Appendix B

Noise and vibration study

Mount Pleasant Project Modification

Noise and Vibration Assessment

Prepared for Coal & Allied Operations Pty Limited | 27 September 2010

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Mount Pleasant Project Modification

Final

J10004 I Prepared for Coal & Allied Operations Pty Limited I 27 September 2010

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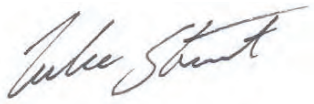
Signature		Signature	
Date	27 September 2010	Date	27 September 2010

Document Control

Version	Date	Prepared by
1	13 May 2010	Najah Ishac
2	26 May 2010	Najah Ishac
3	27 May 2010	Najah Ishac
4	4 August 2010	Najah Ishac
5	20 August 2010	Najah Ishac
6	30 August 2010	Najah Ishac
7	27 September 2010	Najah Ishac

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Executive summary

This noise and vibration study was prepared for Coal & Allied Operations Pty Limited (Coal & Allied) to assess environmental noise emissions resulting from its proposed modifications of the Mount Pleasant Project (the Project).

Mining studies and an environmental impact statement (EIS) were completed in 1997, with a development consent granted in 1999. The Mount Pleasant Project has approval to extract up to 10.5 million tonnes of run-of-mine (ROM) coal per year. It is located approximately four kilometres (km) north-west of Muswellbrook, in the Upper Hunter Valley of New South Wales (NSW).

Coal & Allied has reviewed the Mount Pleasant Project as part of its normal investment decision-making process to ascertain the design and cost of a project that may be constructed and deliver coal to Port by 2014. The design will be generally in accordance with the development consent but certain minor modifications have been identified as necessary for operational effectiveness; these are the subject of this modification. From a noise perspective, the key changes include provision of an optional conveyor/service corridor, to be located in an envelope, as an alternative to the approved rail line and rail loop and loader facilities, including load out conveyor and bin. The other change comprises possible adjustments to the specific location of coal processing infrastructure within an infrastructure envelope. This is to provide flexibility during the detailed design and construction in place of the specific locations detailed in the EIS.

The following noise and vibration impact assessment report adopts the Department of Environment, Climate Change and Water (DECCW) Industrial Noise Policy (INP) to establish project specific noise criteria for the entire project and to address impacts as a consequence of the proposed modifications. The focus of the assessment is therefore on residential locations potentially affected by these modifications. However, at the request of the Department of Planning and DECCW, the study also includes an INP assessment of the approved worst case mine plan, as identified in the EIS, on the broader surrounding community. The main difference in the assessment under the INP policy is the adoption of the Leq noise metric over the L_{10} level, and a more thorough and clear assessment approach for adverse weather conditions.

ES1 Existing environment

Residential properties are located in or around the town of Muswellbrook which lies to the east-south-east of the Mount Pleasant Project, South Muswellbrook and Muswellbrook Racecourse which lie to the south-east, and Kayuga which lies to the north-north-east. Residential properties are also spread along the eastern boundary of the Mount Pleasant Project area and more isolated residences are located further to the east, south-west and south.

Rating background levels (RBL) for the mine surrounds were derived from recent long term unattended noise monitoring, conducted quarterly as part of the site's ongoing baseline surveys, or from published noise assessments for neighbouring mines.

ES2 Impact assessment

ES2.1 Assessment locations

The INP based noise criteria have been derived for residential properties around the site, including the seven monitoring locations defined in the EIS prepared in 1997. A total of 156 privately owned residential assessment locations were identified.

ES2.2 Existing consent limits

The existing consent limits for the site are based on the EIS study, which apply now out dated noise criteria. The Department of Planning has requested an assessment in accordance with the DECCW INP.

ES2.3 Noise and vibration criteria

ES2.3.1 Operational noise criteria

The site has a current consent to mine that includes operational noise limits based on the guidelines that existed in 1997. However, these guidelines have since been superseded by the DECCW's INP in 2000. To bring the project up to current standards for noise assessment, the INP has been used for this assessment.

The DECCW's current sleep disturbance criterion was adopted for this assessment, which is that L_{max} noise from a source should not exceed the existing background noise level by more than 15 dB.

The blast noise and vibration criteria have not changed since the consent was issued. Hence, the consent criteria will apply to the current project. Given that the mining aspect of the current project is substantially the same as the approved operation, the EIS blast noise and vibration assessment remains valid.

ES2.3.2 Construction noise criteria

The aspect of the project to which construction noise criteria would apply is the construction of the optional conveyor/service corridor. All other construction aspects of the project were addressed in the EIS.

The DECCW's Interim Construction Noise Guideline (ICNG) (2009) provides the current and most relevant guidance for construction noise assessment, and was adopted for this assessment.

ES2.4 Assessment against operational noise criteria

ES2.4.1 Methodology

The prediction of noise from operations was undertaken using the Environmental Noise Model (ENM) prediction software. The ENM predicts total noise levels at residences from the concurrent operation of multiple noise sources. The mine plans used for modelling were those used and presented in the EIS for Years 3, 5 and 10, the years where noise impacts are expected to be highest.

The only changes to the modelling, compared to the EIS, is the introduction of the conveyor/service corridor option in lieu of the rail operation, and adjustment to the possible locations of infrastructure within an infrastructure area envelope. Both the conveyor/service corridor and the infrastructure plant were modelled at the western most extremities of their identified envelope areas. Initial assessment results for the conveyor showed that it would produce noise levels that were too high at affected residences if the noise was not mitigated. Accordingly, a cover and a shield on the western side of the conveyor are proposed at locations where the conveyor would be at ground level. Where the conveyor is elevated, it will be completely enclosed. Furthermore, provision for the procurement of the best available technology plant that will include suppression on all mobile equipment is included in this study. Together, these are considered to constitute adoption of all feasible and reasonable mitigation measures for the project.

ES2.4.2 Comparison with project specific noise criteria and property acquisition criteria

The assessment of the proposed modifications found that the conveyor, if constructed, will require a cover and consolidated solid western wall to meet noise criteria for most residences to the west of the Mount Pleasant Project area. With this measure in place, the modelling predicted that one residence would exceed DECCW's operational criteria during calm weather conditions for both day and night periods. For prevailing weather conditions, the modelling predicted that the proposed modifications would introduce impacts at assessment locations to the south-west not previously identified in the EIS. Three additional, or a total of four, residences have been identified where noise levels are predicted to be above acquisition levels that would typically be set by the Department of Planning.

The Mount Pleasant Project has been assessed in its entirety in accordance with the INP, including assessment for adverse weather conditions not previously assessed. Identified in the 1997 EIS and contained in the Schedule to Conditions 6.2.1 and 6.4.2 of the consent, are properties with predicted noise levels above possible acquisition criteria under 'calm' weather conditions. This assessment has found nine properties containing 12 residences are predicted to exceed acquisition criteria during 'adverse' weather conditions. These properties are in addition to those entitled to acquisition upon request listed in the Schedule to Conditions 6.2.1 and 6.4.2 of the development consent. These INP predictions are made on the same mine plan presented in the 1997 EIS, however with considerable additional reasonable and feasible mitigation measures, most notably sound suppression of mobile plant and equipment at a cost of some $15-20M.

Coal & Allied is committed to working with communities in which they operate and extends the opportunity for upfront acquisition upon request to the four properties identified from the assessment of the proposed conveyor/services corridor (i.e. from the proposed modification) and a further nine properties from the mine that are affected under adverse conditions.

ES2.4.3 Sleep disturbance assessment

The worst case scenario was assessed for sleep disturbance at residential locations where the loudest intermittent noise (125dB(A)L_{max} from a haul truck) occurred under prevailing weather conditions. The assessment indicates that predicted noise levels under prevailing weather conditions are within the DECCW's conservative sleep disturbance criterion at the majority of assessment locations shown. Exceedances are predicted for locations 43 to 45 and 135. These locations were also identified as above potential acquisition criteria.

ES2.4.4 Cumulative noise assessment

Ambient noise at assessment locations will also be influenced by adjoining industrial operations. There are two existing mining operations in the area that could contribute to noise at locations sensitive to the project's operations. These are Bengalla Mine to the immediate south and Mount Arthur Mine, south of Bengalla Mine.

The cumulative noise received at residences surrounding the Mount Pleasant Project area was projected for both calm and prevailing weather and for the worst case year of operation each for the Mount Pleasant project, Bengalla Mine and Mount Arthur Mines facilitating a conservative assessment. The results indicate that the project only dominates the noise environment at one assessment location during calm weather. However, during prevailing weather conditions, site noise dominates, or is a significant contributor, at four of the selected assessment locations. This is not unexpected given that these locations were selected on the expectation that they are potentially the most exposed to the project.

ES2.5 Assessment against construction noise criteria

The conveyor/service corridor, if pursued, will be the only construction activity not previously addressed in the EIS. The following statements assume that the conveyor/service corridor will be pursued in lieu of the rail facilities.

The construction hours for will be consistent with the requirements in the DECCW's ICNG of 7am to 6pm Monday to Friday, and 8am to 1pm on Saturdays, with no work on Sundays or public holidays. This will satisfy the main objective of the ICNG.

Based on the concurrent operation of the three or four items of construction equipment, a combined typical emission value of not more than 117dB(A) is predicted. Applying this typical sound power level for construction activity, the predicted construction noise levels were predicted for the closest and potentially the most exposed residences to the conveyor/service corridor as levels are above the 'noise affected' definition. To that end, the ICNG recommends application of all reasonable and feasible work practices and that the proponent should inform all potentially impacted residents of the nature of the work to be carried out, the expected noise levels and duration (unlikely to be not more than six months), as well as contact details.

The DECCW's ICNG suggests that if construction noise exceeds the background noise level by more than 10dB, residences may be considered as 'noise affected'. Predicted results indicate that residents will not be highly noise affected according to the definition in DECCW's ICNG, however, there may be some community reaction.

ES3 Management and monitoring

The Mount Pleasant Project's existing consent conditions include practical management measures and protocols that will continue to be adopted should the proposed modifications obtain approval. These conditions include Condition 6.4 (Noise Control) and Condition 11.1 (Area of Affectation- Land Acquisition including resolution of disputes). However, the now outdated L_{10} based noise criteria outlined in Condition 6.4 will be replaced by the INP derived Leq noise criteria. These criteria are referenced as Project Specific Noise Criteria and outlined in Table 6.3 of this report and will form part of the detailed noise monitoring programme for the Mount Pleasant Project.

The following items are believed to constitute relevant feasible and reasonable measures that will be adopted for this project and that have been included in noise modelling:

- plant will operate in less exposed areas during the more sensitive night period (consistent with the EIS);
- a cover and a shield on the western side of the conveyor at locations where the conveyor would be at ground level. Where the conveyor is elevated, it will be completely enclosed; procurement of new and best available technology plant;
- provision of noise suppression on all mobile plant. It anticipated that the noise suppression technology will require in outlay of capital expenditure of between $15M and $20M; and
- updating the comprehensive operational noise management plan to include real-time back to base noise monitoring using the best available technology.

i Proposed modifications

In addition to the feasible and reasonable mitigation measures, properties 43, 44, 45 and 263 will be provided with the opportunity of upfront acquisition rights.

ii Broader mine context

Although the mine plan and operations are not changing from those in the EIS, the proponent is committed to the procurement of best available technology plant and mobile equipment including noise suppression on all mobile plant. This is the single most effective management measure that will be adopted. In addition, nine properties containing 12 residences identified in this study to be affected above acquisition levels under 'adverse' weather conditions will be provided with the opportunity for upfront acquisition. This is in addition to those properties in the Schedule to Conditions 6.2.1 and 6.4.2 of the development consent identified as affected under 'calm' weather conditions in the 1997 EIS.

iii General and whole of operations

A detailed noise management plan (NMP) will include the appropriate management actions as required under the existing development consent.

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1 Introduction

This report was prepared for Coal & Allied Operations Pty Limited (Coal & Allied) to assess environmental noise emissions resulting from its proposed modifications of Mount Pleasant Project.

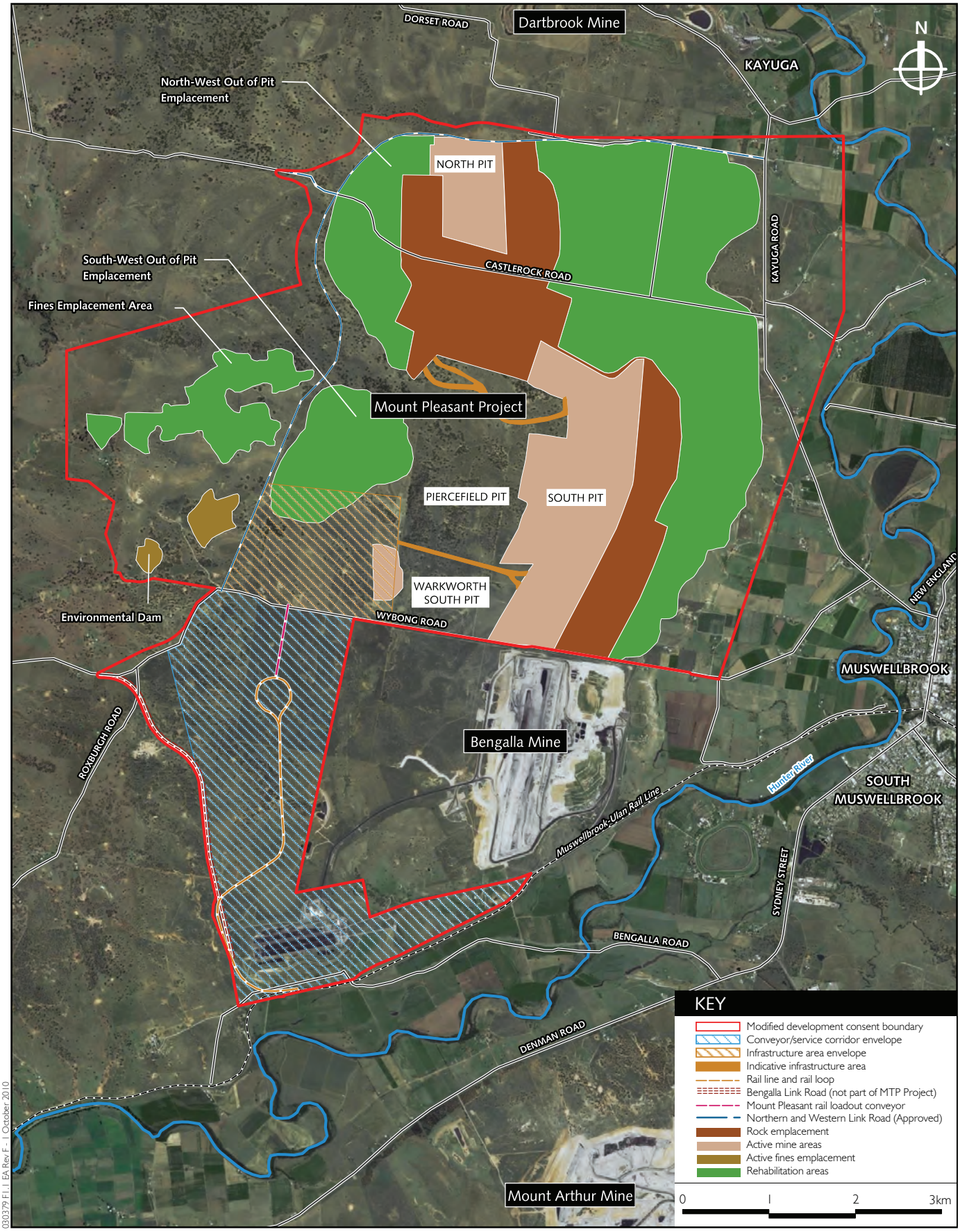
Coal & Allied obtained an Authorisation to Prospect in 1992 (Auth 459) for exploration of the Mount Pleasant resource. Mining studies and an environmental impact statement (EIS) were completed in 1997, with a development consent granted in 1999 under the *NSW Environmental Planning and Assessment Act 1979* (EP&A Act), referred to as Development Consent DA 92/97. The consent was for 21 years to 2020.

The Mount Pleasant Project has approval to extract up to 10.5 million tonnes of run-of-mine (ROM) coal per year. It is located approximately four kilometres (km) north-west of Muswellbrook, in the Upper Hunter Valley of New South Wales (NSW). Figure 1 shows the location of the Project with respect to the neighbouring areas of Muswellbrook and other approved mines in the vicinity.

Coal & Allied has reviewed the Mount Pleasant Project as part of its normal investment decision-making process to ascertain the design and cost of a project that may be constructed and deliver coal to Port by 2014. The design will be generally in accordance with the development consent but certain minor modifications have been identified as necessary for operational effectiveness; these are the subject of this modification. From a noise perspective, the key changes include provision of an optional conveyor/service corridor, to be located in an envelope, as an alternative to the approved rail line and rail loop and loader facilities, including load out conveyor and bin. The other change comprises possible adjustments to the specific location of coal processing infrastructure within an infrastructure envelope. This is to provide flexibility during the detailed design and construction in place of the specific locations detailed in the EIS.

The development consent includes operational noise limits based on guidelines that existed in 1997. However, these guidelines have since been superseded by the Department of Environment, Climate Change and Water (DECCW)'s Industrial Noise Policy (INP) in 2000. The main difference in the assessment under the INP policy is the adoption of the Leq noise metric over the L_{10} level, and a more thorough and clear assessment approach for adverse weather conditions.

The following noise and vibration study assesses the potential impacts from the conveyor/service corridor and possible infrastructure positioning changes within an infrastructure envelope. As requested by the Department of Planning (DoP) and DECCW, the potential noise impacts from the approved worst case Mount Pleasant Project mine plan (as presented in the EIS) on the broader surrounding community has been assessed in accordance with the INP, including assessment for adverse weather conditions to contemporary standards.



030379 FI.1 EA Rev F - 1 October 2010

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Overview of the Proposal

Mount Pleasant Project Modification - Noise and Vibration Assessment

FIGURE 1.1

2 Glossary

A number of technical terms are required for the discussion of noise and vibration. These are explained in Table 2.1.

Table 2.1 Glossary of terms

Term	Description
dB(A)	Noise is measured in units called decibels (dB). There are several scales for describing noise, the most common being the 'A-weighted' scale. This attempts to closely approximate the frequency response of the human ear.
DECCW	The NSW Department of Environment, Climate Change & Water.
ECRTN	Environmental Criteria for Road Traffic Noise policy (Published by the Environment Protection Authority (now DECCW) in 1999).
ENM	Environmental Noise Model – Noise prediction software developed by RTA Technology
INP	NSW Industrial Noise Policy (Published by the Environment Protection Authority (now DECCW) in 2000).
L_1	The noise level exceeded for 1 % of a measurement period.
L_{10}	A noise level which is exceeded 10 % of the time. It is approximately equivalent to the average of maximum noise levels.
L_{90}	Commonly referred to as the background noise, this is the level exceeded 90 %of the time.
L_{eq}	It is the energy average noise from a source, and is the equivalent continuous sound pressure level over a given period. The $L_{eq,15min}$ descriptor refers to an Leq noise level measured over a contiguous 15 minute period.
L_{max}	The maximum root mean squared sound pressure level received at the microphone during a measuring interval.
RBL	The Rating Background Level (RBL) is an overall single value background level representing each assessment period over the whole monitoring period. The RBL is used to determine the intrusiveness criteria for noise assessment purposes and is the median of the ABL's.
SI	SI ("Still Isothermal") refers to calm weather conditions (ie. The absence of any wind or temperature gradients).
Sound Power Level	This is a measure of the total power radiated by a source. The sound power of a source is a fundamental property of the source and is independent of the surrounding environment.
Temperature Inversion	A positive temperature gradient. A meteorological condition where atmospheric temperature increases with altitude.
($\sigma\theta$) sigma-theta	The standard deviation of horizontal wind fluctuation.

It is useful also to have some appreciation of the scale of decibels, the unit of noise measurement. The following gives some practical indication as to what an average person perceives about changes in noise levels:

- differences of less than approximately 2dB are imperceptible in general, ie, most people would find it difficult to discern which is the louder of two noise sources having levels within 2dB of each other; and
- a difference in noise levels of around 10dB appears as either doubling or halving of loudness.

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3 Properties around the mine and the existing environment

3.1 Modelled assessment locations

The potential noise from mining operations has been predicted for the potentially most exposed privately owned residential assessment locations around the proposed conveyor/service corridor. A second set of predictions are also presented for identified privately owned residences within the broader area, updating the assessment of the entire mine operation to current standards promulgated in the DECCW's INP.

A total of 156 assessment locations were identified and INP based criteria derived. At the time of the assessment, these noise sensitive residences were all privately owned properties. The property numbering presented is a new expanded numbering system capturing a broader range of privately owned residences and is different to the numbering system presented in the 1997 EIS. These properties are illustrated in Figures 3.1a to 3.1d and shown in Table 3.1, along with their corresponding 1997 EIS number where relevant for reference. The previous EIS assessment identified 170 properties and assessed noise at seven representative locations.

The locations of residences were identified by the Proponent using aerial photographical images and, where possible, verified in the field but limited to publicly accessible locations. The locations are regarded as a comprehensive list and those potentially most exposed to noise from the operations. However, it may be possible that some properties may be missed and others incorrectly identified as residences when they are not. This is inherent with the methods that are available for residence mapping.

Table 3.1 Residential assessment locations

Assessment location			MGA coordinates	
No.	**Name**	**EIS No. (1997)**	**Easting**	**Northing**
4	JIM ROD SCRIVEN	232	299200	6425203
5	MARTIN JOSEPH DRAKE	234	299163	6425532
6	MUSWELLBROOK RACE CLUB LIMITED	250	298604	6426145
7	BERYL DOROTHEA ENGLEBRECHT, JEFFREY NOEL ENGLEBRECHT	235	298473	6426131
19	DOUGLAS PETER ENGLEBRECHT	249	299123	6426787
20	KENNETH BRIAN BARNETT, JOSEPHINE ANNE BARNETT	248	298869	6426833
21	MARK JAMES MCGOLDRICK	247	298806	6426827
23	JABETIN PTY. LIMITED	229	299050	6427372
35	CHRISTOPHER HORNE	74	299982	6428585
43	JONATHON BUCHANAN MOORE	97	292290	6429006
44	JONATHAN BUCHANAN MOORE	Not Listed	291404	6428662
45	BRADLEY ATHOL STRACHAN, TRACEY ELIZABETH STRACHAN	Not Listed	291261	6428282
47	BRUCE LEONARD BATES, MARY LLEWELLYN BATES	96	291279	6429623
67	JUDITH MARY SIMPSON	170	299896	6429209
68	RAYMOND KEITH GOOGE, NOELENE VALETTA GOOGE	72	299977	6429064
74	NIKOLA SORMAZ, MARIA SORMAZ	177	300002	6429277
77	LAWRENCE JAMES PURSER, DOREEN MILLICENT PURSER	Not Listed	300330	6429503
78	WARREN JOHN ADNUM	Not Listed	300623	6429412
79	WARREN JOHN ADNUM, DARREN WARREN ADNUM	Not Listed	300569	6429455
80	WARREN JOHN ADNUM	Not Listed	300555	6429474
82	CHRISTINE KAREN BIRCH	Not Listed	301017	6429175

Table 3.1 Residential assessment locations

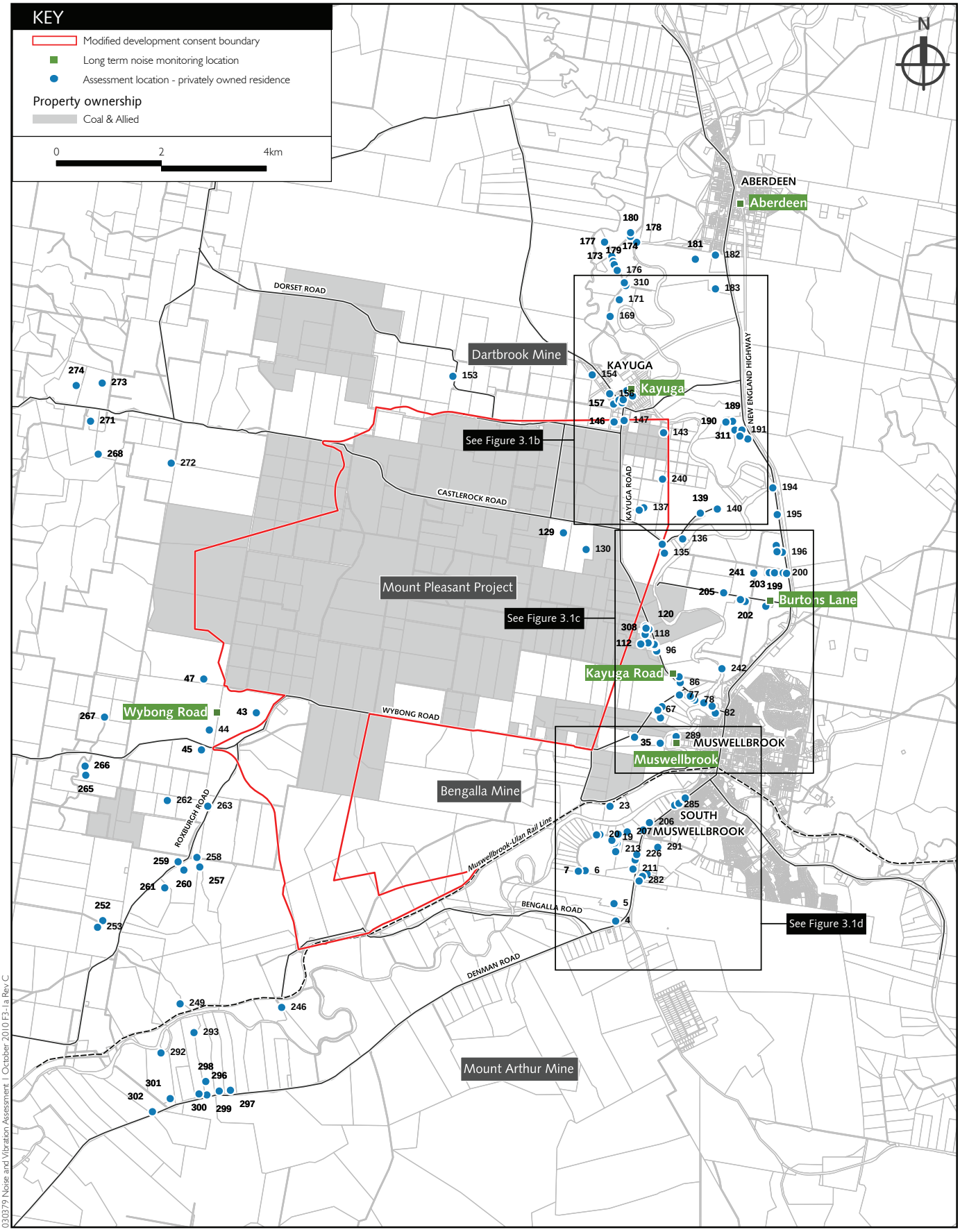
Assessment location			MGA coordinates	
No.	**Name**	**EIS No. (1997)**	**Easting**	**Northing**
83	LEONARD GEORGE KELMAN, CAROL MAY KELMAN	Not Listed	300955	6429303
84	WALTER JOHN PITMAN	Not Listed	300795	6429366
86	COWTIME INVESTMENTS PTY LIMITED	71	300339	6429740
96	RICHARD PAUL GRAY	157	299879	6430328
101	CYRIL AUSTIN	155	299842	6430422
102	ALAN J. P. S. MATHER	154	299831	6430450
107	BRENDAN LINDSAY WILTON	149	299731	6430479
108	JOHN STEPHEN GIBSON	148	299714	6430479
112	BRENDAN DOUGLAS BARRY	143	299574	6430454
118	JOHN & CHRISTINE HAYES	133	299653	6430636
120	DOUGLAS LLOYD MOORE, PAMELA ANN MOORE	131	299722	6430738
121	CARL MOORE, JENNIFER MAY MOORE	130	299654	6430790
129	RODNEY MICHAEL FARRELL, SYLVIA DIANNE FARRELL	47	298062	6432531
130	MICHAEL JOHN FARRELL	48	298498	6432223
135	KEITH JOSEPH YORE, GEORGINA MASKERY YORE	50	299990	6432183
136	DAVID GEORGE YORE	122	300332	6432458
137	DOUGAL HAMISH HAMILTON MACINTYRE	29	299580	6433036
138	DOUGAL HAMISH HAMILTON MACINTYRE	29	299494	6432987
139	RODNEY WILLIAM UPTON, LOLA PATRICIA UPTON	123	300658	6432953
140	DAPKOS PTY. LIMITED	51	300980	6433039
143	JAMES STEPHEN LONERGAN, NELLIE MARIA LONERGAN	275	299928	6434462
146	COLIN RODNEY HOATH, NERIDA JOAN HOATH	198	298983	6434647
147	MAXWELL JOHN ADNUM, ROBERT GEORGE ADNUM	199	299175	6434679
153	GAVIN MICHAEL CASEY	16	295901	6435451
154	PETER DAVID STANDING, FLORA STANDING	193	298550	6435532
156	JOHN EDWARD LONERGAN, JOHANNA LAMBERTINA LONERGAN	180	298890	6435181
157	REGINALD BRUCE PARKINSON, SHIRLEY ANN PEBERDY	183	298969	6434987
158	JULIEANN MAREE HOATH	187	299069	6435064
159	JOHN ERLE DUCEY, MAYSIE SARAH DUCEY	214	299129	6435015
161	JAMES S. & NELLIE M. LONERGAN	207	299214	6435247
169	CHARLES STANLEY WATTUS	265	298868	6436646
171	CHARLES STANLEY WATTUS	265	299038	6436964
172	RAYMOND LINDSAY THOMPSON, CHERYL ELIZABETH THOMPSON	258	299155	6437236
173	SCOTT ANTONY WALKLATE, LEANNE NICOLE WALKLATE	262	298879	6437783
174	TYRONE JAMES POWER, MARY LILLIAN POWER	262	298904	6437690
175	TYRONE JAMES POWER, MARY LILLIAN POWER	262	298926	6437626
176	RONALD JAMES PAGE, MERRILYN RUTH PAGE	263	298987	6437518
177	FRANK WILLIAM WHEATLEY, HELEN MARY WHEATLEY, SCOTT ANDREW WHEATLEY	261	298735	6438051
178	PAMELA ANN NEELY	259	299346	6438058
179	FRANK WILLIAM WHEATLEY	260	299226	6438168
180	F. A. WHEATLEY & SON PTY LIMITED	260	299226	6438240
181	K.L. & H.R. DAY PTY. LIMITED	257	300468	6437761
182	JOHN GREGORY SADLER, AVERIL JOSEPHINE SADLER	257	300849	6437846
183	K.L. & H.R. DAY PTY. LIMITED	257	300863	6437207
189	THOMAS JAMES O'BRIEN, OLIVE BEVERLEY O'BRIEN	272	301237	6434704
190	THOMAS JAMES O'BRIEN, OLIVE BEVERLEY O'BRIEN	272	301111	6434688
191	JOHN ANDREW FIBBINS, JULIE ELIZABETH FIBBINS	Not Listed	301417	6434542
192	IAN GEORGE INGLE, CATHRYN WENDY INGLE	Not Listed	301286	6434539
193	GEOFFREY MACDONALD SMITH, KATHLEEN LYNETTE SMITH	273	301533	6434376

Table 3.1 Residential assessment locations

Assessment location			MGA coordinates	
No.	**Name**	**EIS No. (1997)**	**Easting**	**Northing**
194	TYRONE CHARLES HARRIS, JANINE BEVERLEY ANNE HARRIS	Not Listed	302027	6433461
195	THOMAS YOUNG, ROBIN KIRKLAND YOUNG	Not Listed	302121	6432956
196	THOMAS YOUNG, ROBIN KIRKLAND YOUNG	Not Listed	302233	6432245
197	THOMAS YOUNG, ROBIN KIRKLAND YOUNG	Not Listed	302113	6432371
198	THOMAS JOSEPH GOLDRICK, NORA PATRICIA GOLDRICK	Not Listed	301993	6431851
199	NORMAN ALLEN BURLING, HELEN MARY BURLING	Not Listed	302093	6431851
200	ROBERT EASTON, CHRISTINA ROSEMARY EASTON	Not Listed	302255	6431854
201	NEVILLE BRUCE COLLINS, ROBERT PATRICK COLLINS	Not Listed	302321	6431845
202	ROBERT NEIL RAPHAEL, MARGARET HASLETT RAPHAEL	55	301545	6431298
203	ROBERT FREDERICK MILLARD, MARGO ANNE MILLARD	55	301453	6431332
204	ROBERT NEIL RAPHAEL, MARGARET HASLETT RAPHAEL	Not Listed	301938	6431215
205	DAPKOS PTY LIMITED	54	301132	6431455
206	WALTER JAMES HARDES	Not Listed	299805	6427078
207	SCOTT WILLIAM BARKLEY, KERRY LYN BARKLEY	Not Listed	299388	6426895
208	FRANCIS KELVIN ALMOND, WALTER DAVID GEORGE ALMOND, PETER WILLIAM HUME	Not Listed	299175	6426789
211	JUSTIN PETER DRAKE	Not Listed	299511	6426193
212	DANIEL RUDOLPH TUBB, CAROLINE JOY TUBB	Not Listed	299549	6426367
213	ENGLEBRECHT RACING STABLES PTY. LIMITED	Not Listed	299180	6426554
214	ROSS STANLEY CRIDLAND, JOSEPHINE TERESA CRIDLAND	Not Listed	299186	6426577
215	AMANDA CAROL GOOD	Not Listed	299187	6426610
216	NARELLE JOY KEEVERS	Not Listed	299192	6426637
217	SCOTT MATTHEW BREDDEN	Not Listed	299196	6426666
218	SUSAN YVONNE JOHNSON	Not Listed	299139	6426581
219	GAVIN LESLEY ANDREWS, IAN LESLEY ANDREWS	Not Listed	299140	6426603
220	REBECCA ANN BYRNES, MICHAEL ADAM MOLLER	Not Listed	299147	6426639
221	TREVOR DOUGLAS BARRON	Not Listed	299152	6426677
222	MARK LESLIE SWEENEY, ELIZABETH ANN SWEENEY	Not Listed	299154	6426714
223	MICHAEL CRAIG DOBIE, LESA JOAN DOBIE	Not Listed	299127	6426717
224	JOHN ROBINSON, DOROTHY LYNETTE ROBINSON	Not Listed	299099	6426728
225	JASON ROGER GLEESON, MELANIE RUTH CRANFIELD	Not Listed	299210	6426700
226	JASON ROGER GLEESON, MELANIE RUTH CRANFIELD	Not Listed	299577	6426470
229	CHRISTOPHER HORNE	74	299491	6428687
231	DOUGLAS LAURENCE WICKS, FREDA ROSE WICKS	Not Listed	300535	6429486
236	JOHN ERLE DUCEY, MAYSIE SARAH DUCEY	214	299149	6435073
237	JAMES S. & NELLIE M. LONERGAN	207	299326	6435147
240	DOUGAL HAMISH HAMILTON MACINTYRE	29	299927	6433584
241	COWTIME INVESTMENTS PTY LIMITED	Not Listed	301696	6431837
242	ROBERT NEIL RAPHAEL, MARGARET HASLETT RAPHAEL	Not Listed	301126	6430019
246	MICHAEL THEODOR CHUDYK	103	292887	6423440
249	TREVOR WAYNE ROOTS	Not Listed	290956	6423468
252	RAYMOND MORRIS MERRICK, KATHLEEN FRANCIS MERRICK	Not Listed	289453	6425012
253	RAYMOND MORRIS MERRICK, KATHLEEN FRANCIS MERRICK	Not Listed	289356	6424885
257	PETER GERARD LANE, CATHERINE MARY LANE	269	291276	6426065
258	NEVILLE JOHN ELLIS, RUTH YVONNE ELLIS	Not Listed	291218	6426245
259	MARK ROBERT PEEL	Not Listed	290862	6426156
260	PETER STUART JOHN MURRAY	Not Listed	290976	6425999
261	PETER RAYMOND ELLIS	Not Listed	290620	6425657
262	REGINALD BRUCE PARKINSON, SHIRLEY ANN PARKINSON	Not Listed	290634	6427309
263	RAYMOND ROBERT HAMILTON, JANICE MARY HAMILTON	Not Listed	291404	6427218
265	REGINALD BRUCE & SHIRLEY ANN PARKINSON	Not Listed	289073	6427757

