Appendix 7

ROUTINE OPERATIONAL NOISE MONITORING

Attended Noise Monitoring

May 2008

June 2008

July 2008

August 2008

September 2008

December 2008

March 2009

Unattended Noise Monitoring

July 2008

September 2008

December 2008

March 2009

29 May 2008

Ref: 05168/2617

Mr Danny Young
Narrabri Coal Pty Ltd
PO Box 600
GUNNEDAH NSW 2380

RE: MAY 2008 NOISE MONITORING RESULTS

This letter report presents the results of attended noise compliance monitoring conducted for the Narrabri Coal Mine (NCM) on Thursday 15th May 2008. The purpose of the monitoring was to determine mine construction noise levels at the "Kurrajong" residence, owned my Mr M Lennox, to the south of the site. The survey was not a full compliance monitoring survey as detailed in the Narrabri Coal Mine Noise Monitoring Program. Rather, the measurements were conducted at the request of DoP to determine the level of noise impact at "Kurrajong" in response to complaints. A full compliance survey will be conducted in June 2008. A measurement was also taken on the entry road to "Bow Hills".

NOISE CRITERIA

The following is an extract from the Narrabri Coal NMP:

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

Noise Limits

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

Location	Day	Evening	Night	
	$L_{Aeq(15\ minute)}$	$L_{Aeq(15\ minute)}$	$L_{Aeq(15\ minute)}$	$L_{A1(1\ minute)}$
All Privately owned Residences	35	35	35	45

Table 1: Impact assessment criteria dB(A)

Notes:

- *To determine compliance with the $LA_{eq(15\ minute)}$ limit, noise from the project is to be measured at the most affected point within the residential boundary, or at the most affected point within 30 metres of a dwelling (rural situations) where the dwelling is more than 30 metres from the boundary. Where it can be demonstrated that direct measurement of noise from the project is impractical, the DECC may accept alternative means of determining compliance (see Chapter 11 of the NSW Industrial Noise Policy). The modification factors in Section 4 of the NSW Industrial Noise Policy shall also be applied to the measured noise levels where applicable.*
- *These limits apply under the relevant meteorological conditions outlined in the assessment procedures in Chapter 5 of the NSW Industrial Relations Policy.*
- *To determine compliance with the $LA1_{(1\ minute)}$ noise limits, noise from the project is to be measured at 1 metre from the dwelling façade. Where it can be demonstrated that direct measurement of noise from the project is impractical, the DECC may accept alternative means of determining compliance (See Chapter 11 of the NSW Industrial Noise Policy).*
- *These limits do not apply if the Proponent has an agreement with the relevant owner/s of these residences to generate higher noise levels, and the Proponent has advised the Department in writing of the terms of this agreement.*

NOISE MONITORING LOCATIONS

It was not possible to conduct monitoring at a point within 30m of the residence, as access to the property was denied by the land owner. An alternative location was chosen at the edge of mine owned land in the direction of “Kurrajong”. Measurements were taken near the entry gate to “Claremont”, which is approximately half way between the equipment forming the box cut and the “Kurrajong” residence.

A noise measurement was also conducted next to the access road to “Bow Hills” at a distance from the Kamilaroi Highway approximately equal to the set-back of the residence. The measurement point was significantly closer to the mine access road construction works than the residence.

NOISE MEASUREMENTS

Noise emission levels were measured with a Brüel & Kjær Type 2260 Precision Sound Analyser. This instrument has Type 1 characteristics as defined in AS1259-1982 “Sound Level Meters”. Calibration of the instrument was confirmed with a Brüel & Kjær Type 4231 Sound Level Calibrator prior to and at the completion of measurements.

Conditions on the day were very windy with gusts up to 8 m/s. The wind direction was variable, but was generally directly from the drift construction activities to “Kurrajong”. Wind over the microphone was above 50 dB(A) with a 25mm wind sock, so a 75mm wind sock was used to minimise wind noise. The sound meter was placed on a tripod and observed closely for times when the wind dropped sufficiently to allow measurement of noise from the mine, which was audible at most times. A hand held Kestrel weather station was utilised to ensure that noise measurements were taken when the wind speed dropped below 5 m/s.

RESULTS

"Kurrajong"

Due to the gusty nature of the wind there was significant variability in the mine noise. For example, the drill was a constant noise source but varied over time between levels in the mid-30 dB(A) range and inaudible. Noise from the excavator was also variable. Figure 2 below shows three measurement samples in which wind speed dropped to below 5 m/s. The third sample (Specific 3) gives a good indication of mine noise. The wind dropped to around 3 m/s and noise from the excavator peaked at 43 dB(A). The background level of 31 dB(A) during this sample represented drill noise. The L_{Aeq} for the sample was 34 dB(A). Assuming that the sample was representative of operations at the time, noise emissions from the mine are estimated as **34 dB(A),$L_{eq(15\ min)}$** and **43 dB(A),L_{max}**.

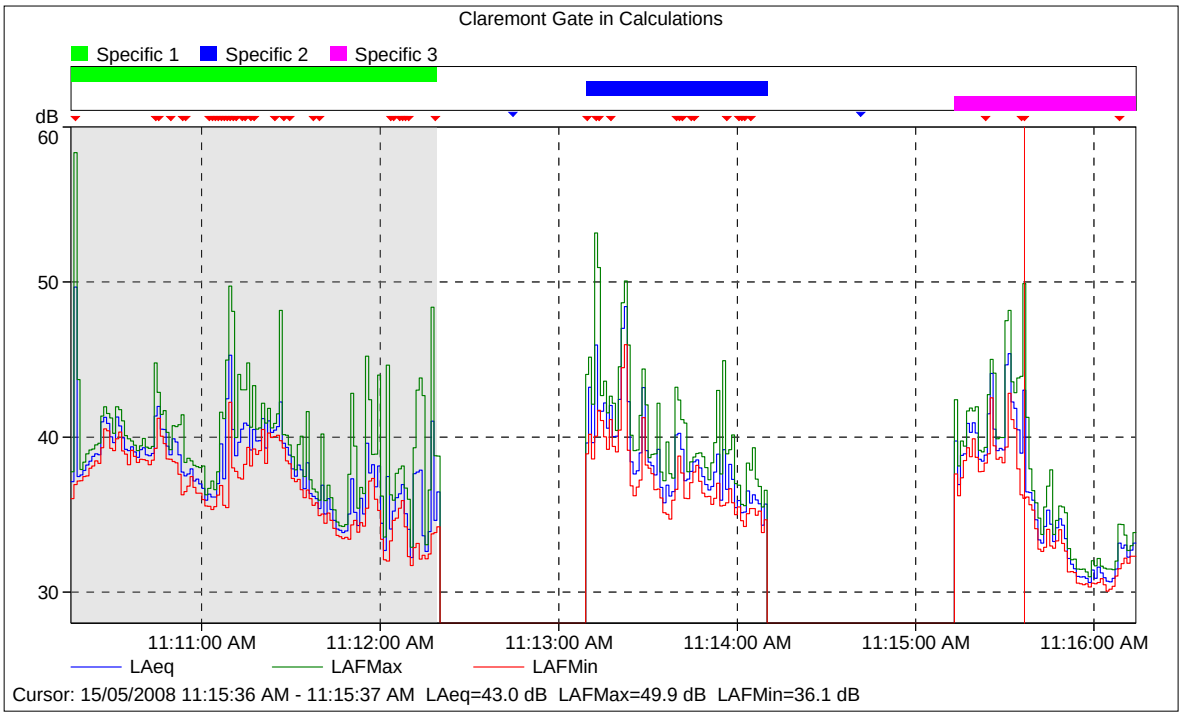


Figure 2. Time trace at Claremont gate.

Noise modelling originally conducted by Spectrum Acoustics for the Narrabri Mine was reviewed to determine the difference in noise level between the gate to "Claremont" (the measurement location) and the "Kurrajong" residence. Although noise contours have not been presented here, each modelled scenario was re-run with a NE wind to correspond with the wind direction on 15 May.

As expected, the model with the NE wind had an 8 dB difference between the measurement point and "Kurrajong", while the noise level difference was greater for all other scenarios. This is because the NE wind represents the worst case in terms of noise enhancement at "Claremont" and "Kurrajong". Applying this level difference to the measured levels discussed above gives **26 dB(A),$L_{eq(15\ min)}$** and **35 dB(A),L_{max}** at "Kurrajong". Without access to "Kurrajong" this is the best estimate of noise levels at this receiver on 15 May.

During the brief period when the wind dropped (see Figure 2) this noise level would have been audible at "Kurrajong" from outside the residence. The same level of noise occurring under calmer conditions

would certainly be audible. The results suggest that noise levels from Narrabri Mine easily satisfied the 35 dB(A) noise criterion. It is hoped that access to "Kurrajong" will be allowed for future compliance monitoring so that an exact measure of noise at this location can be achieved. If access is denied, then an extrapolation approach as applied above will be followed.

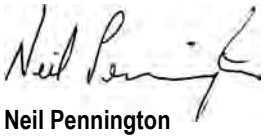
"Bow Hills"

The measurement was interrupted by intermittent traffic on the highway, although this was relatively easily removed from the time trace. Noise from a grader, which was the closest source, was occasionally audible and measured approximately 28 dB(A),L_{eq}. A topsoil scraper was working a large area and came within measurable range twice during a 15 minute period, producing a maximum level of 38 dB(A). The estimated total noise from construction works is **29 dB(A),$L_{eq(15minute)}$**. Again, this is well below the criterion and even lower levels would be experienced at the "Bow Hills" residence.

We trust this report fulfils your requirements at this time, however, should you require additional information or assistance please contact the undersigned on 4954 2276 or 0406 670677.

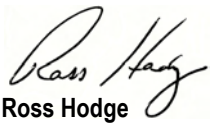
Yours faithfully,
SPECTRUM ACOUSTICS PTY LIMITED

Author:



Neil Pennington
Acoustical Consultant

Review:



Ross Hodge
Acoustical Consultant

24 July 2008

Ref: 05168/2684

Mr Danny Young
Narrabri Coal Pty Ltd
PO Box 600
GUNNEDAH NSW 2380

RE: JUNE 2008 ATTENDED NOISE MONITORING RESULTS

This letter report presents the results of attended noise compliance monitoring conducted for the Narrabri Coal Mine (NCM) on Thursday 26th June 2008. Noise monitoring was carried out in accordance with the conditions of the NCM Noise Management Plan (NMP) as detailed below. At the time of monitoring operations at NCM were in the construction phase.

NOISE CRITERIA

The following is an extract from the Narrabri Coal NMP:

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

Noise Limits

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

Location	Day	Evening	Night	
	$L_{Aeq(15\ minute)}$	$L_{Aeq(15\ minute)}$	$L_{Aeq(15\ minute)}$	$L_{A1(1\ minute)}$
All Privately owned Residences	35	35	35	45

Table 1: Impact assessment criteria dB(A)

Notes:

- *To determine compliance with the $LA_{eq(15\ minute)}$ limit, noise from the project is to be measured at the most affected point within the residential boundary, or at the most affected point within 30 metres of a dwelling (rural situations) where the dwelling is more than 30 metres from the boundary. Where it can be demonstrated that direct measurement of noise from the project is impractical, the DECC may accept alternative means of determining compliance (see Chapter 11 of the NSW Industrial Noise Policy). The modification factors in Section 4 of the NSW Industrial Noise Policy shall also be applied to the measured noise levels where applicable.*
- *These limits apply under the relevant meteorological conditions outlined in the assessment procedures in Chapter 5 of the NSW Industrial Relations Policy.*
- *To determine compliance with the $LA1_{(1\ minute)}$ noise limits, noise from the project is to be measured at 1 metre from the dwelling façade. Where it can be demonstrated that direct measurement of noise from the project is impractical, the DECC may accept alternative means of determining compliance (See Chapter 11 of the NSW Industrial Noise Policy).*
- *These limits do not apply if the Proponent has an agreement with the relevant owner/s of these residences to generate higher noise levels, and the Proponent has advised the Department in writing of the terms of this agreement.*

NOISE MONITORING LOCATIONS

Noise measurement locations for the attended noise survey are listed below:

Location N1: Bow Hills
Location N2: Westhaven
Location N3: Naroo
Location N4: Greylands
Location N5: Kurrajong*

*It was not possible to conduct monitoring at a point within 30m of the residence, as access to the property was denied by the land owner. An alternative location was chosen at the edge of mine owned land in the direction of "Kurrajong". Measurements were taken near the boundary fence with "Claremont", which is approximately half way between the works for construction of the box cut and the "Kurrajong" residence.

