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Acoustic Peer Review Mt Thorley and Warkworth Mine Continuation

REPORT No
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Prepared for and instructed by:
Bulga Milbrodale Progress Association
C/- EDO NSW
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Sydney NSW 2000



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Report	Date	Prepared	Checked	Comment
Draft	1/8/2014	Stephen Gauld	Matthew Harwood	To client for comment
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INTRODUCTION

1. I, Stephen Gauld, Principal Acoustical Engineer, have been engaged by Bulga Milbrodale Progress Association to provide an expert peer review of the acoustic report/s provided as part of the Environmental Assessments for the Mt Thorley and Warkworth Mine Continuation 2014 to be presented to the Planning Assessment Commission (PAC).
2. The Environmental Assessment is open for public comment until 6 August 2014.
3. The letter of instruction from the EDO NSW on behalf of the Bulga Milbrodale Progress Association (BMPA) to myself is attached as Appendix "B".
4. In this report, I provide expert acoustical evidence to assist the PAC in their consideration of the matter.
5. I have read the documents provided to me, as listed in Appendix "C".
6. I visited Bulga on Friday 18 July 2014 to measure the background noise level at 98 Noses Peak Road, Bulga, and to inspect the Mt Thorley and Warkworth mines from outside the mine's boundaries to appreciate their geographical relationship to the townships of Bulga and Milbrodale.



EXECUTIVE SUMMARY

7. I have reviewed the Noise and Vibration Study prepared by EMGA Mitchell McLennan dated 2 June 2014 (EMGA Report 1) for Mt Thorley Operations Pty Ltd, which is Appendix F in the Environmental Impact Statement also prepared by EMGA Mitchell McLennan dated 15 June 2014.
8. I have also reviewed the Noise and Vibration Study prepared by EMGA Mitchell McLennan dated 12 June 2014 (EMGA Report 2) for Warkworth Mining Limited, which is Appendix F in the Environmental Impact Statement also prepared by EMGA Mitchell McLennan dated 15 June 2014.
9. EMGA Reports 1 and 2 are largely the same with respect to background noise levels, discussion of noise criteria and differ with regards to the prediction of noise from each mine.
10. The Secretary's Environmental Assessment Requirements for the Mt Thorley Continuation Project include an assessment of the likely operational noise impacts of the development (including construction noise) under the *NSW Industrial Noise Policy*.
11. The Secretary's Environmental Assessment Requirements for the Warkworth Continuation Project include an assessment of the likely operational noise impacts of the development (including construction noise) under the *NSW Industrial Noise Policy* paying particular attention to establishing accurate background noise levels in the surrounding area, the effect of removing Saddleback Ridge and the obligations in chapters 8 and 9 of the policy.
12. Given the issues raised in this peer review, substantial modifications are required to be made by Warkworth Mining Limited and Mt Thorley Operations Pty Ltd in order to present a proposal that provides a reasonable balance between the continuation of the Warkworth Mine to the West and the expected noise impact to residential premises.
13. It is not acceptable to provide background noise levels that are higher than measured.
14. It is not acceptable to discount the Low Frequency Noise modifying factor required to be assessed in the *NSW Industrial Noise Policy*.
15. It is not acceptable to discount mitigation measures due to the high cost of implementation.
16. In my opinion, the expected noise impact of the proposal is unacceptable and will unduly disturb the amenity of the residents in the Bulga community.



ABOUT THE AUTHOR

17. I, Stephen Gauld, am the Managing Director and Principal Acoustical Engineer at Day Design Pty Ltd, Consulting Acoustical Engineers, of Suite 17, 808 Forest Road, Peakhurst, NSW, 2210.
18. I have practiced as a Consulting Acoustical Engineer since December 1997. I was awarded my Bachelor of Engineering (Mechanical) in 1997 and my Masters of Engineering Science (Noise and Vibration) in 2007. My curriculum vitae is attached in Appendix "A".
19. I have read Division 2, Part 31 of the Uniform Civil Procedure Rules 2005 and the Expert Witness Code of Conduct in Schedule 7. I am aware of the expectations of the Court. This report is prepared in accordance with these documents and I agree to be bound by their terms, while acknowledging that the PAC public hearing is not a Court proceeding.
20. I have made all the inquiries that I believe are required and appropriate and that no matters of significance which I regard as relevant, have to my knowledge been withheld from this report.
21. My evidence in this statement is within my area of expertise, except where I state that I have relied upon the evidence of another person.

DESCRIPTION OF THE SITE AND SURROUNDING AREA

22. It is assumed that the readers of this review will be familiar with the site and surrounding areas.
23. For a summary please refer to Section 1 in either EMGA Report 1 or 2 prepared on 2nd and 12th June 2014 respectively.
24. It is noted that Wollemi Peak Road, Bulga is often referred to as Noses Peak Road, Bulga in documentation.



ACOUSTIC PEER REVIEW

Background Noise Levels

25. The background noise level for the day, evening and night determined in Table 8.1 for both the Mt Thorley and Warkworth mine noise assessments range between 30 and 33 dBA at the six locations and is repeated below in Table 1.

Table 1 – Representative Background Noise Levels for Bulga (RBL as per INP)

Location	Period	RBL, dB(A)		
		Day	Evening	Night
A. Wollemi Peak Rd	20/6/13 – 13/8/13	33	33	34
B. 367 Wambo Road	1/12/11- 29/11/12	30	33	34
C. 128 Wambo Rd	29/11/12- 31/7/13	33	37	33
D. 193 Inlet Rd	1/12/11- 28/5/12	30	32	31
E. 339 Inlet Rd	18/3/13- 30/6/13	30	30	30
F. Scout Hall (Putty Rd)	1/12/11- 4/9/12	33	37	36

*Extracted from the EMGA reports dated 2 and 12 June 2014

26. An Infobyte iM4 Type 2 noise logger (#103) was placed within 500 mm of the BarnOwl noise logger at 98 Wollemi Peak Road on Friday 18 July 2014 by Stephen Gauld. A photo of the two noise loggers is shown in Photo 1 below. The logger measured the background noise level for seven days and was returned by the owner of the property, Mr John Krey on Wednesday 30 July 2014.
27. The calculated RBL for the day, evening and night at 98 Wollemi Peak Road is 30 dBA. The measured L₉₀ background noise level data is presented in Appendix “D”.