Table 3.1 Residential assessment locations

Assessment location			MGA coordinates	
No.	**Name**	**EIS No. (1997)**	**Easting**	**Northing**
266	REGINALD BRUCE & SHIRLEY ANN PARKINSON	Not Listed	289056	6427928
267	JOHN EDWARD LONERGAN, JOHANNA LAMBERTINA LONERGAN	Not Listed	289407	6428864
268	JOHN DOUGLAS VANDENBERGH	Not Listed	289182	6433840
271	DONALD SCOTT MACDOUGALL, DIANNE ELIZABETH KILGANNON	Not Listed	289024	6434460
272	GRAEME CARL SPARRE	277	290574	6433697
273	IAN JAMES RICHARDS, CHRISTINE MAREE RICHARDS	Not Listed	289230	6435187
274	SEAN LEECE, ELIZABETH LESLEY LEECE	Not Listed	288737	6435130
279	REGINALD BRUCE PARKINSON	171	299922	6429209
280	MONADELPHOUS PROPERTIES PTY LTD	Not Listed	299782	6426105
281	JOHN RICHARD BUCKLEY, JUDITH ANN BUCKLEY	Not Listed	299694	6426057
282	DULCIE JOAN HALLETT, KIM LEE CAMPBELL, JOHN CAMPBELL, SUE ELLEN HALLETT, JAMES EWEN ANDERSON, TREVLYN PETER HALLETT, MELISSA VIVIAN HALLETT	Not Listed	299631	6425971
283	STANLEY RICHARD PHILLIP RAY, RUTH FRANCES RAY	Not Listed	299634	6425997
284	WALTER JAMES HARDES	Not Listed	299691	6426935
285	THE NEW SOUTH WALES GREYHOUND BREEDERS OWNERS & TRAINERS ASSOCIATION LIMITED	Not Listed	300279	6427417
286	THE COUNCIL OF THE MUNICIPALITY OF MUSWELLBROOK	Not Listed	300361	6427455
287	TELSTRA CORPORATION LIMITED	Not Listed	300461	6427543
288	KELVIN IRWIN	Not Listed	300478	6427557
289	ROBERT ALAN LAWMAN, ELIZABETH ANNE LAWMAN	Not Listed	300282	6428716
290	COWTIME INVESTMENTS PTY LIMITED	71	300316	6429848
291	THE COUNCIL OF THE MUNICIPALITY OF MUSWELLBROOK	Not Listed	299974	6426612
292	GEOFFREY ROGER WALSH, MELISSA KAY WALSH	Not Listed	290613	6422532
293	MALCOLM GARRY LATHAM, LYNETTE JEAN LATHAM	Not Listed	291230	6422929
296	JANIS MAUREEN WILD	Not Listed	291733	6421834
297	JULIAN ZAHRA, ELIZABETH ZAHRA	Not Listed	291946	6421853
298	MALCOLM GARRY LATHAM, LYNETTE JEAN LATHAM	Not Listed	291473	6422011
299	JAMES THOMAS LAMBKIN	Not Listed	291501	6421757
300	MALCOLM GARRY LATHAM, LYNETTE JEAN LATHAM	Not Listed	291351	6421772
301	GEOFFREY ROGER WALSH, MELISSA KAY WALSH	Not Listed	290806	6421673
302	MALCOLM JAMES DUNCAN, MARILYN JOY DUNCAN	Not Listed	290472	6421418
305	RITA HELEN ENGLEBRECHT	Not Listed	299175	6426515
308	DOUGLAS LLOYD MOORE, PAMELA ANN MOORE	131	299668	6430755
309	KEITH JOSEPH YORE, GEORGINA MASKERY YORE	50	299945	6432351
310	RAYMOND LINDSAY THOMPSON, CHERYL ELIZABETH THOMPSON	258	299126	6437288
311	GEOFFREY MACDONALD SMITH, KATHLEEN LYNETTE SMITH	273	301382	6434428
312	THOMAS YOUNG, ROBIN KIRKLAND YOUNG	Not Listed	302130	6432254
315	FRANCIS KELVIN ALMOND, WALTER DAVID GEORGE ALMOND, PETER WILLIAM HUME	Not Listed	299215	6426847



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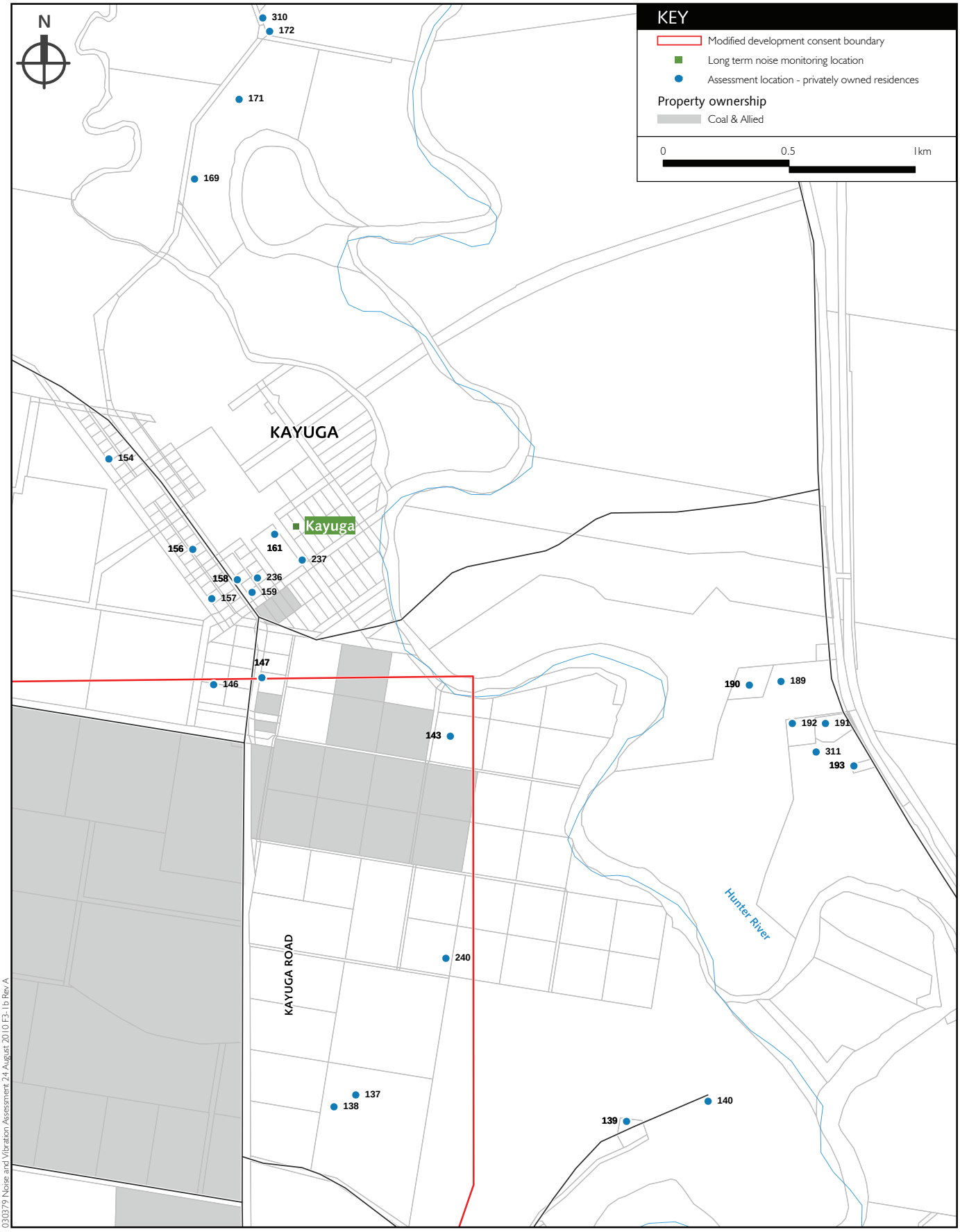
Assessment Locations and Long Term Monitoring Locations

Mount Pleasant Project Modification - Noise and Vibration Assessment

FIGURE 3.1a



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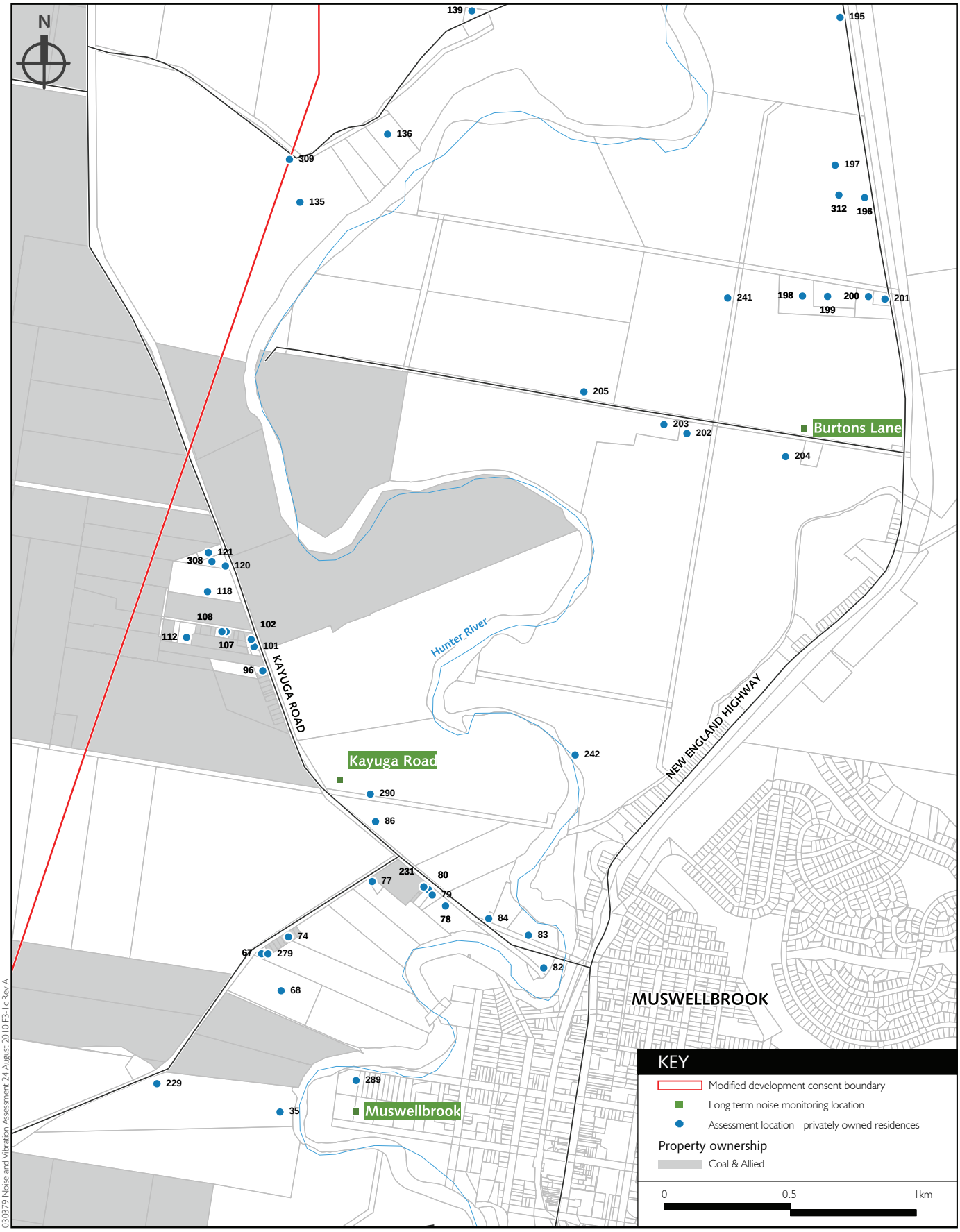
Assessment Locations and Long Term Monitoring Locations - Kayuga

Mount Pleasant Project Modification - Noise and Vibration Assessment

FIGURE 3.1b



0303791 Noise and Vibration Assessment 24 August 2010 F3_1c Rev A

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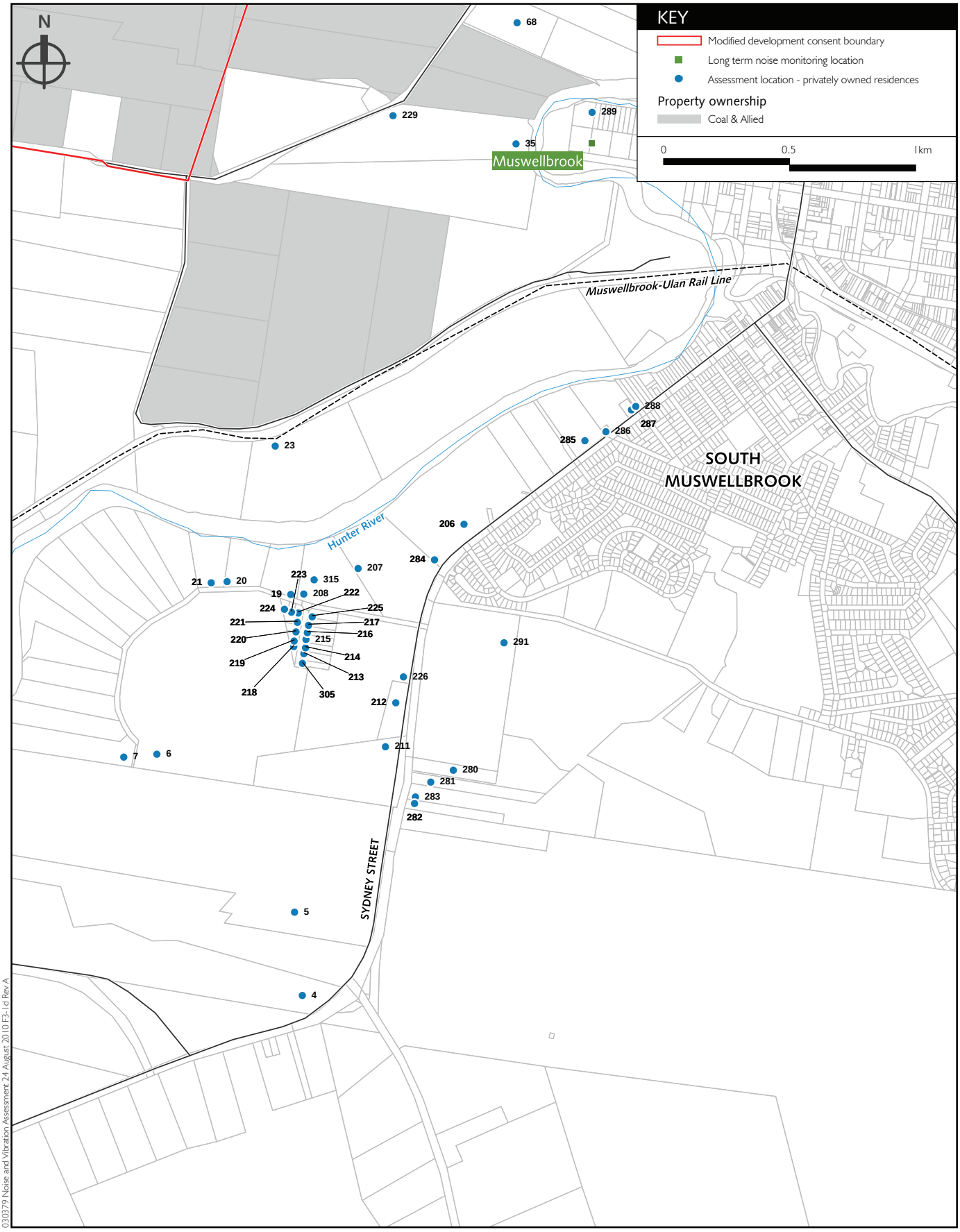
Assessment Locations and Long Term Monitoring Locations - Muswellbrook

Mount Pleasant Project Modification - Noise and Vibration Assessment

FIGURE 3.1c



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Receiver Locations and Long Term Monitoring Locations - South Muswellbrook

Mount Pleasant Project Modification - Noise and Vibration Assessment

FIGURE 3.1d

3.2 Existing environment

The Mount Pleasant Project's neighbours include the town of Muswellbrook to the east-south-east with its commercial hub and surrounding suburbs. Further south east is South Muswellbrook, which is predominately a residential area. Also to the south east is Muswellbrook Racecourse, which includes residential neighbours. To the north-north-east is the town of Kayuga, and otherwise the site has residential properties spread along its eastern boundary and more isolated residences further afar to the east, south west and south. Refer to Figures 3.1a to 3.1.d.

The EIS prepared in 1997 included long term noise monitoring data at seven representative residential locations. Section 12.1 of the EIS describes the surrounding environment and details the baseline noise survey undertaken at that time. From such data, representative background noise levels were determined for the EIS, similar to how this is now done under the DECCW's INP.

However, for this assessment more recent long term unattended noise monitoring was adopted. This includes monitoring undertaken quarterly as part of the Mount Pleasant Project's ongoing baseline surveys. The most recent long term monitoring data part of these surveys was undertaken in 2009 at several representative residential locations (refer to Figure 3.1a). Another supportive source of suitable background noise monitoring data is found in the Mount Arthur Coal (MAC) Environmental Assessment Noise and Vibration Report (MAC 2009). These sources of data were used and rating background levels (RBL) were determined for this project in accordance with the INP. The RBL values are summarised in Table 3.2 and the approach documented in Appendix A. The RBL values adopted are comparable to the EIS data, granted the differences in the way the INP now requires representative background noise to be determined.

Table 3.2 Representative background noise levels (RBL)

Location		Measured RBL, dB(A)[1]			Source
Name	**Relative to Site**	**Day**	**Evening[2]**	**Night**	
Burtons Lane	Far East (North of Muswellbrook), near the New England Highway	32	37	32	2009 Coal & Allied quarterly data
Aberdeen	North East	32	34	31	2010 Coal & Allied quarterly data
Kayuga	North North East	30	30	30	2010 Coal & Allied quarterly data
Kayuga Road	Near East	35	38	32	2009 Coal & Allied quarterly data
Wybong Road	South West - Conveyor area	30	30	30	2009 Coal & Allied quarterly data
Muswellbrook	South East	36	40	34	2009 Coal & Allied quarterly data
Racecourse Road	South East	38	37	36	Mount Arthur Coal 2009 EA data[3]
Yammanie	South East (SE of Racecourse)	34	33	32	Mount Arthur Coal 2009 EA data[3]
East Antiene, New England Hwy	SE (Applies to residences near New England Hwy east of site)	36	35	34	Mount Arthur Coal 2009 EA data[3]

Notes: *1. Where RBL values below 30dB(A) was measured, the INP's minimum recommended background of 30dB(A) is adopted.*

2. As per the INP application notes, where RBL values for the evening are unjustifiably higher than that for the day, the daytime or night time RBL will be adopted for the assessment.

3. Mount Arthur Coal – Consolidated Project Noise and Blasting Impact Assessment (Wilkinson Murray 2009). The raw data was not verified, although the methodology presented in the EA is considered appropriate.

3.3 Existing consent limits

The Mount Pleasant Project's existing consent limits are based on the EIS, which apply now dated noise metrics ($L_{10,15minute}$). The criteria are summarised in Table 3.3 for non-adverse and adverse conditions. The key difference between the L_{10} metric and the INP's L_{eq} metric (refer to Section 4) is that the former is the average of the maximum noise levels, and is typically higher than the L_{eq} for the same noise source. It is important to note that the impacts for locations potentially affected by the conveyor and infrastructure modifications will be similarly protected under both the previous L_{10} based consent limits and the INP's L_{eq} criteria. This is due to two reasons:

- representative background noise level adopted for potentially affected locations is the minimum possible at 30dB(A), resulting in a limit of 35dB(A)$L_{10,15minute}$ or 35dB(A) $L_{eq,15minute}$; and
- character of both the conveyor/service corridor and infrastructure plant noise is relatively constant, which implies that the L_{10} and L_{eq} emission values from such plant is typically the same.

Table 3.3 Existing consent noise acquisition limits- $L_{10,15minute}$

Location of residence	Time	Non-Adverse	Adverse
Muswellbrook Urban Area	Day (0700-2200)	40	45
	Night (2200-0700)	37	42
Other Areas	Day (0700-2200)	40	45
	Night (2200-0700)	35	40

Source: DA 92/97 Condition 6.4.3.

Under the existing consent, those properties affected above 'acquisition levels' during calm weather conditions outlined in the 1997 EIS are entitled to acquisition upon request and will continue to be protected under this acquisition entitlement. The Mount Pleasant development consent provides for a hierarchy of monitoring, mitigation then acquisition measures during operations for those affected during 'adverse' weather conditions. Only those affected above acquisition levels during 'calm' weather conditions are entitled to seek upfront acquisition upon request.

In recent years conditions of development consents/project approvals developed by the DoP now typically entitle residents affected above acquisition criteria during 'adverse' weather conditions to upfront acquisition upon request. As discussed above, an assessment in accordance with the DECCW INP was undertaken on the proposed modifications, namely the optional conveyor and change to infrastructure area. In addition, an INP assessment was undertaken for the entire project approved under the development consent to enable noise monitoring and management of the mine in accordance with contemporary standards.

4 Noise and vibration criteria

4.1 Operational noise

Industrial sites including mines in NSW that are regulated by the DoP or DECCW usually have a set of conditions for operations which include noise limits. These limits are normally derived from operational noise criteria that apply at residences and that are based on guidelines stipulated in the INP or are achievable noise limits following the application of all reasonable and feasible noise mitigation.

The current development consent includes operational noise limits based on the guidelines that existed in 1997. However, these guidelines have since been superseded by the INP in 2000. The INP has been used for this assessment.

The DECCW, in its INP, provides guidelines for assessing industrial facilities, including mines. The INP states with respect to the criteria:

"*They are not mandatory, and an application for a noise producing development is not determined purely on the basis of compliance or otherwise with the noise criteria. Numerous other factors need to be taken into account in the determination. These factors include economic consequences, other environmental effects and the social worth of the development.*"

Assessment criteria depend on the existing amenity of areas potentially affected by a proposed development. Assessment criteria for sensitive receivers near industry are based on the following objectives:

- protection of the community from excessive intrusive noise; and
- preservation of amenity for specific land uses.

In order to ensure that these objectives are met, two separate criteria are prescribed by the DECCW, namely the intrusiveness criteria and the amenity criteria. A fundamental difference between the intrusiveness and the amenity criteria is that the former is applicable over 15 minutes in any period, while the latter covers the entire assessment period (day, evening and night).

4.1.1 Intrusiveness

The intrusiveness criterion requires that $L_{Aeq,15min}$ noise levels from a newly introduced source during the day, evening and night do not exceed the existing RBL by more than 5dB. This is expressed as:

$$L_{Aeq,15min} \leq RBL + 5 - K$$

where $L_{Aeq,15min}$ is the L_{eq} noise level from the source (i.e. site), measured over a 15 minute period and K is a series of adjustments for various noise characteristics. Where the RBL is less than 30dB(A), a value of 30 dB(A) is used.

Based on the monitoring data obtained from the long term surveys described in Section 3.2, the intrusiveness criteria derived for the site are shown in Table 4.1.

Table 4.1 DECCW's INP intrusiveness criteria

Assessment location		$L_{eq,15minute}$ intrusiveness noise criteria, dB(A)			Basis of criteria
No.	EIS No.	Day	Evening	Night	
4	232	39	37	37	MAC EIA Noise Tech Report Section 5.7 (Yammannie data).
5	234	39	37	37	MAC EIA Noise Tech Report Section 5.7 (Yammannie data).
6	250	41	39	39	Muswellbrook data
7	235	41	39	39	Muswellbrook data
19	249	41	39	39	Muswellbrook data
20	248	41	39	39	Muswellbrook data
21	247	41	39	39	Muswellbrook data
23	229	41	39	39	Muswellbrook data
35	74	41	39	39	Muswellbrook data
43	97	35	35	35	Wybong Road data
44	Not Listed	35	35	35	Wybong Road data
45	Not Listed	35	35	35	Wybong Road data
47	96	35	35	35	Wybong Road data
67	170	40	37	37	Kayuga Road data
68	72	40	37	37	Kayuga Road data
74	177	40	37	37	Kayuga Road data
77	Not Listed	40	37	37	Kayuga Road data
78	Not Listed	40	37	37	Kayuga Road data
79	Not Listed	40	37	37	Kayuga Road data
80	Not Listed	40	37	37	Kayuga Road data
82	Not Listed	41	39	39	Muswellbrook data
83	Not Listed	41	39	39	Muswellbrook data
84	Not Listed	41	39	39	Muswellbrook data
86	71	40	37	37	Kayuga Road data
96	157	40	37	37	Kayuga Road data
101	155	40	37	37	Kayuga Road data

Table 4.1 DECCW's INP intrusiveness criteria

Assessment location		$L_{eq,15minute}$ intrusiveness noise criteria, dB(A)			Basis of criteria
No.	EIS No.	Day	Evening	Night	
102	154	40	37	37	Kayuga Road data
107	149	40	37	37	Kayuga Road data
108	148	40	37	37	Kayuga Road data
112	143	40	37	37	Kayuga Road data
118	133	40	37	37	Kayuga Road data
120	131	40	37	37	Kayuga Road data
121	130	40	37	37	Kayuga Road data
129	47	35	35	35	Minimum adopted
130	48	35	35	35	Minimum adopted
135	50	35	35	35	Minimum adopted
136	122	35	35	35	Minimum adopted
137	29	35	35	35	Minimum adopted
138	29	35	35	35	Minimum adopted
139	123	35	35	35	Minimum adopted
140	51	35	35	35	Minimum adopted
143	275	35	35	35	Minimum adopted
146	198	35	35	35	Kayuga Village 2010 Data
147	199	35	35	35	Kayuga Village 2010 Data
153	16	35	35	35	Minimum adopted
154	193	35	35	35	Kayuga Village 2010 Data
156	180	35	35	35	Kayuga Village 2010 Data
157	183	35	35	35	Kayuga Village 2010 Data
158	187	35	35	35	Kayuga Village 2010 Data
159	214	35	35	35	Kayuga Village 2010 Data
161	207	35	35	35	Kayuga Village 2010 Data
169	265	35	35	35	Minimum adopted
171	265	35	35	35	Minimum adopted
172	258	35	35	35	Minimum adopted
173	262	35	35	35	Minimum adopted

Table 4.1 DECCW's INP intrusiveness criteria

Assessment location		$L_{eq,15minute}$ intrusiveness noise criteria, dB(A)			Basis of criteria
No.	EIS No.	Day	Evening	Night	
174	262	35	35	35	Minimum adopted
175	262	35	35	35	Minimum adopted
176	263	35	35	35	Minimum adopted
177	261	35	35	35	Minimum adopted
178	259	35	35	35	Minimum adopted
179	260	35	35	35	Minimum adopted
180	260	35	35	35	Minimum adopted
181	257	35	35	35	Minimum adopted
182	257	41	40	39	MAC EIA Noise Report Section 5.12 New England Hwy area data
183	257	41	40	39	MAC EIA Noise Report Section 5.12 New England Hwy area data
189	272	41	40	39	MAC EIA Noise Report Section 5.12 New England Hwy area data
190	272	41	40	39	MAC EIA Noise Report Section 5.12 New England Hwy area data
191	Not Listed	41	40	39	MAC EIA Noise Report Section 5.12 New England Hwy area data
192	Not Listed	41	40	39	MAC EIA Noise Report Section 5.12 New England Hwy area data
193	273	41	40	39	MAC EIA Noise Report Section 5.12 New England Hwy area data
194	Not Listed	41	40	39	MAC EIA Noise Report Section 5.12 New England Hwy area data
195	Not Listed	41	40	39	MAC EIA Noise Report Section 5.12 New England Hwy area data
196	Not Listed	41	40	39	MAC EIA Noise Report Section 5.12 New England Hwy area data
197	Not Listed	41	40	39	MAC EIA Noise Report Section 5.12 New England Hwy area data
198	Not Listed	41	40	39	MAC EIA Noise Report Section 5.12 New England Hwy area data
199	Not Listed	41	40	39	MAC EIA Noise Report Section 5.12 New England Hwy area data

Table 4.1 DECCW's INP intrusiveness criteria

Assessment location		$L_{eq,15minute}$ intrusiveness noise criteria, dB(A)			Basis of criteria
No.	**EIS No.**	**Day**	**Evening**	**Night**	
200	Not Listed	41	40	39	MAC EIA Noise Report Section 5.12 New England Hwy area data
201	Not Listed	41	40	39	MAC EIA Noise Report Section 5.12 New England Hwy area data
202	55	37	37	37	Burtons Lane data
203	55	37	37	37	Burtons Lane data
204	Not Listed	37	37	37	Burtons Lane data
205	54	37	37	37	Burtons Lane data
206	Not Listed	41	39	39	Muswellbrook data
207	Not Listed	41	39	39	Muswellbrook data
208	Not Listed	41	39	39	Muswellbrook data
211	Not Listed	39	38	37	MAC EIA Noise Tech Report Section 5.7 (Yammannie data).
212	Not Listed	39	38	37	MAC EIA Noise Tech Report Section 5.7 (Yammannie data).
213	Not Listed	41	39	39	Muswellbrook data
214	Not Listed	41	39	39	Muswellbrook data
215	Not Listed	41	39	39	Muswellbrook data
216	Not Listed	41	39	39	Muswellbrook data
217	Not Listed	41	39	39	Muswellbrook data
218	Not Listed	41	39	39	Muswellbrook data
219	Not Listed	41	39	39	Muswellbrook data
220	Not Listed	41	39	39	Muswellbrook data
221	Not Listed	41	39	39	Muswellbrook data
222	Not Listed	41	39	39	Muswellbrook data
223	Not Listed	41	39	39	Muswellbrook data
224	Not Listed	41	39	39	Muswellbrook data
225	Not Listed	41	39	39	Muswellbrook data
226	Not Listed	39	38	37	MAC EIA Noise Tech Report Section 5.7 (Yammannie data).
229	74	40	37	37	Kayuga Road data

Table 4.1 DECCW's INP intrusiveness criteria

Assessment location		$L_{eq,15minute}$ intrusiveness noise criteria, dB(A)			Basis of criteria
No.	EIS No.	Day	Evening	Night	
231	Not Listed	40	37	37	Kayuga Road data
236	214	35	35	35	Minimum adopted
237	207	35	35	35	Minimum adopted
240	29	35	35	35	Minimum adopted
241	Not Listed	37	37	37	Burtons Lane data
242	Not Listed	37	37	37	Burtons Lane data
246	103	35	35	35	Minimum adopted
249	Not Listed	35	35	35	Minimum adopted
252	Not Listed	35	35	35	Minimum adopted
253	Not Listed	35	35	35	Minimum adopted
257	269	35	35	35	Minimum adopted
258	Not Listed	35	35	35	Minimum adopted
259	Not Listed	35	35	35	Minimum adopted
260	Not Listed	35	35	35	Minimum adopted
261	Not Listed	35	35	35	Minimum adopted
262	Not Listed	35	35	35	Minimum adopted
263	Not Listed	35	35	35	Minimum adopted
265	Not Listed	35	35	35	Minimum adopted
266	Not Listed	35	35	35	Minimum adopted
267	Not Listed	35	35	35	Minimum adopted
268	Not Listed	35	35	35	Minimum adopted
271	Not Listed	35	35	35	Minimum adopted
272	277	35	35	35	Minimum adopted
273	Not Listed	35	35	35	Minimum adopted
274	Not Listed	35	35	35	Minimum adopted
279	171	40	37	37	Kayuga Road data
280	Not Listed	39	38	37	MAC EIA Noise Tech Report Section 5.7 (Yammannie data).
281	Not Listed	39	38	37	MAC EIA Noise Tech Report Section 5.7 (Yammannie data).

Table 4.1 DECCW's INP intrusiveness criteria

Assessment location		$L_{eq,15minute}$ intrusiveness noise criteria, dB(A)			Basis of criteria
No.	EIS No.	Day	Evening	Night	
282	Not Listed	39	38	37	MAC EIA Noise Tech Report Section 5.7 (Yammannie data).
283	Not Listed	39	38	37	MAC EIA Noise Tech Report Section 5.7 (Yammannie data).
284	Not Listed	41	39	39	Muswellbrook data
285	Not Listed	41	39	39	Muswellbrook data
286	Not Listed	41	39	39	Muswellbrook data
287	Not Listed	41	39	39	Muswellbrook data
288	Not Listed	41	39	39	Muswellbrook data
289	Not Listed	41	39	39	Muswellbrook data
290	71	40	37	37	Kayuga Road data
291	Not Listed	39	38	37	MAC EIA Noise Tech Report Section 5.7 (Yammannie data).
292	Not Listed	35	35	35	Minimum adopted
293	Not Listed	35	35	35	Minimum adopted
296	Not Listed	37	36	35	MAC EIA Noise Tech Report Section 5.9 Denman Road data
297	Not Listed	37	36	35	MAC EIA Noise Tech Report Section 5.9 Denman Road data
298	Not Listed	37	36	35	MAC EIA Noise Tech Report Section 5.9 Denman Road data
299	Not Listed	37	36	35	MAC EIA Noise Tech Report Section 5.9 Denman Road data
300	Not Listed	37	36	35	MAC EIA Noise Tech Report Section 5.9 Denman Road data
301	Not Listed	37	36	35	MAC EIA Noise Tech Report Section 5.9 Denman Road data
302	Not Listed	37	36	35	MAC EIA Noise Tech Report Section 5.9 Denman Road data
305	Not Listed	41	39	39	Muswellbrook data
308	131	40	37	37	Kayuga Road data
309	50	35	35	35	Minimum adopted
310	258	35	35	35	Minimum adopted

Table 4.1 DECCW's INP intrusiveness criteria

Assessment location		$L_{eq,15minute}$ intrusiveness noise criteria, dB(A)			Basis of criteria
No.	**EIS No.**	**Day**	**Evening**	**Night**	
311	273	41	40	39	MAC EIA Noise Report Section 5.12 New England Hwy area data
312	Not Listed	41	40	39	MAC EIA Noise Report Section 5.12 New England Hwy area data
315	Not Listed	41	39	39	Muswellbrook data

Notes: Where evening RBL values are higher than night, the night time criteria was adopted for the evening period in accordance with the DECCW's INP application notes.