NOISE MEASUREMENTS

Noise emission levels were measured with a Brüel & Kjær Type 2260 Precision Sound Analyser. This instrument has Type 1 characteristics as defined in AS1259-1982 "Sound Level Meters". Calibration of the instrument was confirmed with a Brüel & Kjær Type 4231 Sound Level Calibrator prior to and at the completion of measurements.

Meteorological data used in this report was obtained from a hand held weather station with measurements made at approximately 2m above ground level. The morning of June 26 was cold and clear and early measurements were made whilst there was very little wind.

RESULTS

The total measured Leq is shown in **Table 1**. Where the noise from NCM was audible the Bruel & Kjaer "*Evaluator*" analysis software was used to quantify the contributions of the mine and other significant noise sources to the overall.

Noise from NCM is shown in bold type. Where noise from NCM is listed as inaudible, this means the maximum levels from the mine were at least 10 dB below the minimum level during the measurement and not measurable.

Table 1
NCM Noise Monitoring Results – 26 June 2008

Location	Time	dB(A),Leq	Wind speed/ direction	Identified Noise Sources
Bow Hills	9:17 am	41	1.5 m/s, 135°	Traffic (39), NCM (34), birds (27)
Westhaven	8:43 am	41	1.0 m/s, 315°	Birds and cows (38), NCM (36), plane (36),
Naroo	7:51 am	47	0.5 m/s, 45°	Traffic (45), birds (41), NCM (34)
Greylands	8:14 am	40	1.0 m/s, 315°	Traffic (43), NCM (38), birds (34)
Kurrajong*	7:32 am	50	0.5 m/s, 45°	NCM (48), birds (42), farm animals (35)

The results shown in table 1 indicate that noise emission from the construction works at NCM exceeded the day time noise criterion when measured at Westhaven, Greylands and the monitoring location adopted for Kurrajong.

At Westhaven and Greylands the noise was audible as general engine hum and occasional engine revs and reverse alarms. At the monitoring point for Kurrajong the noise was dominated by engine noise and general plant noise.

Additional noise measurements were made at the Kurrajong monitoring point to determine potential impacts under different atmospheric conditions.

At 3.20 pm on Wednesday June 25 the measured noise level was 30 dB(A) with noise from NCM contributing less than 25 dB(A). At the time there was a light breeze at less than 1m/s from the north west. Noise from NCM was audible as a low hum.

At 9.40 am on Thursday June 26 the measured noise level was 38 dB(A) with noise from NCM contributing 38 dB(A). At the time there was a breeze at approximately 1.5 m/s from the north west.

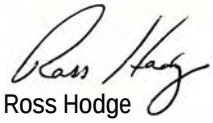
We trust this report fulfils your requirements at this time, however, should you require additional information or assistance please contact the undersigned on 4954 2276.

Yours faithfully,
SPECTRUM ACOUSTICS PTY LIMITED

Author:

Neil Pennington
Acoustical Consultant

Review:



Ross Hodge
Acoustical Consultant

24 July 2008

Ref: 05168/2685

Mr Danny Young
Narrabri Coal Pty Ltd
PO Box 600
GUNNEDAH NSW 2380

RE: JUNE 2008 ADDITIONAL NOISE MONITORING RESULTS

This letter report presents the results of attended noise compliance monitoring conducted for the Narrabri Coal Mine (NCM) on Friday 11th July 2008. The purpose of the monitoring was to determine mine construction noise levels at the "Kurrajong" residence, owned my Mr M Lennox, to the south of the site. The survey was not a full compliance monitoring survey as detailed in the Narrabri Coal Mine Noise Monitoring Program. Rather, the measurements were conducted at the request of NCM to determine the level of noise impact at "Kurrajong" in response to complaints.

NOISE CRITERIA

The following is an extract from the Narrabri Coal NMP:

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

Noise Limits

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

Location	Day	Evening	Night	
	$L_{Aeq(15\ minute)}$	**$L_{Aeq(15\ minute)}$**	$L_{Aeq(15\ minute)}$	$L_{A1(1\ minute)}$
All Privately owned Residences	35	35	35	45

Table 1: Impact assessment criteria dB(A)

Notes:

- *To determine compliance with the $L_{Aeq(15\ minute)}$ limit, noise from the project is to be measured at the most affected point within the residential boundary, or at the most affected point within 30 metres of a dwelling (rural situations) where the dwelling is more than 30 metres from the boundary. Where it can be demonstrated that direct measurement of noise from the project is impractical, the DECC may accept alternative means of determining compliance (see Chapter 11 of the NSW Industrial Noise Policy). The modification factors in Section 4 of the NSW Industrial Noise Policy shall also be applied to the measured noise levels where applicable.*
- *These limits apply under the relevant meteorological conditions outlined in the assessment procedures in Chapter 5 of the NSW Industrial Relations Policy.*
- *To determine compliance with the $L_{A1(1\ minute)}$ noise limits, noise from the project is to be measured at 1 metre from the dwelling façade. Where it can be demonstrated that direct measurement of noise from the project is impractical, the DECC may accept alternative means of determining compliance (See Chapter 11 of the NSW Industrial Noise Policy).*
- *These limits do not apply if the Proponent has an agreement with the relevant owner/s of these residences to generate higher noise levels, and the Proponent has advised the Department in writing of the terms of this agreement.*

NOISE MONITORING LOCATIONS

It was not possible to conduct monitoring at a point within 30m of the residence, as access to the property was denied by the land owner. An alternative location was chosen at the edge of mine owned land in the direction of “Kurrajong”. Measurements were taken near the boundary fence with “Claremont”, which is approximately half way between the works for construction of the box cut and the “Kurrajong” residence.

NOISE MEASUREMENTS

Noise emission levels were measured with a Brüel & Kjær Type 2260 Precision Sound Analyser. This instrument has Type 1 characteristics as defined in AS1259-1982 “Sound Level Meters”. Calibration of the instrument was confirmed with a Brüel & Kjær Type 4231 Sound Level Calibrator prior to and at the completion of measurements.

Conditions on the day were cold and clear with a light breeze at approximately 0.5 m/s from the south west. The wind speed increased slightly throughout the morning. At approximately 7.00 am the temperature was 4°C increasing to 11°C by 9.00 am.

RESULTS

The total measured Leq is shown in **Table 1**. Where the noise from NCM was audible the Bruel & Kjaer “*Evaluator*” analysis software was used to quantify the contributions of the mine and other significant noise sources to the overall.

Noise from NCM is shown in bold type. Where noise from NCM is listed as inaudible, this means the maximum levels from the mine were at least 10 dB below the minimum level during the measurement and not measurable.

Table 1
NCM Noise Monitoring Results – 11 July 2008

Location	Time	dB(A),Leq	Wind speed/ direction	Identified Noise Sources
Kurrajong*	7:02 am	41	0.5 m/s, 135°	NCM (41)
Kurrajong*	7:30 am	37	0.5 m/s, 135°	NCM (37) birds (<30),
Kurrajong*	7:58 am	44	0.5 m/s, 135°	NCM (44)
Kurrajong*	8:31 am	46	1.0 m/s, 135°	Birds (46), NCM (est. 30)
Kurrajong*	9:00 am	43	1.5 m/s, 135°	Birds (43), NCM (est. <30),

*Kurrajong monitoring location at Claremont.

In order to gauge the impacts of various operational scenarios the measurement at 7:30 am was carried out whilst only one dozer and one scraper were working

The results in Table 1 show that the received noise at the monitoring location were in excess of the project noise goal during the early morning period. Changes in atmospheric conditions later in the morning most likely resulted in less noise enhancing conditions and a consequently reduced noise level.

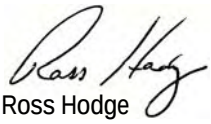
We trust this report fulfils your requirements at this time, however, should you require additional information or assistance please contact the undersigned on 4954 2276.

Yours faithfully,
SPECTRUM ACOUSTICS PTY LIMITED

Author:

Neil Pennington
Acoustical Consultant

Review:



Ross Hodge
Acoustical Consultant

21 August 2008

Ref: 05168/2732

Mr Danny Young
Narrabri Coal Pty Ltd
PO Box 600
GUNNEDAH NSW 2380

RE: AUGUST 2008 ADDITIONAL NOISE MONITORING RESULTS

This letter report presents the results of attended noise compliance monitoring conducted for the Narrabri Coal Mine (NCM) on Tuesday 12th August 2008. The purpose of the monitoring was to determine mine construction noise levels at the "Kurrajong" residence, owned my Mr M Lennox, to the south of the site. The survey was not a full compliance monitoring survey as detailed in the Narrabri Coal Mine Noise Monitoring Program. Rather, the measurements were conducted at the request of NCM to determine the level of noise impact at "Kurrajong".

NOISE CRITERIA

The following is an extract from the Narrabri Coal NMP:

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

Noise Limits

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

Location	Day	Evening	Night	
	$L_{Aeq(15\ minute)}$	$L_{Aeq(15\ minute)}$	$L_{Aeq(15\ minute)}$	$L_{A1(1\ minute)}$
All Privately owned Residences	35	35	35	45

Table 1: Impact assessment criteria dB(A)

Notes:

- *To determine compliance with the $L_{Aeq(15\ minute)}$ limit, noise from the project is to be measured at the most affected point within the residential boundary, or at the most affected point within 30 metres of a dwelling (rural situations) where the dwelling is more than 30 metres from the boundary. Where it can be demonstrated that direct measurement of noise from the project is impractical, the DECC may accept alternative means of determining compliance (see Chapter 11 of the NSW Industrial Noise Policy). The modification factors in Section 4 of the NSW Industrial Noise Policy shall also be applied to the measured noise levels where applicable.*
- *These limits apply under the relevant meteorological conditions outlined in the assessment procedures in Chapter 5 of the NSW Industrial Relations Policy.*
- *To determine compliance with the $L_{A1(1\ minute)}$ noise limits, noise from the project is to be measured at 1 metre from the dwelling façade. Where it can be demonstrated that direct measurement of noise from the project is impractical, the DECC may accept alternative means of determining compliance (See Chapter 11 of the NSW Industrial Noise Policy).*
- *These limits do not apply if the Proponent has an agreement with the relevant owner/s of these residences to generate higher noise levels, and the Proponent has advised the Department in writing of the terms of this agreement.*

NOISE MONITORING LOCATIONS

It was not possible to conduct monitoring at a point within 30m of the residence, as access to the property was denied by the land owner. An alternative location was chosen at the edge of mine owned land in the direction of “Kurrajong”. Measurements were taken near the boundary fence with “Claremont”, which is approximately half way between the box cut construction works and the “Kurrajong” residence.

NOISE MEASUREMENTS

Noise emission levels were measured with a Brüel & Kjær Type 2260 Precision Sound Analyser. This instrument has Type 1 characteristics as defined in AS1259-1982 “Sound Level Meters”. Calibration of the instrument was confirmed with a Brüel & Kjær Type 4231 Sound Level Calibrator prior to and at the completion of measurements.

Conditions on the day were cold and clear with a light breeze from the north increasing from calm to around 0.5 m/s throughout the morning. At 7.39 am the temperature was 1°C increasing to 9°C by 9.00 am.

RESULTS

The total measured Leq is shown in **Table 1**. Where the noise from NCM was audible the Bruel & Kjaer “*Evaluator*” analysis software was used to quantify the contributions of the mine and other significant noise sources to the overall.

Noise from NCM is shown in bold type.

