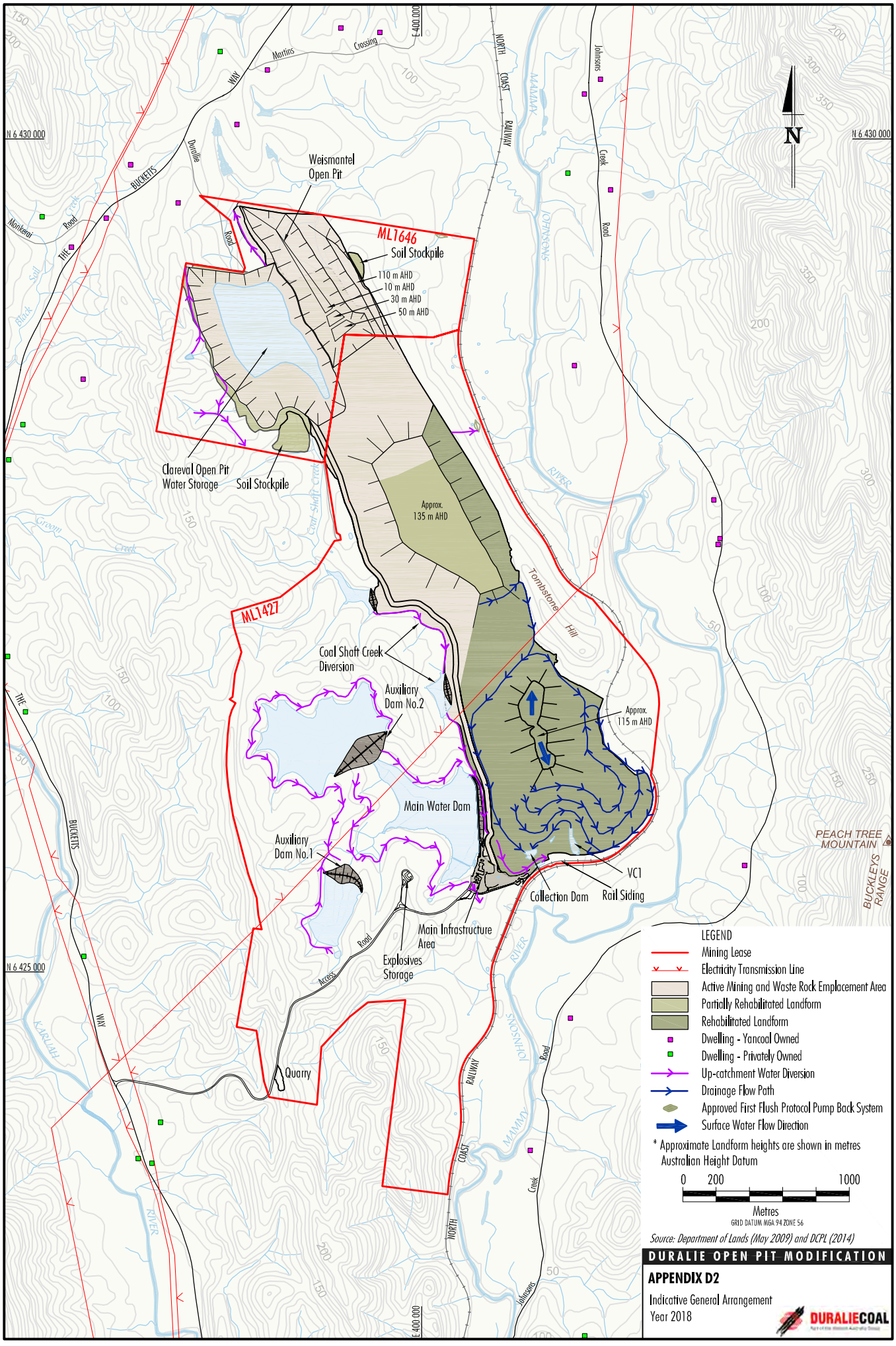


GCL-14-23_Mod2_Noise_104F

GCL-14-23_Mod2_Noise_1058

DURALIE EXTENSION PROJECT (NIA 25 JAN 10) DCM AWS 5YRS (03/05 PLUS 07/08)