4.1.2 Amenity

The DECCW's amenity criterion requires industrial noise to be within an acceptable level for the particular locality and land use. Where ambient noise is already high, the acoustic environment should not be deteriorated significantly. The strategy behind the amenity criterion is a holistic approach to noise, where all industrial noise (existing and future) received at a given location does not exceed the recommended goals.

Private residences potentially affected by the Mount Pleasant Project are covered by the DECCW's suburban or rural amenity categories. For residences located in and around the areas of Muswellbrook and South Muswellbrook, the suburban category is considered suitable, while those further isolated the rural residential category is suitable. The amenity criteria taken from Table 2.1 of the INP are given in Table 4.2.

Table 4.2 DECCW base amenity criteria

Location	Indicative area	Time period	Recommended $L_{eq,period}$ noise level, dB(A)	
			Acceptable	Maximum
Residential	Rural	Day	50	55
		Evening	45	50
		Night	40	45
	Suburban	Day	55	60
		Evening	45	50
		Night	40	45

Source: DECCW INP 2000

4.1.3 Project specific noise criteria

The INP requires that both the intrusiveness and amenity criteria are satisfied. However, the more limiting of the two becomes the project specific noise criteria (PSNC) or operational criteria for this site alone. In this case and for all assessment locations, the intrusiveness criteria are the more limiting of the two and hence the PSNC are those presented earlier in Table 4.1.

4.2 Sleep disturbance criteria

The aforementioned criteria, which consider the average noise emission of a source over 15 minutes, are appropriate for assessing noise from relatively steady-state sources, such as engine noise from mobile plant and other pit equipment. However, noise from sources such as reversing alarms, track plates and the banging of shovel buckets is intermittent (rather than continuous) in nature, and as such, needs to be assessed using the L_1 or L_{max} noise metrics.

The most important impact of such intermittent noises would be to disturb the sleep of nearby residents. While the INP does not specify a criterion for assessing sleep disturbance, DECCW's *Environmental Criteria for Road Traffic Noise* (EPA 1999) policy indicates that levels below 50 to 55 dB(A) inside residences are unlikely to wake sleeping occupants. The likely number of noise events per night should also be

considered. If bedroom windows are open, this corresponds to an external maximum noise level of approximately 60 to 65 dB(A) L_{max} at a residence. However, this is considerably higher than the DECCW's previous position on sleep disturbance in its *Environmental Noise Control Manual* (EPA, 1994) which recommends that L_1 noise from a source should not exceed the existing background noise level by more than 15dB. For the purpose of this assessment, the descriptors L_{max} and L_1 may be considered interchangeable. This is the DECCW's current position on sleep disturbance criteria.

As part of the background noise monitoring, it was established that background noise levels for some residences are as low as 30dB(A). As such, the sleep disturbance criterion would be as low as 45 dB(A) L_{max} for some residences.

The latter more conservative sleep disturbance criterion was adopted for this study, with proposed criteria for the adopted assessment locations listed in Table 4.3.

Table 4.3 DECCW's sleep disturbance criteria

Assessment location		Night time L_{max} sleep disturbance criteria, dB(A)
No.	**EIS No.**	
4	232	47
5	234	47
6	250	49
7	235	49
19	249	49
20	248	49
21	247	49
23	229	49
35	74	49
43	97	45
44	Not Listed	45
45	Not Listed	45
47	96	45
67	170	47
68	72	47
74	177	47
77	Not Listed	47
78	Not Listed	47
79	Not Listed	47
80	Not Listed	47
82	Not Listed	49
83	Not Listed	49
84	Not Listed	49
86	71	47
96	157	47
101	155	47
102	154	47
107	149	47
108	148	47
112	143	47
118	133	47
120	131	47

Table 4.3 DECCW's sleep disturbance criteria

Assessment location		Night time L_{max} sleep disturbance criteria, dB(A)
121	130	47
129	47	45
130	48	45
135	50	45
136	122	45
137	29	45
138	29	45
139	123	45
140	51	45
143	275	45
146	198	45
147	199	45
153	16	45
154	193	45
156	180	45
157	183	45
158	187	45
159	214	45
161	207	45
169	265	45
171	265	45
172	258	45
173	262	45
174	262	45
175	262	45
176	263	45
177	261	45
178	259	45
179	260	45
180	260	45
181	257	45
182	257	49

Table 4.3 DECCW's sleep disturbance criteria

Assessment location		Night time L_{max} sleep disturbance criteria, dB(A)
183	257	49
189	272	49
190	272	49
191	Not Listed	49
192	Not Listed	49
193	273	49
194	Not Listed	49
195	Not Listed	49
196	Not Listed	49
197	Not Listed	49
198	Not Listed	49
199	Not Listed	49
200	Not Listed	49
201	Not Listed	49
202	55	47
203	55	47
204	Not Listed	47
205	54	47
206	Not Listed	49
207	Not Listed	49
208	Not Listed	49
211	Not Listed	47
212	Not Listed	47
213	Not Listed	49
214	Not Listed	49
215	Not Listed	49
216	Not Listed	49
217	Not Listed	49
218	Not Listed	49
219	Not Listed	49
220	Not Listed	49
221	Not Listed	49
222	Not Listed	49

Table 4.3 DECCW's sleep disturbance criteria

Assessment location		Night time L_{max} sleep disturbance criteria, dB(A)
223	Not Listed	49
224	Not Listed	49
225	Not Listed	49
226	Not Listed	47
229	74	47
231	Not Listed	47
236	214	45
237	207	45
240	29	45
241	Not Listed	47
242	Not Listed	47
246	103	45
249	Not Listed	45
252	Not Listed	45
253	Not Listed	45
257	269	45
258	Not Listed	45
259	Not Listed	45
260	Not Listed	45
261	Not Listed	45
262	Not Listed	45
263	Not Listed	45
265	Not Listed	45
266	Not Listed	45
267	Not Listed	45
268	Not Listed	45
271	Not Listed	45
272	277	45
273	Not Listed	45
274	Not Listed	45
279	171	47
280	Not Listed	47
281	Not Listed	47

Table 4.3 DECCW's sleep disturbance criteria

Assessment location		Night time L_{max} sleep disturbance criteria, dB(A)
282	Not Listed	47
283	Not Listed	47
284	Not Listed	49
285	Not Listed	49
286	Not Listed	49
287	Not Listed	49
288	Not Listed	49
289	Not Listed	49
290	71	47
291	Not Listed	47
292	Not Listed	45
293	Not Listed	45
296	Not Listed	45
297	Not Listed	45
298	Not Listed	45
299	Not Listed	45
300	Not Listed	45
301	Not Listed	45
302	Not Listed	45
305	Not Listed	49
308	131	47
309	50	45
310	258	45
311	273	49
312	Not Listed	49
315	Not Listed	49

An assessment of the potential for sleep disturbance within residences from the Project is presented in Section 6.3.

4.3 Cumulative noise criteria

The total industrial noise at a receptor from all possible industrial sites is required to satisfy the INP's amenity criteria presented earlier in Table 4.1.

4.4 Construction noise criteria

The aspect of the Mount Pleasant Project which will require noise criteria for activities not previously approved is the construction of the conveyor/service corridor option. All other aspects were addressed in the EIS and are therefore not covered herein.

It should be noted that it is accepted practice to adopt operational noise criteria for construction activities at 'brownfield' mine sites since such activities are often indistinguishable from mining type operations. However, the area proposed for the conveyor/service corridor is relatively undeveloped and most sections are geographically separated from the mining activities and given the prevailing wind direction to receptors, is likely to be clearly distinguishable.

The DECCW's *Interim Construction Noise Guideline* (ICNG) (2009) is specifically aimed at managing construction works regulated by the DECCW under the NSW *Protection of the Environment Operations Act 1997* (POEO Act). This provides the current and most relevant guidance for construction noise assessment.

One of the first steps in the ICNG is the identification of sensitive receivers, which include residences, classrooms, hospitals, places of worship and passive and active recreation areas.

Whilst all receivers are important, the most sensitive and those afforded the strictest criteria by the ICNG are residences. For the optional conveyor/service corridor, residences are also the closest and potentially the most impacted from construction activities. Hence, the assessment has focused upon residences. The residences selected for construction assessment are the closest to the proposed conveyor/service corridor and are locations 43, 44, 45, 246, 249, 257 and 263, as shown in Figure 3.1a.

The construction activities will be spread across sections of the potential alignment of the conveyor/service corridor. It is anticipated that works will be completed within six to nine months, and hence any potential impacts will be limited to this period.

4.4.1 Construction times

The primary management measure of the ICNG is that construction be undertaken during daytime hours only, which will be adopted for this project. The ICNG recommends works are restricted to:

- Monday to Friday – 7.00am to 6.00pm;
- Saturday – 8.00am to 1.00pm; and
- no construction work to take place on Sunday and public holidays.

The proposed works will be undertaken between these hours only and hence will satisfy the main objective of the ICNG.

4.4.2 Noise assessment criteria

For major construction developments, the ICNG recommends a quantitative noise assessment approach. Table 4.4 is an extract from the ICNG and relates to residential locations only.

Table 4.4 ICNG residential criteria

Time of day	Management level [$L_{Aeq\ [15\ min]}$]*	How to apply
Recommended standard hours are Monday to Friday 7.00am to 6.00pm Saturday 8.00am to 1.00pm with no work on Sundays or public holidays	Noise affected RBL + 10dB	The noise affected level represents the point above which there may be some community reaction to noise Where the predicted or measured L_{Aeq} [15 min] is greater than the noise affected level, the proponent should apply all feasible and reasonable work practices to meet the noise affected level The proponent should also inform all potentially impacted residents of the nature of works to be carried out, the expected noise levels and duration, as well as contact details
	Highly noise affected 75dB(A)	The highly noise affected level represents the point above which there may be strong community reaction to noise Where noise is above this level, the relevant authority (consent, determining or regulatory) may require respite periods by restricting the hours that the very noisy activities can occur, taking into account: • times identified by the community when they are less sensitive to noise (such as before and after school for works near schools, or mid-morning or mid-afternoon for works near residences) • if the community is prepared to accept a longer period of construction in exchange for restrictions on construction times
Outside recommended standard hours	Noise affected RBL + 5dB	A strong justification would typically be required for works outside the recommended standard hours The proponent should apply all feasible and reasonable work practices to meet the noise affected level Where all feasible and reasonable practices have been applied and noise is more than 5dB[A] above the noise affected level, the proponent should negotiate with the community For guidance on negotiating agreements see section 7.2.2

Notes: ** Noise levels apply at the property boundary that is most exposed to construction noise, and at a height of 1.5m above ground level. If the property boundary is more than 30m from the residence, the location for measuring or predicting noise levels is at the most noise-affected point within 30m of the residence. Noise levels may be higher at upper floors of the noise affected residence.*

Source: ICNG 2009.

For other receiver types the ICNG provides the recommendations in Table 4.5 (sourced directly from the ICNG).

Table 4.5 Noise at sensitive land uses (other than residences) using quantitative assessment

Land use	Management level ($L_{Aeq\ [15\ min]}$)
Classrooms at schools and other educational institutions	Internal noise level - 45dB(A)
Hospital wards and operating theatres	Internal noise level - 45dB(A)
Places of worship	Internal noise level - 45dB(A)
Active recreation areas (characterised by sporting activities and activities which generate their own noise or focus for participants, making them less sensitive to external noise intrusion)	External noise level - 65dB(A)
Passive recreation areas(characterised by contemplative activities that generate little noise and where benefits are compromised by external noise intrusion, for example, reading, meditation)	External noise level - 60dB(A)
Community centres	Depends on the intended use of the centre. Refer to the recommended 'maximum' internal levels in AS2107 for specific uses.

Source: ICNG 2009

For industrial and commercial receivers not covered above, the ICNG provides the following:

"The external noise levels should be assessed at the most-affected occupied point of the premises:

- *industrial premises: external $L_{Aeq\ [15\ min]}$ 75dB(A);*
- *offices, retail outlets: external $L_{Aeq\ [15\ min]}$ 70dB(A);* and
- *other businesses that may be very sensitive to noise, where the noise level is project specific as discussed below.*

The proponent should assess construction noise levels for the project, and consult with occupants of commercial and industrial premises prior to lodging an application where required.

During construction, the proponent should regularly update the occupants of the commercial and industrial premises regarding noise levels and hours of work." (ICNG, 2009).

4.5 Blasting criteria

The blast noise and vibration criteria have not changed since the consent was issued. Hence, the consent criteria will apply to the current Project. Given that the mining aspect of the current Project is substantially the same as the approved operation, the EIS blast noise and vibration assessment remains valid. Accordingly, no further assessment is provided herein.

5 Noise modelling parameters

The prediction of noise from the Mount Pleasant Project's operations was undertaken using the Environmental Noise Model (ENM) prediction software. The ENM predicts total noise levels at residences from the concurrent operation of multiple noise sources. The model included consideration of factors such as the lateral and vertical location of plant, source-to-receiver distances, ground effects, atmospheric absorption, topography of the mine and surrounding area and meteorological conditions. This section outlines the base parameters used in the noise modelling.

The mine plans used for modelling were those used and presented in the EIS for Years 3, 5 and 10. These years represent potential mining operations that could eventuate within the likely consent period sought, which is to end in 2022.

The only changes to the modelling as compared to the EIS comprise the introduction of the conveyor/service corridor option in lieu of the rail operation, and adjustment to the possible locations of the infrastructure area within an infrastructure envelope. Both the conveyor/service corridor and the infrastructure scenarios were modelled at the western most extremities of their identified envelope areas. This approach would produce the worst case noise impact to the closest receivers, which are located west of the conveyor/service corridor and infrastructure envelope. The mine plans and equipment locations are shown in Appendix B of this report.

5.1 Equipment noise levels

Table 5.1 describes the main noise sources associated with the Mount Pleasant Project.

Table 5.1 Main noise sources of the project

Mining activity	Typical plant
Mine	Drills, Shovels, Front-End Loaders, Trucks, Excavators, Dozers, Graders, Draglines, Cable Reelers and Generators for Lighting Sets
Overburden Emplacements, Rejects Emplacement and Haul Roads	Trucks, Dozers, Graders and Generators for Lighting Sets.
Coal Transportation	Trucks and Graders on haul roads. Coal Preparation Plant, Reclaimer, yard and overland Conveyor.

Sound power levels for equipment typically used for in-pit earth-moving and overburden emplacement are listed in Table 5.2. These sound power levels are indicative of the range of noise levels measured at existing mines operated by the proponent. The mining equipment schedule is based on that documented in the EIS.

Table 5.2 Typical equipment sound pressure levels

Typical item	Representative $L_{eq,15minute}$ sound power level, dB(A)
Haul Truck (Komatsu 830E, 730E)	114
Water Cart	116
Drill (SKS, DK40)	119
Shovel (PH5700, XPC)	118
Cable Reeler	116
Dozer	117
Dozer (690 Tiger)	112
Dragline	114
Grader (16G, 24H)	113
FEL- L1850 (Loader)	113
Excavator (3600, 5500)	107
Lighting Plant	104
Coal Preparation Plant	113
Conveyor	83 per linear metre (open), Modelled as covered and shielded to the west
Conveyor Drive Motors (Modelled as shielded to the west)	
280kW	102 (open)
315kW	102 (open)
355kW	103 (open)
500kW	105 (open)

Notes: Refer to Appendix C for spectral data used in noise modelling. The emission levels above are based on site measurements.

6 Predicted operational noise levels

This section presents the results of modelled noise emission levels from the Mount Pleasant Project inclusive of the effect of prevailing meteorological conditions recorded at the site.

Noise modelling was based on three-dimensional digitised ground contours for the surrounding land, mine pits and overburden emplacement areas for three stages of the Mount Pleasant Project (Years 3, 5 and 10). The mine plans represent worst case snapshots and equipment was placed at various locations and heights, representing realistic operating conditions in each of these stages of the mine.

The noise model was configured to predict the total L_{eq} noise levels from mining operations. The results presented assume all plant and equipment to be operating simultaneously and at full power. In practice, such an operating scenario would occur infrequently. The noise predictions presented are therefore worst case.

As described earlier, the main difference between the current Mount Pleasant Project and the approved operation in 1999 is the introduction of the conveyor/service corridor and minor adjustment to the position of infrastructure within a defined envelope. It is therefore expected that receptors nearest these areas (locations 43, 44, 45, 246, 249, 250 to 253, 257, 258, 259, 260, 261, 262 and 263) to the west would be impacted differently to those impacts predicted in the EIS. This is because other receivers are considerably removed from the conveyor, and are relatively much closer to other areas of the mine.

6.1 Predicted noise during calm weather

Operational noise levels to residences were first determined for periods with no wind or temperature gradients, which are termed SI (Still Isothermal) or “calm” conditions. Values for air temperature and relative humidity used in the noise modelling were 20°C and 70 per cent for day, and 10°C and 80 per cent for night periods respectively.

The $L_{eq,15min}$ noise levels at receivers resulting from mining operations during calm conditions for both day and night periods are presented later in Table 6.3.

Notably, operational noise levels were predicted to comply with DECCW’s operational noise limits for most assessment locations during calm meteorological conditions for both day and night periods. The exceptions being locations 43, 129 and 130. The latter two properties are within the lease boundary of the site

6.2 Predicted noise during “prevailing” meteorological conditions

The INP provides guidance on how noise due to varying meteorological conditions is to be assessed. The procedure is based on identifying and combining worst case meteorological conditions at the site (referred to as the “prevailing meteorology”) and assessing the cumulative noise levels against the relevant limits.

During wind and temperature gradient conditions, noise levels at residences may increase or decrease compared with noise during calm conditions. This is due to refraction caused by the varying speed of sound with increasing height above ground. The level of noise received increases when the wind blows from source to receivers or under temperature inversion conditions, and conversely, decreases when the wind blows from receivers to source or under temperature lapse conditions.

In some circumstances, compliance achieved under calm conditions generally results in compliance being achieved under "prevailing meteorological" conditions when higher received noise levels may prevail. Despite the increase in noise at properties caused by adverse winds, ambient noise also increases during such weather conditions (due to wind induced vegetation noise) and mine noise is masked.

6.2.1 Assessment of potential for temperature inversions

The Pasquill Stability Class represents the degree of mixing in the atmosphere, and can be used to gauge the presence and magnitude of temperature inversions. Stability classes range from Class A to Class F. Stability Class A applies under sunny conditions with light winds when dispersion is most rapid. Stability Class D applies under windy and/or overcast conditions when dispersion is moderately rapid and Stability Class F occurs at night when winds are light and the sky is clear. Stability Classes B, C and E represent the presence of intermediate conditions. Temperature inversions may occur during Stability Classes E and F. In particular, Stability Class F generally represents a range of temperature gradients from 1.5^0C/100 m up to less than 4^0C/100 m.

Records of wind speed, wind direction and sigma-theta (σ_θ - used to approximate Pasquill Stability Classes) were acquired from the McLeans Hill weather station for 2004, operated by MAC. The Air Quality specialists on this project (PAEHolmes) verify this data as being the most complete set available and representative for the site and surrounds.

The Stability Class frequency for the area, as determined from the hourly weather data, is indicated in Table 6.1. The table shows that atmospheric Stability Class F occurs for only 10 per cent of the winter nights in the area. This is well below the DECCW's 30 per cent threshold where temperature inversions are considered to be a 'feature' of an area and therefore does not need to be included in the noise impact assessment. Nonetheless, the prediction of noise impacts in this assessment includes consideration of the effects of a 4^0C/100m temperature inversion. This approach is appropriate given the well documented presence of temperature inversions in the area and these are referenced in numerous noise assessments for developments in the Upper Hunter Valley.

Table 6.1 Atmospheric stability class frequency

Stability Class	Percentage of occurrence (winter night)
A	0
B	0
C	0
D	51
E	39
F	10
TOTAL	**100**

Notes: This information is based on winter night analysis for year 2004, as this was the only year available with sigma-theta values.

Source: McLeans Hill automatic weather station, 2004.

6.2.2 Analysis of "prevailing" winds for the area

A detailed analysis of the vector components of wind speed and direction for 2004 was undertaken in accordance with the INP. To that end, the DECCW encourage the use of their "Wind Calculator" program

which is provided on their website, so that a consistent approach to noise modelling is undertaken throughout NSW. This assessment has utilised this programme and accordingly, our analysis is consistent with the DECCW's "Wind Calculator" with respect to 'feature' wind directions. The assessment provides the additional process of determining the upper 10th percentile wind speed for the 'feature' direction. The results of the assessment are summarised in Appendix D.

The wind directions determined to be a 'feature' of the area in accordance with the INP are summarised in Table 6.2. The cumulative total values (represented by arms in the wind roses in Appendix D) indicate wind speed occurrence above the INP 30 per cent threshold, which triggers the requirement for assessment (Section 5.3 of the INP). This is determined by a cumulative arithmetic addition of percentage occurrence values (refer Appendix D).

It is demonstrated in Table 6.2 that the assessable winds occur during the day, evening and night time, and these specific winds are considered a 'feature' of the area according to the INP. Since the evening and night mine operations are the same, and the night time wind data set provides a more statistically valid analysis (covering a 9 hour period as opposed to only 4 hours for the evening), the 'feature' winds occurring during the night were used for noise assessment.

The final set of wind roses in Appendix D demonstrate that a combined wind and temperature inversion (rather than these occurring in isolation) occur significantly less frequently than the DECCW's 30 per cent threshold. Hence, a combined gradient wind and temperature inversion calculation was not required for this assessment.

Table 6.2 Assessable INP wind conditions

Identified weather conditions	Wind direction from north (degrees)	Wind speed (m/s)
DAY PERIODS (7am to 6pm)		
1	CALM	0
2	22.5	1.9
3	45	1.7
4	270	2.4
5	292.5	2.5
6	315	2.4
7	337.5	2.2
8	360	2
NIGHT PERIODS (10pm to 7am)		
1	CALM	0
2	22.5	2.1
3	45	1.9
4	67.5	1.8
5	90	2.4
6	112.5	2.6

Table 6.2 Assessable INP wind conditions

Identified weather conditions	Wind direction from north (degrees)	Wind speed (m/s)
7	157.5	2.3
8	180	1.9
9	202.5	1.6
10	247.5	2.1
11	270	2.3
12	292.5	2.3
13	315	2.2
14	337.5	2.1
15	360	2.3
16	4 degree /100m Inversion	0

6.2.3 Predicted noise level results

The wind conditions in Table 6.2 were used in the modelled predictions of mining noise levels. The prediction of mining noise during periods of 'prevailing INP meteorology' is presented in Table 6.3. These data incorporate all "prevailing" INP weather conditions (ie. calm, INP winds and temperature inversions) for day and night operations.

The results presented in Table 6.3 were derived in accordance with the INP assessment methodology and considered the effect of only adverse (prevailing) INP-assessable meteorological conditions and not all possible wind conditions that may be experienced at site.

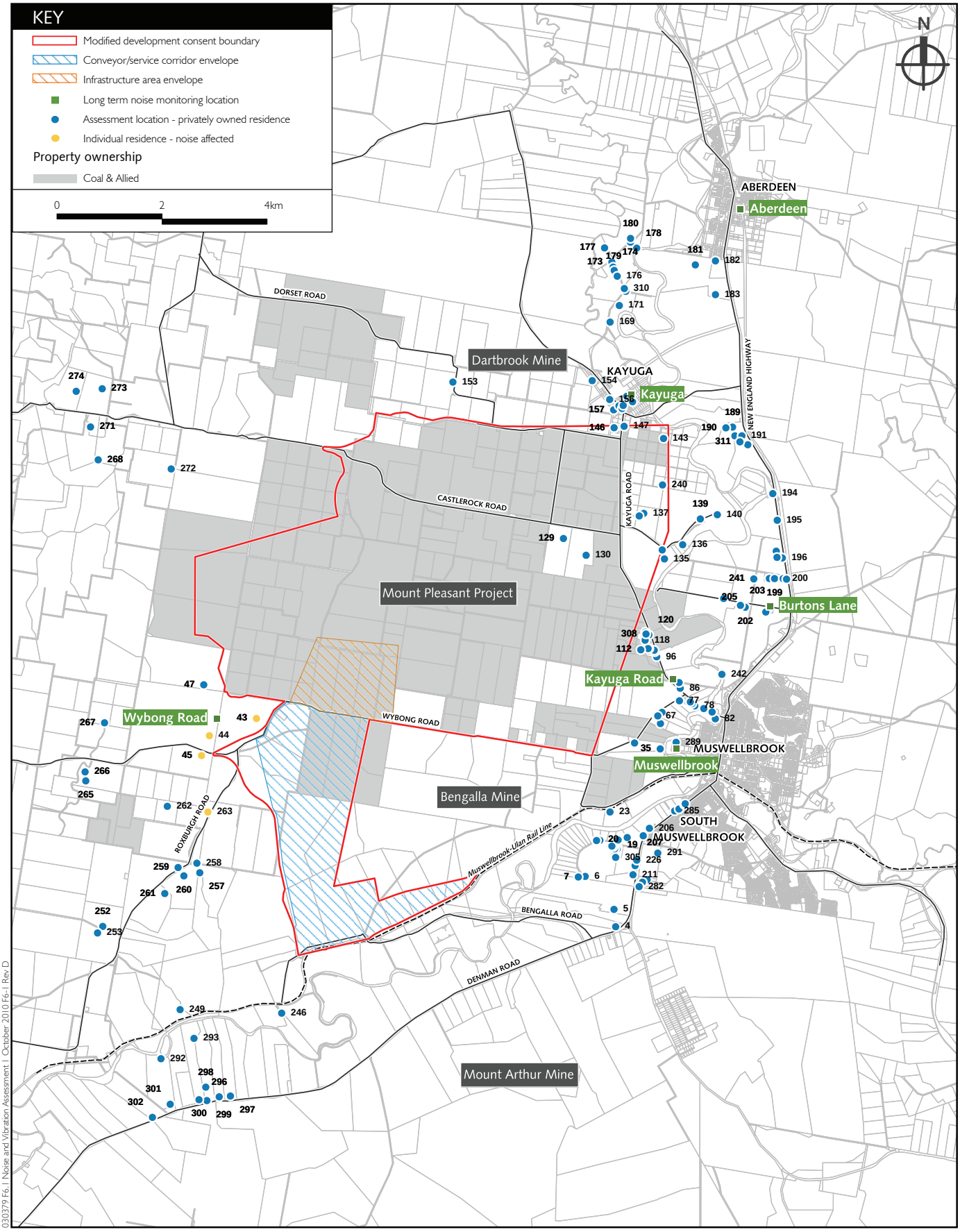
The results demonstrate that the introduction of the proposed conveyor/service corridor and possible reconfiguring of the infrastructure area introduce impacts at four identified assessment locations to the south west. These are locations 43, 44, 45 and 263 where noise levels are predicted to be above possible acquisition levels (indicated in bold text in the table). Of note, each of the four assessment locations comprises one residence only. Beyond these locations further west, noise levels are shown to be below acquisition levels (eg location 257) and no other residences are within the possible acquisition zone due to the introduction of the proposed conveyor. These properties are also shown in Figure 6.1.

Table 6.3 Operational noise at receptors during 'calm' and prevailing meteorology – locations closest to conveyor and infrastructure areas (dB(A) Leq,15min)

Receptor	Year 3				Year 5				Year 10				PSNC, $L_{eq,15min}$, dB(A)		Possible acquisition criteria, $L_{eq,15min}$, dB(A)	
	Day Calm	Day Mets	Night Calm	Night Mets	Day Calm	Day Mets	Night Calm	Night Mets	Day Calm	Day Mets	Night Calm	Night Mets	Day	Evening/Night	Day	Evening/Night
43	37	**47**	33	**48**	37	**47**	33	**46**	**37**	**48**	33	**49**	35	35	40	40
44	32	**43**	27	**45**	32	**42**	24	**43**	32	**43**	25	**46**	35	35	40	40
45[1]	31	40	27	**42**	31	40	24	40	31	40	30	**43**	35	35	40	40
246[2]	22	35	22	38	22	35	21	37	22	35	21	38	35	35	40	40
249[1]	19	30	18	32	19	30	17	31	19	31	18	32	35	35	40	40
257	26	37	26	40	26	36	25	39	26	38	26	40	35	35	40	40
263[1]	31	39	31	**42**	30	39	29	**41**	31	41	31	**43**	35	35	40	40

Notes: *1. These properties were NOT listed in the EIS.*

2. This property is listed in BMC's consent for acquisition upon request.



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Proposed Modifications Noise Assessment and Affected Properties

Mount Pleasant Project Modification - Noise and Vibration Assessment

FIGURE 6.1

6.3 Predicted noise levels for the broader assessment locations

The Mount Pleasant Project has been assessed in its entirety in accordance with the INP, including assessment for adverse weather conditions in accordance with current practice. The approved Year 10 EIS mine plan was modelled to enable a conservative assessment. The 1997 EIS demonstrated that the proposed Year 10 operations would result in the worst case impacts of the three scenarios that were investigated. In addition, Table 6.3 of this report shows Year 10 to be potentially the worst case for selected assessment locations.

The mine plan and equipment locations modelled are consistent with the EIS. With the application of all reasonable and feasible mitigation measures, impacts to the broader community will be reduced than those described in the EIS. Once the mine is operational, the noise emissions from the general mine pit area for receivers to the north, east and south-east will be consistent with the approved project. Any differences that may be presented by the current study are purely a function of the current INP assessment.

6.3.1 Feasible and reasonable measures

The reference of 'feasible and reasonable' in noise terms is defined within the INP and the key factors include:

- noise mitigation benefit (amount of noise reduction provided, number of people protected);
- cost of mitigation (cost versus benefit);
- community views (aesthetic impacts and community wishes); and
- noise levels for affected land uses (existing and future landuses, and changes in noise levels).

The assessment of the Mount Pleasant Project under the INP will enable noise monitoring and management at the mine in accordance with contemporary standards. The following items constitute relevant feasible and reasonable measures that will be adopted in the operation of the mine and were included in noise modelling:

- plant will operate in less exposed areas during the more sensitive night period, a measure consistent with the EIS;
- a cover and a shield on the western side of the conveyor at locations where the conveyor would be at ground level. Where the conveyor is elevated, it will be completely enclosed;procurement of new and best available technology plant;
- provision of noise suppression on all mobile plant. It anticipated that the noise suppression technology will require an outlay of capital expenditure of between $15M and $20M; and
- updating the comprehensive operational noise management plan to include real-time back to base noise monitoring using the best available technology.

6.3.2 Operational noise level predictions

The results of the INP assessment for the approved mine are shown in Table 6.4. The assessment has found that no additional properties outside the calm weather envelope from the 1997 EIS are affected. Refer to Table 12.10 in the EIS and EIS Figure 50.

As previously discussed, properties affected under 'adverse' weather conditions were entitled under the development consent to a hierarchy of monitoring, mitigation then acquisition measures during operations, rather than the right to seek upfront acquisition. Conditions of development consents/project approvals developed by the Department of Planning (DoP) in recent years now typically entitle residents affected above acquisition criteria during adverse weather conditions to upfront acquisition upon request.

Under 'adverse' weather conditions for the daytime assessment period three residences are predicted to experience noise levels above potential acquisition criteria, due to the modelling of the approved mine plan under adverse winds that were not required to be assessed for the EIS in 1997. It should be noted that two of the three residences were previously identified as only one property in the 1997 EIS. Of the properties listed in the Schedule to Conditions 6.2.1 and 6.4.2 of the development consent, seven are predicted to be above the INP noise acquisition criteria for the daytime period during 'adverse' conditions (these properties are currently entitled to acquisition upon request).

Under 'adverse' weather conditions for the night time assessment period, nine properties containing 12 residences are predicted to experience noise levels above potential acquisition criteria, due to the modelling of the approved mine plan under adverse winds that were not required to be assessed for the EIS. It should be noted that six of these residences were previously identified as only three properties in the 1997 EIS. Of the properties listed in the Schedule to Conditions 6.2.1 and 6.4.2 of the development consent, seventeen residences are predicted to be above the INP noise acquisition criteria for the night time period during 'adverse' conditions (these properties are currently entitled to acquisition upon request). It should be noted that four of these residences were previously identified as only two properties in the 1997 EIS. Location 67 was also listed in the Schedule to Conditions 6.2.1 and 6.4.2 of the development consent as a consequence of dust impacts and will continue to be afforded acquisition rights even though the current noise assessment concludes that this location will not be impacted.

Based on the above, a total of nine properties containing 12 residences are predicted to exceed acquisition criteria under 'adverse' weather conditions. These properties are in addition to those that are currently entitled to acquisition upon request under 'calm' weather conditions in the 1997 EIS and 1999 development consent.

Properties predicted to experience noise levels above acquisition criteria are shown in bold text in Table 6.4 and displayed in Figure 6.2.