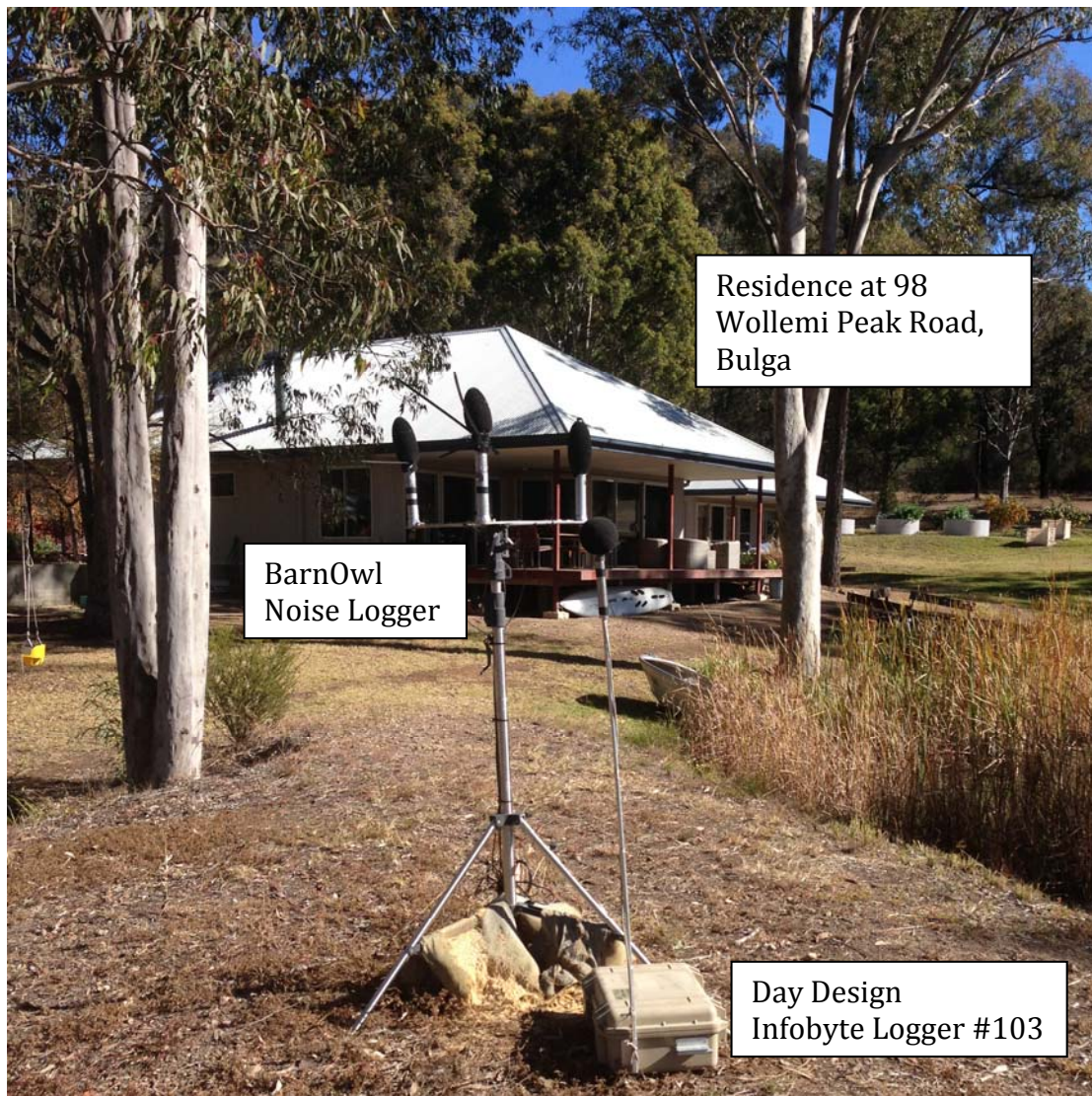


Photo 1: BarnOwl logger and Day Design logger at 98 Wollemi Peak Road, Bulga

28. This measured data is lower than the background noise level data measured by EMGA for the mine at Location A - Wollemi Peak Road.
29. Mr Krey is provided with the L_{Aeq} data from the BarnOwl logger weekly however does not receive the L_{A90} data. He has requested this data however has not been provided with the data. The measured L_{A90} data would provide a useful comparison with the Day Design measured data to determine whether the BarnOwl was measuring correctly.
30. It is my understanding that the BarnOwl logger has been located at 98 Wollemi Peak Road for more than 2 years without removal. Noise loggers such as these should be regularly calibrated by a NATA approved laboratory every two years if not every year. There is no information in the EMGA reports relating to calibration of the BarnOwl noise loggers. It is likely that the BarnOwl logger has not been calibrated by a NATA approved



laboratory as mobile NATA laboratories for logger calibration do not exist to my knowledge.

31. To verify the background noise level at the remaining two locations with the higher background noise levels (C and F), the background noise level should be measured by an independent acoustical consultant.
32. The background noise level at Location A should be reduced to 30 dBA (from 33 dBA as presented by EMGA) and the applicable noise criteria in accordance with the INP reduced to 35 dBA (compared to 38 dBA presented by EMGA).