Table 1 Seasonal Frequency of Occurrence Wind Speed Intervals - Daytime

Period	Calm (< 0.5 m/s)	Wind Direction (± 45º)	Wind Speed		
			0.5 to 2 m/s	2 to 3 m/s	0.5 to 3 m/s
Annual	7.0%	N	15.8%	7.9%	23.6%
Summer	3.9%	NNE	16.8%	12.5%	29.3%
Autumn	9.7%	N	20.9%	7.8%	28.7%
Winter	9.2%	NNW	17.7%	5.6%	23.3%
Spring	5.2%	NNE	10.7%	8.0%	18.6%

Table 2 Seasonal Frequency of Occurrence Wind Speed Intervals - Evening

Period	Calm (< 0.5 m/s)	Wind Direction (± 45º)	Wind Speed		
			0.5 to 2 m/s	2 to 3 m/s	0.5 to 3 m/s
Annual	11.6%	NNW	18.8%	12.8%	31.6%
Summer	1.8%	NNE	14.8%	18.5%	33.3%
Autumn	17.1%	NNW	23.8%	11.7%	35.5%
Winter	19.0%	NW	26.2%	5.8%	31.9%
Spring	7.2%	NNW	13.7%	18.8%	32.4%

Table 3 Seasonal Frequency of Occurrence Wind Speed Intervals - Night-Time

Period	Calm (< 0.5 m/s)	Wind Direction (± 45º)	Wind Speed		
			0.5 to 2 m/s	2 to 3 m/s	0.5 to 3 m/s
Annual	19.5%	NNW	28.7%	10.0%	38.7%
Summer	15.9%	N	28.0%	14.2%	42.1%
Autumn	24.6%	NNW	32.1%	9.3%	41.4%
Winter	21.0%	NNW	30.4%	4.6%	35.0%
Spring	17.0%	NNW	25.5%	12.8%	38.3%

Table 4 Summary

Season	Winds ±45 º 3 m/s with Frequency of Occurrence 30%		
	Daytime	Evening	Night-Time
Annual	Nil	NNW (31.6%)	NNW (38.7%)
Summer	Nil	NNE (33.3%)	N (42.1%)
Autumn	Nil	NNW (35.5%)	NNW (41.4%)
Winter	Nil	NW (31.9%)	NNW (35.0%)
Spring	Nil	NNW (32.4%)	NNW (38.3%)

Table 5 Frequency of Occurrence of Atmospheric Stability Classes – Evening & Night-time

Stability	Frequency of Occurrence					Estimated ELR ºC/100 m	Qualitative Description
	Annual	Summer	Autumn	Winter	Spring		
A	0%	0%	0%	0%	0%	<-1.9	Lapse
B	0%	0%	0%	0%	0%	-1.9 to -1.7	Lapse
C	0%	0%	0%	0%	0%	-1.7 to -1.5	Lapse
D	40%	48%	35%	34%	44%	-1.5 to -0.5	Neutral
E	15%	16%	15%	15%	15%	-0.5 to 1.5	Weak inversion
F	40%	31%	45%	48%	37%	1.5 to 4	Moderate inversion
G	5%	6%	5%	3%	4%	>4.0	Strong inversion
F+G	45%	36%	50%	51%	41%	>1.5	Moderate to strong inversion

LOW FREQUENCY NOISE MODIFYING FACTOR ADJUSTMENTS

Predicted A and C Weighted Noise Level Differences (dBA re 20 µPa, dBC re 20 µPa,)