Table 6.4 Operational noise at receptors during 'calm' and prevailing meteorology (dB(A) Leq,15min)

Receptor	Predicted Noise Levels, dB(A)				PSNC, $L_{eq,15min}$, dB(A)		Possible acquisition criteria, $L_{eq,15min}$, dB(A)	
	Day Calm	Day Mets	Night Calm	Night Mets	Day	Evening/Night	Day	Evening/Night
4	21	33	19	34	39	37	44	43
5	19	34	18	34	39	37	44	43
6	20	36	18	37	41	39	46	44
7	20	36	18	37	41	39	46	44
19	23	38	21	38	41	39	46	44
20	23	39	20	39	41	39	46	44
21	23	39	20	39	41	39	46	44
23	24	40	23	40	41	39	46	44
35	25	42	20	41	41	39	46	44
47	29	**42**	26	**44**	35	35	40	40
67[1]	26	43	21	42	40	37	45	42
68	26	43	20	42	40	37	45	42
74	26	43	20	42	40	37	45	42
77	25	42	21	41	40	37	45	42
78	24	41	20	40	40	37	45	42
79	24	41	21	41	40	37	45	42
80	24	41	21	41	40	37	45	42
82	23	39	20	39	41	39	46	44
83	23	39	20	39	41	39	46	44
84	24	40	20	40	41	39	46	44
86	25	42	21	42	40	37	45	42
96[1]	27	44	22	**43**	40	37	45	42
101[1]	25	45	22	**45**	40	37	45	42
102[1]	25	45	22	**45**	40	37	45	42
107[1]	25	45	22	**45**	40	37	45	42
108[1]	24	44	22	**44**	40	37	45	42
112[1]	24	44	22	**43**	40	37	45	42
118[1]	24	**46**	23	**46**	40	37	45	42
120[1]	24	45	23	**46**	40	37	45	42
121[1]	24	**46**	23	**46**	40	37	45	42
129[1]	**57**	**60**	57	**60**	35	35	40	40
130[1]	**57**	**60**	57	**60**	35	35	40	40
135[1]	28	**44**	28	**45**	35	35	40	40
136	21	30	21	32	35	35	40	40
137	33	**43**	34	**44**	35	35	40	40
138	32	**43**	33	**45**	35	35	40	40
139	27	38	28	40	35	35	40	40

Table 6.4 Operational noise at receptors during 'calm' and prevailing meteorology (dB(A) Leq,15min)

Receptor	Predicted Noise Levels, dB(A)				PSNC, $L_{eq,15min}$, dB(A)		Possible acquisition criteria, $L_{eq,15min}$, dB(A)	
	Day Calm	Day Mets	Night Calm	Night Mets	Day	Evening/Night	Day	Evening/Night
140	26	37	27	39	35	35	40	40
143	28	38	29	**41**	35	35	40	40
146[1]	26	39	27	**42**	35	35	40	40
147	27	38	27	**42**	35	35	40	40
153[1]	28	38	30	**47**	35	35	40	40
154	23	35	25	40	35	35	40	40
156	24	37	26	**42**	35	35	40	40
157[1]	25	37	26	**41**	35	35	40	40
158	24	37	26	**42**	35	35	40	40
159	26	36	27	**41**	35	35	40	40
161	24	36	26	**41**	35	35	40	40
169	21	31	22	36	35	35	40	40
171	20	31	21	35	35	35	40	40
172	21	31	22	34	35	35	40	40
173	19	29	20	33	35	35	40	40
174	19	29	21	33	35	35	40	40
175	20	30	21	34	35	35	40	40
176	20	30	21	34	35	35	40	40
177	18	28	19	33	35	35	40	40
178	19	29	20	32	35	35	40	40
179	19	29	20	32	35	35	40	40
180	19	29	20	32	35	35	40	40
181	18	28	20	31	35	35	40	40
182	20	28	21	30	41	39	46	45
183	20	29	21	32	41	39	46	45
189	24	34	25	37	41	39	46	45
190	24	35	25	37	41	39	46	45
191	24	34	25	37	41	39	46	45
192	24	35	25	37	41	39	46	45
193	24	34	24	37	41	39	46	45
194	22	34	22	36	41	39	46	45
195	23	34	23	36	41	39	46	45
196	22	35	22	37	41	39	46	45
197	22	35	23	37	41	39	46	45

Table 6.4 Operational noise at receptors during 'calm' and prevailing meteorology (dB(A) Leq,15min)

Receptor	Predicted Noise Levels, dB(A)				PSNC, $L_{eq,15min}$, dB(A)		Possible acquisition criteria, $L_{eq,15min}$, dB(A)	
	Day Calm	Day Mets	Night Calm	Night Mets	Day	Evening/Night	Day	Evening/Night
198	23	36	23	38	41	39	46	45
199	23	36	23	37	41	39	46	45
200	23	35	23	37	41	39	46	45
201	23	35	23	37	41	39	46	45
202	24	38	23	39	37	37	42	42
203	24	38	23	40	37	37	42	42
204	23	36	22	38	37	37	42	42
205	24	40	24	41	37	37	42	42
206	22	38	22	38	41	39	46	44
207	22	38	21	38	41	39	46	44
208	23	38	22	38	41	39	46	44
211	21	35	19	36	39	37	44	43
212	22	36	20	36	39	37	44	43
213	22	37	19	37	41	39	46	44
214	22	37	20	37	41	39	46	44
215	22	37	20	38	41	39	46	44
216	22	37	20	37	41	39	46	44
217	22	37	21	38	41	39	46	44
218	22	37	19	38	41	39	46	44
219	22	37	20	38	41	39	46	44
220	22	37	20	37	41	39	46	44
221	22	37	21	38	41	39	46	44
222	23	38	21	38	41	39	46	44
223	22	38	21	38	41	39	46	44
224	22	38	21	38	41	39	46	44
225	23	37	21	38	41	39	46	44
226	22	36	21	37	39	37	44	43
229	26	43	21	**43**	40	37	45	42
231	24	41	21	41	40	37	45	42
236	25	37	27	**42**	35	35	40	40
237	25	37	26	**41**	35	35	40	40
240	26	38	26	40	35	35	40	40
241	24	37	24	39	37	37	42	42
242	24	39	22	40	37	37	42	42
249	17	29	17	31	35	35	40	40
252	19	30	18	32	35	35	40	40

Table 6.4 Operational noise at receptors during 'calm' and prevailing meteorology (dB(A) Leq,15min)

Receptor	Predicted Noise Levels, dB(A)				PSNC, $L_{eq,15min}$, dB(A)		Possible acquisition criteria, $L_{eq,15min}$, dB(A)	
	Day Calm	Day Mets	Night Calm	Night Mets	Day	Evening/Night	Day	Evening/Night
253	19	29	18	31	35	35	40	40
258*	26	36	26	40	35	35	40	40
259*	26	35	26	39	35	35	40	40
260*	22	33	22	37	35	35	40	40
261*	21	33	23	37	35	35	40	40
262	19	29	17	35	35	35	40	40
265	18	31	16	34	35	35	40	40
266	18	31	16	35	35	35	40	40
267	19	33	17	35	35	35	40	40
268	20	26	15	32	35	35	40	40
271	16	24	14	31	35	35	40	40
272	18	26	16	36	35	35	40	40
273	16	21	14	30	35	35	40	40
274	16	23	13	29	35	35	40	40
279	26	43	21	42	40	37	45	42
280	21	35	20	35	39	37	44	43
281	20	35	19	35	39	37	44	43
282	20	34	18	35	39	37	44	43
283	20	34	18	35	39	37	44	43
284	22	38	22	38	41	39	46	44
285	22	37	21	38	41	39	46	44
286	22	38	21	38	41	39	46	44
287	22	37	21	37	41	39	46	44
288	22	37	21	37	41	39	46	44
289	24	41	20	40	41	39	46	44
290	25	42	21	42	40	37	45	42
291	21	35	21	35	39	37	44	43
292	13	27	13	29	35	35	40	40
293	13	29	13	31	35	35	40	40
296	17	28	16	29	37	35	42	41
297	17	28	17	30	37	35	42	41
298	15	27	15	29	37	35	42	41
299	16	27	16	29	37	35	42	41
300	16	27	15	29	37	35	42	41
301	14	26	14	28	37	35	42	41
302	14	26	13	27	37	35	42	41

Table 6.4 Operational noise at receptors during 'calm' and prevailing meteorology (dB(A) Leq,15min)

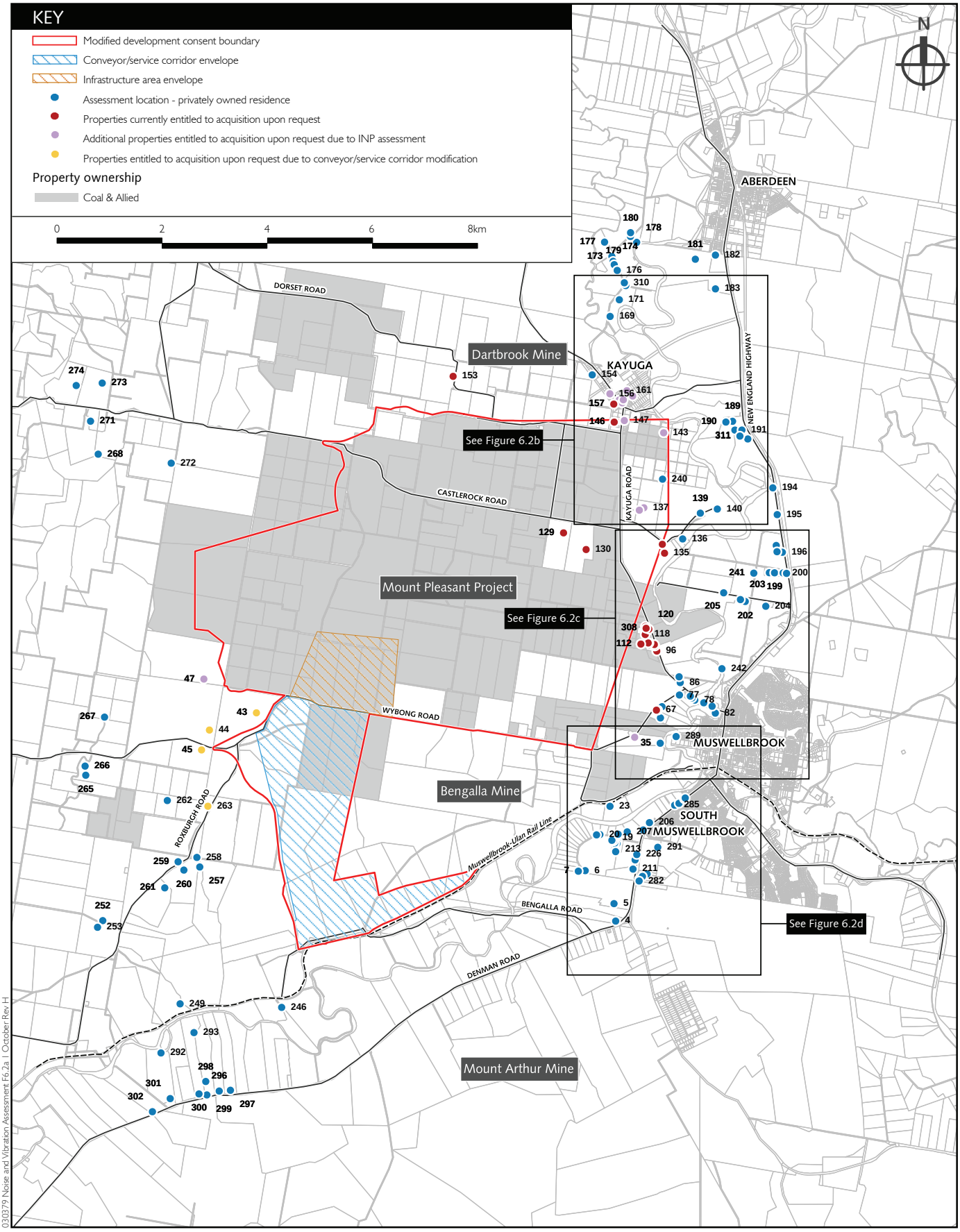
Receptor	Predicted Noise Levels, dB(A)				PSNC, $L_{eq,15min}$, dB(A)		Possible acquisition criteria, $L_{eq,15min}$, dB(A)	
	Day Calm	Day Mets	Night Calm	Night Mets	Day	Evening/Night	Day	Evening/Night
305	22	37	19	37	41	39	46	44
308[1]	24	**46**	23	**46**	40	37	45	42
309[1]	28	**44**	29	**45**	35	35	40	40
310	21	30	22	34	35	35	40	40
311	24	35	25	37	41	39	46	45
312	22	36	22	37	41	39	46	45
315	22	38	21	38	41	39	46	44

Notes: 1. These locations were identified as affected in the 1997 EIS and are listed as such in the schedule to Conditions 6.2.1 and 6.4.2 of the site's consent (a total of 17 properties).

**The predicted noise levels for these locations do not include suppression on mobile plant as it was considered that potential noise from the conveyor will dominate at these properties and mobile plant operating in the mine would not materially alter their results.*

There are 28 affected properties comprising 34 residences as summarised following:

- fifteen properties listed in the schedule to Conditions 6.2.1 and 6.4.2 are affected, however, there are a total of 18 residences on these properties;
- a further four residences (four properties) are affected due to the proposed conveyor/service corridor; and
- a further 12 residences (from nine properties) are affected due to the broader mining operations.



0303379 Noise and Vibration Assessment F6.2a I October Rev H

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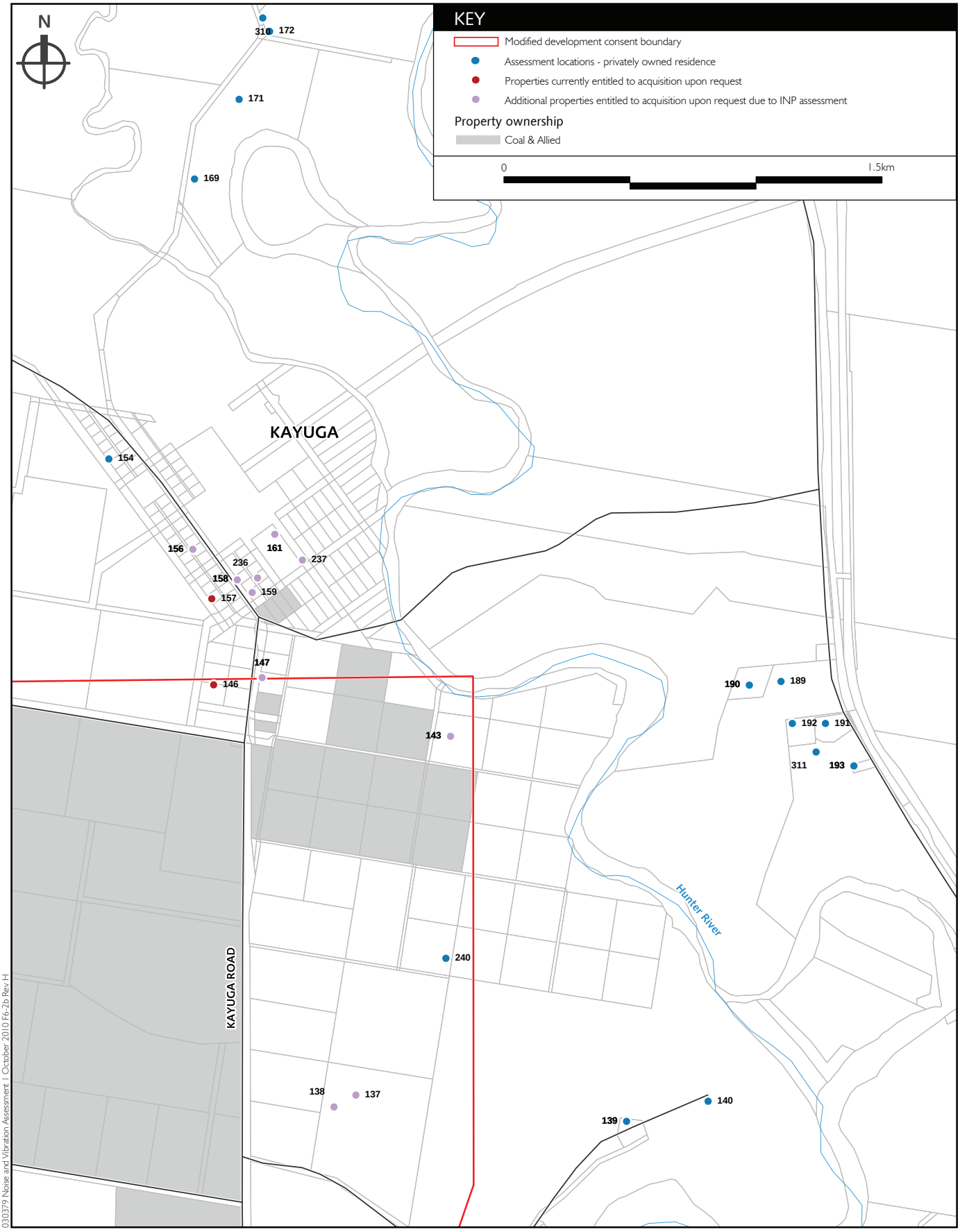
INP Assessment and Affected Properties

Mount Pleasant Project Modification - Noise and Vibration Assessment

FIGURE 6.2a



0303379 Noise and Vibration Assessment | October 2010 F6.2b Rev H

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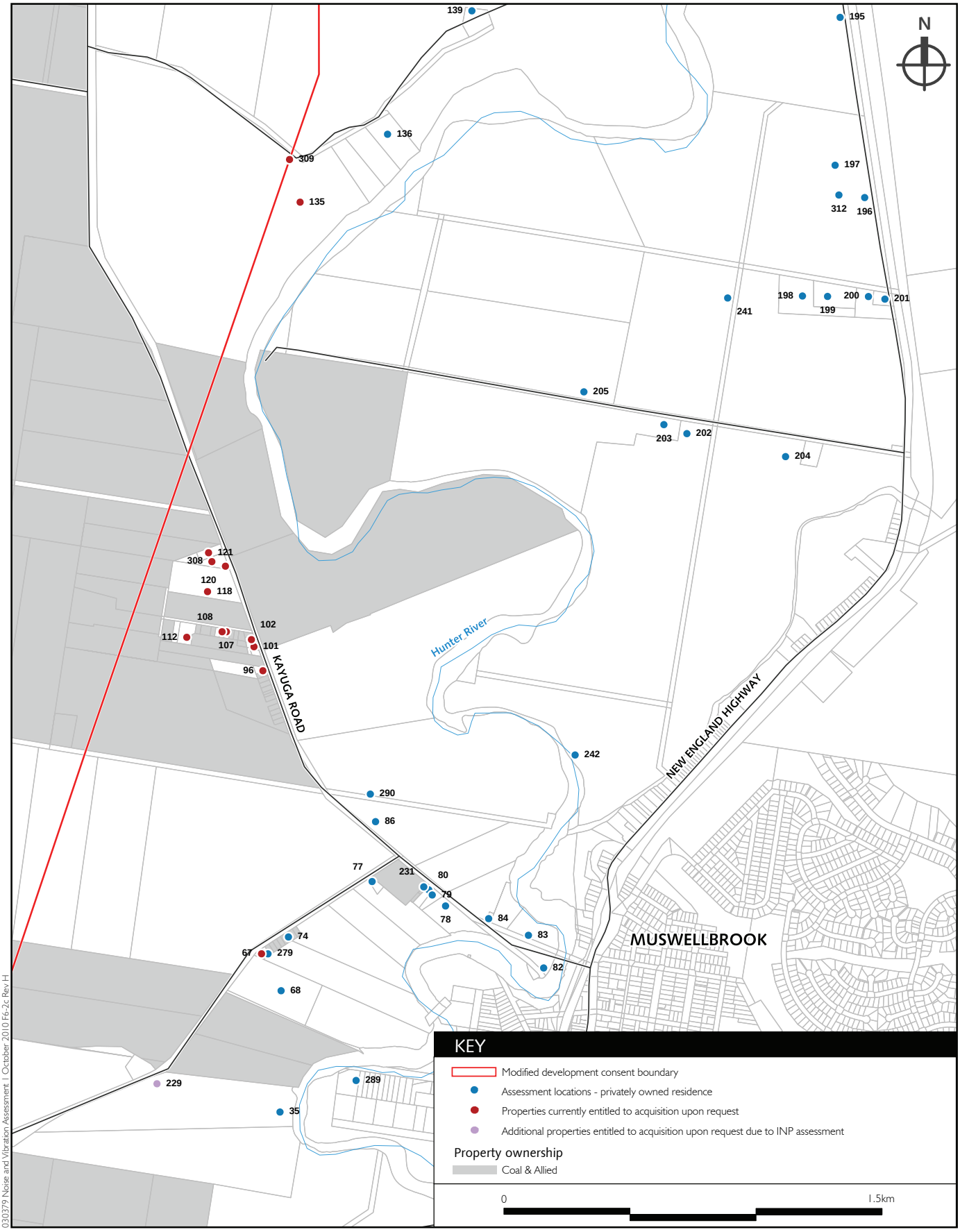
INP Assessment and Affected Properties - Kayuga

Mount Pleasant Project Modification - Noise and Vibration Assessment

FIGURE 6.2b



0303379 Noise and Vibration Assessment | October 2010 F6.2c Rev H

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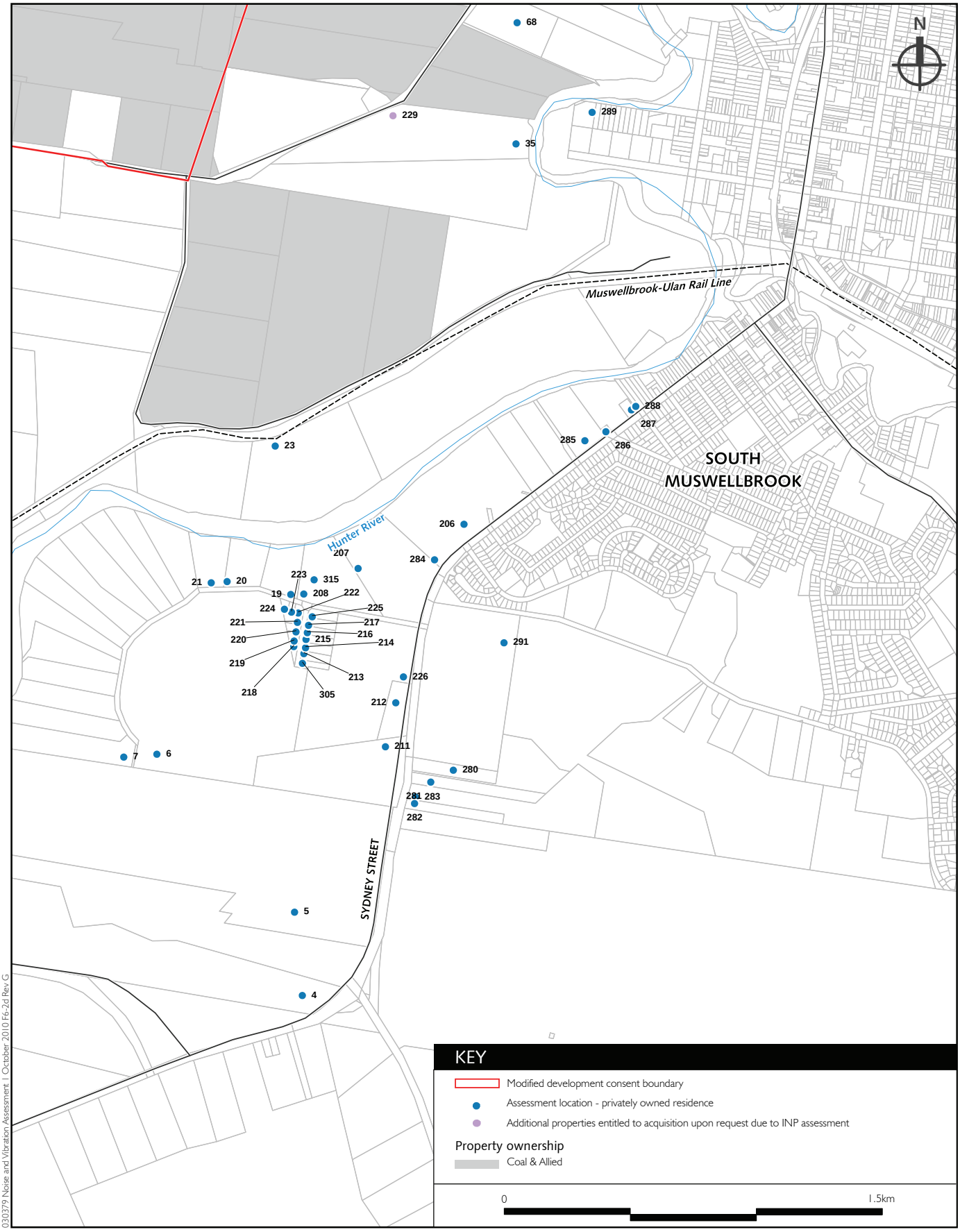
INP Assessment and Affected Properties - Muswellbrook

Mount Pleasant Project Modification - Noise and Vibration Assessment

FIGURE 6.2c



0303379 Noise and Vibration Assessment | October 2010 F6.2d Rev G

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INP Assessment and Affected Properties - South Muswellbrook

Mount Pleasant Project Modification - Noise and Vibration Assessment

FIGURE 6.2d

6.4 Percentage occurrence of noise levels (probability distribution)

The level of mine noise at a given receptor varies and is dependent upon many factors including prevailing weather conditions. It is prudent to gain an understanding of this variation rather than relying on a single predicted noise level for one set of weather conditions as presented earlier.

The ENM noise model predicts noise levels under various combinations of wind speed and direction and vertical temperature gradient. Hence, the proportion of time during which certain noise levels will be experienced can be inferred from the percentage occurrence of the various combinations of wind speed, wind direction and stability class.

The effect of a representative set of meteorological conditions on the level of noise received at locations 43, 44, 45 and 263 is presented for the Year 10 night operating scenario (mine and conveyor). These locations represent the areas west and potentially most affected by the conveyor operation.

The analysis of meteorological effects involved calculating noise to each of the four assessment locations under the influence of each of 198 meteorological conditions based on a combination of wind speed, wind direction and temperature gradient, and combining these in proportion to the probability of their occurrence. These conditions are derived by adopting sixteen wind directions, six temperature gradients and two 10m elevation wind speed ranges (ie 16 x 6 x 2 = 192). In addition, six calm weather conditions (defined by winds less than 0.4m/s and six stability classes) where included in the calculations. This analysis results in a noise probability distribution for each location as shown in Figure 6.3.

Often a reasonable indicator of noise impact is associated with an industrial noise level present for at least 10 per cent of the time. This is consistent with the intent of the INP.

From Figure 6.3, the 10 per cent exceedance noise level is 48dB(A), 42dB(A), 39dB(A) and 40dB(A) for locations 43, 44, 45 and 263 respectively. These levels compare to an INP-based prediction (see Table 6.3 Year 10 Night Mets results) of 49dB(A), 46dB(A), 43dB(A) and 43dB(A) for these locations. This demonstrates a good correlation between the two methods, with the INP approach being marginally conservative for the four locations.

Other observations of note include that mine noise at all four locations is predicted to be at or below 33dB(A) for 50 per cent of the time (refer to 50 per cent probability in the chart).

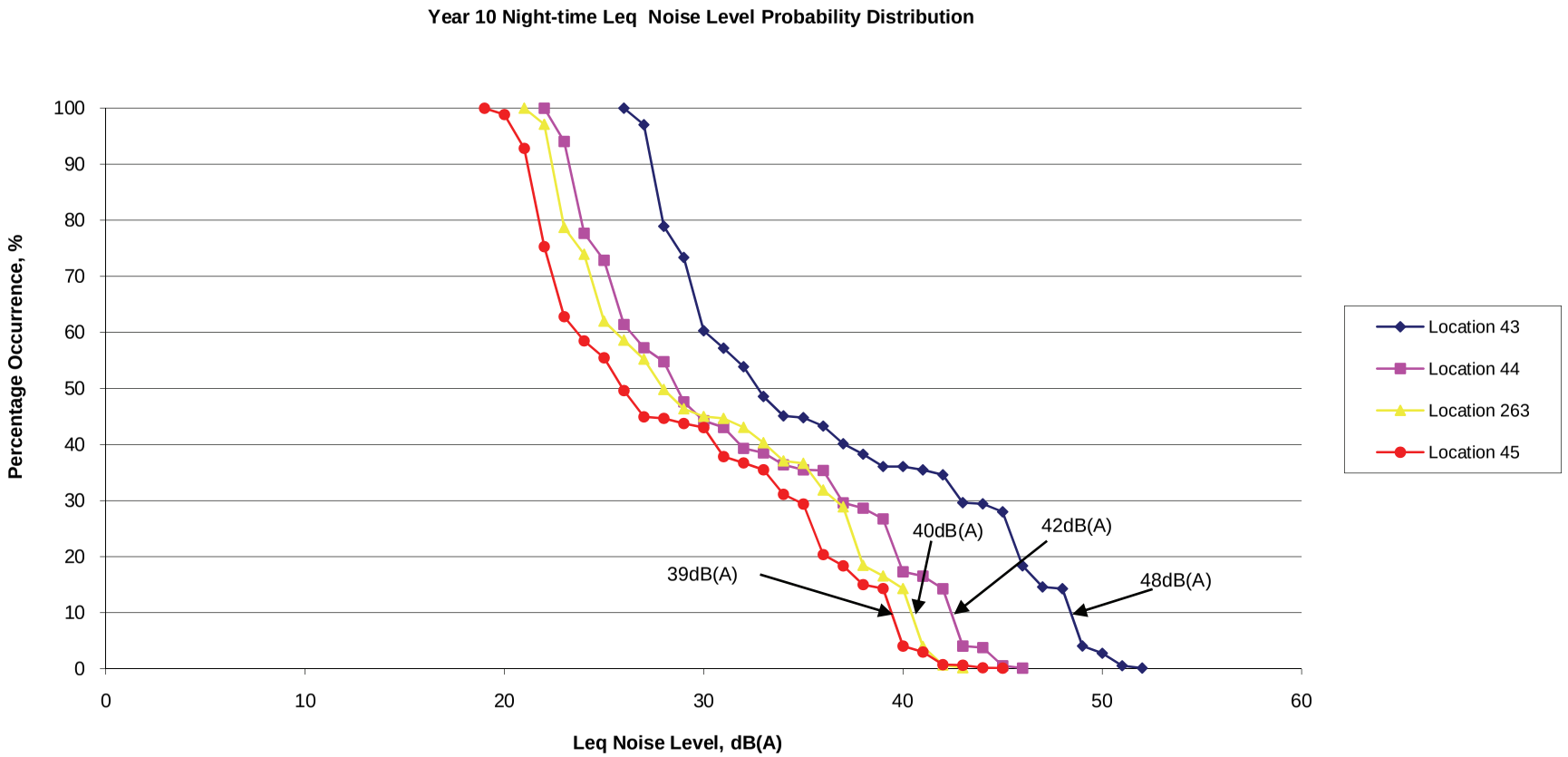

Figure 6.3 Year 10 night time Leq noise level probability distribution

6.5 Sleep disturbance assessment

Sleep within residences may be disturbed by intermittent noises such as banging of shovel gates, bulldozer track plates and reversing alarms of heavy vehicle. Typical noise levels from the loudest of these events are presented in Table 6.5.

Table 6.5 Maximum noise from intermittent sources

Noise source	Measured L_{max} noise level, dB(A)
Haul Truck	125
Shovel gate banging	120
Bulldozer with reversing alarm	115

Source: EMGA MM file

Table 6.5 indicates that the highest maximum noise levels expected at residences would likely result from haul trucks. The maximum sound power level of unmitigated haul trucks has previously been measured to be typically 125dB(A)L_{max}. Maximum noise levels at each residence were calculated under "prevailing meteorology" and reported herein.

Table 6.5 summarises the maximum predicted L_{max} noise levels from trucks under adverse (prevailing) meteorology at the adopted assessment locations based on the typical equipment positions used for mining operations. Predictions were based on a single event, rather than the simultaneous operation of a number of plant items because of the low probability of more than one maximum noise event occurring concurrently. The criteria used to assess sleep disturbance are based on the DECCW's "background noise level plus 15 dB" for the maximum L_{max} level (INP, 2000). This results in sleep criteria levels ranging from 45 to 51dB(A) L_{max} depending on the individual location's background noise levels as determined through monitoring.

Table 6.6 indicates that predicted noise levels under prevailing weather conditions are within the DECCW's conservative sleep disturbance criterion for a select set of residences. Exceedances are predicted for locations 43, 44, 45 and 135. These locations were also identified earlier as predicted to experience noise levels above potential acquisition criteria.

Table 6.6 Lmax sleep disturbance assessment

Assessment location	Predicted typical Lmax noise level during INP weather, dB(A)	Night time Lmax criteria, dB(A)
21	44	49
43	**52**	45
44	**49**	45
45[1]	**46**	45
112	36	47

Table 6.6 Lmax sleep disturbance assessment

Assessment location	Predicted typical Lmax noise level during INP weather, dB(A)	Night time Lmax criteria, dB(A)
135	**47**	45
156	39	45
190	43	49
202	43	47
246[2]	35	45
249[1]	32	45
257	38	45
263[1]	43	45
288	39	49
289	42	49

Notes: 1. *These properties were NOT listed in the 1997 EIS.*

2. *This property is within BMC's acquisition upon request clause.*

6.6 Other noise emissions

Currently, there is a number of noise sources located at the Bengalla Rail Spur, such as the CHPP, loading bin, loading of coal onto trains and rail operations. This is consistent with the noise levels from the proposed Mount Pleasant Project modifications operations as only one train can be loaded at any one time. A maximum of five trains would be loaded per day on the Bengalla Rail Spur (Hansen Bailey, 2006). The approved Mount Pleasant Project rail loop is similarly designed to load one train with one waiting to be loaded.

The closest residence (location 246) is approximately 3km southwest from the Bengalla Rail Spur, less than 1km north from the boundary of Mount Arthur Mine and approximately 1.5km south from the proposed conveyor. Location 246 is listed within Bengalla Mine's development consent for acquisition upon request. The operational noise at location 246 from the surrounding mining operations under prevailing weather conditions is predicted as follows:

- Bengalla - 40dB(A)$L_{eq,15minute}$;
- Mount Arthur Mine - <41dB(A) $L_{eq,15minute}$
  - If this wind is prevailing, it will mean that noise from Bengalla Mine and Mount Pleasant Project is reduced due to the direction; and
- Mount Pleasant Project - 38dB(A) $L_{eq,15minute}$
  - Dominated by the conveyor and drive motors which produce 35dB(A));

- **Cumulative Total - <45dB(A) $L_{eq,15minute}$.**

The above data demonstrates that the conveyor option (if pursued)would contribute 35dB(A) to the total noise at location 246 and Bengalla Mine would contribute of 40dB(A) for prevailing winds. However, if the approved rail facilities were constructed, it would contribute approximately 40dB(A). Accordingly, the cumulative noise of Bengalla Mine and Mount Pleasant Project at location 246 is predicted to be higher if Mount Pleasant Project were to proceed with the approved rail facilities rather than the proposed conveyor.

In reality the worst case noise at the closest residence is likely to be the result of cumulative noise from Bengalla and Mount Pleasant Project (ie 38 + 40 = 42dB(A)) combined from a prevailing wind from the north or Mount Arthur Mine (ie 41dB(A)) from a prevailing wind from the south, given the direction of prevailing winds. Similarly, if the approved Mount Pleasant rail facilities were adopted instead of the proposed conveyor the noise levels at location 246 would be 40dB(A) from the Mount Pleasant Project and 40dB(A) from Bengalla or a total of 43dB(A).

Accordingly, the cumulative noise of Bengalla and Mount Pleasant mines at location 246 is predicted to be higher if Mount Pleasant were to proceed with its approved rail line and loop compared to if the optional conveyor was used instead.

In relation to noise from additional rail movements and loading on the existing Bengalla loop, the movements and loading associated with the respective activities of both Bengalla and the Mount Pleasant Project would not be cumulative as stated previously in this report. The rail loading noise and rail locomotive noise in isolation from all other sources can also be quantified at the closest residence based on current modelling as follows:

- Load bin noise 30dB(A) $L_{eq,15minute}$; and
- Locomotive noise 40dB(A) $L_{eq,15minute}$.

The above are worst case $L_{eq,15minute}$ noise levels and are those currently being experienced at location 246 and will not change due to the project since only one train can be loaded at any one time. The locomotive noise is present during rail loading operations, which at present is typically five to 10 hours per day and, subject to the current modification being approved, increasing by a further five to 10 hours a day, given the similar production rates of the two projects. Whilst there is proposed to be more loading operations, the worst case $L_{eq,15minute}$ noise level will remain unchanged from current operations.

The next closest privately owned residence to the existing rail loop is Roots (location 249). The predicted noise levels at this residence and others further south or south west from Bengalla and the Mount Pleasant Project Modification are not expected to be above possible acquisition limits of either operation. Hence, Bengalla's current zone of affectation is highly unlikely to increase as a result of the Mount Pleasant Project.

The conditions in Section 11.3 of the Mount Pleasant consent provides relevant procedures to be followed in the event of cumulative impacts (refer to Appendix A of EA Volume 2).

7 Cumulative noise assessment

The noise ambient at locations in the vicinity of the Mount Pleasant Project will also be influenced by adjoining industrial operations. There are two existing mining operations in the area that could contribute to noise at locations sensitive to the Project's operations. These are Bengalla Mine to the immediate south and Mount Arthur Mine, south of Bengalla Mine. In broad terms, mine noise at a given locality will be influenced by the closer of the mines to that receiver. For example, it is expected that noise from both the Mount Pleasant Project and Bengalla Mine would contribute to received noise at Muswellbrook in a similar way. However, cumulative noise from Mount Pleasant Project and Mount Arthur Mine is unlikely to be significant at the same assessment location given the relative positions of these two mines, Bengalla Mine located in-between and the influence of prevailing weather conditions. To that end, prevailing winds will play a major factor in which of these three main industrial operations will dominate or contribute to the total received noise at any given sensitive location. This is particularly applicable given the north-south alignment of these three contributing mining operations.