Past Judgements

33. The Mt Thorley and Warkworth mine extensions were approved by the PAC on 3 February 2012.
34. The approval by PAC was appealed by the Bulga community in March 2012 and in April 2013. The Land and Environment Court upheld the appeal.
35. The mines sought to overturn the appeal in the Appeal Court, however in April 2014, the appeal was unsuccessful. The expected noise impact was one of the main reasons for refusal.
36. Subsequently, the current (two) applications for the continuation of both Warkworth and Mount Thorley mines seeks to have the continuation of each approved by the PAC.
37. The application does not appear to differ from the original application and therefore there are numerous reasons for refusal as outlined in the judgment by the Land and Environment Court decision. The reasons relating to noise impact include:

Land and Environment Court (LEC) 10224 of 2012, Decision 15 April 2013

- Establishing too high background noise levels [para 330]
 - Setting criteria based on what the mine can achieve not what is acceptable [para 334]
 - Insufficient accounting for the effect of meteorology on noise levels [para 348]
 - Insufficient accounting for annoying noise characteristics [para 362]
38. Paragraph 385 of the LEC decision concludes that when the approved noise criteria, noise impacts on the residents of Bulga, annoying character of the noise and the effect of meteorological conditions are considered, the result is likely to be significant, intrusive and reduce amenity. The proposed noise mitigation strategies are not likely to reduce the noise levels to the project specific noise levels recommended in the INP and that the significant residual impacts are unacceptable. It further states that no confident conclusion can be drawn that the noise impacts of the Project will be acceptable.



Noise Monitoring

39. There are four BarnOwl noise monitors described in Figure 4.5 of the EMGA Reports.
40. The BarnOwl noise loggers are able to determine the direction of measured noise levels and the data used to assess whether non-compliance of the mines is occurring.
41. Section 4.2 of the EMGA Reports describes the Real-Time noise monitoring regime that includes “a number of monitors which have been strategically placed to adequately represent a wide range of private residences”.
42. The BarnOwl network has been used to “activate numerous noise alarms during the night shift in 2014”. This demonstrates that exceedance of the noise criteria is common and that further expansion of the mines is likely to intensify the noise impact with more exceedances more often.
43. Section 4.3 of the EMGA Reports describe three nights within a period of one month where supplementary noise monitoring occurred and action taken to shutdown plant to reduce the noise impact. In all three instances a large number of plant was shut down in order to reduce the noise emission to the noise criteria.
44. This further demonstrates that regular exceedances of the noise criteria occur and action is required to be taken through the shutdown of plant to meet the criteria.
45. The mine should be installing acoustic kits on all plant used that contribute to the overall noise level at residences, to reduce the occurrence of acoustic non-compliance.

Saddleback Ridge – Compare Normal case with Normal case not Worst with Worst

46. The Land and Environment Court judgment dated 15 April 2013 acknowledged that the noise attenuation effect of Saddleback Ridge was best during calm conditions and provided up to 5 dB attenuation [Paragraph 284].
47. It is agreed that the Ridge provides good attenuation during calm weather, which occurs for the majority of the time.
48. During adverse conditions, however it was noted that the noise benefit of the Ridge during calm weather was virtually nullified during adverse winds or temperature inversions.
49. I can accept that the worst case noise impact prior to the removal of Saddleback Ridge is much the same as the noise impact after the removal of Saddleback Ridge, however this scenario means that the current worst case with the Ridge in place will become the normal (or calm weather) case after the removal of the Ridge.
50. This scenario provides a significant increase to the current noise impact from the mine which is not identified in the EMGA Reports.



Low Frequency Noise Criteria

51. The low frequency noise criteria is particularly relevant to this assessment due to the nature of the operation (machinery and heavy vehicles), the quiet background and significant distances to residential receivers.
52. The machinery and the heavy vehicles used on the mine sites generate both low frequency and high frequency noise.
53. At larger distances the high frequency noise is attenuated more than the low frequency noise and therefore the low frequency noise becomes more prominent.
54. The NSW INP provides an assessment method for determining the presence of low frequency noise, where the difference between the A-weighted and C-weighted noise levels is determined. If the difference is equal to or greater than 15 dB, a 5 dB modifying factor is applied to the measured (or predicted) noise level from the noise source in question – in this case the predicted noise level from the mine.
55. The EMGA reports provide assessments against two other low frequency noise criteria – the Broner method and the Department of Environment, Food and Rural Affairs.
56. The noise assessment is required to be carried out in accordance with the INP.
57. Section 9.7 of the EMGA report states that “Warkworth Mine (or MTO) has listened to this feedback (relating to low frequency noise complaints) and to consider the issue EMM [EMGA] have completed three different methods of assessment for Low Frequency Noise (LFN).”
58. It is curious that according to the INP LFN assessment, a 5 dB modifying factor should be applied, however the modifying factor is not applied due to the preference of using the Broner method.
59. If the INP LFN modifying factor were applied, as is required to be applied, the predicted noise level would increase by 5 dB at each assessment location where the predicted noise is expected to be low frequency in character. These locations were determined in Table 10.12 of the EMGA reports and include Bulga Village, Inlet Road West and Long Point.
60. Section 9.7.1 of the EMGA Reports 1 and 2 discuss the merits and alleged deficiencies of the current low frequency noise (LFN) modifying factor assessment method in the INP.
61. The EMGA Reports state that the LFN was originally intended for testing sources at close distances. The reason for this is a source may not display low frequency characteristics at close range, but over larger distances, the high frequency content of the noise is reduced and the low frequency content remains and presents as low frequency noise. I disagree with this assertion.



62. The fact is the residents receive the low frequency noise and are disturbed by it regardless of its origin. As the noise originates from the mines, the low frequency noise should be reduced at source through acoustic kits fitted to plant and machinery or a penalty applied at the assessment point. Discounting the criteria is not acceptable.
63. By way of comparison, tonal noise is also penalized in the INP. If a tonal reversing alarm on a heavy vehicle is tonal at source but not tonal at the receptor due to high frequency attenuation over large distances, you will never hear the argument to apply the +5 dB penalty due to the noise at source being tonal.
64. Similarly, the noise at close range is largely irrelevant except when designing noise controls to meet a certain noise criteria.
65. The INP LFN modifying factor should be applied if low frequency noise is measured or predicted at residential assessment points.
66. Alternative low frequency assessment methods may be considered, however the current method in the INP should be used for the assessment of noise from the mine.
67. We understand that the INP LFN assessment method is currently under review. Only at the point when the EPA update the INP to alter the low frequency assessment method, should another method be relied upon.
68. The EMGA Reports predict low frequency noise has and will occur after the proposed continuation (Table 10.12), however the 5 dB penalty is not applied as the absolute dBC value is less than the Broner criteria.
69. The 5dB LFN penalty should be applied to the predicted noise levels in the EMGA Reports and therefore the predicted cumulative noise levels in Table 11.1 at locations in Bulga Village, Inlet Road West and Long Point will increase to well above the INP noise criteria and be considered unacceptable.
70. This is reinforced by the resident's strong objection to the continuation projects and their experience of the impact of the low frequency noise from the mines.