TABLE 1 NCM Noise Monitoring Results – 12 August 2008				
Location	**Time**	**dB(A),Leq**	**Wind speed/ direction**	**Identified Noise Sources**
Kurrajong*	7:39 am	47.1	Calm	**NCM (47)**
Kurrajong*	8:03 am	44.1	Calm	**NCM (42.7)** birds (40),
Kurrajong*	8:18 am	40.7	Calm	**NCM (40.7)**
Kurrajong*	8:31 am	38.6	0.1 m/s, 45°	**NCM (38.4),** Birds (<30),
Kurrajong*	8:53 am	35.3	0.5 m/s, 45°	Birds (34), **NCM (27.6)**

*Kurrajong monitoring location at Claremont southern boundary.

The results in Table 1 show that the received noise levels at the monitoring location were in excess of the project noise goal during the early morning period. Changes in atmospheric conditions later in the morning resulted in less noise enhancing conditions and a consequently reduced noise level. In particular, the ground level temperature increase from 1^0C to 9^0C during the survey corresponded with the 'burning off' of what would have been an intense nocturnal inversion.

We trust this report fulfils your requirements at this time, however, should you require additional information or assistance please contact the undersigned on 4954 2276.

Yours faithfully,
SPECTRUM ACOUSTICS PTY LIMITED

Author:

Neil Pennington
Acoustical Consultant

Review:

Ross Hodge
Acoustical Consultant

27 October 2008

Ref: 05168/2828

Mr Danny Young
Narrabri Coal Pty Ltd
PO Box 600
GUNNEDAH NSW 2380

RE: SEPTEMBER 2008 ATTENDED NOISE MONITORING RESULTS

This letter report presents the results of attended noise compliance monitoring conducted for the Narrabri Coal Mine (NCM) on Tuesday 30th September 2008. Noise monitoring was carried out in accordance with the conditions of the NCM Noise Management Plan (NMP) as detailed below. At the time of monitoring activities at NCM were in the construction phase.

NOISE CRITERIA

The following is an extract from the Narrabri Coal NMP:

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

Noise Limits

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

Location	Day	Evening	Night	
	$L_{Aeq(15\ minute)}$	$L_{Aeq(15\ minute)}$	$L_{Aeq(15\ minute)}$	$L_{A1(1\ minute)}$
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Table 1: Impact assessment criteria dB(A)

Notes:

- *To determine compliance with the $L_{Aeq(15\ minute)}$ limit, noise from the project is to be measured at the most affected point within the residential boundary, or at the most affected point within 30 metres of a dwelling (rural situations) where the dwelling is more than 30 metres from the boundary. Where it can be demonstrated that direct measurement of noise from the project is impractical, the DECC may accept alternative means of determining compliance (see Chapter 11 of the NSW Industrial Noise Policy). The modification factors in Section 4 of the NSW Industrial Noise Policy shall also be applied to the measured noise levels where applicable.*
- *These limits apply under the relevant meteorological conditions outlined in the assessment procedures in Chapter 5 of the NSW Industrial Relations Policy.*
- *To determine compliance with the $L_{A1(1\ minute)}$ noise limits, noise from the project is to be measured at 1 metre from the dwelling façade. Where it can be demonstrated that direct measurement of noise from the project is impractical, the DECC may accept alternative means of determining compliance (See Chapter 11 of the NSW Industrial Noise Policy).*
- *These limits do not apply if the Proponent has an agreement with the relevant owner/s of these residences to generate higher noise levels, and the Proponent has advised the Department in writing of the terms of this agreement.*

NOISE MONITORING LOCATIONS

Noise measurement locations for the attended noise survey are listed below:

Location N1: Bow Hills
Location N2: Westhaven
Location N3: Naroo
Location N4: Greylands
Location N5: Kurrajong*

*It was not possible to conduct monitoring at a point within 30m of the residence, as access to the property was denied by the land owner. An alternative location was chosen at the edge of mine owned land in the direction of "Kurrajong". Measurements were taken near the boundary fence with "Claremont", which is approximately half way between the works for construction of the box cut and the "Kurrajong" residence. Noise contours from the project EA showed that the noise level at "Kurrajong" is approximately 8 dB lower than at the measurement point. This correction has been applied to the measured level to estimate the noise level at "Kurrajong".

NOISE MEASUREMENTS

Noise emission levels were measured with a Brüel & Kjær Type 2260 Precision Sound Analyser. This instrument has Type 1 characteristics as defined in AS1259-1982 "Sound Level Meters". Calibration of the instrument was confirmed with a Brüel & Kjær Type 4231 Sound Level Calibrator prior to and at the completion of measurements.

Meteorological data used in this report was obtained from a hand held weather station with measurements made at approximately 2m above ground level. The morning of September 30 was cool and clear with a 3-4 m/s breeze from the SSE.

RESULTS

The total measured Leq is shown in **Table 1**. Where the noise from NCM was audible the Bruel & Kjaer "***Evaluator***" analysis software was used to quantify the contributions of the mine and other significant noise sources to the overall level.

Noise from NCM is shown in bold type. Where noise from NCM is listed as inaudible, this means the maximum levels from the mine were at least 10 dB below the minimum level during the measurement and not measurable.

Table 1
NCM Noise Monitoring Results – 30 September 2008

Location	Time	dB(A),Leq	Wind speed/ direction	Identified Noise Sources
Bow Hills	8:39 am	35.7	1.5 m/s, SSE	Traffic (35), **NCM (26)**
Westhaven	9:36 am	38.5	1.0 m/s, SSE	Birds and cows (38), **NCM Inaudible**
Naroo	8:20 am	47.9	2-3 m/s, SSE	Birds (47), **NCM (<25)**
Greylands	9:11 am	45.0	1.0 m/s, SSE	Birds (43), Traffic (40), **NCM (22)**
Kurrajong*	7:58 am	36.2	3-4 m/s, SSE	Farm animals (35), **NCM (20)**

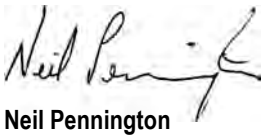
* Correction of -8dB applied to the *mine noise component only* measured at "Claremont" boundary.

The results shown in table 1 indicate that noise emission from the construction works at NCM were below the criterion of 35 dB(A),$L_{eq(15min)}$ at all receivers.

We trust this report fulfils your requirements at this time, however, should you require additional information or assistance please contact the undersigned on 4954 2276.

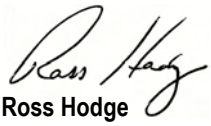
Yours faithfully,
SPECTRUM ACOUSTICS PTY LIMITED

Author:



Neil Pennington
Acoustical Consultant

Review:



Ross Hodge
Acoustical Consultant

31 December 2008

Ref: 05168/2909

Mr Danny Young
Narrabri Coal Pty Ltd
PO Box 600
GUNNEDAH NSW 2380

RE: DECEMBER 2008 ATTENDED NOISE MONITORING RESULTS

This letter report presents the results of attended noise compliance monitoring conducted for the Narrabri Coal Mine (NCM) on Wednesday 17th December 2008. Noise monitoring was carried out in accordance with the conditions of the NCM Noise Management Plan (NMP) as detailed below.

NOISE CRITERIA

The following is an extract from the Narrabri Coal NMP:

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

Noise Limits

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

Location	Day	Evening	Night	
	$L_{Aeq(15\ minute)}$	$L_{Aeq(15\ minute)}$	$L_{Aeq(15\ minute)}$	$L_{A1(1\ minute)}$
All Privately owned Residences	35	35	35	45

Table 1: Impact assessment criteria dB(A)

Notes:

- *To determine compliance with the $L_{Aeq(15\ minute)}$ limit, noise from the project is to be measured at the most affected point within the residential boundary, or at the most affected point within 30 metres of a dwelling (rural situations) where the dwelling is more than 30 metres from the boundary. Where it can be demonstrated that direct measurement of noise from the project is impractical, the DECC may accept alternative means of determining compliance (see Chapter 11 of the NSW Industrial Noise Policy). The modification factors in Section 4 of the NSW Industrial Noise Policy shall also be applied to the measured noise levels where applicable.*
- *These limits apply under the relevant meteorological conditions outlined in the assessment procedures in Chapter 5 of the NSW Industrial Relations Policy.*
- *To determine compliance with the $L_{A1(1\ minute)}$ noise limits, noise from the project is to be measured at 1 metre from the dwelling façade. Where it can be demonstrated that direct measurement of noise from the project is impractical, the DECC may accept alternative means of determining compliance (See Chapter 11 of the NSW Industrial Noise Policy).*
- *These limits do not apply if the Proponent has an agreement with the relevant owner/s of these residences to generate higher noise levels, and the Proponent has advised the Department in writing of the terms of this agreement.*

NOISE MONITORING LOCATIONS

Noise measurement locations for the attended noise survey are listed below:

Location N1: Bow Hills
Location N2: Westhaven
Location N3: Naroo
Location N4: Greylands
Location N5: Kurrajong*

*It was not possible to conduct monitoring at a point within 30m of the residence, as access to the property was denied by the land owner. An alternative location was chosen at the edge of mine owned land in the direction of "Kurrajong". Measurements were taken near the boundary fence with "Claremont", which is approximately half way between the works for construction of the box cut and the "Kurrajong" residence. Noise contours from the project EA showed that the noise level at "Kurrajong" is approximately 8 dB lower than at the measurement point. This correction has been applied to the measured level to estimate the noise level at "Kurrajong".

NOISE MEASUREMENTS

Noise emission levels were measured with a Brüel & Kjær Type 2260 Precision Sound Analyser. This instrument has Type 1 characteristics as defined in AS1259-1982 "Sound Level Meters". Calibration of the instrument was confirmed with a Brüel & Kjær Type 4231 Sound Level Calibrator prior to and at the completion of measurements.

Meteorological data used in this report was obtained from a hand held weather station with measurements made at approximately 2m above ground level. The morning of December 17 was warm and clear at 26^0C and 40% relative humidity with wind increasing from the west.

RESULTS

The total measured Leq is shown in **Table 1**. Where the noise from NCM was audible the Bruel & Kjaer "***Evaluator***" analysis software was used to quantify the contributions of the mine and other significant noise sources to the overall level.

Noise from NCM is shown in bold type. Where noise from NCM is listed as inaudible, this means the maximum levels from the mine were at least 10 dB below the minimum level during the measurement and not measurable.

Table 1
NCM Noise Monitoring Results – 17 December 2008

Location	Time	dB(A),Leq	Wind speed/ direction	Identified Noise Sources
Kurrajong*	8:51 am	37.3	Calm	Traffic (35), Domestic (34), **NCM (<20)**
Bow Hills	9:12 am	58.2	0.5 m/s W	Truck (58), **NCM (<25)**
Greylands	9:35 am	38.8	0.5 m/s W	Birds (37), Traffic (33), **NCM (25)**
Westhaven	9:57 am	38.0	2 m/s W	Wind (35), Domestic (34), **NCM Inaudible**
Naroo	8:20 am	38.0	1.5 m/s W	Traffic (36), Birds (32), **NCM Inaudible**

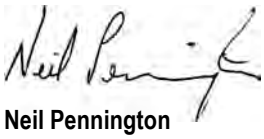
* Correction of -8dB applied to the *mine noise component only* measured at "Claremont" boundary.

The results shown in Table 1 indicate that noise emissions from the NCM were below the criterion of 35 dB(A),$L_{eq(15min)}$ at all receivers.

We trust this report fulfils your requirements at this time, however, should you require additional information or assistance please contact the undersigned on 4954 2276.

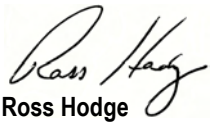
Yours faithfully,
SPECTRUM ACOUSTICS PTY LIMITED

Author:



Neil Pennington
Acoustical Consultant

Review:



Ross Hodge
Acoustical Consultant

26 March 2009

Ref: 05168/3011

Mr Danny Young
Narrabri Coal Pty Ltd
PO Box 600
GUNNEDAH NSW 2380

RE: MARCH 2009 ATTENDED NOISE MONITORING RESULTS

This letter report presents the results of attended noise compliance monitoring conducted for the Narrabri Coal Mine (NCM) from Monday 23rd to Tuesday 24th March 2009. Noise monitoring was carried out in accordance with the conditions of the NCM Noise Management Plan (NMP) as detailed below.