The level of noise at residences from each of these surrounding mines was obtained from the following publicly available documents:

- Mount Arthur Coal - Consolidated Project Environmental Assessment of 2009; and
- Bengalla Mining Company Modification to Development Consent Statement of Environmental Effects, 2006.

These assessments predict noise levels at residences under "calm" and adverse (prevailing) weather conditions. It should be noted however that the methods used for adverse (prevailing) weather predictions differ to this assessment. To assess cumulative impacts, the L_{eq} noise levels predicted in this assessment were combined with the L_{eq} noise levels from relevant mining stages of each of the aforementioned assessments, which coincide with the Year 10 night scenario for the Mount Pleasant Project.

Table 7.1 summarises the cumulative noise received at residences surrounding the Mount Pleasant Project. The results are presented for both calm and prevailing weather separately. Also presented (in parentheses) is the respective percentage contribution to the total cumulative noise level from the Project. This demonstrates the dominance or otherwise of the Mount Pleasant Project at the given assessment location. The locations selected are a subset of the previous list shown in Table 6.3 and are considered to represent the potentially worst affected as a result of cumulative noise from the three mines. The cumulative assessment is considered to be conservative due to the fact that the results are for prevailing weather, since worst case winds (for example) for all three mines cannot occur at the same time thus creating worst case impacts at the same assessment location. This conservative approach, whilst not altogether realistic, does provide a suitable ranking order of which of the three mines could be the dominant contributor for that assessment location.

This analysis indicates that the Mount Pleasant Project only dominates the noise environment at one assessment location (location 43, to the west of the conveyor) during calm weather. However, during prevailing weather conditions, Mount Pleasant Project is a significant contributor at four of the selected assessment locations (43, 44, 45 and 289). This is not unexpected given that these locations were selected on the expectation that they are potentially the most exposed to the proposed modifications (ie conveyor/ service corridor and infrastructure area envelopes).

Table 7.1 Cumulative noise assessment (Project Year 10 Night) Leq, dB(A))

Location	Calm weather	Prevailing weather
7	39 (1%)	43 (25%)
21	38 (2%)	43 (40%)
43	34 (63%)	46 (79%)
44	32 (40%)	44 (79%)
45	31 (40%)	41 (79%)
246	30 (10%)	44 (20%)
249	26 (13%)	41 (10%)
257	31 (20%)	42 (50%)
263	32 (40%)	42 (40%)
288	31 (10%)	40 (50%)
289	30 (10%)	42 (63%)
305	37 (2%)	42 (32%)

Notes: The calm weather results for MAC were not available and therefore its contribution under calm weather not included. This is not considered to manifest in any significant implications as noise under calm weather at most nominated locations will not be as influenced by MAC.

8 Construction noise assessment

As discussed earlier, the conveyor/service corridor option, if pursued, will be the only construction activity not previously addressed in the EIS. The construction hours will generally be consistent with the requirements in the DECCW's ICNG of 7am to 6pm Monday to Friday, and 8am to 1pm on Saturdays, with no work on Sundays or public holidays. This will satisfy the main objective of the ICNG. The exceptions would be emergency work or similar or low impact activities where noise is inaudible or less than 5dB above background.

The secondary recommendation in the ICNG relates to construction noise levels at sensitive receivers. The typical construction plant needed is listed below along with representative sound power levels:

- compactors – 107dB(A)$L_{eq,15minute}$;
- graders – 107dB(A)$L_{eq,15minute}$;
- scrapers – 115dB(A)$L_{eq,15minute}$;
- excavators – 111dB(A)$L_{eq,15minute}$;
- backhoes – 107dB(A)$L_{eq,15minute}$;
- Water cart – 110dB(A)$L_{eq,15minute}$;
- road truck – 103dB(A)$L_{eq,15minute}$; and
- rollers – 107dB(A)$L_{eq,15minute}$.

The above items include plant that is similar to what is expected during typical mining operations, although mining has not occurred at the subject site.

The concurrent operation of the above plant will likely be limited to three or four items, resulting in a combined typical emission value of not more than 117dB(A), influenced mostly by use of the noisiest item, the scraper. Applying this typical sound power level for construction activity, Table 8.1 provides the predicted construction noise at the closest and potentially the most exposed residences to the conveyor/service corridor.

As shown previously in Table 4.4, the DECCW's ICNG states that if construction noise exceeds the background noise level by more than 10dB, residences may be considered as 'noise affected', whilst construction noise levels above 75dB(A) at residences are defined as 'highly noise affected'. The results shown in Table 8.1 indicate that residents will not be 'highly noise affected' according to the definition in DECCW's ICNG, however, there may be some receptors may experience levels are above the 'noise affected' definition. To that end, the ICNG recommends application of all reasonable and feasible work practices and that the proponent should inform all potentially impacted residents of the nature of the work to be carried out, the expected noise levels and duration (understood to be not more than six months), as well as provide contact details.

Table 8.1 Conveyor/service corridor construction noise assessment

Assessment location	Predicted typical Leq,15minute construction noise level during INP weather, dB(A)	Daytime construction noise criteria, dB(A)	
		Noise affected	Highly noise affected
43	53	40	75
44	52	40	75
45	45	40	75
246	50	40	75
249	41	40	75
257	47	40	75
263	50	40	75

9 Noise management

The existing consent conditions of the Mount Pleasant Project include practical management measures and protocols that will continue to be adopted should the proposed modifications obtain approval. These conditions include Condition 6.4 (Noise Control) and Condition 11.1 (Area of Affectation – Land Acquisition including resolution of disputes). However, the now outdated L_{10} based noise criteria outlined in Condition 6.4 will be replaced by the INP derived L_{eq} noise criteria. These criteria are referenced as Project Specific Noise Criteria and outlined in Table 4.1 of this report. As previously stated, the adoption of INP derived noise criteria has been discussed and confirmed with DoP. These new criteria will also form part of the detailed noise monitoring programme for the Mount Pleasant Project.

As part of the existing development consent (Condition 8.4), a Noise Management Plan (NMP) must be prepared prior to commencement of construction. The current quarterly monitoring undertaken around the surrounding areas of the mine will be continued as a component of the NMP. In future, such monitoring will be supplemented to include real time noise and weather data monitoring to aid in the management of any future noise emissions. The real time noise monitors will include stations at Kayuga, Muswellbrook and at a representative site to the south-west.

9.1 Proposed modifications

In addition to the feasible and reasonable mitigation measures outlined earlier which includes cladding the proposed conveyor, properties 43, 44, 45 and 263 will be provided with the opportunity of upfront acquisition rights.

9.2 Broader mine context

Although the mine plan and operations are not changing from those in the EIS, the proponent is committed to the procurement of best available technology plant and mobile equipment including noise suppression on all mobile plant. This is the single most effective management measure that will be adopted.

In addition, nine properties containing 12 residences identified in this study to be affected above acquisition levels under 'adverse' weather conditions will be provided with the opportunity for upfront acquisition. This is in addition to those properties in the Schedule to Conditions 6.2.1 and 6.4.2 of the development consent identified as affected under 'calm' weather conditions in the 1997 EIS and 1999 development consent.

9.3 General and whole of operations

The plan will typically include the following aspects:

- identify noise affected properties and relevant noise limits consistent with the Environmental Assessment;
- specify procedures for undertaking independent noise investigations;
- specify protocols for routine, regular attended and unattended noise monitoring of the Project. This would include real time noise monitoring on a permanent basis at Kayuga, Muswellbrook and to the south west of the site;

- outline the procedure to notify property owners and occupiers that could be affected by noise from the mine;
- establish a protocol to handle noise complaints that includes recording, reporting and acting on complaints;
- include appropriate mechanisms for community consultation;
- outline mitigation measures to be employed to limit noise;
- identify longer term strategies to mitigate noise that exceeds the DECCW target noise criteria;
- outline measures to reduce the impact of intermittent, low frequency and tonal noise (including truck reversing alarms); and
- specify measures to document any higher level of impacts or patterns of temperature inversions, and detail actions to quantify and ameliorate enhanced impacts if they occur.

The NMP will be extended to include management of potential noise emissions associated with the construction of the conveyor. The plan will also consider pro-active and predictive modelling and management, and protocols for managing noise during adverse meteorological conditions.

10 Conclusion

10.1 Proposed Modification

The conveyor, if pursued, will require elevated gantries to be enclosed and overland sections to be enclosed along the western side with roofing, to meet noise criteria for most residences to the west of the Mount Pleasant Project area.

The noise assessment indicates that operational noise will comply with DECCW's operational criteria at all assessment locations during calm weather conditions for both day and night periods with the exceptions of assessment location 43, which is located approximately 400m west of the proposed conveyor/service corridor, and locations 129 and 130, which are within the development consent boundary. For prevailing weather conditions, the modelling predicts that the introduction of the proposed conveyor and possible reconfiguration of the infrastructure within an infrastructure envelope introduce impacts at receiver locations to the south-west not previously identified in the EIS. A total of four assessment locations (43, 44, 45 and 263) have been identified where noise levels are predicted to be above possible acquisition levels. Of note, these four assessment locations each comprise one residence only and acquisition beyond these properties to the west is not predicted.

This assessment also concludes that construction of the conveyor will need to be managed to minimise the potential for construction noise nuisance to neighbouring residences.

10.2 Update of noise predictions to INP assessment

The Mount Pleasant Project has been assessed in its entirety in accordance with the INP contemporary noise standards. The differences in the INP assessment compared to that undertaken in the 1997 EIS include the adoption of the L_{eq} noise metric over the L_{10} level, and a more thorough and clear assessment approach for adverse weather conditions.

The assessment found that the extent of potential impact during 'calm' weather conditions to be similar to that in the 1997 EIS.

The main difference when assessing noise to contemporary standards to that in the 1997 EIS, is the DoP requirements for upfront acquisition of properties affected under 'adverse' weather conditions. While the 1997 EIS gave consideration to such weather conditions, the development consent provided a hierarchy of monitoring, mitigation and then acquisition during operations. Conditions of development consents/project approvals granted in more recent times entitle residences where predictions exceed acquisition criteria during adverse weather conditions to the right to upfront acquisition upon request.

This assessment has found nine properties containing 12 residences are predicted to exceed acquisition criteria during 'adverse' weather conditions. These properties are in addition to those entitled to acquisition upon request listed in the Schedule to Conditions 6.2.1 and 6.4.2 of the development consent due to the 1997 EIS which predicted exceedances under 'calm' weather conditions. These predictions are made on the same mine plan presented in the 1997 EIS, however with considerable additional reasonable and feasible mitigation measures, most notably sound suppression of mobile plant and equipment at a cost of some $15-20M.

Coal & Allied is committed to working with the in which they operate and extends the opportunity for upfront acquisition upon request to the additional 13 properties, which includes the four properties identified from the assessment of the proposed conveyor/services corridor (i.e. from the proposed modification) and a further nines properties from the mine that are affected under adverse conditions.

References

Bengalla Mining Company Modification to Development Consent Statement of Environmental Effects, (Hansen Bailey 2006).

Environmental Criteria for Road Traffic Noise (EPA 1999).

Environmental Noise Control Manual (Environment Protection Authority, 1994).

Environmental Noise Model (ENM) Windows Version 3.06 (RTA Technology).

Interim Construction Noise Guideline (DECCW, 2009).

Mount Arthur Coal – Consolidated Project Noise and Blasting Impact Assessment (Wilkinson Murray 2009).

NSW Industrial Noise Policy (Environment Protection Authority, 2000).

Technical Basis for Guidelines to Minimise Annoyance due to Blasting Overpressure and Ground Vibration (Australian and New Zealand Environment and Conservation Council (ANZECC, 1990)).

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Appendix A

Noise monitoring data 2009

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Mount Pleasant Project Quarter 4, 2009
Environmental Noise Monitoring

Reference: 09248_R01.doc

Report Date: 14 January 2010

Prepared for:
Coal & Allied
Mount Pleasant Project
19 Bridge Street
Muswellbrook NSW 2333

Prepared by:
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QA review: Tony Welbourne, Director

Global Acoustics Pty Ltd ~ Environmental noise modelling and impact assessment ~ Sound power testing ~ Noise control advice ~ Noise and vibration monitoring ~ OHS noise monitoring and advice ~ Expert evidence in Land and Environment and Compensation Courts ~ Architectural acoustics ~ Blasting assessments and monitoring ~ Noise management plans (NMP) ~ Sound level meter and noise logger sales and hire

EXECUTIVE SUMMARY

Global Acoustics was engaged by Coal and Allied to conduct a noise survey around the site approved for open cut mining and known as the Mount Pleasant Project (MTP), Muswellbrook.

Attended monitoring was conducted on the night of 30/31 October 2009. This monitoring does not provide levels that could be considered representative (being only brief and irregular), however, it will allow, after many surveys, identification of typical noise sources in the area.

Continuous noise logging was conducted between 31 October and 13 November 2009 at six sites.

There are six monitoring locations in total for the Mount Pleasant Project as detailed in the table below.

MONITORING LOCATIONS

Descriptor	Monitoring Location
Burtons Lane	Burtons Lane, Muswellbrook
Aberdeen	Gordon Street, Aberdeen
Muswellbrook	Cnr Brook and Scott Streets, Muswellbrook
Kayuga	Little Acres, Kayuga Road, Kayuga
Kayuga Road	Cnr Kayuga and Wybong Roads, Muswellbrook
Wybong Road	1232 Wybong Road

A combination of traffic on the New England Highway, frogs and insects generally dominated the acoustic environment at most locations.

Continuous noise logging indicated that RBL's logged at night were generally lowest (less than 30 dB) in the more rural monitoring site on Wybong Road.

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TABLE OF APPENDICES

1 INTRODUCTION

1.1 BACKGROUND

Global Acoustics was engaged by Coal and Allied to conduct a noise survey around the site approved for open cut mining and known as the Mount Pleasant Project (MTP), Muswellbrook.

Attended monitoring was conducted on the night of 30/31 October 2009. This monitoring does not provide levels that could be considered representative (being only brief and irregular), however, it will allow, after many surveys, identification of typical noise sources in the area.

Continuous noise logging was conducted between 31 October and 13 November 2009 at six sites.

The purpose of the survey is to quantify and describe the acoustic environment around the site.

1.2 MONITORING LOCATIONS

There are six monitoring locations in total for the Mount Pleasant Project as detailed in Table 1.1.

Table 1.1 MONITORING LOCATIONS

Descriptor	Monitoring Location
Burtons Lane	Burtons Lane, Muswellbrook
Aberdeen	Gordon Street, Aberdeen
Muswellbrook	Cnr Brook and Scott Streets, Muswellbrook
Kayuga	Little Acres, Kayuga Road, Kayuga
Kayuga Road	Cnr Kayuga and Wybong Roads, Muswellbrook
Wybong Road	1232 Wybong Road

1.3 TERMINOLOGY

Some definitions of terminology, which may be used in this report, are provided in Table 1.2.

Table 1.2 TERMINOLOGY

Descriptor	Definition
L_A	The A-weighted root mean squared (RMS) noise level at any instant
L_{A1}	The noise level which is exceeded for 1 per cent of the time
L_{A10}	The noise level which is exceeded for 10 per cent of the time, which is approximately the average of the maximum noise levels
L_{A90}	The level exceeded for 90 per cent of the time, which is approximately the average of the minimum noise levels. The L_{A90} level is often referred to as the "background" noise level and is commonly used to determine noise criteria for assessment purposes
L_{Aeq}	The average noise energy during a measurement period
L_{pk}	The unweighted peak noise level at any instant
dB(A)	Noise level measurement units are decibels (dB). The "A" weighting scale is used to describe human response to noise
SPL	Sound pressure level (SPL), fluctuations in pressure measured as 10 times a logarithmic scale, the reference pressure being 20 micropascals
SEL	Sound exposure level (SEL), the A-weighted noise energy during a measurement period normalised to one second
Hertz (Hz)	Cycles per second, the frequency of fluctuations in pressure, sound is usually a combination of many frequencies together
ABL	Assessment background level (ABL), the 10th percentile background noise level for a single period (day, evening or night) of a 24 hour monitoring period
RBL	Rating background level (RBL), the background noise level for a period (day, evening or night) determined from ABL data

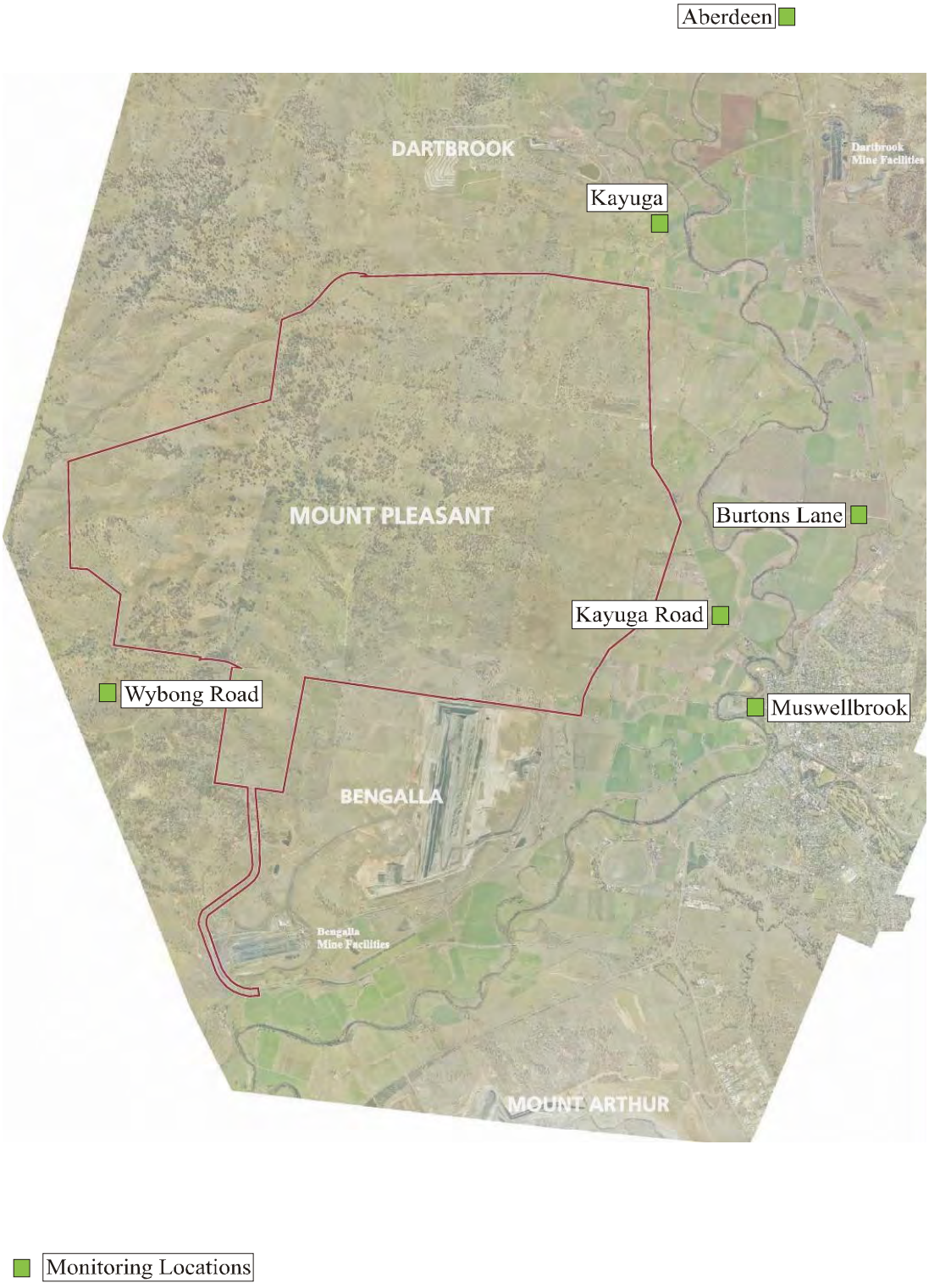

Figure 1 Monitoring Sites

2 METHODOLOGY

2.1 CONTINUOUS NOISE MONITORING

Noise levels were continuously monitored at six locations over approximately 7 days using noise data loggers. The units were configured to provide statistical noise data summaries every 15 minutes.

The equipment used to measure environmental noise levels is listed in Table 2.1.

Table 2.1 MONITORING EQUIPMENT

Model	Serial Number	Calibration Due Date
Ngara S-pack data logger and audio recorder	878007	17/01/2010
Ngara S-pack data logger and audio recorder	878003	20/12/2009
Ngara S-pack data logger and audio recorder	878006	21/01/2010
Rion NC-73 calibrator	11248300	19/03/2010

Calibration certificates are included as Appendix A.

2.2 ATTENDED NOISE MONITORING

Attended monitoring was conducted at three sites in accordance with Department of Environment, Climate Change and Water (DECCW) 'Industrial Noise Policy' (INP) guidelines and Australian Standard AS 1055 'Acoustics, Description and Measurement of Environmental Noise'. Atmospheric condition measurement was also undertaken.

The duration of each measurement was 15 minutes. Monitoring was carried out once at each location during the night period.

The equipment used to measure environmental noise levels are listed in Table 2.2.

Table 2.2 MONITORING EQUIPMENT

Model	Serial Number	Calibration Due Date
Rion NA-28 sound level analyser	00370304	22/05/2011
Rion NC-73 calibrator	11248306	05/02/2010

Calibration certificates are included as Appendix A.

3 RESULTS

3.1 CONTINUOUS NOISE MONITORING

Noise data loggers measure all noise sources at the logger location over the measurement period. This will include local noises, for example road traffic, farm machinery, animals, and insects; and also the source of interest, if audible. It is not possible to discern which sources were responsible for the logged levels.

Table 3.1 provides Rating Background Level (RBL) data for each period for the duration of continuous monitoring. These are totals for background noise levels. Logger data graphs are provided as Appendix B.

Table 3.1 RATING BACKGROUND LEVEL (dB) – TOTAL LEVELS

Site	Day	Evening	Night
Burtons Lane	32	37	32
Aberdeen	NA	NA	NA
Kayuga	NA	NA	NA
Kayuga Road	35	38	32
Wybong Road	25	28	27
Muswellbrook	36	40	34

Notes: 1. N/A indicates data is not available for this location.

Assessment Background Levels (ABL's) are provided below for each location for each day of monitoring. These levels pertain to total background noise levels.

3.1.1 Burtons Lane

Table 3.2 shows the ABL's and RBL's for Burtons Lane between 31 October and 6 November 2009. Results shown have been filtered for weather conditions.

Table 3.2 ASSESSMENT BACKGROUND LEVEL (dB) – TOTAL LEVELS FILTERED FOR WEATHER, BURTONS LANE

Date	Day	Evening	Night
31/10/2009	37	37	30
1/11/2009	32	39	32
2/11/2009	32	36	32
3/11/2009	NA	37	35
4/11/2009	NA	41	31
5/11/2009	NA	NA	35
RBL	**32**	**37**	**32**

Notes: 1. N/A indicates entire period not monitored.

3.1.2 Aberdeen

Due to technical difficulties, data is unavailable for the Aberdeen continuous monitoring location.

3.1.3 Kayuga

Due to technical difficulties, data is unavailable for the Kayuga continuous monitoring location.

3.1.4 Kayuga Road

Table 3.2 shows the ABL's and RBL's for Kayuga Road between 6 and 12 November 2009. Results shown have been filtered for weather conditions.

Table 3.3 ASSESSMENT BACKGROUND LEVEL (dB) – TOTAL LEVELS FILTERED FOR WEATHER, KAYUGA ROAD

Date	Day	Evening	Night
6/11/2009	NA	36	NA
7/11/2009	39	37	29
8/11/2009	36	39	31
9/11/2009	37	42	32
10/11/2009	31	38	32
11/11/2009	32	39	32
12/11/2009	33	NA	NA
RBL	**35**	**38**	**32**

Notes: 1. N/A indicates entire period not monitored.

3.1.5 Wybong Road

Table 3.2 shows the ABL's and RBL's for Wybong Road between 31 October and 6 November 2009. Results shown have been filtered for weather conditions.

Table 3.4 ASSESSMENT BACKGROUND LEVEL (dB) – TOTAL LEVELS FILTERED FOR WEATHER, WYBONG ROAD

Date	Day	Evening	Night
31/10/2009	NA	32	26
1/11/2009	25	26	27
2/11/2009	25	26	29
3/11/2009	NA	28	26
4/11/2009	NA	33	24
5/11/2009	NA	NA	33
RBL	**25**	**28**	**27**

Notes: 1. N/A indicates entire period not monitored.

3.1.6 Muswellbrook

Table 3.2 shows the ABL's and RBL's for Muswellbrook between 6 and 13 November 2009. Results shown have been filtered for weather conditions.

Table 3.5 ASSESSMENT BACKGROUND LEVEL (dB) – TOTAL LEVELS FILTERED FOR WEATHER, MUSWELLBROOK

Date	Day	Evening	Night
6/11/2009	NA	36	NA
7/11/2009	40	40	30
8/11/2009	36	40	32
9/11/2009	38	38	33
10/11/2009	34	41	34
11/11/2009	35	41	34
12/11/2009	36	NA	36
RBL	**36**	**40**	**34**

Notes: 1. N/A indicates entire period not monitored.

Graphs of noise logger data are provided in Appendix B. These show that noise levels are generally highest during the day and evening periods. This was particularly noticeable during morning and afternoon traffic peak hours. Our experience is that mining is typically inaudible during those times (particularly day) and so logged levels then would most likely be non-mining.

RBL's logged at night, the period when it is possible that mining noise may contribute to measured levels, were generally lowest (less than 30 dB) in the more rural monitoring site on Wybong Road.

3.2 ATTENDED NOISE MONITORING

Overall noise levels measured at each location during attended measurement are provided in Table 3.6. Discussion as to the noise sources responsible for these measured levels is provided in Chapter 4 of this report.

Table 3.6 MEASURED NOISE LEVELS - QUARTER 4, 2009

Location	Date And Time	L_{A1} dB	L_{A10} dB	L_{Aeq} dB	L_{A90} dB
Burtons Lane	30/10/2009 22:35	46	41	39	35
Aberdeen	30/10/2009 23:39	47	42	39	34
Kayuga	31/10/2009 01:26	43	36	36	33
Kayuga Road	31/10/2009 01:54	41	39	38	36
Wybong Road	31/10/2009 02:37	39	37	35	34
Muswellbrook	31/10/2009 03:38	44	38	36	30

Atmospheric condition data measured at each location are shown in Table 3.7.

Table 3.7 MEASURED ATMOSPHERIC CONDITIONS

Location	Date And Time	Temperature (Degrees C)	Wind Speed (m/sec)	Wind Direction (Degrees)	Cloud Cover (1/8s)
Burtons Lane	30/10/2009 22:35	19	0.2	130	1
Aberdeen	30/10/2009 23:39	18	0.0	-	0
Kayuga	31/10/2009 01:26	18	0.2	130	0
Kayuga Road	31/10/2009 01:54	18	1.3	130	0
Wybong Road	31/10/2009 02:37	17	0.2	130	0
Muswellbrook	31/10/2009 03:38	17	0.3	130	1

Notes: 1. Wind speed and direction measured at 1.8 metres.

4 DISCUSSION

4.1 NOTED NOISE SOURCES

Table 3.6 presents data gathered during attended monitoring. These noise levels are the result of many sounds reaching the sound level meter microphone during monitoring.

From these observations summaries have been derived for each location. The following chapter sections provide these summaries. Statistical 1/3 octave band analysis of environmental noise was undertaken, and Figures 3 to 8 display frequency ranges for various noise sources at each location for L_{A1}, L_{A10}, L_{A90}, and L_{Aeq}. These figures also provide, graphically, statistical information for these noise levels.

An example is provided as Figure 2 where it can be seen that frogs and insects are generating noise at frequencies above 1000 Hz; mining noise is at frequencies less than 1000 Hz (this is typical). Adding levels at frequencies that relate to mining only allows separate statistical results to be calculated. This analysis cannot always be performed if there are significant levels of other noise at the same frequencies as mining; this can be dogs, cows, or, most commonly, road traffic.

It should be noted that the method of summing statistical values up to a cutoff frequency can overstate the L_{A1} result by a small margin but is entirely accurate for L_{Aeq}.

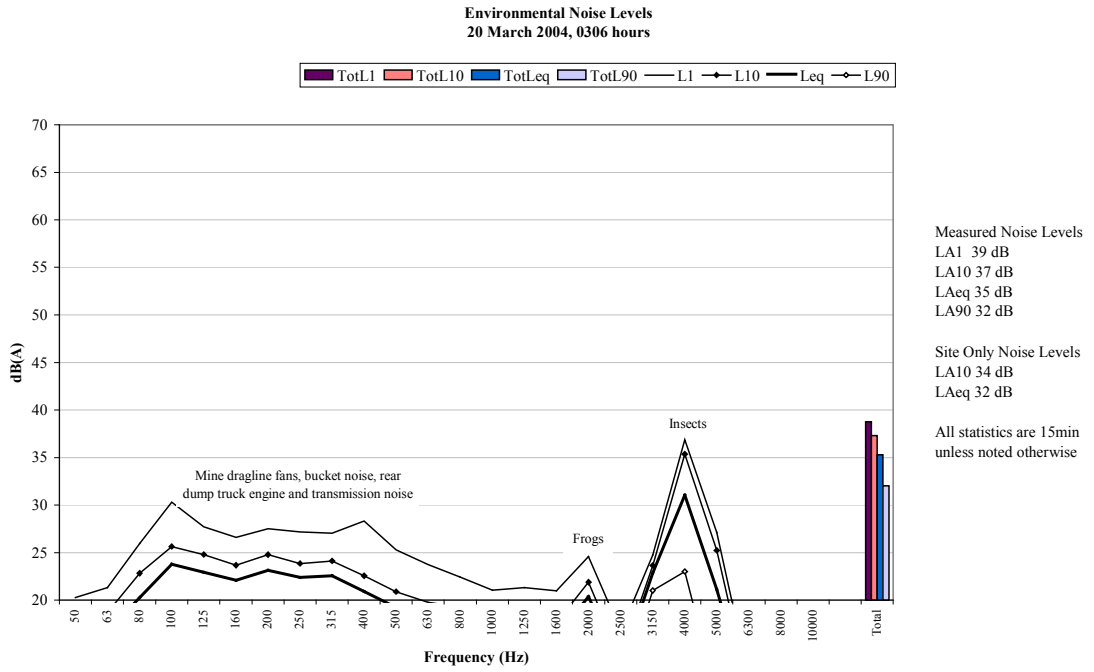

Figure 2 Sample Graph

4.1.1 Burtons Lane, Muswellbrook

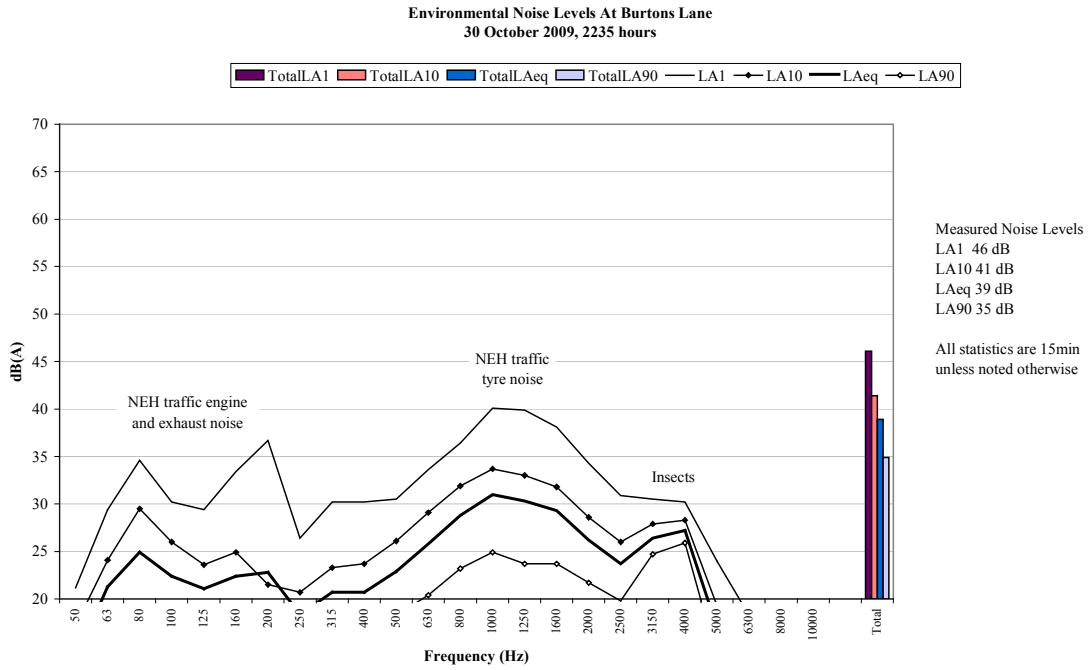

Figure 3 Environmental Noise Levels, Burtons Lane

Tyre noise from traffic on the New England Highway (NEH) dominated the acoustic environment and was primarily responsible for the L_{A1}, L_{A10} and L_{Aeq} and contributed to the measured L_{A90}.

Insects were minor contributors to the measured L_{A10} and L_{Aeq} and were primarily responsible for the measured L_{A90}.

Irrigation sprays and nearby transformer noise was audible throughout the measurement.

4.1.2 Gordon Street, Aberdeen

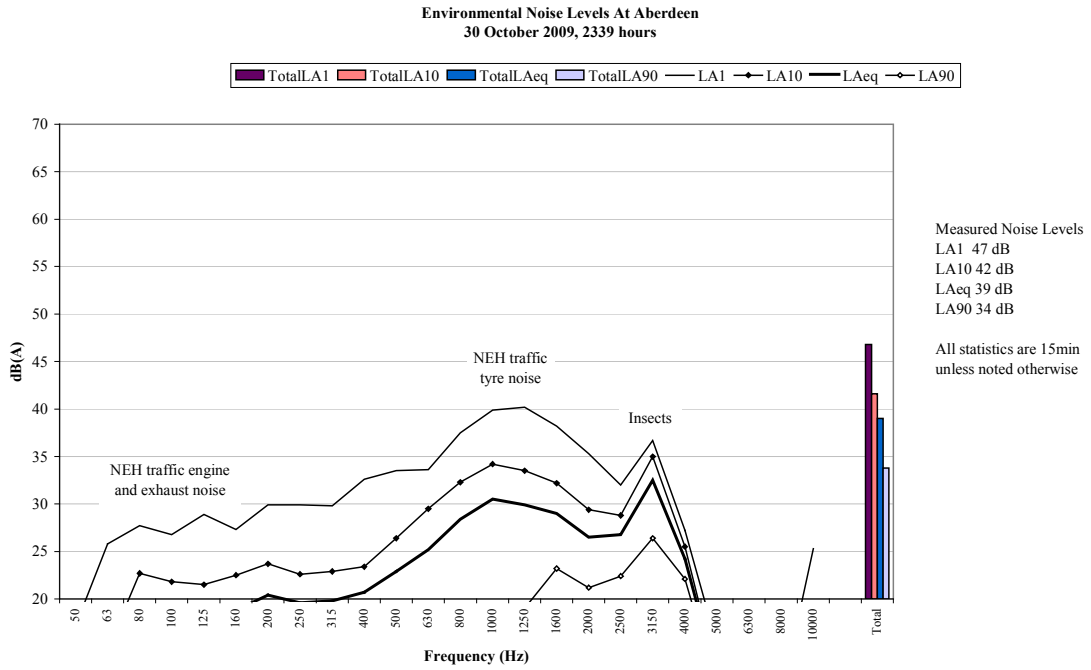

Figure 4 Environmental Noise Levels, Gordon Street, Aberdeen

Traffic on the New England Highway (NEH) generated the measured L_{A1} and contributed to the measured L_{A10} and L_{Aeq}.