Best Practise Noise Controls – attenuate whole of fleet

71. It would appear that the best way to reduce the noise emission from the site would be to attenuate the whole of the fleet.
72. The proposal to attenuate the whole fleet is a good source of noise control, however there is no information on how effective the past attenuation has been or how effective the proposal will be.



Best Practise Noise Controls – Bund Wall

73. Section 10.1 of the EMGA Report 2 for Warkworth discusses the effectiveness of a large noise bund between the proposed mining operations and the Bulga community. It states that mitigation along the transmission path was found to be ineffective as the bund would be required to be ‘considerable in extent and height and would only provide minimal noise benefit to Bulga residences’.
74. Section 10.1 of Report 2 also states that the bund would take up considerable land area and would need to be adjacent to the Wollemi Brook in the proposed offset to not sterilize coal resources.
75. There is considerable land between the proposed disturbance area and the Wollemi Brook for a noise bund to be located, which would make it more difficult if that land is proposed to be mined at a later date.
76. It would appear that the removal of Saddleback Ridge will remove an effective noise bund, albeit more effective during calm weather conditions, and therefore a higher noise impact is expected. A separate noise bund between the residences could be effective, however has been discounted due to cost. The implication of this is a higher noise impact to residences.

Best Practise Noise Controls– Relocation of Plant

77. Section 10.1 of the EGMA report briefly discusses the option of relocating plant to in-pit areas or shutting down plant to achieve the noise criteria at all assessment locations in Bulga. The scenario was discounted as it was not found to be reasonable, at a reported cost of \$100million over the life of the proposal.
78. The implication of this is that the noise criteria is likely to not be met at residences in Bulga.
79. This was one of the main reasons the appeal to the Land and Environment Court was upheld – that the proposal could not meet the noise criteria.

Predicted Non-compliance

80. Section 10.5 of the EGMA report predicts non-compliance at 103 assessment locations (out of 221), equal to 47%.
81. The extent of non-compliance is without applying the LFN modifying factor penalty of 5 dB at locations where it is required.
82. If the LFN penalty were applied, all the “Marginal (1-2 dBA)” and Moderate (3-5 dBA)” exceedances in Table 10.7 would become Significant. One would expect that given this



outcome the conclusions in the assessment by the acoustic consultants engaged by the mine would be very different.

83. If this level of non-compliance were predicted (including the LFN penalty), there would be no way that the proposal could be approved without discounting the impact on residential premises.

This report has been prepared by



Stephen Gauld, BE (Mech), MEngSc (Noise and Vibration), MIEAust., MAAS
Managing Director and Principal Acoustical Engineer

On behalf of Day Design Pty Ltd



APPENDICIES

- **Appendix A** – Curriculum Vitae
- **Appendix B** – Letter of Instruction
- **Appendix C** – List of Documents Supplied and Read
- **Appendix D** – Ambient Noise Levels – 98 Wollemi [Noses] Peak Road
- **Appendix E** – Summary of Acoustic Terminology





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Curriculum Vitae

Stephen Gauld

Stephen Gauld is the Managing Director of Day Design Pty Ltd and works in a technical capacity as the Principal Acoustical Engineer. Stephen provides oversight on all projects and checks the majority of the reports that leave the office. He manages the larger projects and provides training to staff in acoustic measurement and noise control design. Sound level meters and long-term noise monitors are used in the field to measure different types of noise sources and computer software is used to analyse and design noise control.

- Qualifications:** Bachelor of Engineering (Mechanical),
University of New South Wales (1997)
- Masters of Engineering Science (Noise & Vibration),
University of New South Wales (2007)
- Memberships:** Member - Institution of Engineers Australia (2001)
- Member - Australian Acoustical Society (2001)
- Corporate Member – Association of Australian Acoustical Consultants
- Professional Experience:** *February 2004 - Present*
Managing Director and Principal Acoustical Engineer
Day Design Pty Ltd
- October 1998 – Feb 2004*
Consulting Acoustical Engineer
Day Design Pty Ltd
- November 1997 – October 1998*
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Consulting Acoustical Engineers



• AIRCRAFT, ROAD TRAFFIC AND TRAIN NOISE CONTROL
• ARCHITECTURAL ACOUSTICS • INDUSTRIAL NOISE AND VIBRATION CONTROL
• ENVIRONMENTAL NOISE IMPACT INVESTIGATION AND CONTROL
• OCCUPATIONAL NOISE INVESTIGATION • QUIET PRODUCT DEVELOPMENT



A short overview of the nature of **Mr Gauld's Professional Experience** is provided below:

Churches and Places of Worship:	Thornleigh Uniting Church, Corrimal Uniting Church, Glenmore Park Anglican Church, St Johns Church Kirribilli, Roseville Uniting Church, Lakes Baptist Church, Dapto Anglican Church, Heathcote Gospel Trust, Holy Family, Marayong among others.
Schools and Child Care Centres:	Schools located at Prestons, Bass Hill, Greenacre, Edensor Park. Childcare Centres located at Kingsgrove, Greenacre, Quakers Hill, Gymea, Kirrawee, Mount Annan and Thornleigh.
Hotels/Clubs	Bangor Tavern, Narellan Hotel, Billabong Hotel, Royal Oak Hotel, Dooleys Lidcombe Catholic Club, Easts Leagues Club, Gymea Hotel, Summer Hill Hotel, St Johns Park Bowling Club, Five Dock RSL Club, Royal Hotel at Richmond, Welcome Inn at Thirlmere, Wentworth Leagues Club.
Hearing Loss Assessments:	Assessment of occupational noise exposure for many and varied occupations including sheet metal workers, printers, labourers, hotel employees and drivers.
Legal Assignments:	Dewharp Pty Ltd v Sutherland SC, Night Club Noise Impact Ghassibe v Wingecarribee SC, Dog Breeding Facility Shelly Bear Pty Ltd v Canterbury CC, Child Care Centre Martin v Camden Council, Child Care Centre Robert Creed Architects v Strathfield MC, Residential Development Spiro Houteas v Parramatta CC, Residential Development
Occupational Noise:	Pilkington Alexandria and Ingleburn, United Group Rail, Franklins, Transfield Services, King Gee Clothing, Tyco Electronics
Residential:	Building Defect Claims - Sydney Mansions and 'The Rivage', Collins Street, Kiama, Gymea Bay Rd, Gymea Bay, Chapel Street, Rockdale, Auburn Centre, Main St, Blacktown, Taylor Street, Annandale, Queen Victoria Street, Bexley, Willoughby Rd, Crows Nest, Trelawney Street, Woollahra
Traffic:	Casula Powerhouse Arts Centre, Davies Road Expansion at Padstow, Lindenwood Development at Kellyville, Residential Units at McEvoy Street, Alexandria, President Avenue, Miranda, Bulwara Road, Ultimo, Soho Apartments, Waterloo



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17 July 2014

Stephen Gauld
 Day Design Pty Ltd
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 Peakhurst NSW 2210

By post and email: stephen@daydesign.com.au

Dear Stephen,

Warkworth Continuation and Mount Thorley Continuation Projects

We act for Bulga Milbrodale Progress Association (**BMPA**) in relation to the proposed open cut coal mine extensions by Rio Tinto Coal Australia (**Rio Tinto**) for the Warkworth Continuation 2014 (**Warkworth**) and for the Mount Thorley Continuation 2014 (**Mt Thorley**). We note that although these projects have been submitted as separate applications, Rio Tinto proposes to manage the projects as an integrated operation. Our client is concerned about any individual and/or cumulative impacts arising from the proposals.

Both Warkworth and Mt Thorley mines are existing operations with approvals that are due to expire in 2021 and 2017 respectively. The Warkworth proposal involves extending the area of open cut mining from the area of the existing approval. The Mt Thorley proposal seeks to extend the time to conduct mining in a footprint that has already been approved. On the completion of that mining, the mine pit would be used for the emplacement of overburden material generated by the Warkworth mine and the processing of coal in the coal preparation plant.

In June 2014, Rio Tinto lodged their Environmental Assessments (**EAs**) for the Warkworth and Mt Thorley projects. These EAs are open for public comment until Wednesday **6 August 2014**. It is our expectation that the projects will be determined by a Planning Assessment Commission (**PAC**). It is our client's intention to make submissions to the EA process and appear before the PAC and present its objections to the Warkworth and Mt Thorley projects. Accordingly, our client wishes to retain your services to act as an expert witness to provide an expert report for submission to the Environmental Assessments.

Primary purpose to assist the PAC

We note as a preliminary matter that our primary purpose in briefing you to prepare your report is to assist the PAC. We do not ask you to be an advocate for our client. You are requested to prepare an independent report that is clear and well-written.

In this respect, we draw your attention to Division 2, Part 31 of the *Uniform Civil Procedure Rules 2005* (**UCPR**) (**Tab 1**) and the Expert Witness Code of Conduct (**Code of Conduct**) (**Tab 2**) which govern the use of expert evidence in the Court.

We understand that the PAC public hearing is not a Court proceeding, however, we are of the view that the same code of conduct should be adhered to in this instance. Clause 2 of the Code of Conduct states that:

- (1) an expert witness has an overriding duty to assist the court impartially on matters relevant to the expert witness's area of expertise;
- (2) an expert witness's paramount duty is to the court and not to any party to the proceedings (including the person retaining the expert witness);
- (3) an expert witness is not an advocate for a party.

Your expert report must contain an acknowledgment that you have read the Expert Witness Code of Conduct under the *Uniform Civil Procedure Rules 2005* and that you agree to be bound by it.

Background

In April 2010 Coal & Allied submitted an Environmental Assessment for the Proposed Warkworth Extension. In February 2012 this proposal was approved by the PAC. In March 2012 EDO NSW commenced merit appeal proceedings in the Land and Environment Court on behalf of BMPA. BMPA sought refusal of the mine extension on the basis that the proposed mining of the biodiversity offset was contrary to the public interest and ecologically sustainable development, and that the expansion would result in detrimental economic and social impacts on the Bulga community also contrary to the principles of ecologically sustainable development. In April 2013, the Land and Environment Court upheld the appeal and refused the project application. The Court concluded that the project would have significant and unacceptable impacts on biological diversity, including on endangered ecological communities, noise impacts, and social impacts. The Court considered that the proposed conditions of approval were inadequate and would not allow the project to achieve satisfactory levels of impact on the environment, including the residents and community of Bulga. The Court found that these matters outweighed the substantial economic benefits and positive social impacts of the project on the region, and that the extension project should not go ahead. Existing mine operations at Warkworth mine are still authorised under the existing consent until 2021. However, as a result of the Land and Environment Court proceedings the extension project will not go ahead, and the biodiversity offset will not be mined. This decision was upheld in the NSW Court of Appeal in April 2014.

Rio Tinto has now submitted a new application for the Warkworth and Mt Thorley projects.

Overview of work requested

We request that you undertake the following work:

- (1) review the documents listed below and any noise recordings provided by BMPA.
- (2) conduct a site visit to identify the locations of noise impact and assess the current proposal.

- (3) prepare a written expert report that addresses the issues identified below ('Issues to address in your expert report'), and ensure that the work is prepared in accordance with Division 2 of Part 31 of the *Uniform Civil Procedure Rules 2005*.