NOISE CRITERIA

The following is an extract from the Narrabri Coal NMP:

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

Noise Limits

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

Location	Day	Evening	Night	
	$L_{Aeq(15\ minute)}$	$L_{Aeq(15\ minute)}$	$L_{Aeq(15\ minute)}$	$L_{A1(1\ minute)}$
All Privately owned Residences	35	35	35	45

Table 1: Impact assessment criteria dB(A)

Notes:

- *To determine compliance with the $L_{Aeq(15\ minute)}$ limit, noise from the project is to be measured at the most affected point within the residential boundary, or at the most affected point within 30 metres of a dwelling (rural situations) where the dwelling is more than 30 metres from the boundary. Where it can be demonstrated that direct measurement of noise from the project is impractical, the DECC may accept alternative means of determining compliance (see Chapter 11 of the NSW Industrial Noise Policy). The modification factors in Section 4 of the NSW Industrial Noise Policy shall also be applied to the measured noise levels where applicable.*
- *These limits apply under the relevant meteorological conditions outlined in the assessment procedures in Chapter 5 of the NSW Industrial Relations Policy.*
- *To determine compliance with the $L_{A1(1\ minute)}$ noise limits, noise from the project is to be measured at 1 metre from the dwelling façade. Where it can be demonstrated that direct measurement of noise from the project is impractical, the DECC may accept alternative means of determining compliance (See Chapter 11 of the NSW Industrial Noise Policy).*
- *These limits do not apply if the Proponent has an agreement with the relevant owner/s of these residences to generate higher noise levels, and the Proponent has advised the Department in writing of the terms of this agreement.*

NOISE MONITORING LOCATIONS

Noise measurement locations for the attended noise survey are listed below:

Location N1: Bow Hills
Location N2: Westhaven
Location N3: Naroo
Location N4: Greylands
Location N5: Kurrajong*

*It was not possible to conduct monitoring at a point within 30m of the residence, as access to the property was denied by the land owner. An alternative location was chosen at the edge of mine owned land in the direction of "Kurrajong". Measurements were taken near the boundary fence with "Claremont", which is approximately half way between the works for construction of the box cut and the "Kurrajong" residence. Noise contours from the project EA showed that the noise level at "Kurrajong" is approximately 8 dB lower than at the measurement point. This correction has been applied to the measured level to estimate the noise level at "Kurrajong".

NOISE MEASUREMENTS

Noise emission levels were measured with a Brüel & Kjær Type 2260 Precision Sound Analyser. This instrument has Type 1 characteristics as defined in AS1259-1982 "Sound Level Meters". Calibration of the instrument was confirmed with a Brüel & Kjær Type 4231 Sound Level Calibrator prior to and at the completion of measurements.

Meteorological data used in this report was obtained from a hand held weather station with measurements made at approximately 2m above ground level. The weather was generally warm with clear skies, temperatures above 20^0C, 60-70% relative humidity and no wind.

RESULTS

Measured noise levels are shown in **Tables 1-3**. Where the noise from NCM was audible the Bruel & Kjaer "*Evaluator*" analysis software was used to quantify the contributions of the mine and other significant noise sources to the overall level.

Noise from NCM is shown in bold type. Where noise from NCM is listed as inaudible, this means the maximum levels from the mine were at least 10 dB below the minimum level during the measurement and not measurable.

Table 1
NCM Noise Monitoring Results – 24 March 2009 (Day)

Location	Time	dB(A),Leq	Wind speed/ direction	Identified Noise Sources
Naroo	8:32 am	N/A	Calm	Roadworks – no measurement taken
Kurrajong*	8:46 am	39.7	Calm	Birds (39), **NCM (<15)**
Westhaven	9:07 am	31.4	Calm	Birds (31), **NCM inaudible**
Greylands	9:28 am	42.0	Calm	Birds (41), Traffic (35), **NCM inaudible**
Bow Hills	7:45 pm	42.3	Calm	Birds (42), **NCM (27)**

* Correction of -8dB applied to the *mine noise component only* measured at "Claremont" boundary.

Table 2
NCM Noise Monitoring Results – 23 March 2009 (Evening)

Location	Time	dB(A),Leq	Wind speed/ direction	Identified Noise Sources
Bow Hills	7:31 pm	47.0	Calm	Traffic (47), **NCM (25)**
Naroo	7:53 pm	45.2	Calm	Insects (43), Traffic (39), **NCM inaudible**
Kurrajong*	8:16 pm	42.5	Calm	Insects (41), **NCM (<15)**
Westhaven	8.48 pm	38.9	0-0.5m/s SE	Insects (38.9), **NCM inaudible**
Greylands	9.14 pm	46.8	Calm	Insects (46), **NCM (23)**

* Correction of -8dB applied to the *mine noise component only* measured at "Claremont" boundary.

Table 3
NCM Noise Monitoring Results – 23-24 March 2009 (Night)

Location	Time	dB(A),Leq	Wind speed/ direction	Identified Noise Sources
Bow Hills	10:29 pm	44.2	Calm	Insects (42), Traffic (40), **NCM inaudible**
Naroo	10:43 pm	44.8	Calm	Traffic (44), Insects (32), **NCM inaudible**
Kurrajong*	11:03 pm	46.8	Calm	Insects (46), **NCM (<15)**
Westhaven	11:27 pm	26.1	Calm	Insects (26), **NCM inaudible**
Greylands	11:49 pm	40.0	Calm	Cattle (37), Insects (34), **NCM inaudible**
Kurrajong*	12:07 am	46.5	Calm	Insects (46), **NCM (<15)**
Kurrajong*	12:47 am	47.5	Calm	Insects (47), **NCM (<15)**

Kurrajong*	1:18 am	47.8	Calm	Insects (47), **NCM (19)**
Kurrajong*	2:13 am	43.2	Calm	Insects (43), **NCM (18)**

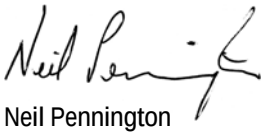
* Correction of -8dB applied to the *mine noise component only* measured at "Claremont" boundary.

The results shown in Tables 1-3 indicate that noise emissions from the NCM were below the criterion of 35 dB(A),$L_{eq(15min)}$ at all receivers.

We trust this report fulfils your requirements at this time, however, should you require additional information or assistance please contact the undersigned on 4954 2276.

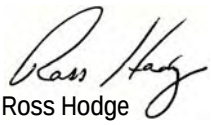
Yours faithfully,
SPECTRUM ACOUSTICS PTY LIMITED

Author:



Neil Pennington
Acoustical Consultant

Review:



Ross Hodge
Acoustical Consultant

22 August 2008

Ref: 05168/2737

Mr Danny Young
Narrabri Coal Pty Ltd
PO Box 600
GUNNEDAH NSW 2380

RE: JULY 2008 UNATTENDED NOISE MONITORING RESULTS

This letter report presents the results of unattended operational noise monitoring conducted for the Narrabri Coal Mine (NCM) during July 2008.

NOISE CRITERIA

The following is an extract from the Narrabri Coal NMP:

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

Noise Limits

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

Location	Day	Evening	Night	
	$L_{Aeq(15\ minute)}$	$L_{Aeq(15\ minute)}$	$L_{Aeq(15\ minute)}$	$L_{A1(1\ minute)}$
All Privately owned Residences	35	35	35	45

Table 1: Impact assessment criteria dB(A)

Notes:

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

NOISE MONITORING LOCATIONS

Noise measurement locations for the attended noise survey are listed below and indicated in Figure 1.

Location N4: Greylands (north of site)
Location N3: Naroo (south of site)

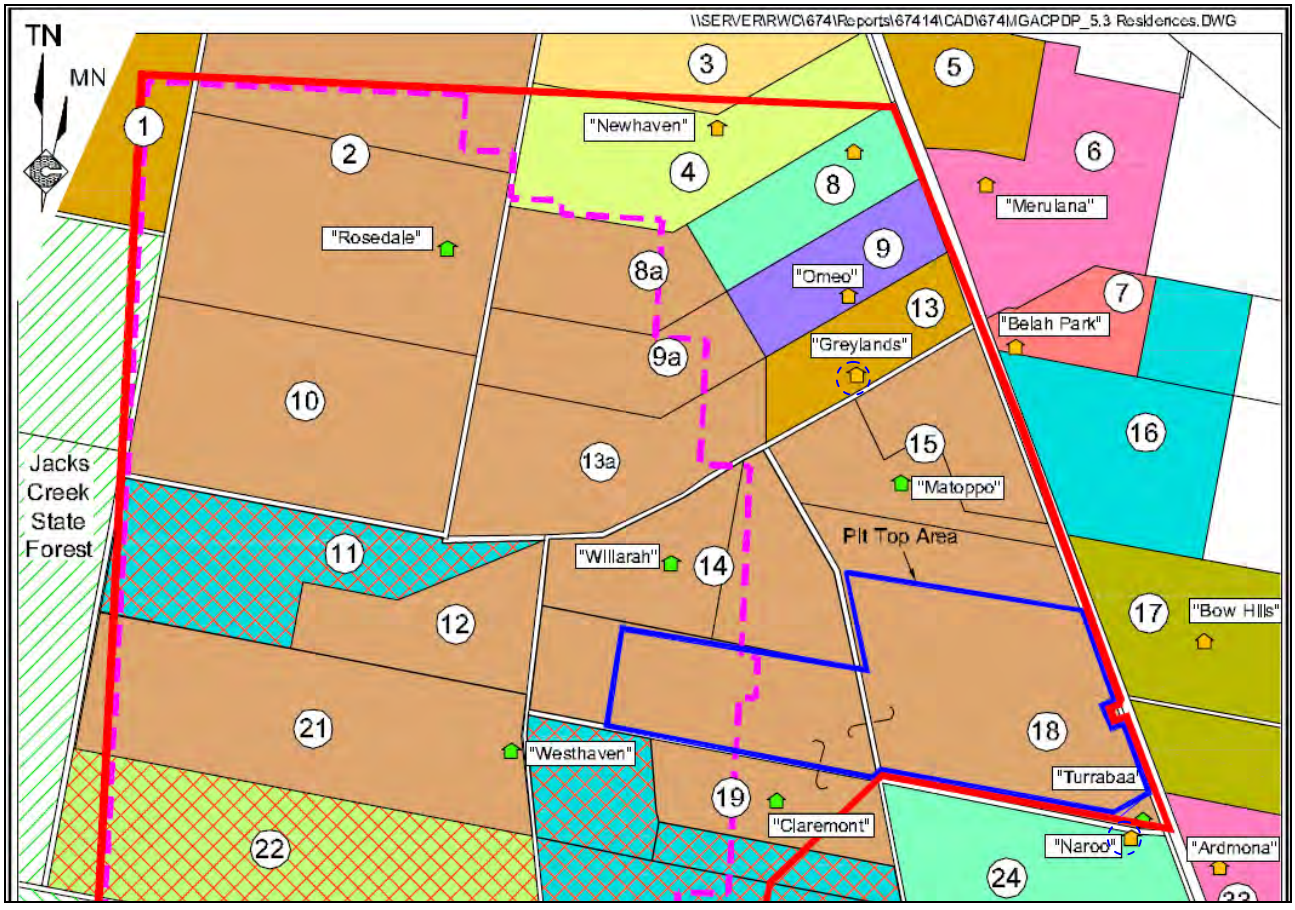


Figure 1. Unattended noise monitoring locations.

NOISE MONITORING PROGRAM

Noise levels were measured at each location for a period of at least seven days. Noise levels were measured at 15 minute statistical intervals using Svan 949 sound and vibration analysers used as environmental noise loggers. The measurements were done in accordance with relevant DECC guidelines and AS 1055-1997 "Acoustics – Description and Measurement of Environmental Noise". The noise loggers used comply with the requirements of AS 1259.2-1990 "Acoustics – Sound Level Meters", and have current NATA calibration certification (see **Appendix B**).