Insects contributed to the measured L_{A10} and L_{Aeq} and were primarily responsible for the measured L_{A90}.

A distant pump, dogs and birds were also noted.

4.1.3 Little Acres, Kayuga Road, Kayuga

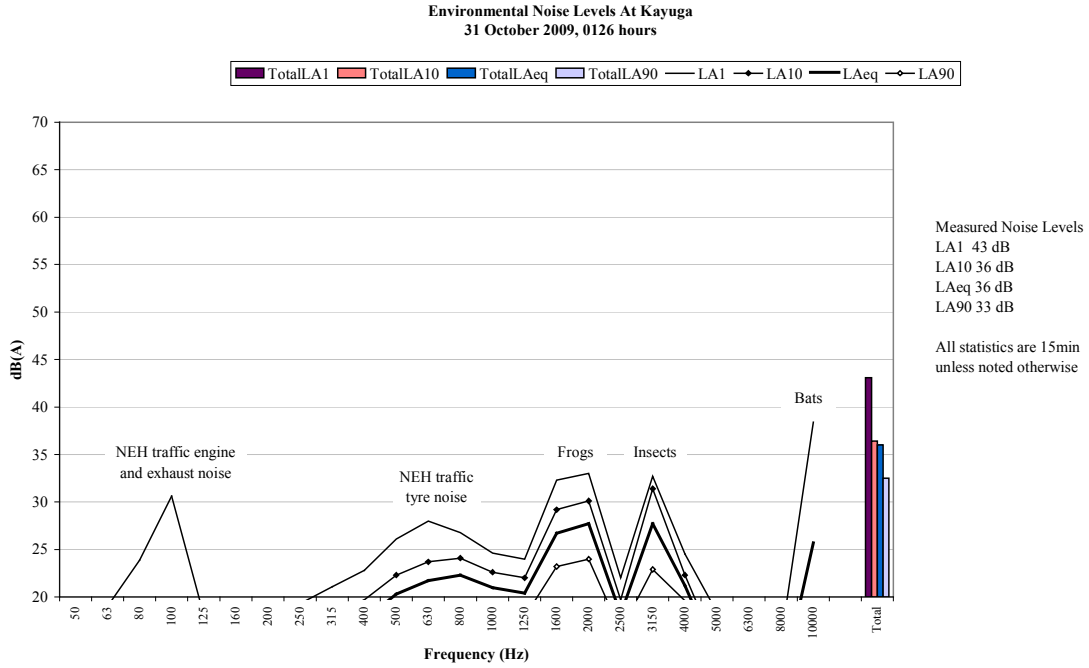

Figure 5 Environmental Noise Levels, Kayuga

Bats were responsible for the measured L_{A1}.

A combination of frogs and insects generated the measured L_{A10}, L_{Aeq} and L_{A90}.

Traffic on the New England Highway (NEH), breeze in foliage and dogs were also noted.

4.1.4 Corner Kayuga and Wybong Roads, Muswellbrook

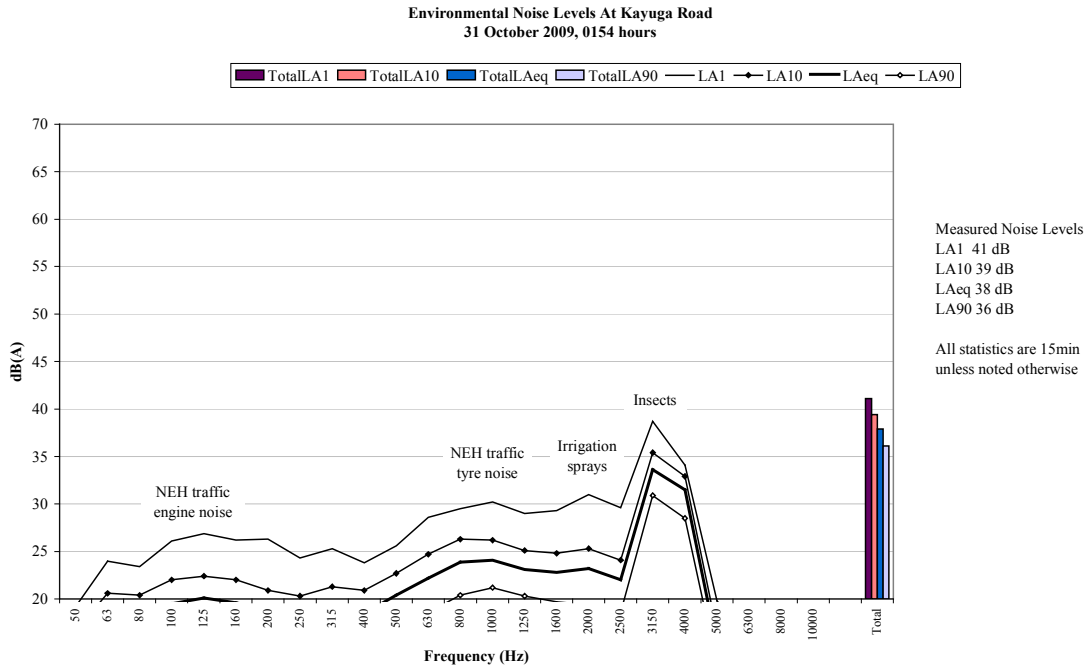

Figure 6 Environmental Noise Levels, Kayuga Road

Insects were responsible for measured levels.

Tyre and engine noise from traffic on the New England Highway (NEH), irrigation sprays, birds, dogs and haul truck engine noise (briefly twice) from Mt Arthur Coal were also noted.

4.1.5 1232 Wybong Road, Muswellbrook

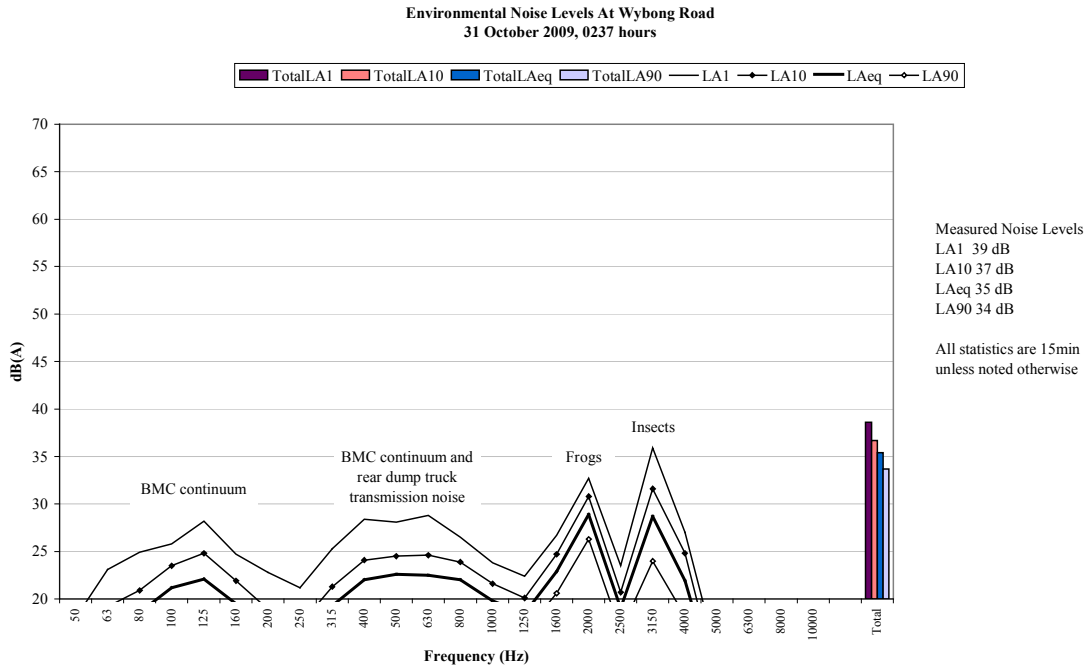

Figure 7 Environmental Noise Levels, Wybong Road

A combination of frogs and insects were responsible for the measured L_{A10}, L_{Aeq} and L_{A90}. Insects generated the measured L_{A1}.

A continuum and rear dump truck transmission noise from Bengalla Mining Company (BMC) was also noted.

4.1.6 Corner Brooks and Scott Streets, Muswellbrook

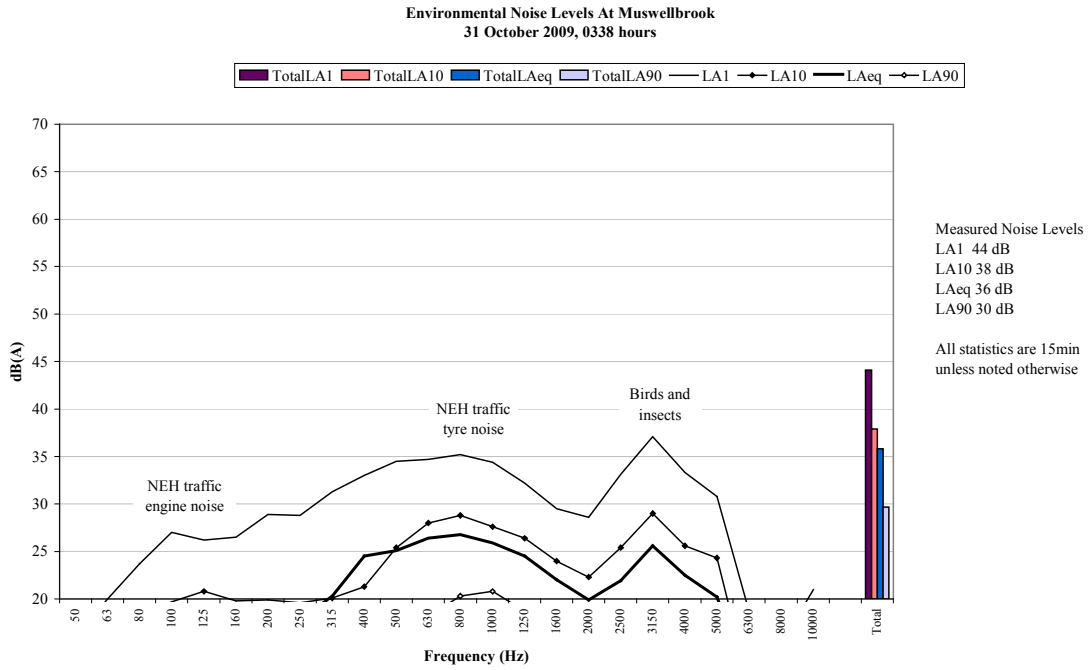

Figure 8 Environmental Noise Levels, Muswellbrook

Traffic engine and tyre noise from the New England Highway (NEH) contributed to the measured L_{A10} and L_{Aeq} and was primarily responsible for the measured L_{A90}.

Birds generated the measured L_{A1}. Birds and insects contributed to the measured L_{A10} and L_{Aeq}.

5 SUMMARY

5.1 SUMMARY

An attended survey to identify noise sources in an area around the approved Mount Pleasant Project (MTP) was undertaken on the night of 30/31 October 2009.

A combination of traffic on the New England Highway, frogs and insects generally dominated the acoustic environment at most locations.

Continuous noise logging was conducted between 31 October and 13 November 2009 at six sites. RBL's logged at night were generally lowest (less than 30 dB) in the more rural monitoring site on Wybong Road.

Appendix

A: Calibration Certificates

Acoustic Research Laboratories
Proprietary Limited A.B.N. 47 050 100 804
Noise and Vibration Monitoring Instrumentation for Industry and the Environment

Sound Level Meter Test Report

Report Number : 07481.doc

Date of Test : 17/01/2008

Report Issue Date : 08/07/2008

Equipment Tested: **ARL Real Time Sound Acquisition System**

Model Number: Ngara S-Pack

Serial Number: 878007

Client Name : Acoustic Research Laboratories Pty Ltd

Level 7, Building 2, 423 Pennant Hills Road

Pennant Hills NSW 2120

Contact Name : Katie Fairjones

Tested by : Morgan Rae

Approved Signatory :

Ken Williams

Date : **8 July 2008**

NATA
WORLD RECOGNISED ACCREDITATION

Acoustic Research Laboratories Pty Ltd is NATA Accredited Laboratory Number. 14172.
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www.acousticresearch.com.au

Acoustic Research Laboratories
Proprietary Limited A.B.N. 47 050 100 804
Noise and Vibration Monitoring Instrumentation for Industry and the Environment

Sound Level Meter Test Report

Report Number : 07477.doc

Date of Test : 20/12/2007

Report Issue Date : 08/07/2008

Equipment Tested: **ARL Real Time Sound Acquisition System**

Model Number: Ngara S-Pack

Serial Number: 878003

Client Name : Acoustic Research Laboratories Pty Ltd

Level 7, Building 2, 423 Pennant Hills Road

Pennant Hills NSW 2120

Contact Name : Katie Fairjones

Tested by : Morgan Rae

Approved Signatory :

Ken Williams

Date : **7 July 2008**

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Proprietary Limited A.B.N. 47 050 100 804
Noise and Vibration Monitoring Instrumentation for Industry and the Environment

Sound Level Meter Test Report

Report Number : 07480.doc

Date of Test : 21/01/2008

Report Issue Date : 24/06/2008

Equipment Tested: **ARL Real Time Sound Acquisition System**

Model Number: Ngara S-Pack

Serial Number: 878006

Client Name : Acoustic Research Laboratories Pty Ltd

Level 7, Building 2, 423 Pennant Hills Road

Pennant Hills NSW 2120

Contact Name : Katie Fairjones

Tested by : Morgan Rae

Approved Signatory :

Ken Williams

Date : **24 June 2008**

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Acoustic Research Laboratories
Proprietary Limited A.B.N. 47 050 100 804
Noise and Vibration Monitoring Instrumentation for Industry and the Environment

Acoustic Calibrator Test Report

Report Number : 09095

Date of Test : 19/03/2009

Report Issue Date : 19/03/2009

Equipment Tested: **Rion Acoustic Calibrator**

Model Number: NC-73

Serial Number: 11248300

Client Name : Acoustic Research Laboratories Pty Ltd

Level 7, Building 2, 423 Pennant Hills Road

Pennant Hills NSW 2120

Contact Name : Katie Fairjones

Tested by : Morgan Rae

Approved Signatory :

Ken Williams

Date : **19 March 2009**

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Acoustic Research Laboratories
Proprietary Limited A.B.N. 47 050 100 804
Noise and Vibration Monitoring Instrumentation for Industry and the Environment

Sound Level Meter Test Report

Report Number : 09229

Date of Test : 22/05/2009

Report Issue Date : 25/05/2009

Equipment Tested: **Rion Sound Level Meter**

Model Number: NA-28

Serial Number: 00370304

Client Name : Global Acoustics Pty Ltd

12/16 Huntingdale Drive

Thornton NSW 2322

Contact Name : Amanda Borserio

Tested by : Morgan Rae

Approved Signatory :

Ken Williams

Date : **25/05/2009**

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Acoustic Research Laboratories
Proprietary Limited A.B.N. 47 050 100 804
Noise and Vibration Monitoring Instrumentation for Industry and the Environment

Acoustic Calibrator Test Report

Report Number : 09031

Date of Test : 05/02/2009

Report Issue Date : 06/02/2009

Equipment Tested: **Rion Acoustic Calibrator**

Model Number: NC-73

Serial Number: 11248306

Client Name : Global Acoustics Pty Ltd

12/16 Huntingdale Drive

Thornton NSW 2322

Contact Name : Tony Welbourne

Tested by : Morgan Rae

Approved Signatory :

Ken Williams

Date : **6 February 2009**

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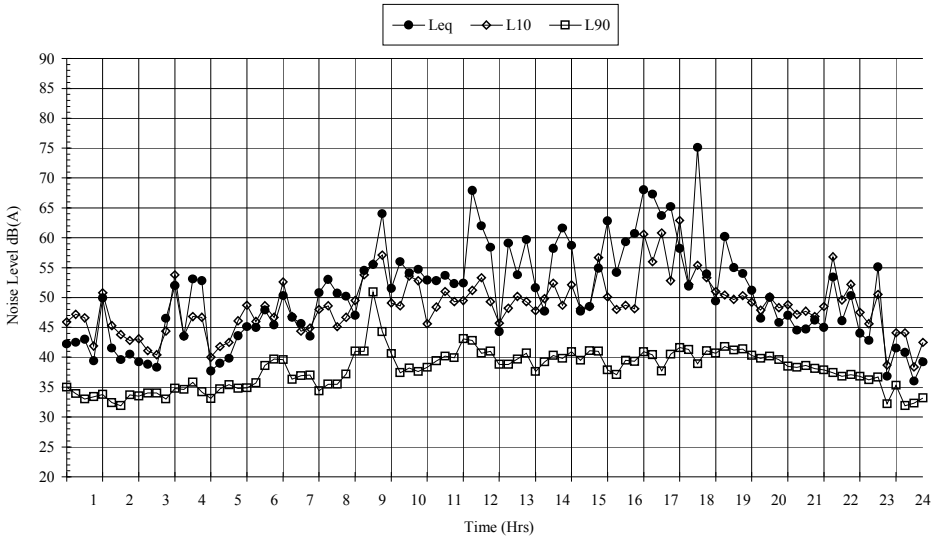
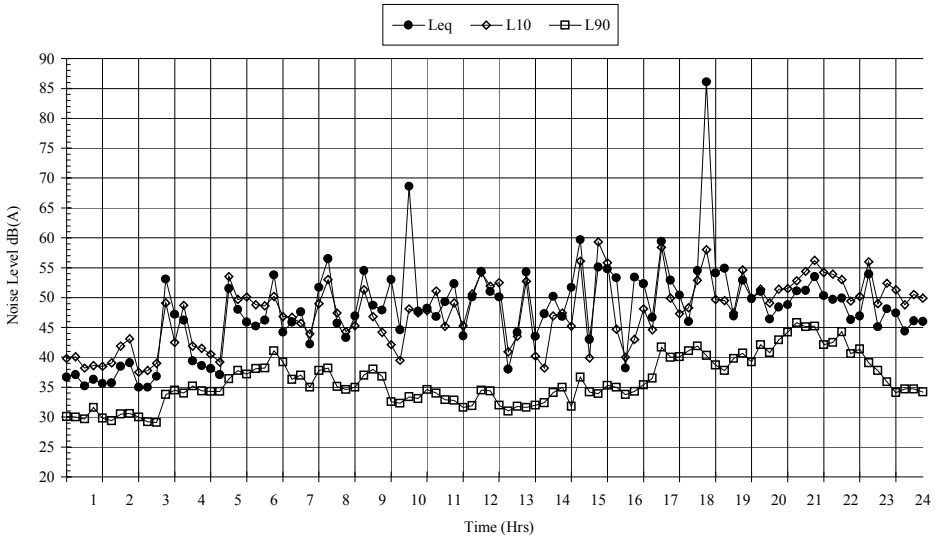
Appendix

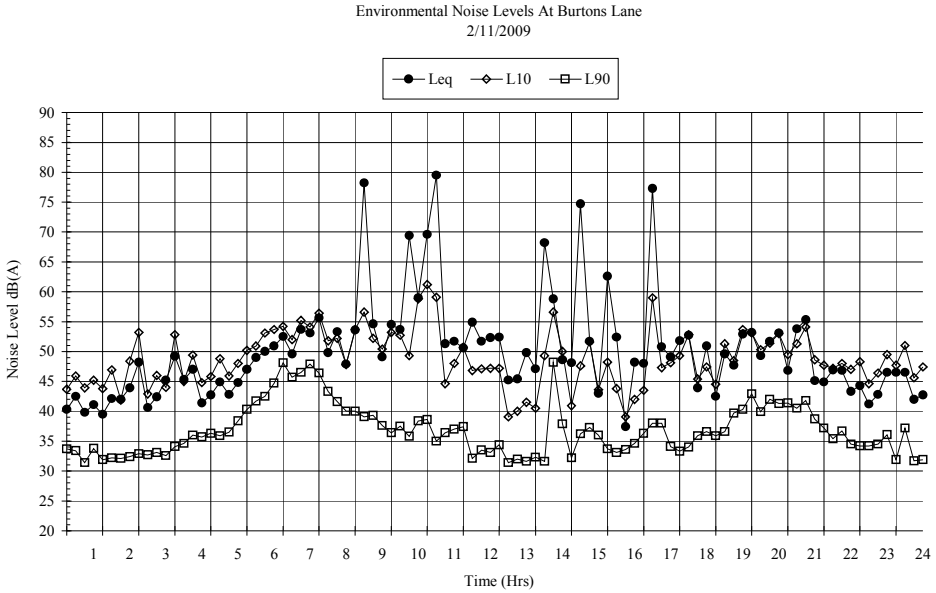
B: Logger Data Graphs

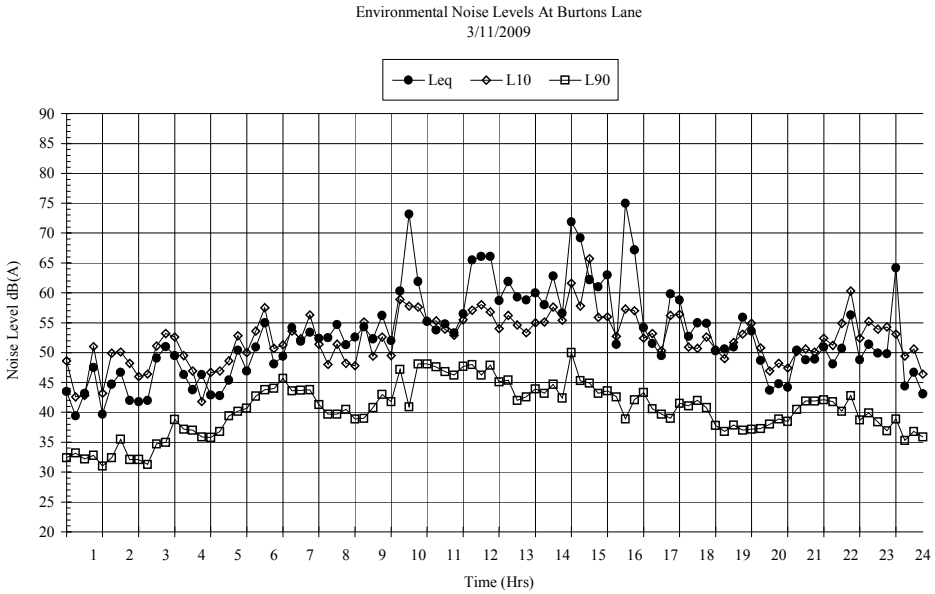
Environmental Noise Levels At Burtons Lane
31/10/2009

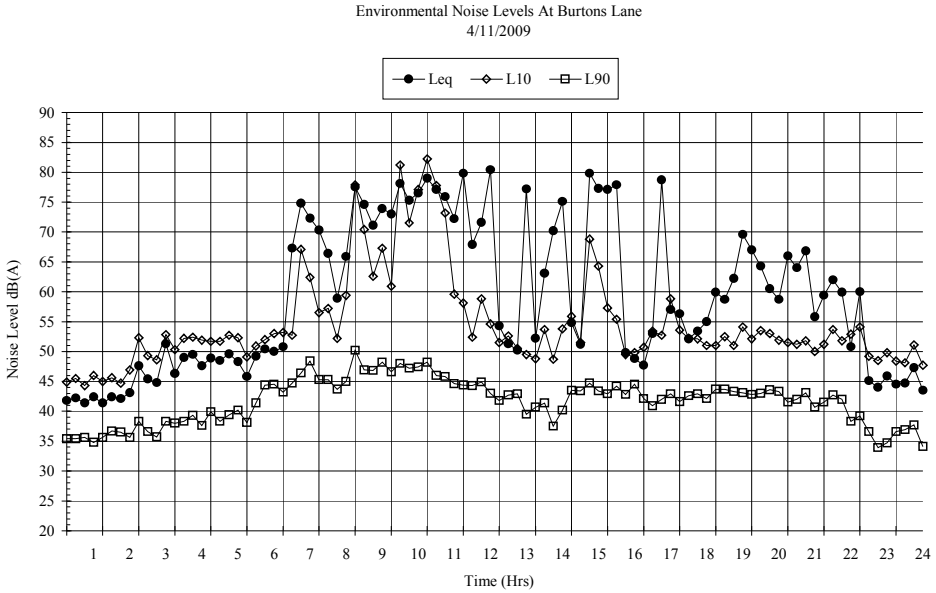


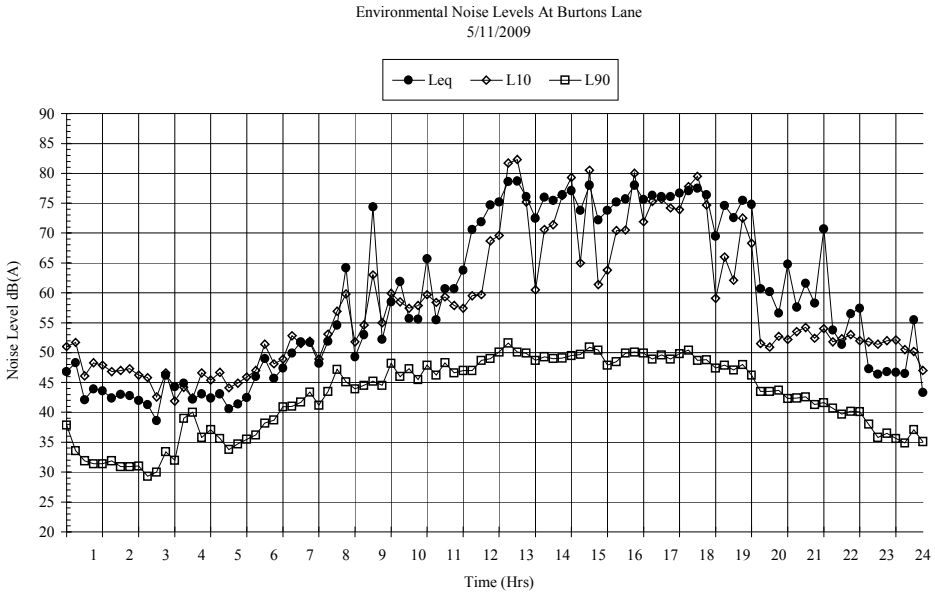
Environmental Noise Levels At Burtons Lane
1/11/2009

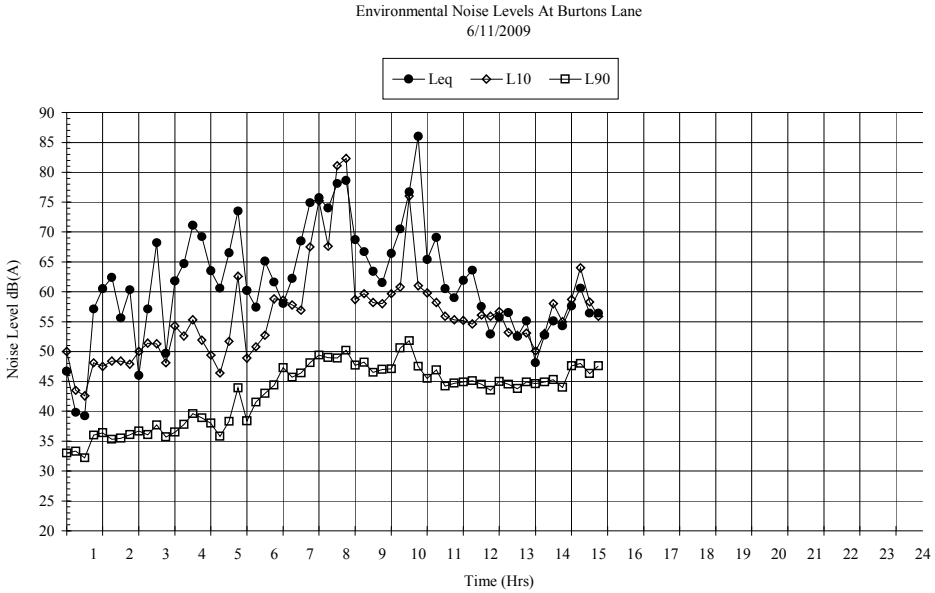


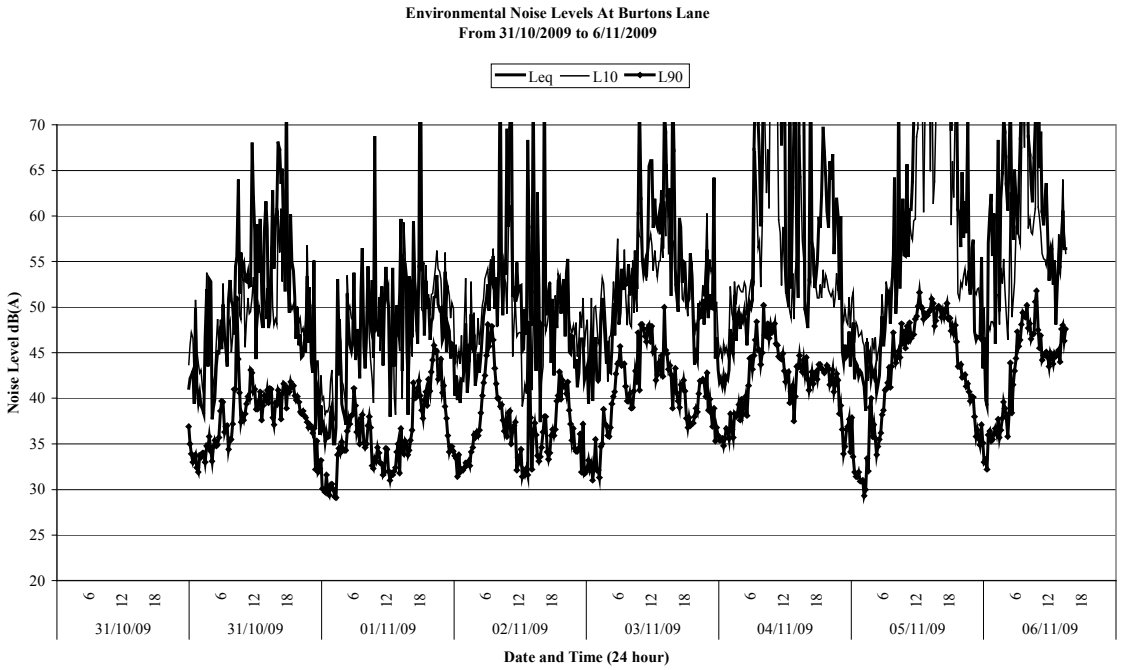

Environmental Noise Levels At Burtons Lane
2/11/2009
Leq
L10
L90
Noise Level dB(A)
Time (Hrs)


Environmental Noise Levels At Burtons Lane
3/11/2009
Leq
L10
L90
Noise Level dB(A)
Time (Hrs)

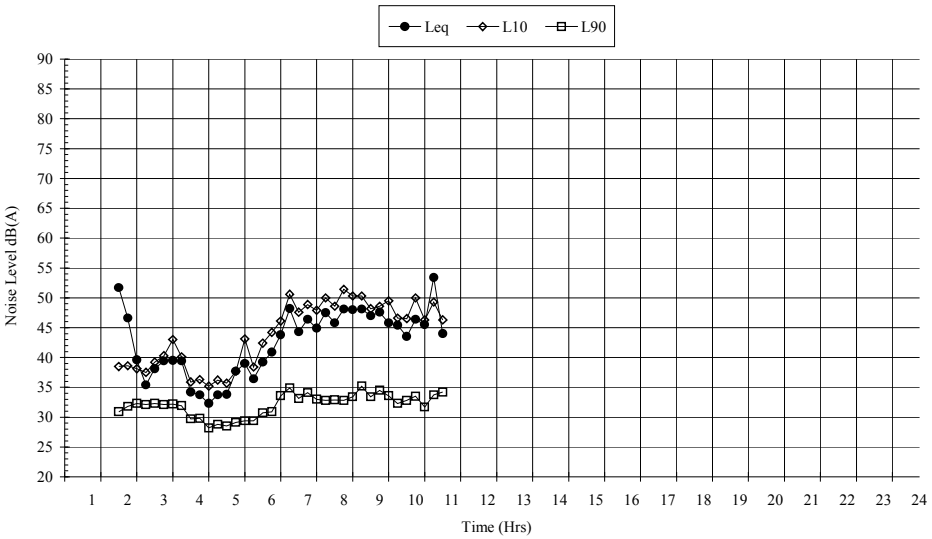

Environmental Noise Levels At Burtons Lane
4/11/2009
Leq
L10
L90
Noise Level dB(A)
Time (Hrs)


Environmental Noise Levels At Burtons Lane
5/11/2009
Leq
L10
L90
Noise Level dB(A)
Time (Hrs)


Environmental Noise Levels At Burtons Lane
6/11/2009
Leq
L10
L90
Noise Level dB(A)
Time (Hrs)

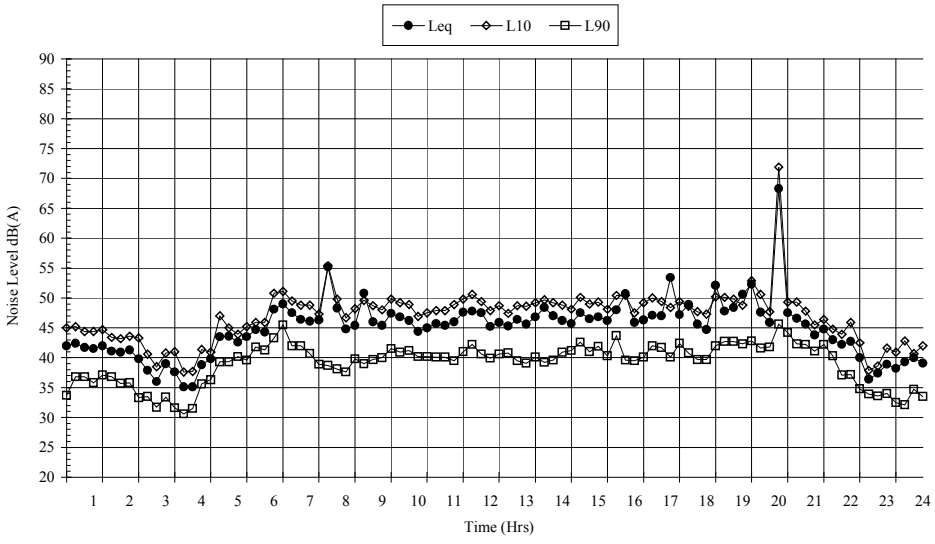

Environmental Noise Levels At Burtons Lane
From 31/10/2009 to 6/11/2009
Leq
L10
L90
Noise Level dB(A)
31/10/09
01/11/09
02/11/09
03/11/09
04/11/09
05/11/09
06/11/09
Date and Time (24 hour)