Octave Band Centre Frequency (Hz)									Overall
Weighting	**31.5**	**63**	**125**	**250**	**500**	**1k**	**2k**	**4k**	**Level**
117 Holmes & Holmes – Predicted Year 2015 operations intrusive noise levels - night-time inversion									
A weighted	4	23	28	36	33	30	18	-8	38.9
C weighted	40	48	44	44	36	30	17	-10	51.3
Overall Difference									12.4
123 Oleksiuk & Carmody – Predicted Year 2015 operations intrusive noise levels - night-time inversion									
A weighted	0	23	28	32	31	27	13	-26	36.3
C weighted	37	49	44	41	34	27	12	-28	50.7
Overall Difference									14.4
126 Hamann - Pixalu P/L – Predicted Year 2015 operations intrusive noise levels - night-time inversion									
A weighted	1	21	28	31	31	27	12	-27	35.6
C weighted	37	47	44	39	34	27	10	-28	49.5
Overall Difference									13.9
127 Fisher-Webster – Predicted Year 2015 operations intrusive noise levels - night-time inversion									
A weighted	2	20	28	31	32	28	16	-20	36.3
C weighted	38	45	44	40	35	28	14	-21	49.0
Overall Difference									12.7
128 Hare-Scott – Predicted Year 2015 operations intrusive noise levels - night-time inversion									
A weighted	3	24	30	31	34	33	25	-1	38.7
C weighted	39	49	46	40	38	33	24	-3	51.7
Overall Difference									13.0
172 Lyall – Predicted Year 2015 operations intrusive noise levels – evening NNW wind									
A weighted	6	25	33	29	35	30	14	-24	38.6
C weighted	43	51	49	38	38	30	13	-26	53.5
Overall Difference									15.0
172 Lyall – Predicted Year 2015 operations intrusive noise levels - night-time inversion plus drainage									
A weighted	7	26	33	30	37	32	17	-20	39.8
C weighted	43	51	49	38	40	32	15	-22	53.9
Overall Difference									14.1
173 Trigg & Holland – Predicted Year 2015 operations intrusive noise levels - night-time inversion plus drainage									
A weighted	6	22	27	28	34	26	9	-37	36.2
C weighted	42	47	42	36	37	26	8	-39	49.9
Overall Difference									13.7

EPA INP APPLICATION NOTES - SLEEP DISTURBANCE

Peak noise level events, such as reversing beepers, noise from heavy items being dropped or other high noise level events, have the potential to cause sleep disturbance. The potential for high noise level events at night and effects on sleep should be addressed in noise assessments for both the construction and operational phases of a development. The NSW Industrial Noise Policy (INP) (New South Wales [NSW] Environmental Protection Agency [EPA], 2000) does not specifically address sleep disturbance from high noise level events.

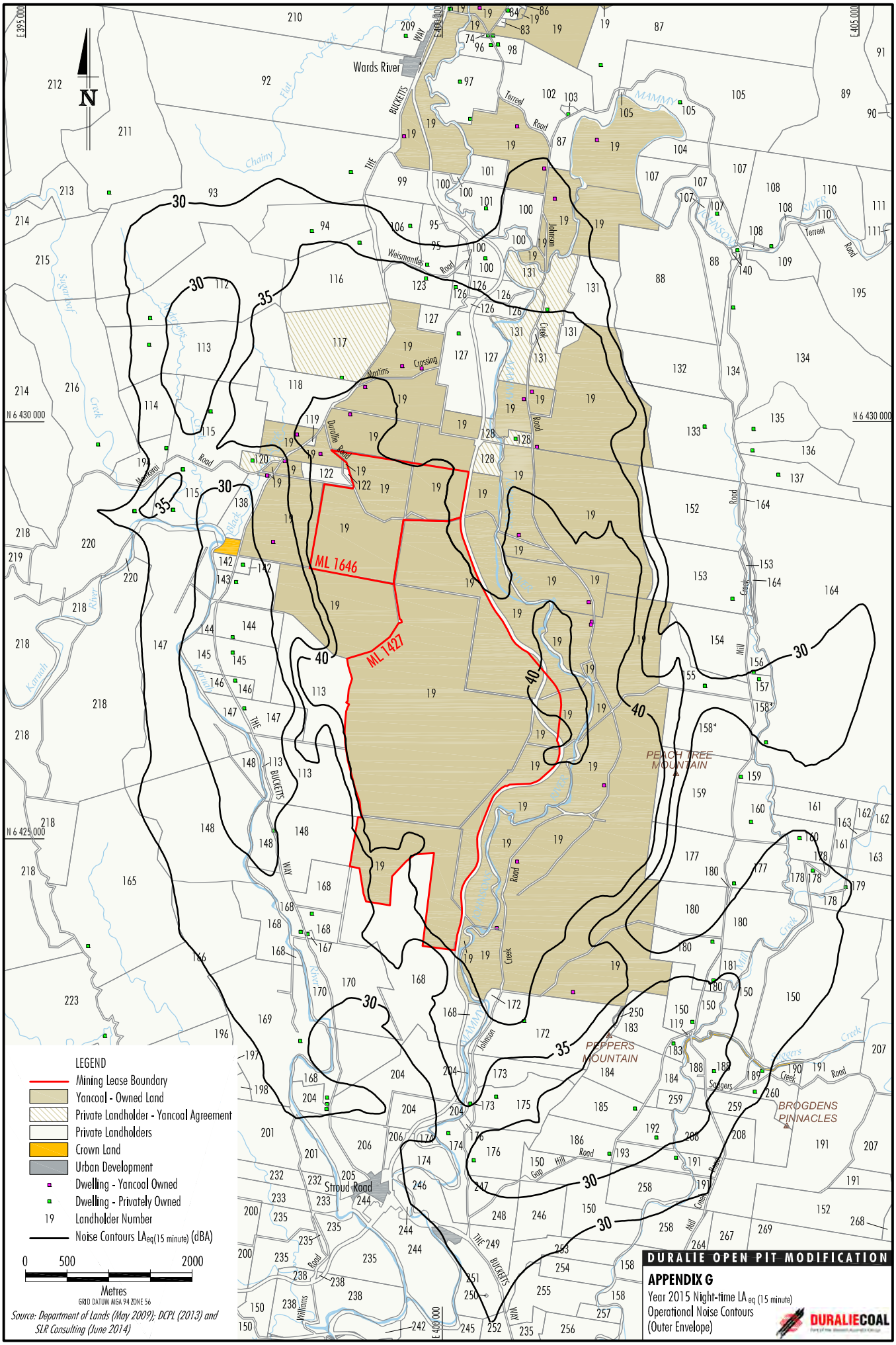
A review of research on sleep disturbance was conducted for the *NSW Environmental Criteria for Road Traffic Noise* (ECRTN) (EPA, 1999). This review concluded that the range of results is sufficiently diverse that it was not reasonable to issue new noise criteria for sleep disturbance.