The documents

Key documents relating to the Warkworth and Mt Thorley projects have been provided to assist you in preparing your expert report. The following documents are provided for your consideration:

Warkworth Continuation Project EIS – Main Report

Executive Summary available at:

<https://majorprojects.affinitylive.com/public/b3dd99643e51ebf5ddc55fe1f29a7d42/10.%20Warkworth%20Continuation%20Project%20EIS%20-%20Executive%20Summary.pdf>

Main Report Part 1 available at:

[https://majorprojects.affinitylive.com/public/7dce71e2246a7be8b66c71e6b2117057/11.%20Warkworth%20Continuation%20Project%20EIS%20-%20Main%20Report%20\(1\).pdf](https://majorprojects.affinitylive.com/public/7dce71e2246a7be8b66c71e6b2117057/11.%20Warkworth%20Continuation%20Project%20EIS%20-%20Main%20Report%20(1).pdf)

Main Report Part 2 available at:

[https://majorprojects.affinitylive.com/public/19a148777067a9ff9435c9693af02dae/12.%20Warkworth%20Continuation%20Project%20EIS%20-%20Main%20Report%20\(2\).pdf](https://majorprojects.affinitylive.com/public/19a148777067a9ff9435c9693af02dae/12.%20Warkworth%20Continuation%20Project%20EIS%20-%20Main%20Report%20(2).pdf)

Warkworth Continuation Project EIS – Appendix F Noise and Vibration

Available at:

<https://majorprojects.affinitylive.com/public/62bc6ddab89462e0ee4936b4d6722324/15.%20Warkworth%20Continuation%20Project%20EIS%20-%20Appendix%20F%20Noise%20&%20Vibration.pdf>

Mt Thorley Continuation Project EIS – Appendix O Traffic and Transport

Available at:

<https://majorprojects.affinitylive.com/public/963d75932264717391836fd4935c7636/24.%20Warkworth%20Continuation%20Project%20EIS%20-%20Appendix%20O%20Traffic%20&%20Transport.pdf>

Mt Thorley Continuation Project EIS – Main Report

Executive Summary available at:

<https://majorprojects.affinitylive.com/public/8d3af13f283010f8c30c87881f567b0a/10.%20Mt%20Thorley%20Continuation%20Project%20EIS%20-%20Executive%20summary.pdf>

Main Report available at:

<https://majorprojects.affinitylive.com/public/efd399568d7dc23ca0aeec1407e0c1c3/11.%20Mt%20Thorley%20Continuation%20Project%20EIS%20-%20Main%20Report.pdf>

Mt Thorley Continuation Project EIS – Appendix F Noise and Vibration

Available at:

<https://majorprojects.affinitylive.com/public/ed4ff58685aca8e2c62226bf255be95f/14.%20Mt%20Thorley%20Continuation%20Project%20EIS%20-%20Appendix%20F%20Noise%20&%20Vibration.pdf>

Mt Thorley Continuation Project EIS – Appendix L Traffic and Transport

Available at:

<https://majorprojects.affinitylive.com/public/5b037513665be12c85bf004300db51bc/20.%20Mt%20Thorley%20Continuation%20Project%20EIS%20-%20Appendix%20L%20Traffic%20&%20Transport.pdf>

Please let us know as soon as possible if you require further information for the purpose of giving your expert opinion.

The purpose of your expert report

Your expert report will be used as evidence in chief of your professional opinion. Information which you believe the PAC should be aware of must be contained in your expert report.

In providing your opinion to the PAC you must set out all the assumptions upon which the opinion is based. This may include, for example, facts observed as a result of field or lab work or 'assumed' facts based on a body of scientific opinion. If the latter, you should provide references which demonstrate the existence of that body of opinion.

Your expert report must also set out the process of reasoning which you have undertaken in order to arrive at your conclusions. It is insufficient for an expert report to simply state your opinion or conclusion reached without an explanation as to how this was arrived at. The purpose of providing such assumptions and reasoning is to enable the PAC and experts engaged by other parties to make an assessment as to the soundness of your opinion.

Issues to address in your expert report

We ask that your report address the following issues for both the Warkworth and Mount Thorley EAs and for any cumulative effort from the operation of both mines:

- (1) In your opinion, was the noise assessment undertaken adequate?
- (2) In your opinion and within your area of expertise what, if any, are the noise impacts that would arise from the project?
- (3) Provide any further observations or opinions which you consider to be relevant.

Format of expert report

Division 2 of Part 31 of the *Uniform Civil Procedure Rules 2005* establishes information that your report is required to contain. This includes:

- your qualifications,
- the facts, and assumptions of fact, on which the opinions in the report are based and your reasons for each opinion expressed,
- if a particular issue falls outside your area of expertise, clear acknowledgement that it falls outside your field of expertise,
- any literature or other materials utilised in support of the opinions,
- details of any examinations, tests or other investigations on which you have relied, including details of the qualifications of the person who carried them out,
- a brief summary of the report,
- if you believe that the report may be incomplete or inaccurate without some qualification, the qualification must be stated in the report,

- If you consider that your opinion is not a concluded opinion because of insufficient research or insufficient data or for any other reason, this must be stated when the opinion is expressed, and
- If you change your opinion on a material matter after providing an expert's report to us, you must provide us with a supplementary report to that effect.

Please format your report as follows:

- Address your report to the NSW Department of Planning and Environment,
- Sign and date your report,
- Include a summary of your qualifications and experience as an appendix to your report,
- Use 12 point type and at least 2cm page margins,
- Number each paragraph of your report, and
- Number all pages, including attachments and annexes, continuously from the first page to the last page (excluding any cover page to your report).

We also note that you may wish to use diagrams or other visual forms of representation in your report, where appropriate, to illustrate an issue or opinion.

Key dates

Submissions to the EAs are due on Wednesday 6 August 2014. To allow our client sufficient time to complete their own submission, we would appreciate receiving your advice by **Friday 1 August 2014**.

The date for the PAC meeting is yet to be determined. Please note that it is likely that we will only receive two weeks' notice from the PAC of the date of the PAC meeting.

Duty of confidentiality

Please treat your work as strictly confidential until your expert report is provided to the NSW Department of Planning and Environment, unless authorised by us.

Fees

Thank you for agreeing to provide expert advice in this matter at a capped rate of \$3,500 (plus GST).

We are grateful for your assistance in this matter.