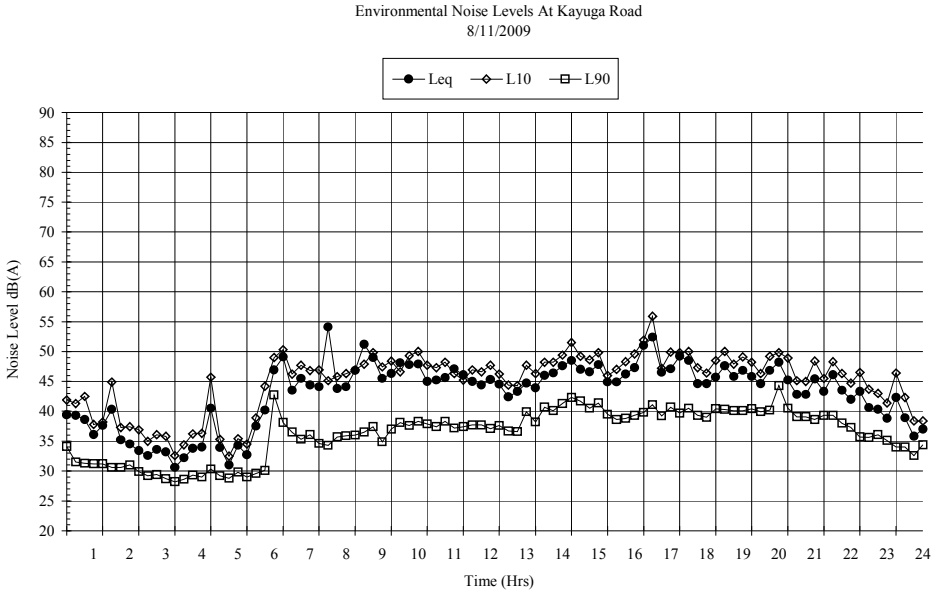
Environmental Noise Levels At Kayuga
31/10/2009

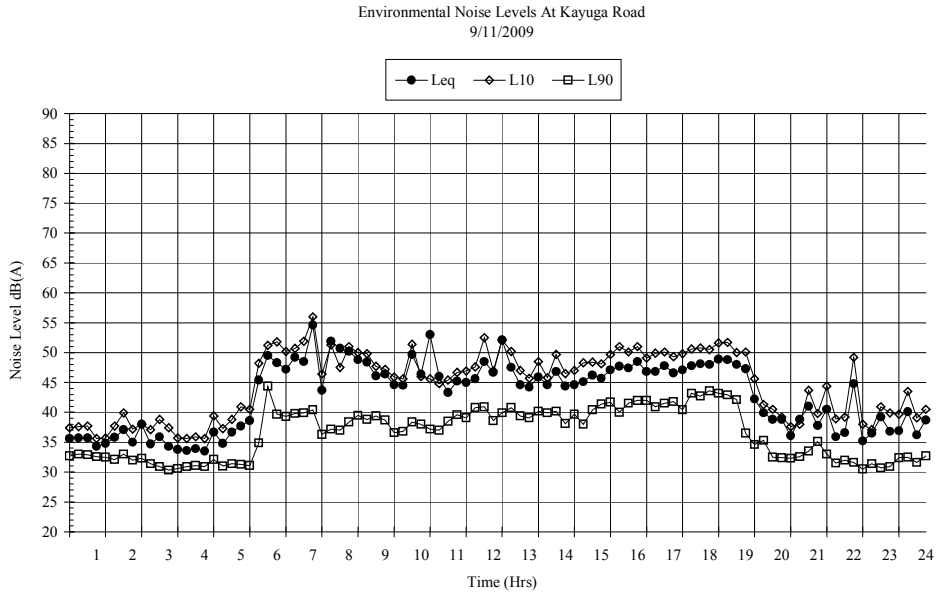


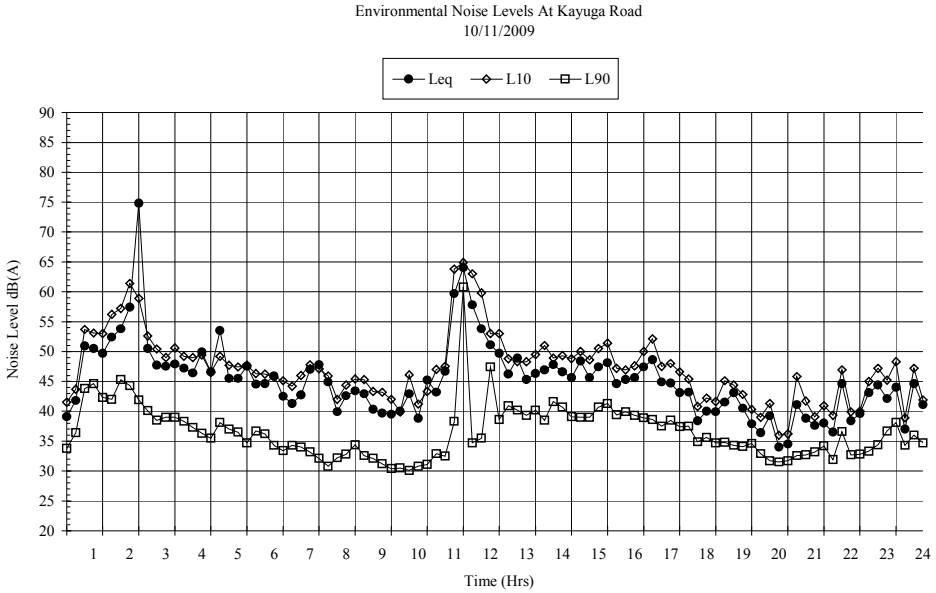
Environmental Noise Levels At Kayuga Road

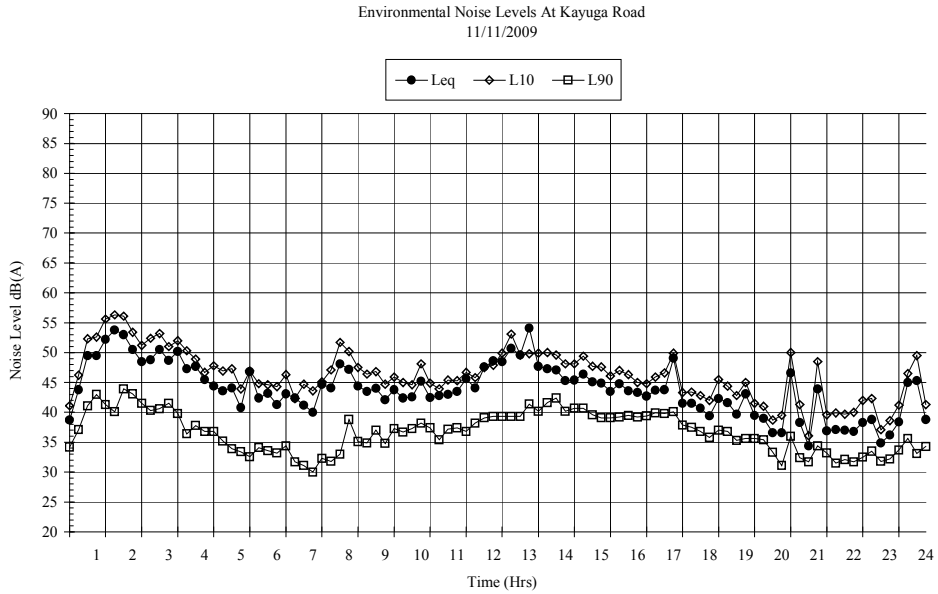
Environmental Noise Levels At Kayuga Road
7/11/2009

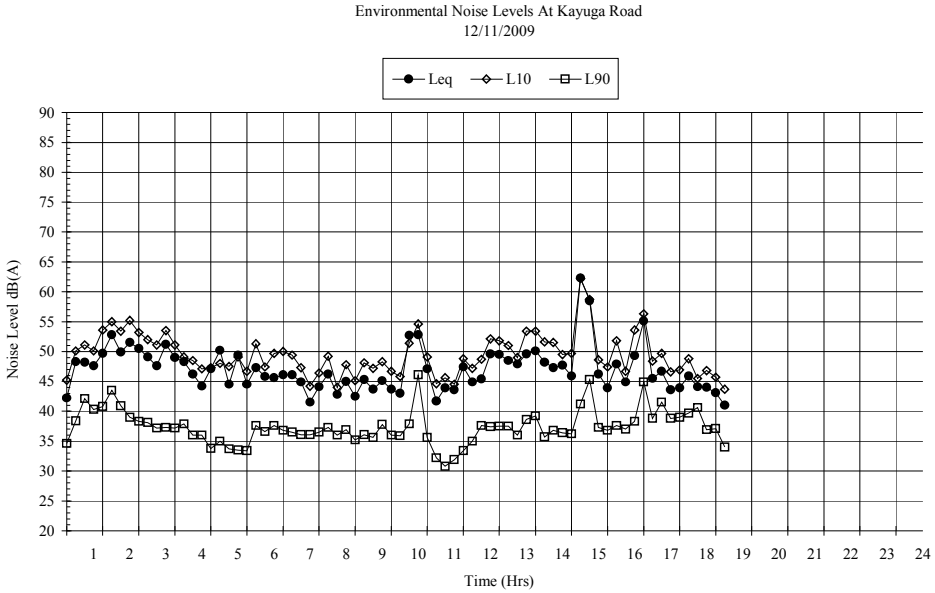


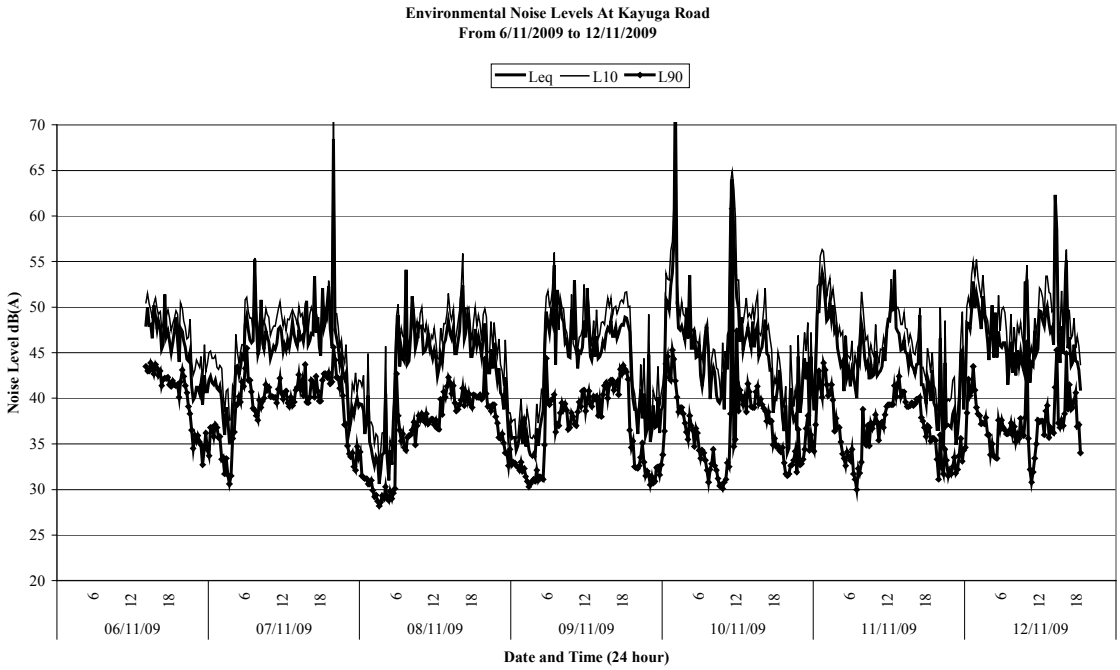

Environmental Noise Levels At Kayuga Road
8/11/2009
Leq
L10
L90
Noise Level dB(A)
Time (Hrs)

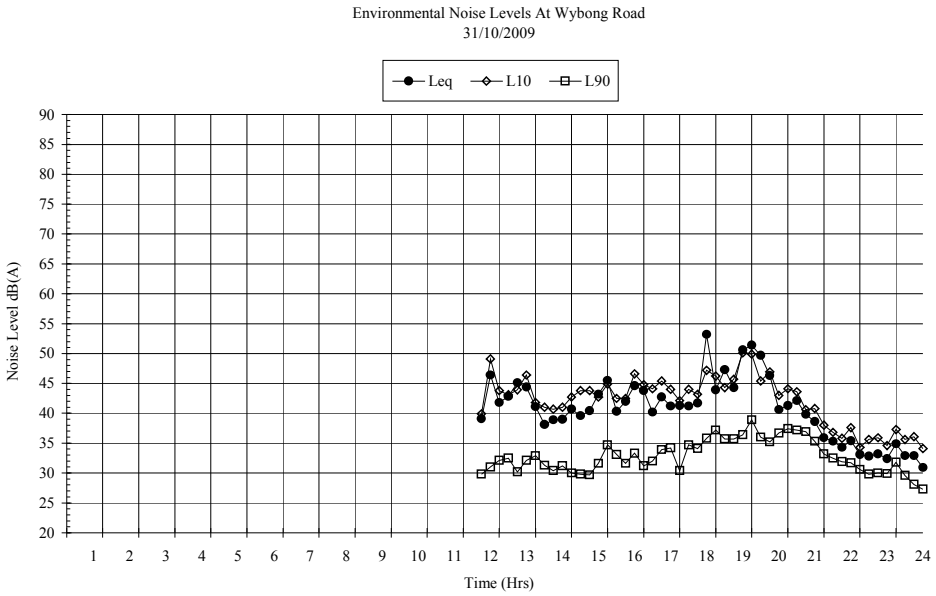

Environmental Noise Levels At Kayuga Road
9/11/2009
Leq
L10
L90
Noise Level dB(A)
Time (Hrs)

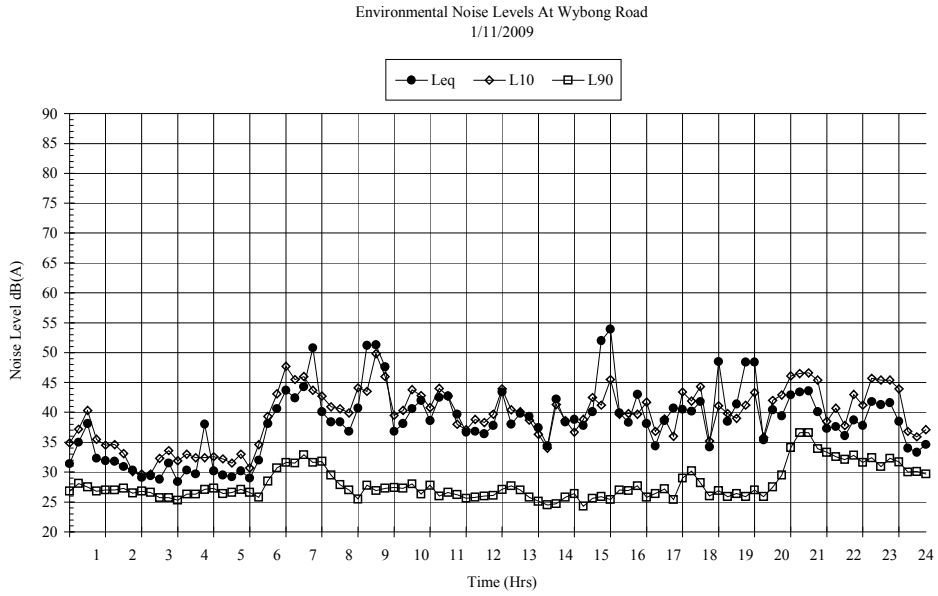

Environmental Noise Levels At Kayuga Road
10/11/2009
Leq
L10
L90
Noise Level dB(A)
Time (Hrs)

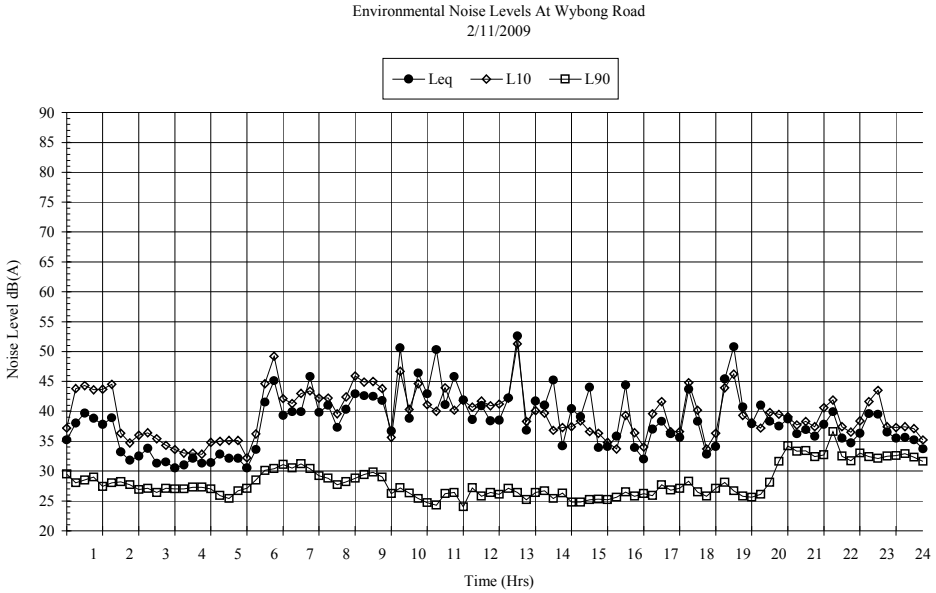

Environmental Noise Levels At Kayuga Road
11/11/2009
Leq
L10
L90
Noise Level dB(A)
Time (Hrs)

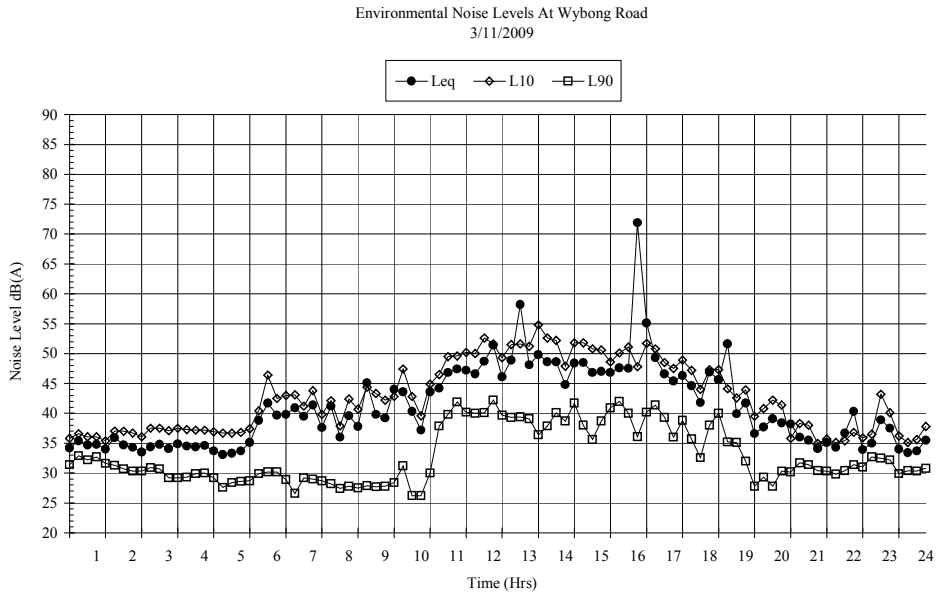

Environmental Noise Levels At Kayuga Road
12/11/2009
Leq
L10
L90
Noise Level dB(A)
Time (Hrs)

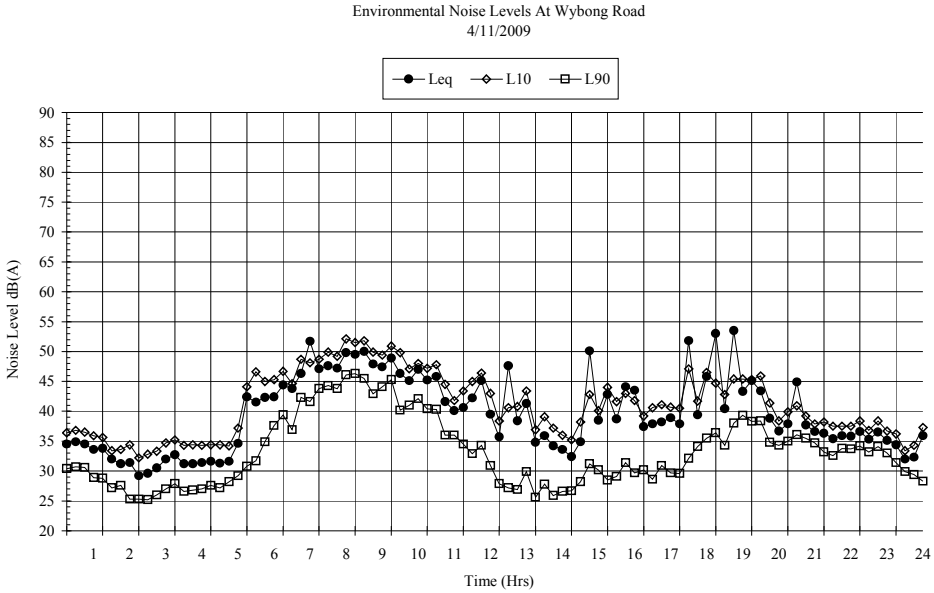

Environmental Noise Levels At Kayuga Road
From 6/11/2009 to 12/11/2009
Leq
L10
L90
Noise Level dB(A)
06/11/09
07/11/09
08/11/09
09/11/09
10/11/09
11/11/09
12/11/09
Date and Time (24 hour)

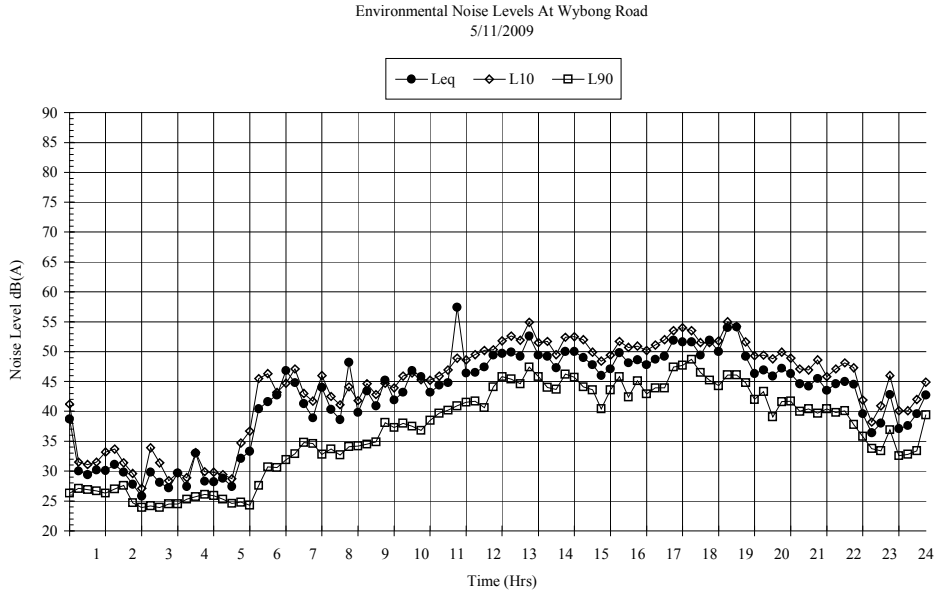

Environmental Noise Levels At Wybong Road
31/10/2009
Leq
L10
L90
Noise Level dB(A)
90
85
80
75
70
65
60
55
50
45
40
35
30
25
20
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
Time (Hrs)


Environmental Noise Levels At Wybong Road
1/11/2009
Leq
L10
L90
Noise Level dB(A)
90
85
80
75
70
65
60
55
50
45
40
35
30
25
20
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
Time (Hrs)

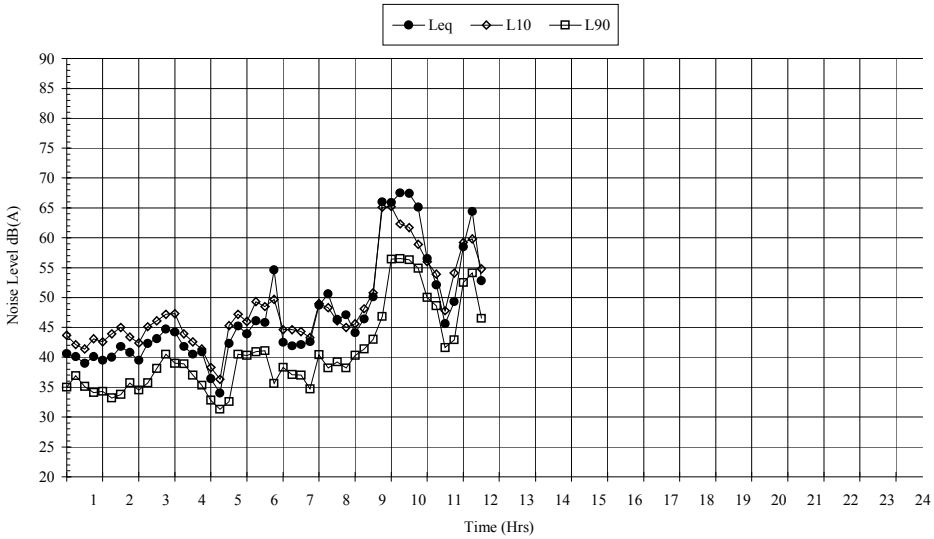

Environmental Noise Levels At Wybong Road
2/11/2009
Leq
L10
L90
Noise Level dB(A)
90
85
80
75
70
65
60
55
50
45
40
35
30
25
20
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
Time (Hrs)


Environmental Noise Levels At Wybong Road
3/11/2009
Leq
L10
L90
Noise Level dB(A)
90
85
80
75
70
65
60
55
50
45
40
35
30
25
20
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
Time (Hrs)

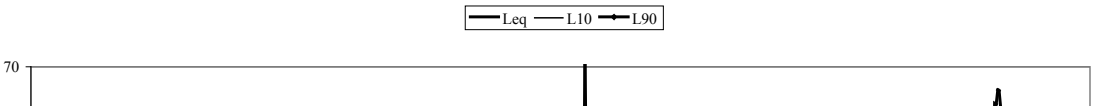

Environmental Noise Levels At Wybong Road
4/11/2009
Leq
L10
L90
Noise Level dB(A)
90
85
80
75
70
65
60
55
50
45
40
35
30
25
20
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
Time (Hrs)


Environmental Noise Levels At Wybong Road
5/11/2009
Leq
L10
L90
Noise Level dB(A)
90
85
80
75
70
65
60
55
50
45
40
35
30
25
20
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
Time (Hrs)

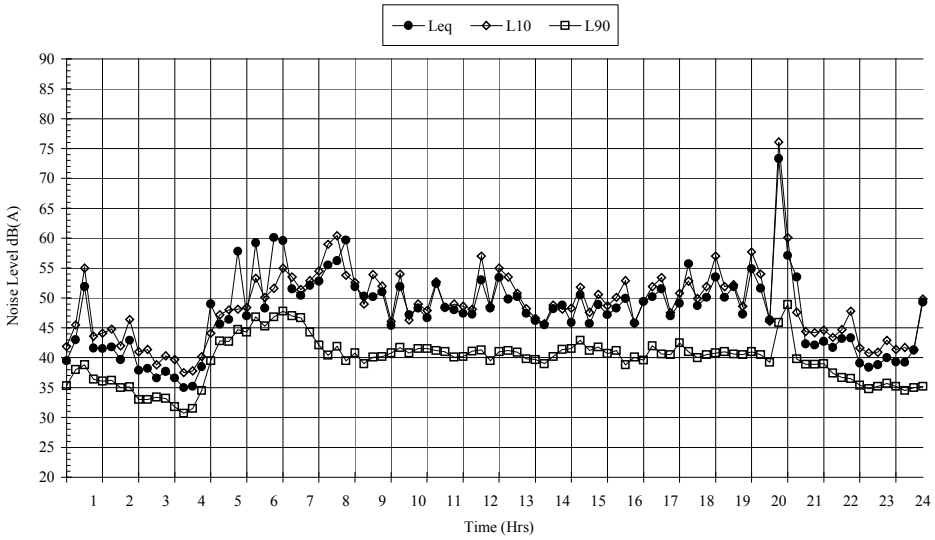
Environmental Noise Levels At Wybong Road
6/11/2009



Environmental Noise Levels At Wybong Road
From 31/10/2009 to 6/11/2009



Environmental Noise Levels At Muswellbrook
7/11/2009



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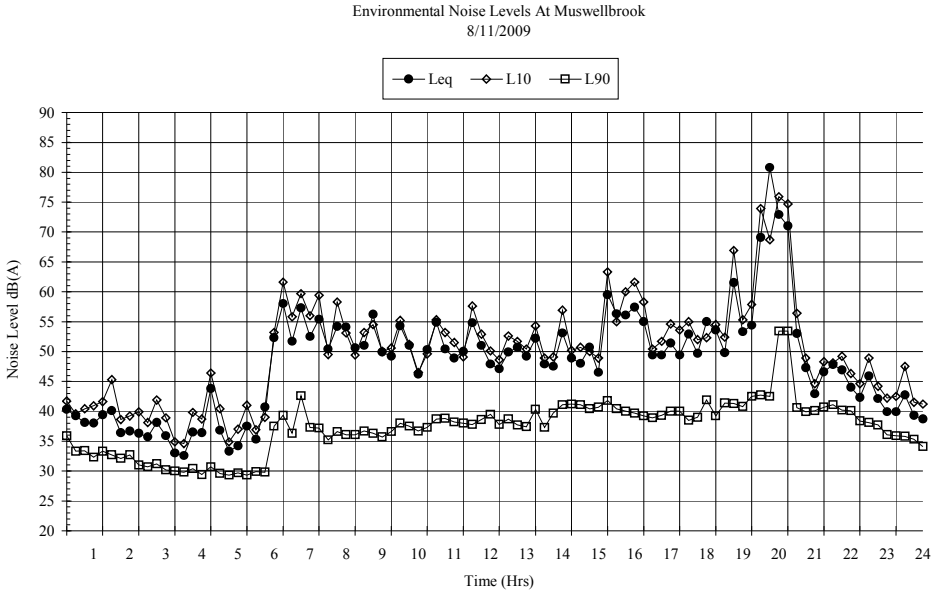
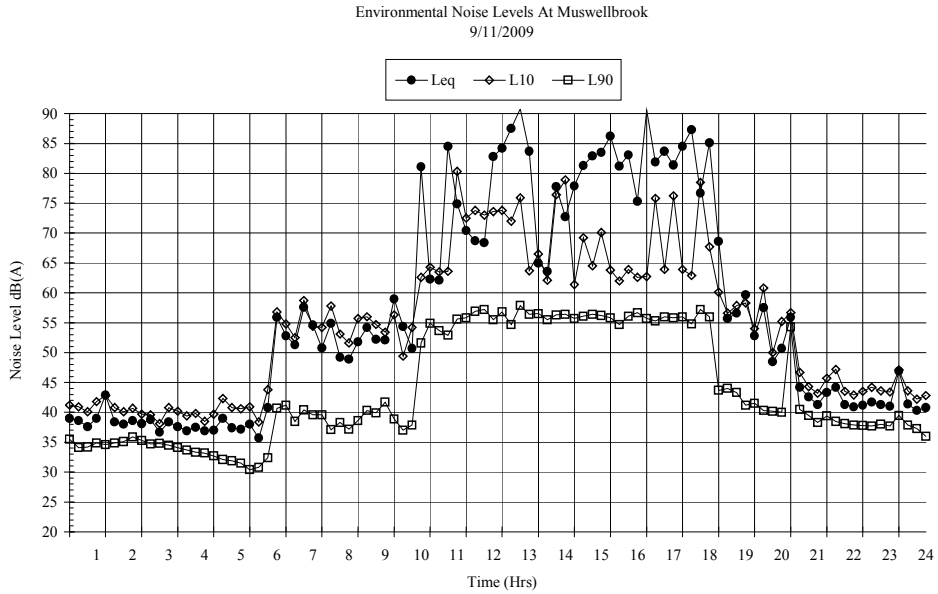
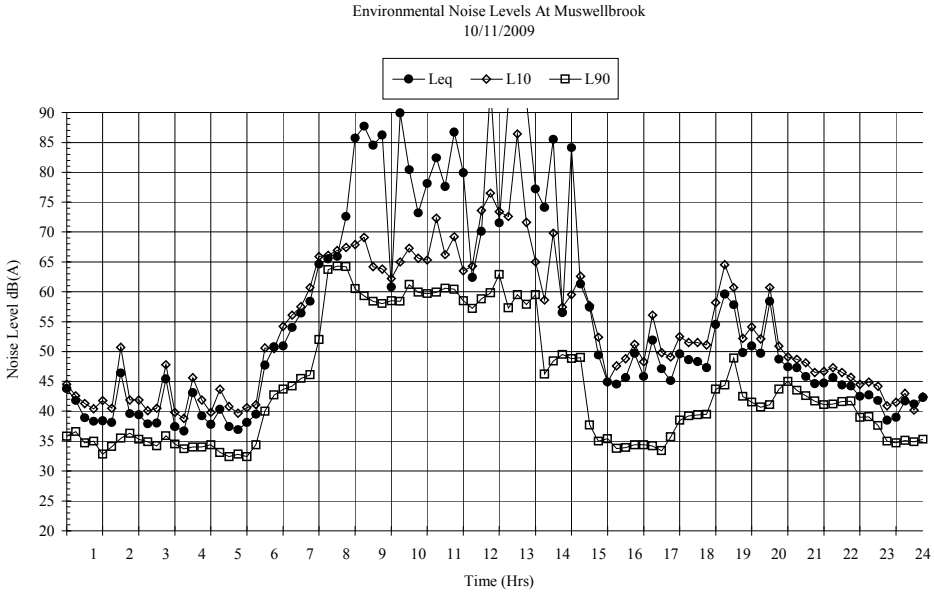
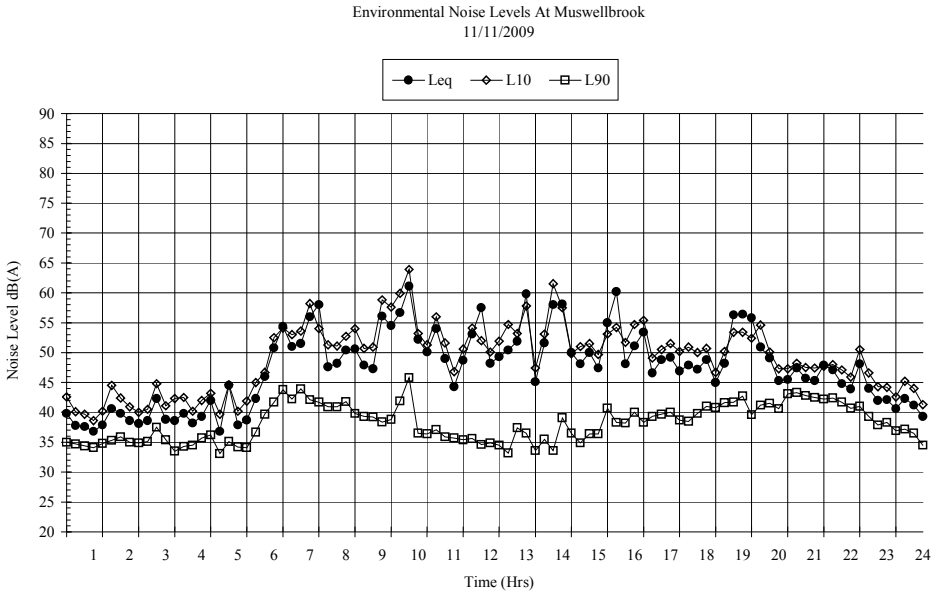
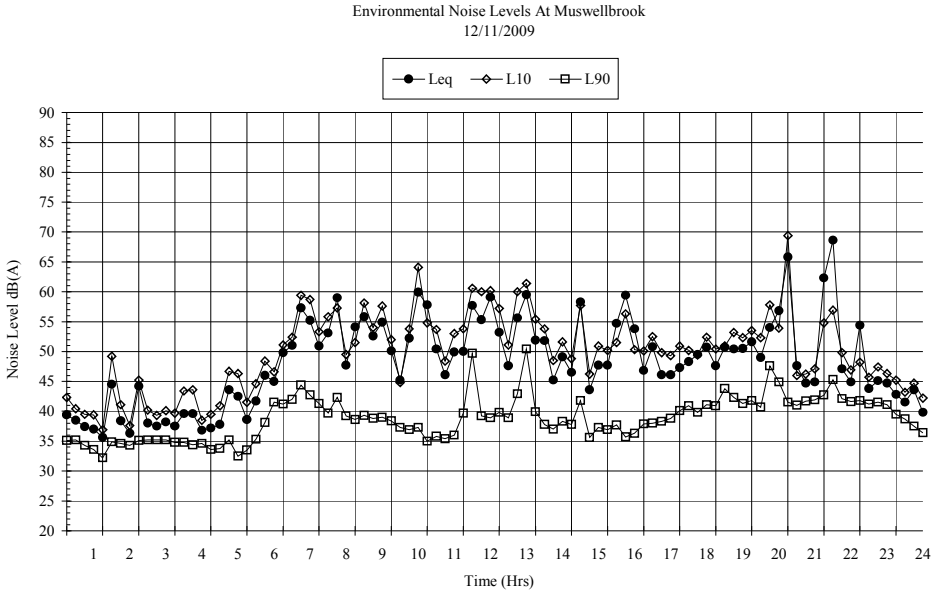
(