From the research, the DECCW recognised that current sleep disturbance criterion of an $L_{A1(1minute)}$ not exceeding the $L_{A90(15minute)}$ by more than 15 A-weighted decibels (dBA) is not ideal. Nevertheless, as there is insufficient evidence to determine what should replace it, the DECCW will continue to use it as a guide to identify the likelihood of sleep disturbance. This means that where the criterion is met, sleep disturbance is not likely, but where it is not met, a more detailed analysis is required.

The detailed analysis should cover the maximum noise level or $L_{A1(1minute)}$, that is, the extent to which the maximum noise level exceeds the background level and the number of times this happens during the night-time period. Some guidance on possible impact is contained in the review of research results in the appendices to the ECRTN. Other factors that may be important in assessing the extent of impacts on sleep include:

- How often high noise events will occur.
- Time of day (normally between 2200 hrs and 0700 hrs).
- Whether there are times of day when there is a clear change in the noise environment (such as during early morning shoulder periods).

The $L_{A1(1minute)}$ descriptor is meant to represent a maximum noise level measured under “fast” time response. DECC will accept analysis based on either $L_{A1(1minute)}$ or L_{Amax}.



GCL-14-23_Mod2_Noise_102C

In accordance with the INP Chapter 2 Industrial Noise Criteria (Section 2.2.4), the evening cumulative sum of the existing, approved and proposed developments $L_{Aeq(4hour)}$ noise amenity levels have been determined as presented below.

Cumulative Evening ($L_{Aeq(4hour)}$) Noise Amenity Levels (dBA re 20 µPa)