Each logger was programmed to continuously register environmental noise levels over the 15 minute intervals, with internal software calculating and storing Ln percentile noise levels for each sampling period. Calibration of the logger was performed as part of the instrument's initialisation procedures, with calibration results being within the allowable ± 0.5 dB(A) range. Since noise loggers record the total acoustic environment, it is not possible to identify or assign noise levels to the various contributing sources. Accordingly, this report does not attempt to interpret the logger results.

MEASURED NOISE LEVELS

Measured noise levels at each location are summarised below. Tabulated results show overall L_{Aeq} and L_{90} levels for the day, evening and night time periods using procedures specified in the DECC INP. Graphs showing full data sets are shown in **Appendix A**.

Greylands

Date	Leq(day)	Leq(eve)	Leq(night)	L90(day)	L90(eve)	L90(night)
5/7/2008	46.3	41.7	40.9	37.0	36.5	36.0
6/7/2008	46.9	38.3	37.4	33.0	33.5	34.0
7/7/2008	49.9	38.9	40.5	33.0	34.0	34.5
8/7/2008	49.8	47.8	43.0	36.5	36.0	36.0
9/7/2008	46.6	37.1	38.4	34.5	33.8	34.5
10/7/2008	45.5	34.9	41.0	32.5	31.8	33.5
11/7/2008	46.3	37.6	37.6	33.5	31.5	31.0
LAeq	48	42	41	--	--	--
L90	--	--	--	34	34	35

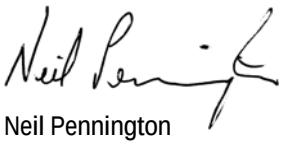
Naroo

Date	Leq(day)	Leq(eve)	Leq(night)	L90(day)	L90(eve)	L90(night)
4-Jul-08	51.0	47.5	44.5	37.3	32.7	33.6
5-Jul-08	48.7	45.7	43.8	30.3	18.3	18.2
6-Jul-08	46.2	46.3	45.5	29.1	19.0	18.2
7-Jul-08	51.6	51.5	43.0	39.3	29.9	18.3
8-Jul-08	54.7	45.8	43.7	40.3	20.0	18.3
9-Jul-08	52.3	46.2	44.3	40.0	19.8	18.7
10-Jul-08	50.8	46.8	45.3	42.4	24.1	18.6
LAeq	52	48	44	--	--	--
L90	--	--	--	39	20	18

We trust this report fulfils your requirements at this time, however, should you require additional information or assistance please contact the undersigned on 4954 2276 or 0406 670677.

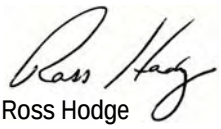
Yours faithfully,
SPECTRUM ACOUSTICS PTY LIMITED

Author:



Neil Pennington
Acoustical Consultant

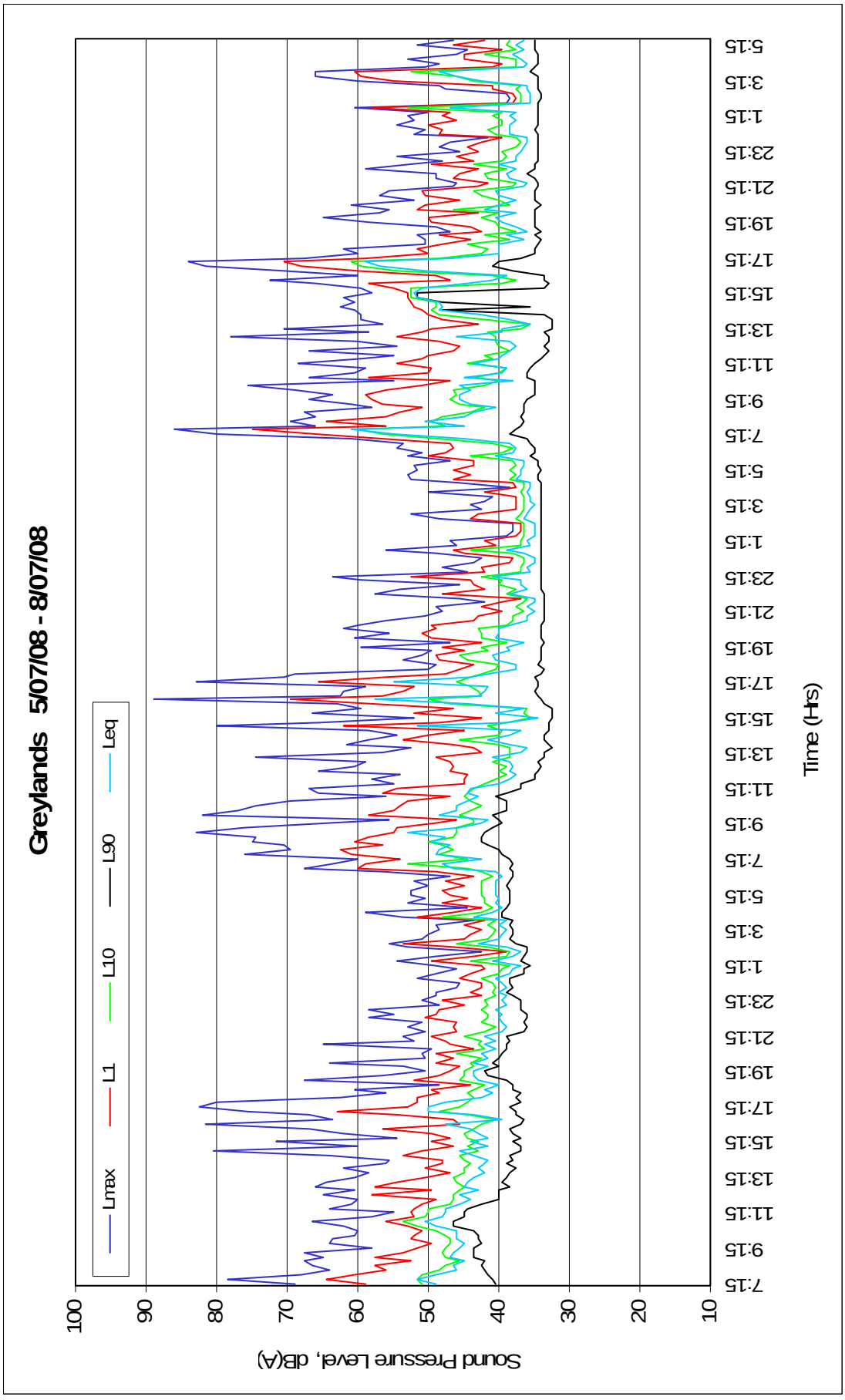
Review:



Ross Hodge
Acoustical Consultant

APPENDIX A

NOISE DATA CHARTS


Greylands 5/07/08 - 8/07/08
Lmax
L1
L10
L90
Leq
Sound Pressure Level, dB(A)
100
90
80
70
60
50
40
30
20
10
Time (Hrs)
7:15
9:15
11:15
13:15
15:15
17:15
19:15
21:15
23:15
1:15
3:15
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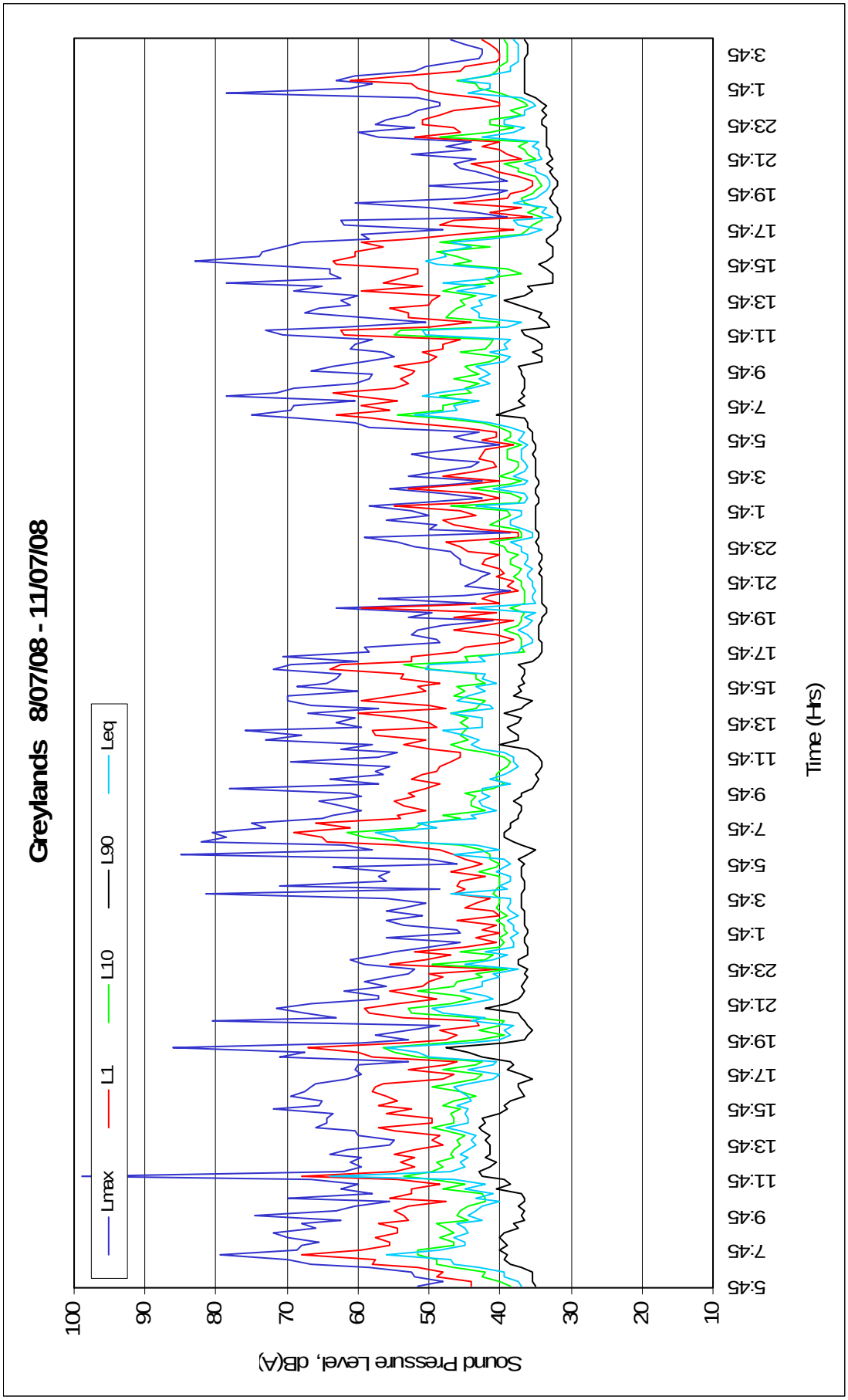
Greylands 8/07/08 - 11/07/08
Lmax
L1
L10
L90
Leq
Sound Pressure Level, dB(A)
100
90
80
70
60
50
40
30
20
10
Time (Hrs)
5:45
7:45
9:45
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13:45
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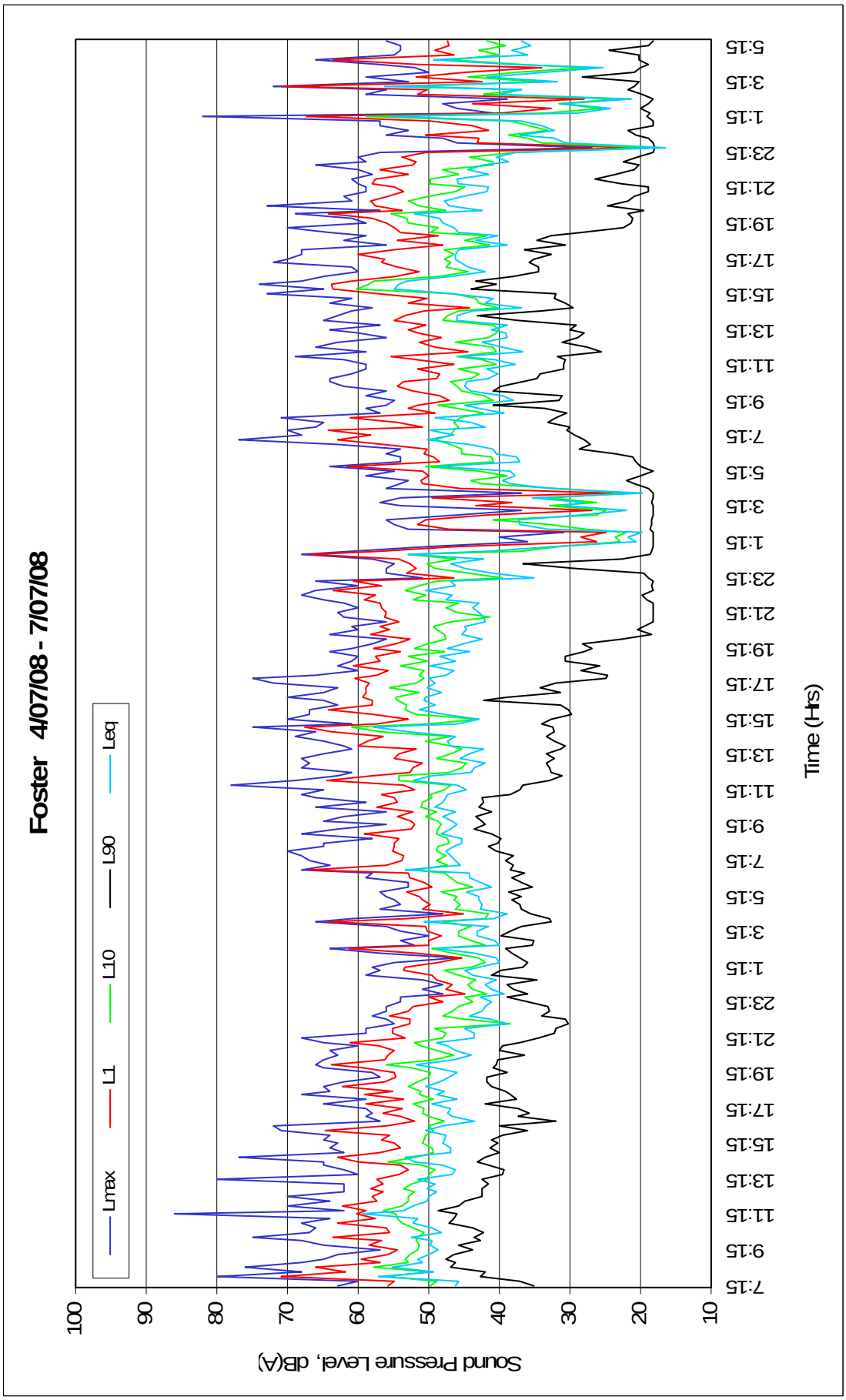
Foster 4/07/08 - 7/07/08
Lmax
L1
L10
L90
Leq
Sound Pressure Level, dB(A)
100
90
80
70
60
50
40
30
20
10
Time (Hrs)
7:15
9:15
11:15
13:15
15:15
17:15
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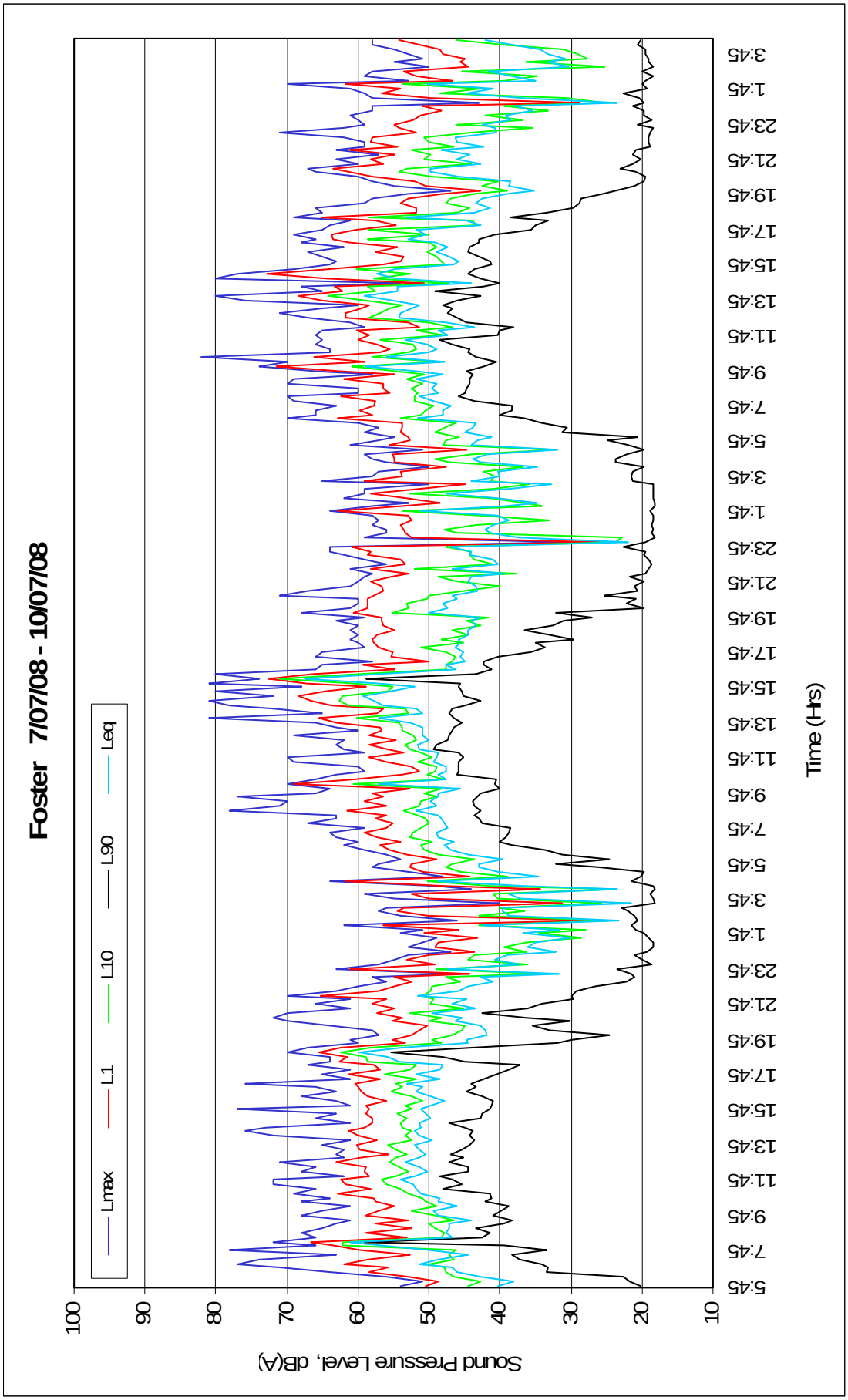
Foster 7/07/08 - 10/07/08
Lmax
L1
L10
L90
Leq
Sound Pressure Level, dB(A)
100
90
80
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40
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Time (Hrs)
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APPENDIX B

CALIBRATION CERTIFICATES

CONFORMANCE CERTIFICATE

We certify that the equipment listed below has been checked, adjusted and aligned to conform to manufacturers specifications.

Certificate No: 7759

INSTRUMENT: Sound & Vibration Anayser
Svantek

Type No: Svan-949 **Serial No:** 9757

Owner: Spectrum Acoustics Pty Ltd
1 Roath St
Cardiff NSW 2285

CONDITION OF TEST:

Ambient Pressure: 1007 **mbar**

Temperature: 23 °C **Relative Humidity:** 37 %

Date of Calibration: 6/10/06

CHECKED BY: JK **AUTHORISED SIGNATORY:** .....
Jack Kielt

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NATA
WORLD RECOGNISED ACCREDITATION
Accredited Lab. No. 9262
Acoustic and Vibration Measurements

ACU-VIB
ELECTRONICS

HEAD OFFICE
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Page 1 of 1
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CONFORMANCE CERTIFICATE

We certify that the equipment listed below has been checked, adjusted and aligned to conform to manufacturers specifications.

Certificate No: 7758

INSTRUMENT: Sound & Vibration Anayser
Svantek

Type No: Svan-949 **Serial No:** 9758

Owner: Spectrum Acoustics Pty Ltd
1 Roath St
Cardiff NSW 2285

CONDITION OF TEST:

Ambient Pressure: 1007 **mbar**

Temperature: 23 **°C** **Relative Humidity:** 37 **%**

Date of Calibration: 6/10/06

CHECKED BY: JK **AUTHORISED SIGNATORY:** .....
Jack Kielt

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AVCERT4 Rev.1 03.09.04

CONFORMANCE CERTIFICATE

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Certificate No: 7757

INSTRUMENT: Sound & Vibration Anayser
Svantek

Type No: Svan-949 **Serial No:** 9756

Owner: Spectrum Acoustics Pty Ltd
1 Roath St
Cardiff NSW 2285

CONDITION OF TEST:

Ambient Pressure: 1007 **mbar**

Temperature: 23 **°C** **Relative Humidity:** 37 **%**

Date of Calibration: 6/10/06

CHECKED BY: JK **AUTHORISED SIGNATORY:** .....
Jack Kielt

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AVCERT4 Rev.1 03.09.04

27 October 2008

Ref: 05168/2829

Mr Danny Young
Narrabri Coal Pty Ltd
PO Box 600
GUNNEDAH NSW 2380

RE: SEPTEMBER 2008 UNATTENDED NOISE MONITORING RESULTS

This letter report presents the results of unattended operational noise monitoring conducted for the Narrabri Coal Mine (NCM) commencing on 30 September 2008.

NOISE CRITERIA

The following is an extract from the Narrabri Coal NMP:

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

Noise Limits

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

Location	Day $L_{Aeq(15\ minute)}$	Evening $L_{Aeq(15\ minute)}$	Night	
			$L_{Aeq(15\ minute)}$	$L_{A1(1\ minute)}$
All Privately owned Residences	35	35	35	45

Table 1: Impact assessment criteria dB(A)

Notes:

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

NOISE MONITORING LOCATIONS

Noise measurement locations for the attended noise survey are listed below and indicated in Figure 1.

Location N4: Greylands (north of site)
Location N3: Naroo (south of site)