Yours sincerely,
EDO NSW



Sue Higginson
Principal Solicitor



Megan Kessler
Scientific Director

Our Ref: 1420971

List of Documents Supplied and Read:

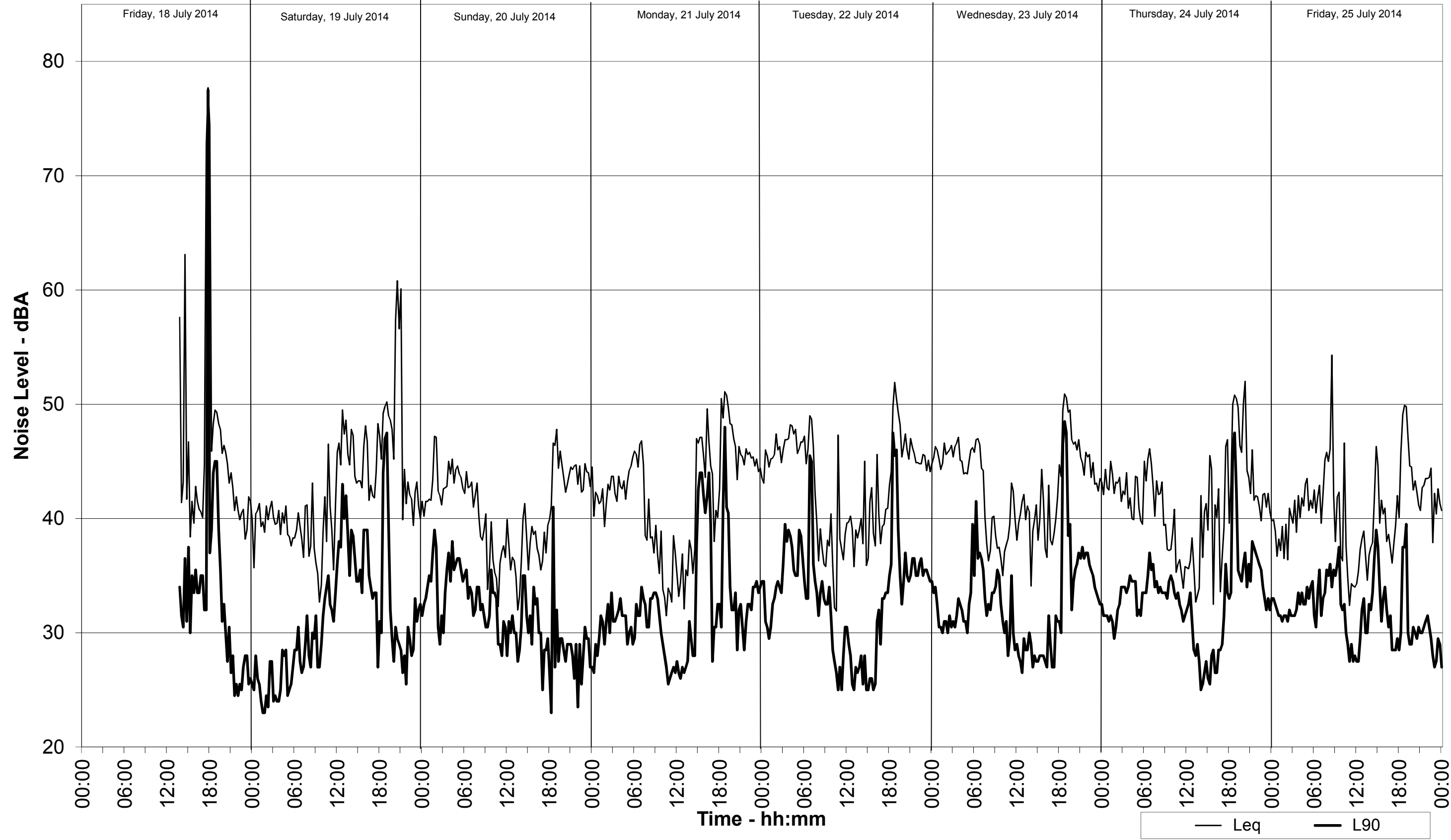
5475-1
Appendix C

1. Division 2, Part 31 of the *Uniform Civil Procedure Rules 2005*
2. Expert Witness Code of Conduct
3. Briefing Letter from EDO NSW to Stephen Gauld dated 17 July 2014
4. NSW Industrial Noise Policy – January 2000
5. Independent Noise Monitoring Report prepared by Sinclair Knight Merz for The Department of Planning and Infrastructure dated 2 April 2012
6. Independent Noise Monitoring Report – Monitoring Location 1 prepared by Sinclair Knight Merz for The Department of Planning and Infrastructure dated 30 April 2012
7. Independent Noise Monitoring Report – Monitoring Location 2 prepared by Sinclair Knight Merz for The Department of Planning and Infrastructure dated 30 April 2012
8. Independent Noise Monitoring Report – Monitoring Location 3 prepared by Sinclair Knight Merz for The Department of Planning and Infrastructure dated 30 April 2012
9. Independent Noise Monitoring Report – Monitoring Location 4 prepared by Sinclair Knight Merz for The Department of Planning and Infrastructure dated 30 April 2012
10. Independent Noise Monitoring Report – Monitoring Location 5 prepared by Sinclair Knight Merz for The Department of Planning and Infrastructure dated 26 March 2012
11. Independent Noise Monitoring Report – Monitoring Location 6 prepared by Sinclair Knight Merz for The Department of Planning and Infrastructure dated 30 April 2012
12. Independent Noise Monitoring Report – Monitoring Location 7 prepared by Sinclair Knight Merz for The Department of Planning and Infrastructure dated 30 April 2012
13. Independent Noise Monitoring Report – Monitoring Location 8 prepared by Sinclair Knight Merz for The Department of Planning and Infrastructure dated 30 April 2012
14. NSW Land and Environment Court Judgement – Bulga Milbrodale Progress Association Inc v Minister for Planning and Infrastructure and Warkworth Mining Limited, 10224 of 2012 dated 15 April 2013
15. *A Simple Criterion for Assessment of Low Frequency Noise Emission* by Dr Norm Broner, Acoustics Australia 2011 Vol 39 No 1.
16. NSW Court of Appeal Judgement – Warkworth Mining Limited v Bulga Milbrodale Progress Association Inc, dated 7 April 2014
17. Noise and Vibration Study prepared for Mt Thorley Operations Pty Ltd by EMGA Mitchell McLennan dated 2 June 2014
18. Noise and Vibration Study prepared for Warkworth Mining Ltd by EMGA Mitchell McLennan dated 12 June 2014



Ambient Noise Survey

Located at 98 Wollemi Peak Road, Bulga, NSW



AMBIENT NOISE – The ambient noise level at a particular location is the overall environmental noise level caused by all noise sources in the area, both near and far, including road traffic, factories, wind in the trees, birds, insects, animals, etc.