ID No	Landholder	Duralie Modification[1]	Stratford Extension Project	AGL Project (Gas Field)	AGL Project (Process Facility)	Rocky Hill Coal Project	Cumulative Amenity Level	NSW INP Acceptable Amenity
Privately owned Receivers								
74	Melmeth	16	20	12	8	7	22	45
84(1)	Hart	16	21	13	8	8	23	45
84(2)	Hart	16	21	13	8	8	23	45
87	PPI Ltd	18	19	12	7	7	22	45
93	Howard	20	17	10	5	5	22	45
94	Howard	26	16	9	3	4	26	45
95	Ransley	24	15	8	3	4	25	45
96	Turnbull	16	20	12	7	7	22	45
97(1)	Davis	16	19	11	7	7	22	45
97(2)	Davis	18	18	11	6	6	22	45
98(1)	Partelle & Ramsay	16	20	12	7	7	22	45
98(2)	Partelle & Ramsay	16	20	12	8	7	22	45
100	Richards	23	16	8	3	4	24	45
101	Holloway	21	17	9	4	5	23	45
103	Macedo	18	18	11	6	6	22	45
105	Edwards	12	18	11	6	7	20	45
106	James	22	16	9	4	4	23	45
107	Spencer	10	15	9	3	5	18	45
108	Tersteeg	13	14	8	2	4	18	45
112	Hogeveen	18	13	7	1	2	19	45
113	Edwards	19	12	6	0	1	20	45
115(1)	Moylan & Newton	22	11	5	0	0	23	45
115(2)	Moylan & Newton	24	12	5	0	0	24	45
115(3)	Moylan & Newton	23	10	4	0	0	23	45
116	Weismantel	25	16	8	3	4	26	45
117[2,3]	Holmes & Holmes	30	13	6	1	1	30	45
120[3]	Mahony	26	11	5	0	0	27	45
123[4]	Oleksiuk & Carmody	25	15	8	3	3	25	45
126[4]	Hamann - Pixalu P/L	24	15	8	2	3	25	45
127	Fisher-Webster	26	14	7	1	3	26	45
128[2,3,4]	Hare-Scott	30	12	5	0	1	31	45
131[3]	Relton	25	15	7	2	3	25	45
133	Gorton	15	12	6	0	1	17	45
134	Duzmen P/L	12	14	7	1	3	17	45
135	Ayliffe	14	11	5	0	1	17	45
136	Pickles	14	11	5	0	1	16	45
137	Lord	16	11	5	0	1	18	45
140	Bennett & Stark	10	15	8	2	4	17	45
142	Madden	27	9	3	0	0	27	45
143	Madden	28	9	3	0	0	28	45
144	Wielgosinski	31	8	2	0	0	31	45
145	Edwards	29	8	2	0	0	30	45
146	Bragg	27	7	2	0	0	27	45

ID No	Landholder	Duralie Modification[1]	Stratford Extension Project	AGL Project (Gas Field)	AGL Project (Process Facility)	Rocky Hill Coal Project	Cumulative Amenity Level	NSW INP Acceptable Amenity
147	Edwards	24	7	1	0	0	24	45
148	McAndrew	29	5	0	0	0	29	45
150	Rumbel	26	2	0	0	0	26	45
153	Paul	17	9	3	0	0	18	45
154	Morgan	22	8	2	0	0	22	45
155	Guberina	30	7	2	0	0	30	45
156	Hope	27	7	2	0	0	27	45
157	Stephenson	28	7	2	0	0	28	45
159	Waterer	27	6	0	0	0	27	45
160(1)	Kenney	27	5	0	0	0	27	45
160(2)	Kenney	24	5	0	0	0	25	45
164	Gorton Timber Co Ltd	27	6	1	0	0	28	45
165	ESOR Nominees P/L	22	3	0	0	0	22	45
167	Ravagnani	30	4	0	0	0	30	45
168(1)	Schultz	27	1	0	0	0	27	45
168(2)	Schultz	30	4	0	0	0	30	45
168(3)	Schultz	28	4	0	0	0	28	45
168(4)	Schultz	28	1	0	0	0	28	45
169	Williams	30	2	0	0	0	30	45
172[4]	Lyall	37	2	0	0	0	37	45
173	Trigg & Holland	33	1	0	0	0	33	45
174	Carroll	29	1	0	0	0	29	45
175	Thomas	31	1	0	0	0	31	45
176	Thompson	29	0	0	0	0	29	45
177	Thompson	25	4	0	0	0	25	45
178	Hitchcock & Coldham	29	4	0	0	0	29	45
179	Mellar	27	4	0	0	0	27	45
180(1)	Thompson	31	3	0	0	0	31	45
180(2)	Thompson	28	3	0	0	0	28	45
183	Elfick	23	2	0	0	0	23	45
185	Raine & Hilleard	17	1	0	0	0	18	45
186	Farnham	26	0	0	0	0	26	45
188	Rumbel	29	1	0	0	0	29	45
189	Gillard	29	1	0	0	0	29	45
192	Vajda	28	0	0	0	0	28	45
193	Smith	28	0	0	0	0	28	45
194	Vajda	21	11	5	0	0	22	45
198	Aspenview Enterprises P/L	20	0	0	0	0	20	45
199	Parker	20	0	0	0	0	20	45
200	Trappel	19	0	0	0	0	19	45
204	Jones	28	1	0	0	0	28	45
209	Chapman	16	20	12	8	7	22	45
211	Irwin	15	14	8	3	3	18	45
216	Vajda	18	10	5	0	0	19	45
220	Lindfield & Associates P/L	23	10	4	0	0	23	45
223	Ferraro	18	1	0	0	0	19	45
260	Roberts	29	1	0	0	0	29	45
DCPL owned Receivers								