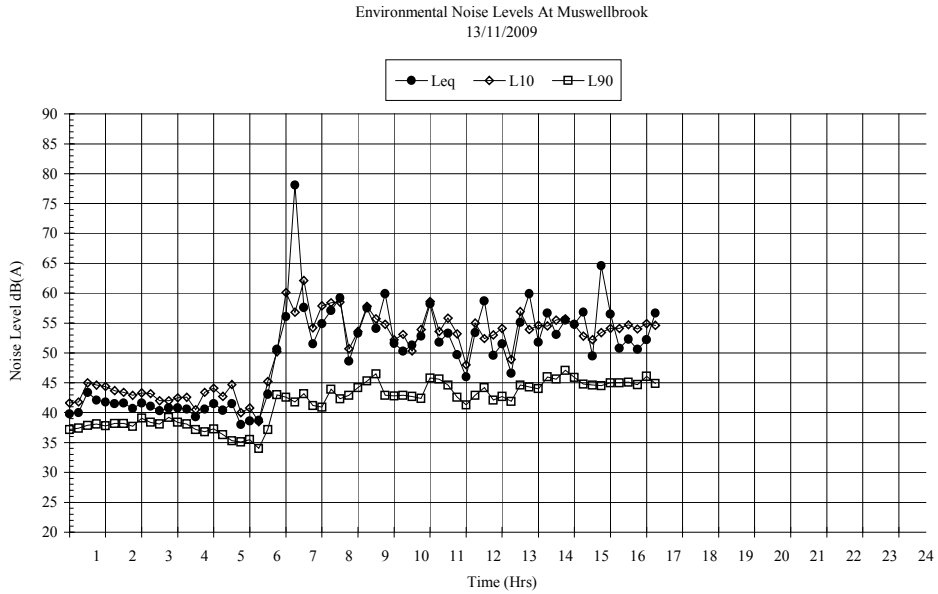

Environmental Noise Levels At Muswellbrook
8/11/2009
Leq
L10
L90
Noise Level dB(A)
Time (Hrs)

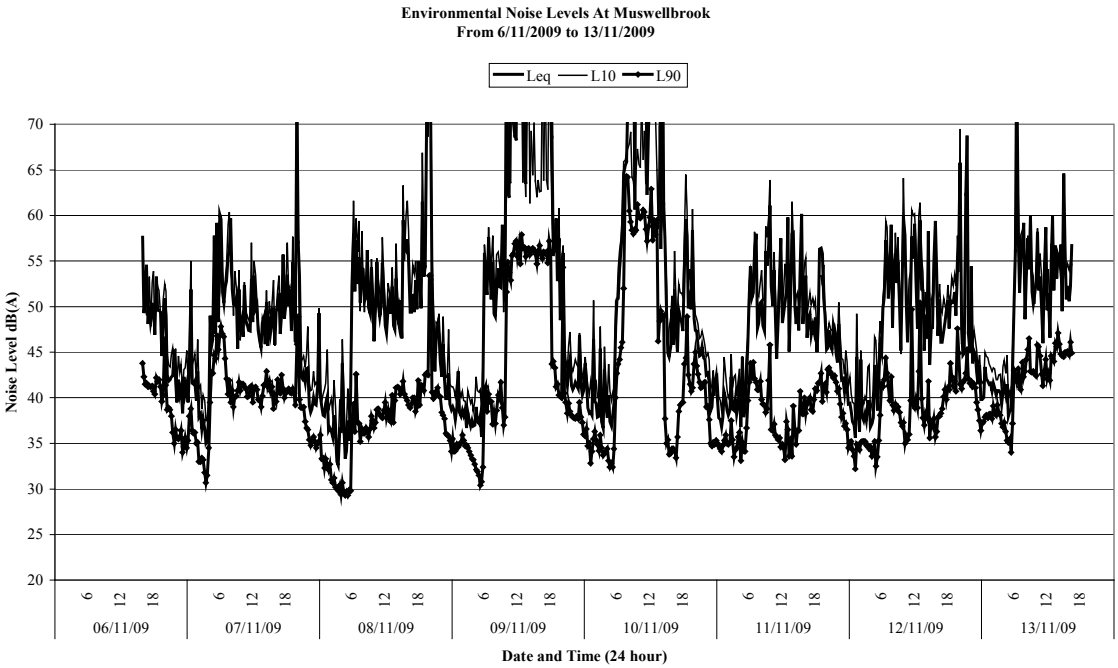

Environmental Noise Levels At Muswellbrook
9/11/2009
Leq
L10
L90
Noise Level dB(A)
Time (Hrs)


Environmental Noise Levels At Muswellbrook
10/11/2009
Leq
L10
L90
Noise Level dB(A)
Time (Hrs)


Environmental Noise Levels At Muswellbrook
11/11/2009
Leq
L10
L90
Noise Level dB(A)
Time (Hrs)


Environmental Noise Levels At Muswellbrook
12/11/2009
Leq
L10
L90
Noise Level dB(A)
Time (Hrs)


Environmental Noise Levels At Muswellbrook
13/11/2009
Leq
L10
L90
Noise Level dB(A)
Time (Hrs)


Environmental Noise Levels At Muswellbrook
From 6/11/2009 to 13/11/2009
Leq
L10
L90
Noise Level dB(A)
70
65
60
55
50
45
40
35
30
25
20
6
12
18
06/11/09
07/11/09
08/11/09
09/11/09
10/11/09
11/11/09
12/11/09
13/11/09
Date and Time (24 hour)

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Appendix B

Mine plans and equipment locations

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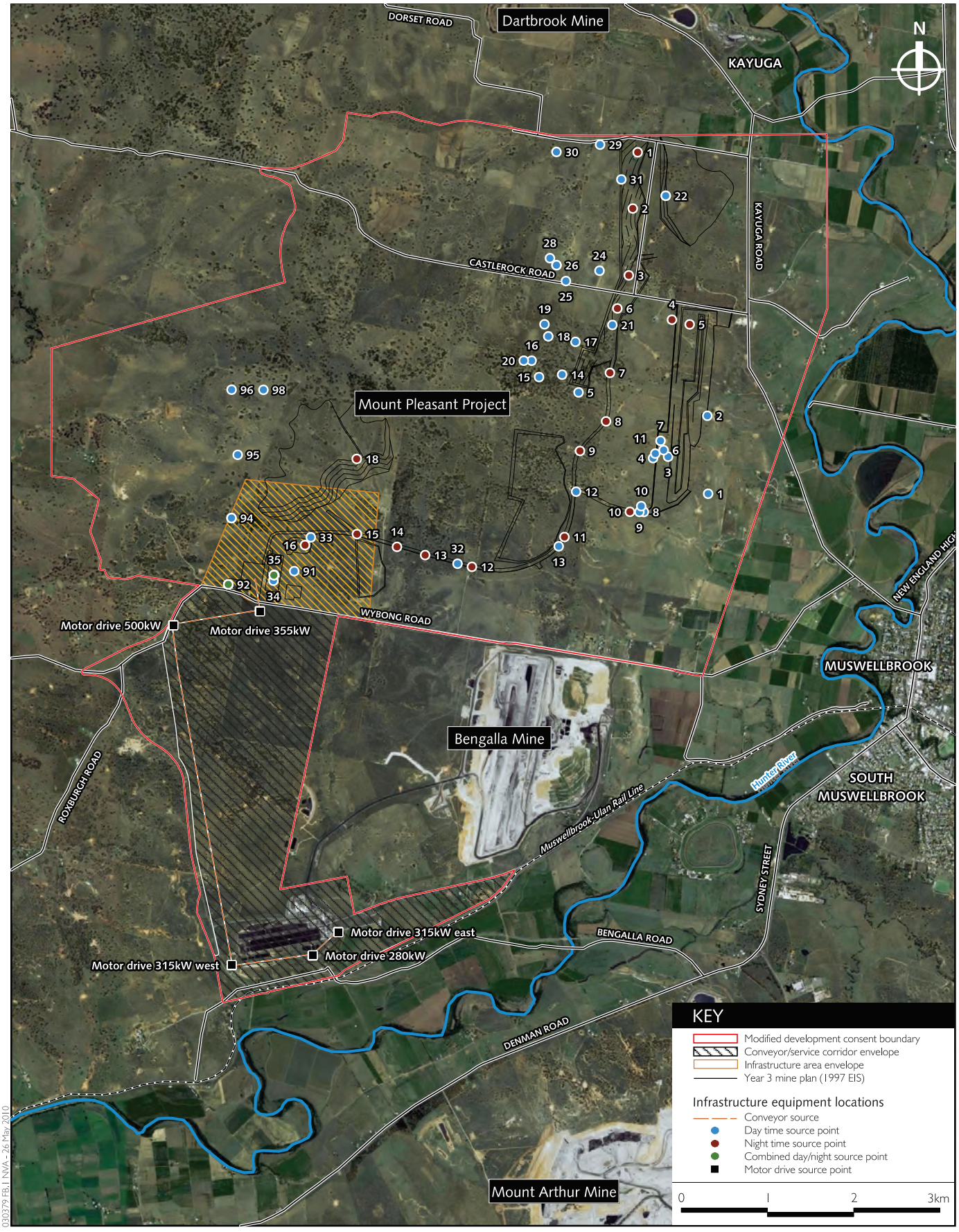


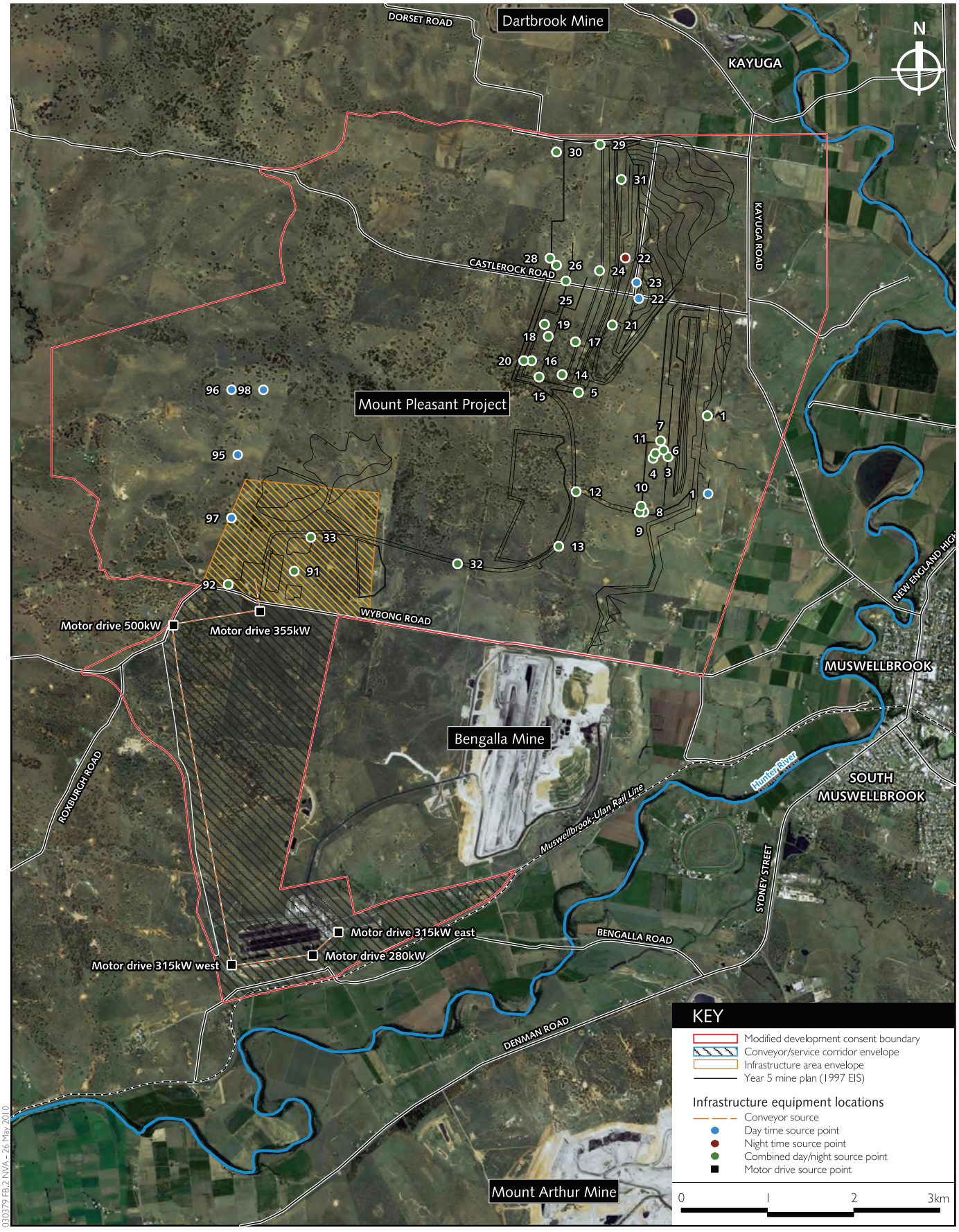
030379 FB_I NVA - 26 May 2010

COAL & ALLIED
Managed by Rio Tinto Coal Australia

Year 3 Mine Plan (1997 EIS), Conveyor and Infrastructure Equipment Locations

Mount Pleasant Project Modification - Noise and Vibration Assessment

FIGURE B.1



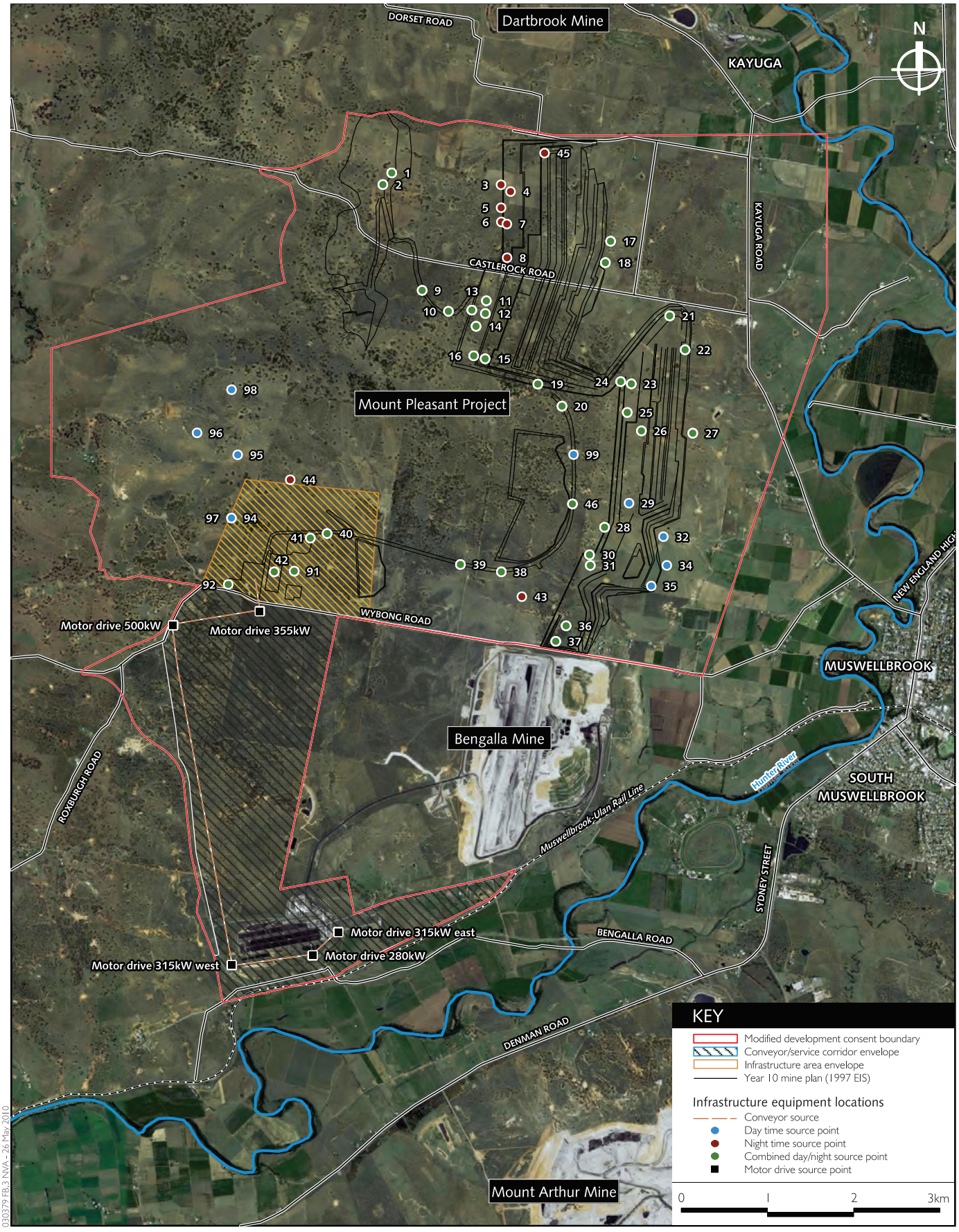
030379 FB_2 NVA - 26 May 2010

COAL & ALLIED
Managed by Rio Tinto Coal Australia

Year 5 Mine Plan (1997 EIS), Conveyor and Infrastructure Equipment Locations

Mount Pleasant Project Modification - Noise and Vibration Assessment

FIGURE B.2



030379 FB.3 NVA - 26 May 2010

COAL & ALLIED
Managed by Rio Tinto Coal Australia

Year 10 Mine Plan (1997 EIS), Conveyor and Infrastructure Equipment Locations

Mount Pleasant Project Modification - Noise and Vibration Assessment

FIGURE B.3

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Appendix C

Sound power spectral data

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Table C.1 Typical Sound Power Spectral Data, dB

Location	Plant	Octave Band Centre Frequency, Hz										
		31.5	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**	**16000**	**A-Wt Total (dB(A))**
Conveyor Corridor	Drive280kW	109	107	107	104	100	97	92	87	78	72	102
	Drive315kWeast	109	107	107	104	100	97	92	87	78	72	103
	Drive315kWwest	109	107	107	104	100	97	92	87	78	72	103
	Drive355kW	110	108	108	105	101	98	93	88	79	73	103
	Drive500kW	111	109	109	106	102	99	94	89	80	74	105
	Conveyor (per 60m length - unmitigated)	107	105	105	102	98	95	90	85	76	70	101
Infrastructure Envelope	CPP	0	117	117	115	110	107	102	97	88	0	113
	Stacker Reclaimer	0	112	118	110	108	107	107	104	97	0	113
	Haul Truck	0	108	113	116	111	109	106	100	94	0	114

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Appendix D

Vector wind rose analysis

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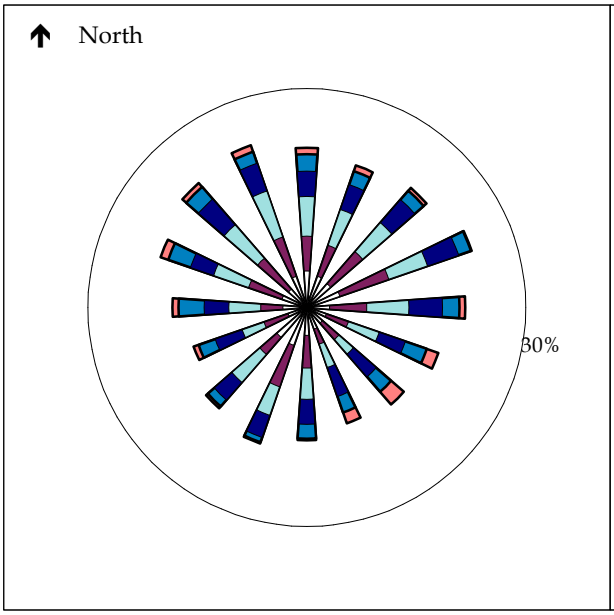
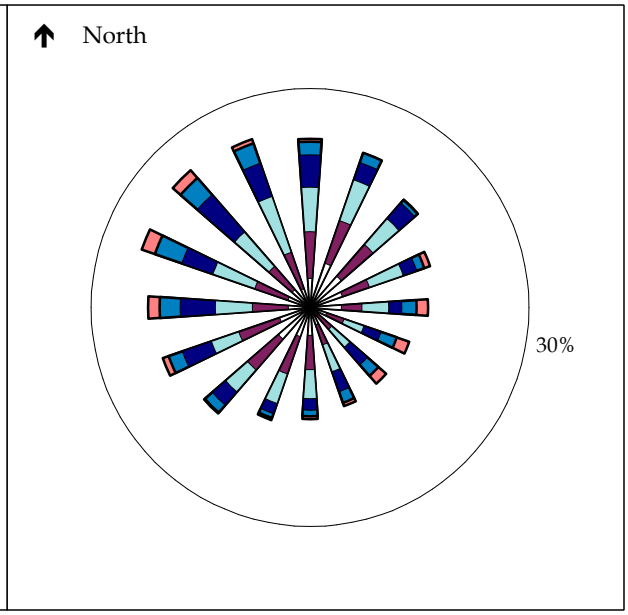
Day

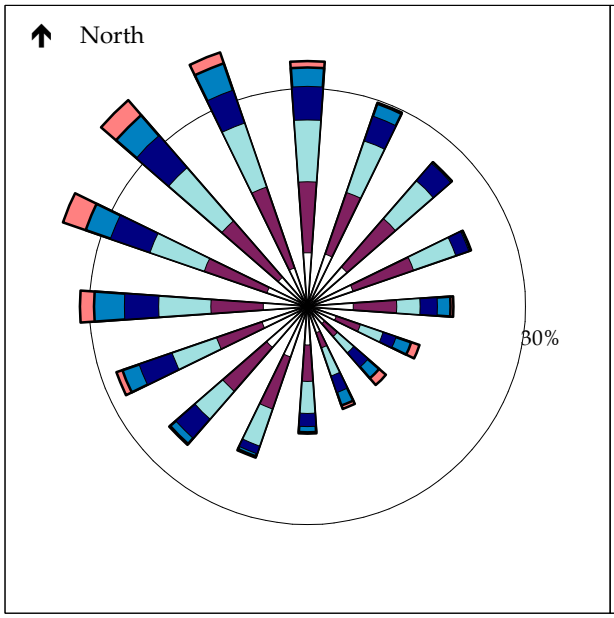
Summer



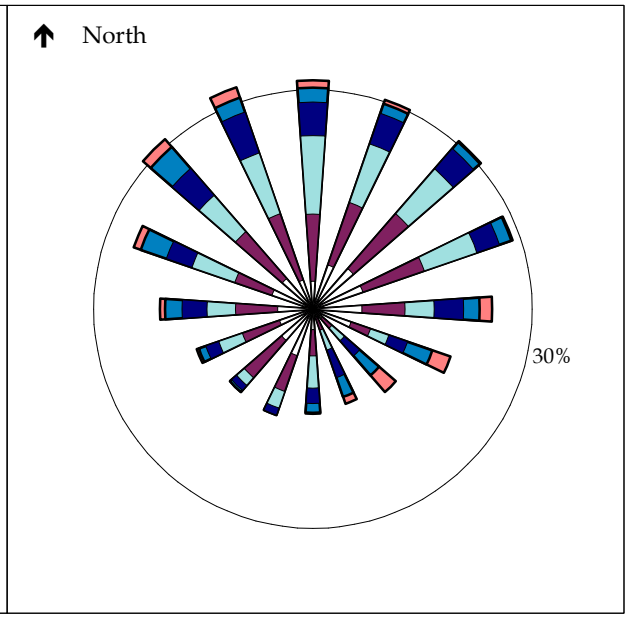
Spring



Winter



Autumn

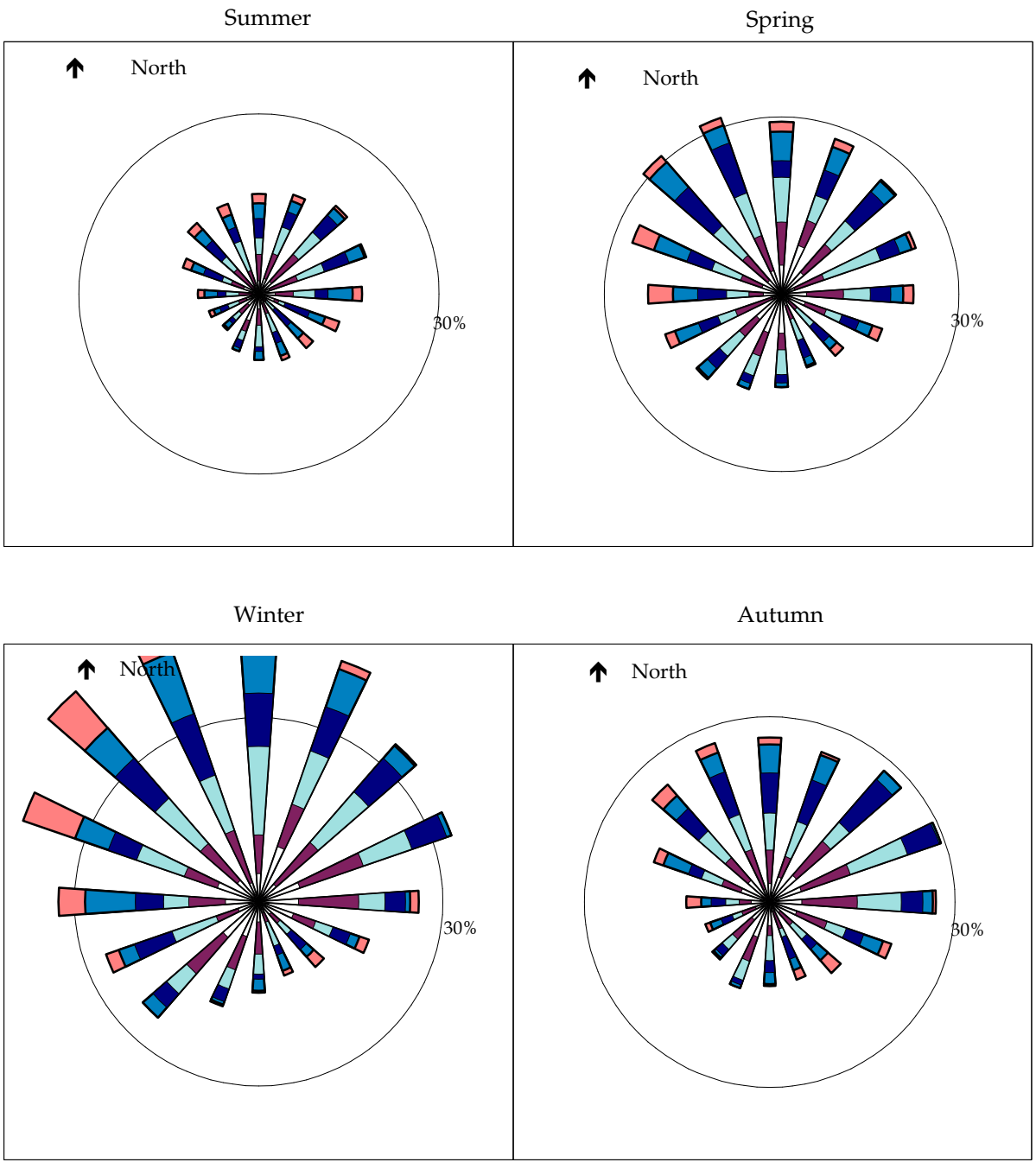


< 0.5 | 0.5 - 1.0 | 1.0 - 1.5 | 1.5 - 2.0 | 2.0 - 2.5 | 2.5 - 3.0 | > 3

Data Source: McLeans Hill (MAC)
Data Range: Hourly, 01-01-04 to 31-12-04

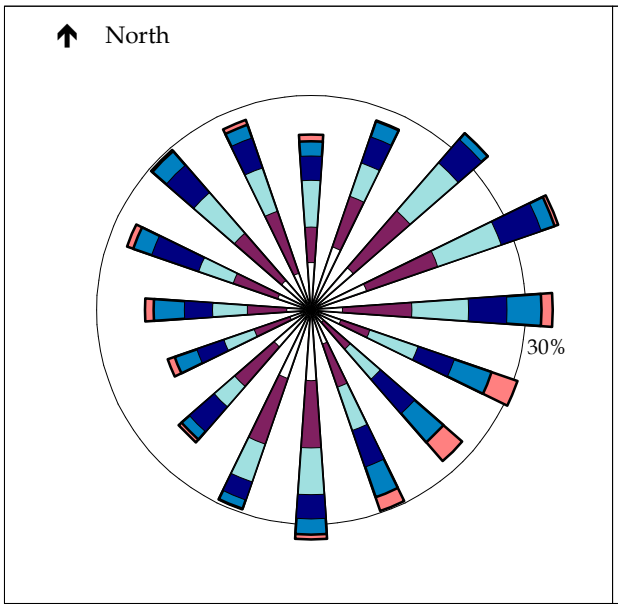
The segments of each arm represent the six valid wind speed classes, with increasing windspeed from the centre outwards. The length of each arm represents the vector components (for each direction) of wind speeds 3m/s or below as a proportion of the total time for the period . The circle represents the 30% occurrence threshold.

Evening

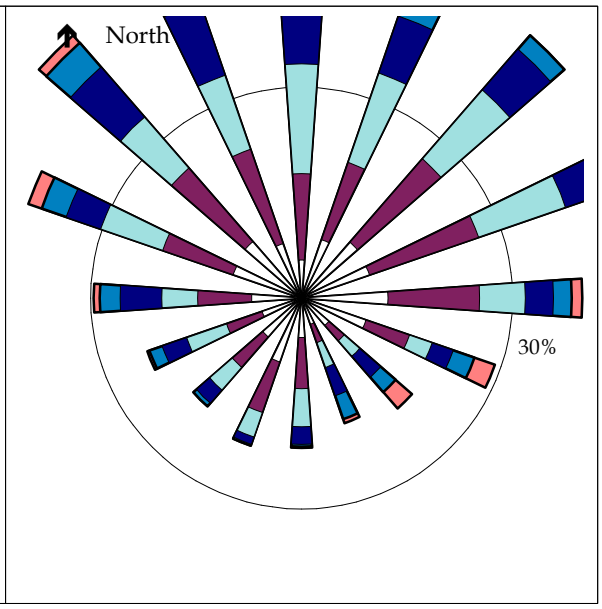

Summer
North
30%
Spring
North
30%
Winter
North
30%
Autumn
North
30%
< 0.5
0.5 - 1.0
1.0 - 1.5
1.5 - 2.0
2.0 - 2.5
2.5 - 3.0
> 3

Night

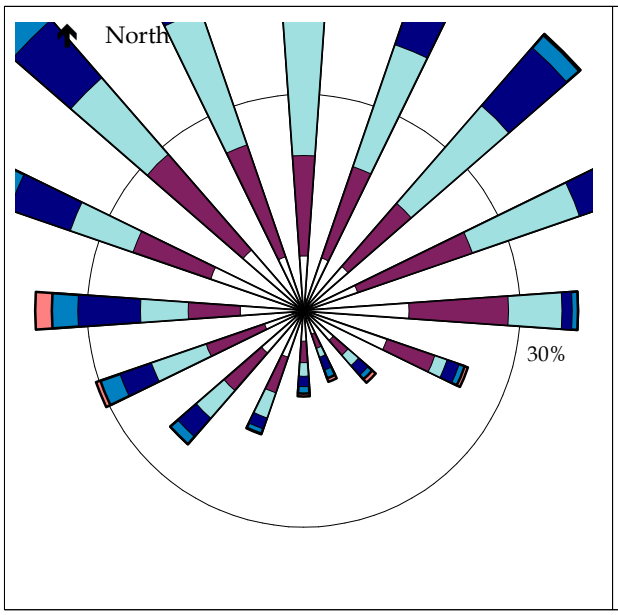
Summer



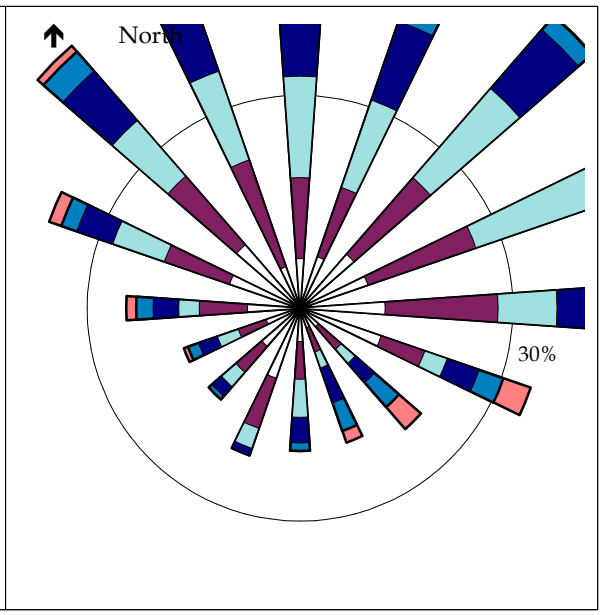
Spring



Winter



Autumn



< 0.5 | 0.5 - 1.0 | 1.0 - 1.5 | 1.5 - 2.0 | 2.0 - 2.5 | 2.5 - 3.0 | > 3

Night - Combined Wind and Inversions