BACKGROUND NOISE LEVEL – Silence does not exist in the natural or the built-environment, only varying degrees of noise. The Background Noise Level is the average minimum dBA level of noise measured in the absence of the noise under investigation and any other short-term noises such as those caused by cicadas, lawnmowers, etc. It is quantified by the L_{A90} or the dBA noise level that is exceeded for 90 % of the measurement period (usually 15 minutes).

- **Assessment Background Level (ABL)** is the single figure background level representing each assessment period – day, evening and night (ie three assessment background levels are determined for each 24hr period of the monitoring period). Determination of the assessment background level is by calculating the tenth percentile (the lowest tenth percent value) of the background levels (L_{A90}) for each period (refer: NSW Industrial Noise Policy, 2000).
- **Rating Background Level (RBL)** as specified by the Environment Protection Authority is the overall single figure (L_{A90}) background noise level representing an assessment period (day, evening or night) over a monitoring period of (normally) three to seven days.

The RBL for an assessment period is the median of the daily lowest tenth percentile of L_{90} background noise levels.

If the measured background noise level is less than 30 dBA, then the Rating Background Level (RBL) is considered to be 30 dBA.

dBA – The human ear is less sensitive to low frequency sound than high frequency sound. We are most sensitive to high frequency sounds, such as a child's scream. Sound level meters have an inbuilt weighting network, termed the dBA scale, that approximates the human loudness response at quiet sound levels (roughly approximates the 40 phon equal loudness contour).

However, the dBA sound level provides a poor indication of loudness for sounds that are dominated by low frequency components (below 250 Hz).

dB C – The C-weighting adjustment takes into account the low-frequency component of noise within the audibility range of humans. If the difference between the "C" weighted and the "A" weighted sound level is 15 dB or more, then the NSW Industrial Noise Policy recommends a 5 dB penalty be applied to the measured dBA level.

EQUIVALENT CONTINUOUS NOISE LEVEL, L_{Aeq} – Many noises, such as road traffic or construction noise, vary continually in level over a period of time. More sophisticated sound level meters have an integrating electronic device inbuilt, which average the A weighted sound pressure levels over a period of time and then display the energy average or L_{Aeq} sound level. Because the decibel scale is a logarithmic ratio the higher noise levels have far more sound energy, and therefore the L_{Aeq} level tends to indicate an average which is strongly influenced by short term, high level noise events. Many studies show that human reaction to level-varying sounds tends to relate closely to the L_{Aeq} noise level.

FREQUENCY – The number of oscillations or cycles of a wave motion per unit time, the SI unit being the Hertz, or one cycle per second.



INTRUSIVE NOISE LEVEL, L_{Aeq} – The level of noise from a factory, place of entertainment, etc. in NSW is assessed on the basis of the average maximum noise level, or the L_{Aeq} (15 min). This is the energy average A weighted noise level measured over any 15 minute period.

MAXIMUM NOISE LEVEL, L_{Amax} – The rms maximum sound pressure level measured on the "A" scale of a sound level meter during a noise survey is the L_{Amax} noise level. It may be measured using either the Fast or Slow response time of the meter. This should be stated.

NOISE – Noise is unwanted sound. Sound is wave motion within matter, be it gaseous, liquid or solid. "Noise includes sound and vibration".

OFFENSIVE NOISE - (Reference: Dictionary of the Protection of the Environment Operations Act 1997). *"Offensive Noise means noise:*

- (a) that, by reason of its level, nature, character or quality, or the time at which it is made, or any other circumstances:*
 - (i) is harmful to (or likely to be harmful to) a person who is outside the premise from which it is emitted, or*
 - (ii) interferes unreasonably with (or is likely to interfere unreasonably with) the comfort or repose of a person who is outside the premises from which it is emitted, or*
- (b) that is of a level, nature, character or quality prescribed by the regulations or that is made at a time, or in other circumstances prescribed by the regulations."*

SOUND PRESSURE LEVEL, L_p – The level of sound measured on a sound level meter and expressed in decibels, dB, dBA, dBC, etc. $L_p = 20 \times \log (P/P_0) \dots \text{dB}$

where P is the rms sound pressure in Pascal and P_0 is a reference sound pressure of 20 μPa .
 L_p varies with distance from a noise source.

SOUND POWER LEVEL, L_w – The Sound Power Level of a noise source is an absolute that does not vary with distance or with a different acoustic environment.

$L_w = L_p + 10 \log A \dots \text{dB, re: } 1\text{pW,}$
 where A is the measurement noise-emission area in square metres in a free field.

STATISTICAL EXCEEDENCE SOUND LEVELS, L_{A90} , L_{A10} , L_{A1} , etc – Noise which varies in level over a specific period of time (usually 15 minutes) may be quantified in terms of various statistical descriptors:

The L_{A90} is the dBA level exceeded for 90 % of the time. In NSW the L_{A90} is measured over periods of 15 minutes, and is used to describe the average minimum or background noise level.

The L_{A10} is the dBA level that is exceeded for 10 % of the time. In NSW the L_{A10} measured over a period of 10 to 15 minutes. It was until recently used to describe the average maximum noise level, but has largely been replaced by the L_{Aeq} for describing level-varying noise.

The L_{A1} is the dBA level that is exceeded for 1 % of the time. In NSW the L_{A1} may be used for describing short-term noise levels such as could cause sleep arousal during the night.