ID No	Landholder	Duralie Modification[1]	Stratford Extension Project	AGL Project (Gas Field)	AGL Project (Process Facility)	Rocky Hill Coal Project	Cumulative Amenity Level	NSW INP Acceptable Amenity
19(a1)	DCPL	41	9	3	0	0	41	45
19(b1)	DCPL	43	6	0	0	0	43	45
19(c1)	DCPL	37	10	4	0	0	37	45
19(d1)	DCPL	40	9	3	0	0	40	45
19(e1)	DCPL	35	3	0	0	0	35	45
19(f1)	DCPL (Mammy Johnsons)	**50**	5	0	0	0	**50**	45
19(g1)	DCPL	31	12	5	0	1	31	45
19(h1)	DCPL	28	11	5	0	0	28	45
19(i1)	DCPL	31	10	4	0	0	31	45
19(j1)	DCPL	32	13	6	0	1	32	45
19(k1)	DCPL	29	13	7	1	2	29	45
19(l1)	DCPL	29	13	6	1	2	29	45
19(m1)	DCPL	28	13	6	0	2	29	45
19(n1)	DCPL (Weismantels Inn)	29	11	5	0	0	29	45
19(o1)	DCPL	33	12	5	0	0	33	45
19(p1)	DCPL	40	12	5	0	0	40	45
19(q1)	DCPL	35	12	6	0	1	35	45
19(r1)	DCPL	44	4	0	0	0	44	45
19(s1)	DCPL	41	9	3	0	0	41	45
19(t1)	DCPL	19	18	10	5	6	22	45
19(u1)	DCPL	15	21	13	9	9	23	45
19(v1)	DCPL	20	18	10	6	6	23	45
19(w1)	DCPL	28	13	6	0	2	28	45
19(x1)	DCPL	21	17	9	4	5	23	45
19(y1)	DCPL	20	17	10	5	5	22	45
19(z1)	DCPL	18	18	10	5	5	22	45
19(a2)	DCPL	15	21	13	8	8	23	45
19(b2)	DCPL	15	21	13	8	8	23	45
19(c2)	DCPL	15	21	13	8	8	23	45

Note 1: All predicted noise levels from the worst case meteorological conditions in **Table 11** for each receiver.
Note 2: Unexercised acquisition rights in accordance with Project Approval (08_0203).
Note 3: Landowner Agreement with Yancoal in accordance with Project Approval (08_0203).
Note 4: Request for additional noise mitigation measures in accordance with Project Approval (08_0203).
Note 5: Predicted cumulative $L_{Aeq(period)}$ amenity noise level complies with 45 dBA (Evening) amenity noise level.
Note 6: Predicted marginal noise exceedance 1 to 2 dBA above 45 dBA (Evening) amenity noise level.
Note 7: Predicted moderate noise exceedance 3 dBA above 45 dBA (Evening) amenity noise level.
Note 8: Predicted appreciable noise exceedance > 3 dBA above 45 dBA (Evening) amenity noise level.

The night-time cumulative sum of the existing, approved and proposed developments $L_{Aeq(9hour)}$ noise amenity levels have been determined as presented below.

Cumulative Night-time ($L_{Aeq(9hour)}$) Noise Amenity Levels (dBA re 20 µPa)

ID No	Landholder	Duralie Mod[1]	Stratford Extension Project	AGL Project (Gas Field)	AGL Project (Process Facility)	Rocky Hill Coal Project	Cumulative Amenity Level	NSW INP Acceptable Amenity
Privately owned Receivers								
74	Melmeth	19	22	12	8	7	24	40
84(1)	Hart	20	23	13	8	8	25	40
84(2)	Hart	20	23	13	8	8	25	40
87	PPI Ltd	23	21	12	7	7	26	40
93	Howard	25	19	10	5	5	26	40
94	Howard	30	18	9	3	4	30	40
95	Ransley	29	17	8	3	4	29	40
96	Turnbull	19	22	12	7	7	24	40

ID No	Landholder	Duralie Mod[1]	Stratford Extension Project	AGL Project (Gas Field)	AGL Project (Process Facility)	Rocky Hill Coal Project	Cumulative Amenity Level	NSW INP Acceptable Amenity
97(1)	Davis	20	21	11	7	7	24	40
97(2)	Davis	24	20	11	6	6	26	40
98(1)	Partelle & Ramsay	21	22	12	7	7	25	40
98(2)	Partelle & Ramsay	22	22	12	8	7	25	40
100	Richards	28	18	8	3	4	29	40
101	Holloway	24	19	9	4	5	25	40
103	Macedo	21	20	11	6	6	24	40
105	Edwards	17	20	11	6	7	22	40
106	James	25	18	9	4	4	26	40
107	Spencer	15	17	9	3	5	20	40
108	Tersteeg	14	16	8	2	4	19	40
112	Hogeveen	25	15	7	1	2	26	40
113	Edwards	26	14	6	0	1	27	40
115(1)	Moylan & Newton	29	13	5	0	0	29	40
115(2)	Moylan & Newton	29	14	5	0	0	29	40
115(3)	Moylan & Newton	29	12	4	0	0	29	40
116	Weismantel	30	18	8	3	4	30	40
117[2,3]	Holmes & Holmes	34	15	6	1	1	34	40
120[3]	Mahony	30	13	5	0	0	30	40
123[4]	Oleksiuk & Carmody	31	17	8	3	3	31	40
126[4]	Hamann - Pixalu P/L	30	17	8	2	3	30	40
127	Fisher-Webster	31	16	7	1	3	31	40
128[2,3,4]	Hare-Scott	34	14	5	0	1	34	40
131[3]	Relton	29	17	7	2	3	29	40
133	Gorton	16	14	6	0	1	18	40
134	Duzmen P/L	13	16	7	1	3	18	40
135	Ayliffe	17	13	5	0	1	19	40
136	Pickles	17	13	5	0	1	19	40
137	Lord	20	13	5	0	1	21	40
140	Bennett & Stark	13	17	8	2	4	19	40
142	Madden	28	11	3	0	0	28	40
143	Madden	29	11	3	0	0	29	40
144	Wielgosinski	30	10	2	0	0	30	40
145	Edwards	30	10	2	0	0	30	40
146	Bragg	27	9	2	0	0	27	40
147	Edwards	24	9	1	0	0	24	40
148	McAndrew	29	7	0	0	0	29	40
150	Rumbel	27	4	0	0	0	27	40
153	Paul	18	11	3	0	0	19	40
154	Morgan	23	10	2	0	0	23	40
155	Guberina	30	9	2	0	0	30	40
156	Hope	28	9	2	0	0	28	40
157	Stephenson	28	9	2	0	0	28	40
159	Waterer	27	8	0	0	0	27	40
160(1)	Kenney	27	7	0	0	0	27	40
160(2)	Kenney	25	7	0	0	0	25	40
164	Gorton Timber Co. Ltd	29	8	1	0	0	29	40
165	ESOR Nominees P/L	23	5	0	0	0	24	40

ID No	Landholder	Duralie Mod[1]	Stratford Extension Project	AGL Project (Gas Field)	AGL Project (Process Facility)	Rocky Hill Coal Project	Cumulative Amenity Level	NSW INP Acceptable Amenity
167	Ravagnani	30	6	0	0	0	30	40
168(1)	Schultz	28	3	0	0	0	28	40
168(2)	Schultz	30	6	0	0	0	30	40
168(3)	Schultz	29	6	0	0	0	29	40
168(4)	Schultz	29	3	0	0	0	29	40
169	Williams	31	4	0	0	0	31	40
172[4]	Lyall	38	4	0	0	0	38	40
173	Trigg & Holland	34	3	0	0	0	34	40
174	Carroll	31	3	0	0	0	31	40
175	Thomas	32	3	0	0	0	32	40
176	Thompson	30	2	0	0	0	30	40
177	Thompson	26	6	0	0	0	26	40
178	Hitchcock & Coldham	29	6	0	0	0	29	40
179	Mellar	28	6	0	0	0	28	40
180(1)	Thompson	32	5	0	0	0	32	40
180(2)	Thompson	28	5	0	0	0	28	40
183	Elfick	24	4	0	0	0	24	40
185	Raine & Hilleard	18	3	0	0	0	19	40
186	Farnham	28	2	0	0	0	28	40
188	Rumbel	30	3	0	0	0	30	40
189	Gillard	30	3	0	0	0	30	40
192	Vajda	29	2	0	0	0	29	40
193	Smith	29	2	0	0	0	29	40
194	Vajda	28	13	5	0	0	28	40
198	Aspenview Enterprises P/L	21	2	0	0	0	21	40
199	Parker	21	2	0	0	0	22	40
200	Trappel	20	2	0	0	0	20	40
204	Jones	29	3	0	0	0	29	40
209	Chapman	20	22	12	8	7	25	40
211	Irwin	20	16	8	3	3	22	40
216	Vajda	19	12	5	0	0	20	40
220	Lindfield & Associates P/L	29	12	4	0	0	29	40
223	Ferraro	18	3	0	0	0	19	40
260	Roberts	30	3	0	0	0	30	40
DCPL owned Receivers								
19(a1)	DCPL	**42**	11	3	0	0	**42**	40
19(b1)	DCPL	**44**	8	0	0	0	**44**	40
19(c1)	DCPL	40	12	4	0	0	40	40
19(d1)	DCPL	41	11	3	0	0	41	40
19(e1)	DCPL	36	5	0	0	0	36	40
19(f1)	DCPL (Mammy Johnsons)	**50**	7	0	0	0	**50**	40
19(g1)	DCPL	34	14	5	0	1	35	40
19(h1)	DCPL	30	13	5	0	0	30	40
19(i1)	DCPL	32	12	4	0	0	32	40
19(j1)	DCPL	37	15	6	0	1	37	40
19(k1)	DCPL	34	15	7	1	2	34	40
19(l1)	DCPL	31	15	6	1	2	32	40

ID No	Landholder	Duralie Mod[1]	Stratford Extension Project	AGL Project (Gas Field)	AGL Project (Process Facility)	Rocky Hill Coal Project	Cumulative Amenity Level	NSW INP Acceptable Amenity
19(m1)	DCPL	32	15	6	0	2	32	40
19(n1)	DCPL (Weismantels Inn)	31	13	5	0	0	31	40
19(o1)	DCPL	36	14	5	0	0	36	40
19(p1)	DCPL	**43**	14	5	0	0	**43**	40
19(q1)	DCPL	39	14	6	0	1	39	40
19(r1)	DCPL	**45**	6	0	0	0	**50**	40
19(s1)	DCPL	**42**	11	3	0	0	**42**	40
19(t1)	DCPL	25	20	10	5	6	26	40
19(u1)	DCPL	25	23	13	9	9	28	40
19(v1)	DCPL	26	20	10	6	6	27	40
19(w1)	DCPL	32	15	6	0	2	32	40
19(x1)	DCPL	26	19	9	4	5	27	40
19(y1)	DCPL	26	19	10	5	5	27	40
19(z1)	DCPL	22	20	10	5	5	24	40
19(a2)	DCPL	19	23	13	8	8	25	40
19(b2)	DCPL	20	23	13	8	8	25	40
19(c2)	DCPL	20	23	13	8	8	25	40

Note 1: All predicted noise levels from the worst case meteorological conditions in **Table 11** for each receiver.
Note 2: Unexercised acquisition rights in accordance with Project Approval (08_0203).
Note 3: Landowner Agreement with Yancoal in accordance with Project Approval (08_0203).
Note 4: Request for additional noise mitigation measures in accordance with Project Approval (08_0203).
Note 5: Predicted cumulative $L_{Aeq(period)}$ amenity noise level complies with 40 dBA (Night-time) amenity noise level.
Note 6: Predicted marginal noise exceedance 1 to 2 dBA above 40 dBA (Night-time) amenity noise level.
Note 7: Predicted moderate noise exceedance 3 dBA above 40 dBA (Night-time) amenity noise level.
Note 8: Predicted appreciable noise exceedance > 3 dBA above 40 dBA (Night-time) amenity noise level.