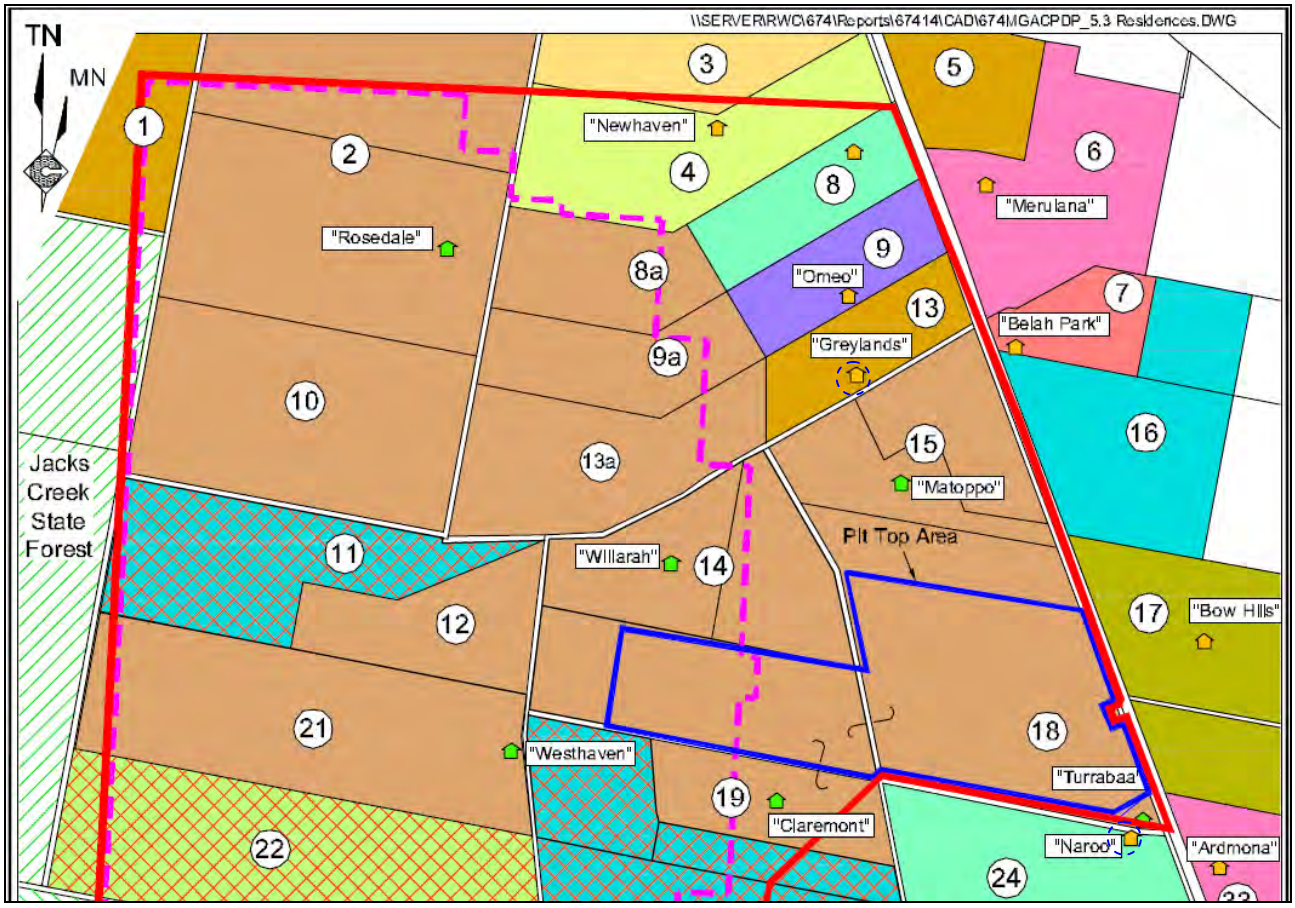


Figure 1. Unattended noise monitoring locations.

NOISE MONITORING PROGRAM

Noise levels were measured at each location for a period of at least seven days. Noise levels were measured at 15 minute statistical intervals using Svan 949 sound and vibration analysers used as environmental noise loggers. The measurements were done in accordance with relevant DECC guidelines and AS 1055-1997 "Acoustics – Description and Measurement of Environmental Noise". The noise loggers used comply with the requirements of AS 1259.2-1990 "Acoustics – Sound Level Meters", and have current NATA calibration certification (see **Appendix B**).

Each logger was programmed to continuously register environmental noise levels over the 15 minute intervals, with internal software calculating and storing Ln percentile noise levels for each sampling period. Calibration of the logger was performed as part of the instrument's initialisation procedures, with calibration results being within the allowable ± 0.5 dB(A) range. Since noise loggers record the total acoustic environment, it is not possible to identify or assign noise levels to the various contributing sources. Accordingly, this report does not attempt to interpret the logger results.

MEASURED NOISE LEVELS

Measured noise levels at each location are summarised below. Tabulated results show overall L_{Aeq} and L_{90} levels for the day, evening and night time periods using procedures specified in the DECC INP. Graphs showing full data sets are shown in **Appendix A**.

Greylands

Date	Leq(day)	Leq(eve)	Leq(night)	L90(day)	L90(eve)	L90(night)
30-Sep-08	50.8	39.4	45.7	25.8	26.9	20.2
1-Oct-08	47.2	41.4	44.1	32.0	29.7	26.2
2-Oct-08	58.4	44.0	45.4	34.1	37.3	35.3
3-Oct-08	48.3	42.2	56.4	30.6	33.7	21.3
4-Oct-08	49.9	51.2	43.6	34.1	29.2	24.9
5-Oct-08	48.4	44.5	52.2	30.6	39.8	31.2
6-Oct-08	52.5	47.3	46.3	36.7	38.4	29.1
LAeq	53	46	50	--	--	--
L90	--	--	--	32	34	26

Naroo

Date	Leq(day)	Leq(eve)	Leq(night)	L90(day)	L90(eve)	L90(night)
30-Sep-08	44.4	52.1	49.2	24.9	23.0	32.7
1-Oct-08	45.9	52.7	54.9	23.6	21.3	33.7
2-Oct-08	48.5	51.2	55.7	28.7	24.1	43.1
3-Oct-08	48.5	51.7	57.3	34.6	38.0	45.8
4-Oct-08	55.3	52.6	54.9	40.9	38.1	40.6
5-Oct-08	47.1	50.9	56.1	36.7	29.5	45.6
6-Oct-08				34.2		
LAeq	50	52	55	--	--	--
L90	--	--	--	34	27	42

We trust this report fulfils your requirements at this time, however, should you require additional information or assistance please contact the undersigned on 4954 2276 or 0406 670677.

Yours faithfully,
SPECTRUM ACOUSTICS PTY LIMITED

Author:

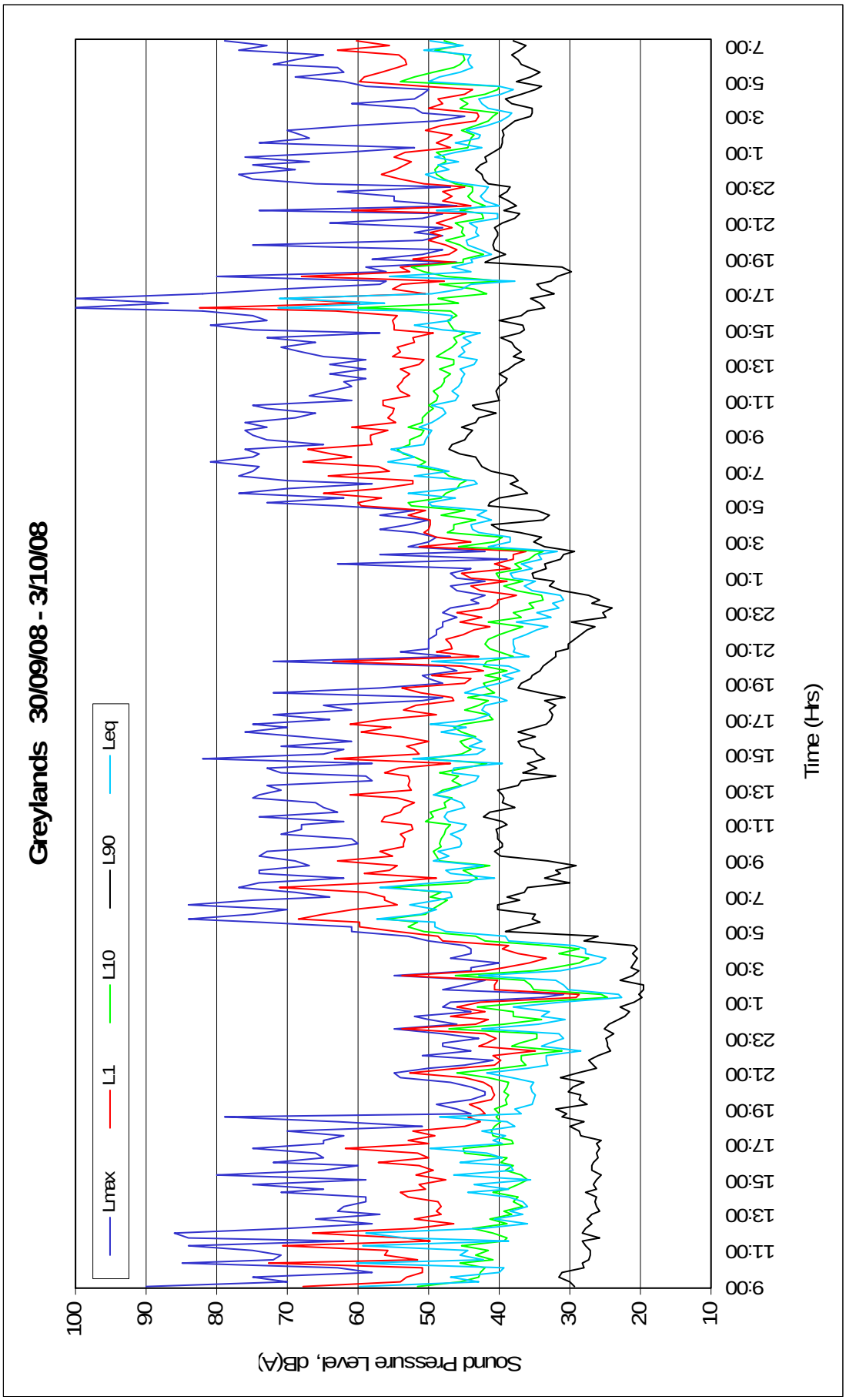
Neil Pennington
Acoustical Consultant

Review:

Ross Hodge
Acoustical Consultant

APPENDIX A

NOISE DATA CHARTS


Greylands 30/09/08 - 3/10/08
Lmax
L1
L10
L90
Leq
Sound Pressure Level, dB(A)
100
90
80
70
60
50
40
30
20
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Time (Hrs)
9:00
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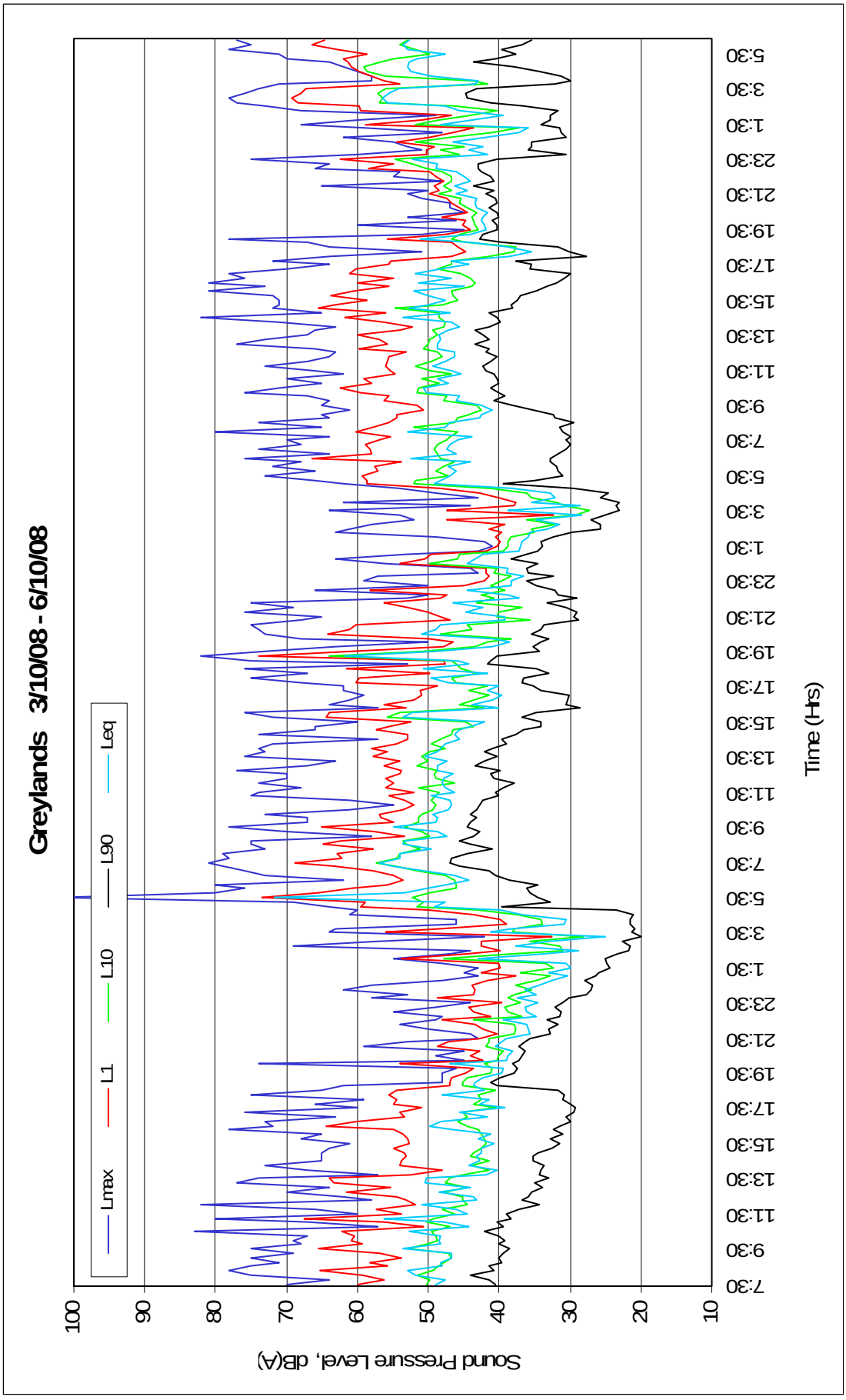
Greylands 3/10/08 - 6/10/08
Lmax
L1
L10
L90
Leq
Sound Pressure Level, dB(A)
100
90
80
70
60
50
40
30
20
10
Time (Hrs)
7:30
9:30
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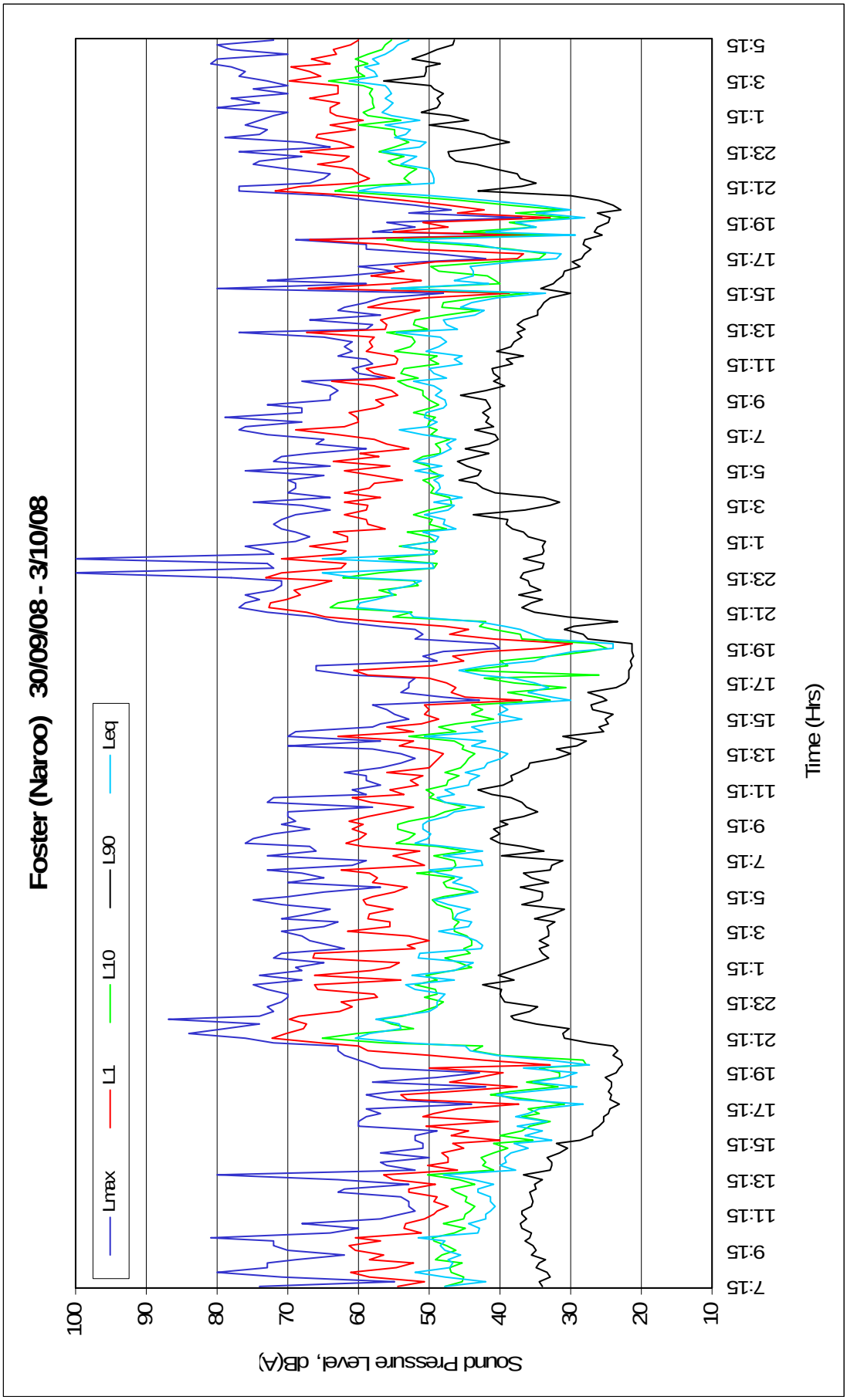
Foster (Naroo) 30/09/08 - 3/10/08
Lmax
L1
L10
L90
Leq
Sound Pressure Level, dB(A)
100
90
80
70
60
50
40
30
20
10
Time (Hrs)
7:15
9:15
11:15
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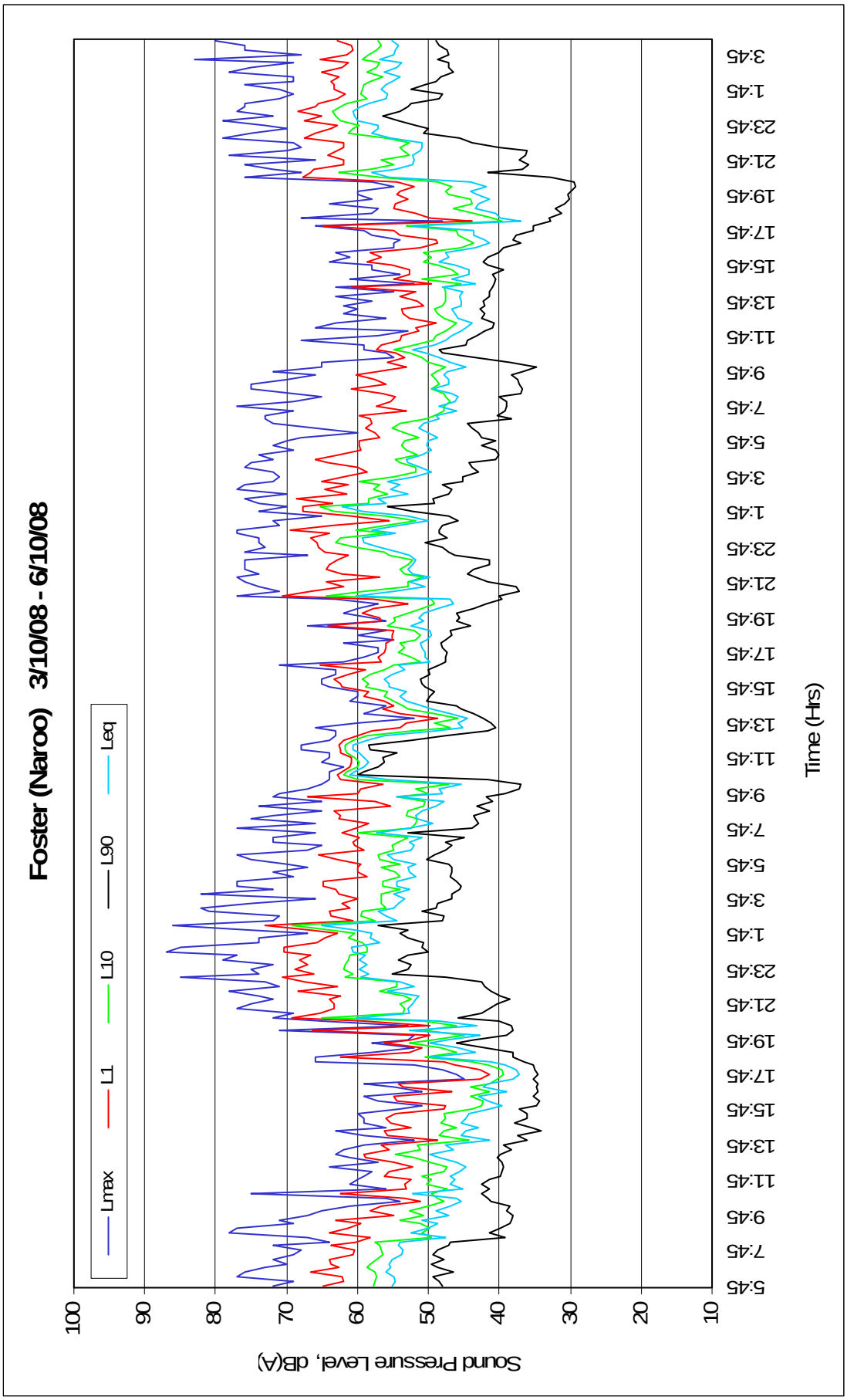
Foster (Naroo) 3/10/08 - 6/10/08
Lmax
L1
L10
L90
Leq
Sound Pressure Level, dB(A)
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APPENDIX B

CALIBRATION CERTIFICATES

CONFORMANCE CERTIFICATE

We certify that the equipment listed below has been checked, adjusted and aligned to conform to manufacturers specifications.

Certificate No: 7759

INSTRUMENT: Sound & Vibration Anayser
Svantek

Type No: Svan-949 **Serial No:** 9757

Owner: Spectrum Acoustics Pty Ltd
1 Roath St
Cardiff NSW 2285

CONDITION OF TEST:

Ambient Pressure: 1007 **mbar**

Temperature: 23 °C **Relative Humidity:** 37 %

Date of Calibration: 6/10/06

CHECKED BY: JK **AUTHORISED SIGNATORY:** .....
Jack Kielt

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web site: www.acu-vib.com.au

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CONFORMANCE CERTIFICATE

We certify that the equipment listed below has been checked, adjusted and aligned to conform to manufacturers specifications.

Certificate No: 7758

INSTRUMENT: Sound & Vibration Anayser
Svantek

Type No: Svan-949 **Serial No:** 9758

Owner: Spectrum Acoustics Pty Ltd
1 Roath St
Cardiff NSW 2285

CONDITION OF TEST:

Ambient Pressure: 1007 **mbar**

Temperature: 23 **°C** **Relative Humidity:** 37 **%**

Date of Calibration: 6/10/06

CHECKED BY: JK **AUTHORISED SIGNATORY:** .....
Jack Kielt

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AVCERT4 Rev.1 03.09.04

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Certificate No: 7757

INSTRUMENT: Sound & Vibration Anayser
Svantek

Type No: Svan-949 **Serial No:** 9756

Owner: Spectrum Acoustics Pty Ltd
1 Roath St
Cardiff NSW 2285

CONDITION OF TEST:

Ambient Pressure: 1007 **mbar**

Temperature: 23 **°C** **Relative Humidity:** 37 **%**

Date of Calibration: 6/10/06

CHECKED BY: JK **AUTHORISED SIGNATORY:** .....
Jack Kielt

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Page 1 of 1
AVCERT4 Rev.1 03.09.04

5 February 2009

Ref: 05168/2949

Mr Danny Young
Narrabri Coal Pty Ltd
PO Box 600
GUNNEDAH NSW 2380

RE: DECEMBER 2008 UNATTENDED NOISE MONITORING RESULTS

This letter report presents the results of unattended operational noise monitoring conducted for the Narrabri Coal Mine (NCM) during December 2008.

NOISE CRITERIA

The following is an extract from the Narrabri Coal NMP:

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

Noise Limits

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

Location	Day	Evening	Night	
	$L_{Aeq(15\ minute)}$	$L_{Aeq(15\ minute)}$	$L_{Aeq(15\ minute)}$	$L_{A1(1\ minute)}$
All Privately owned Residences	35	35	35	45

Table 1: Impact assessment criteria dB(A)

Notes:

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

NOISE MONITORING LOCATIONS

Noise measurement locations for the attended noise survey are listed below and indicated in Figure 1.

Location N4: Greylands (north of site)
Location N3: Naroo (south of site)

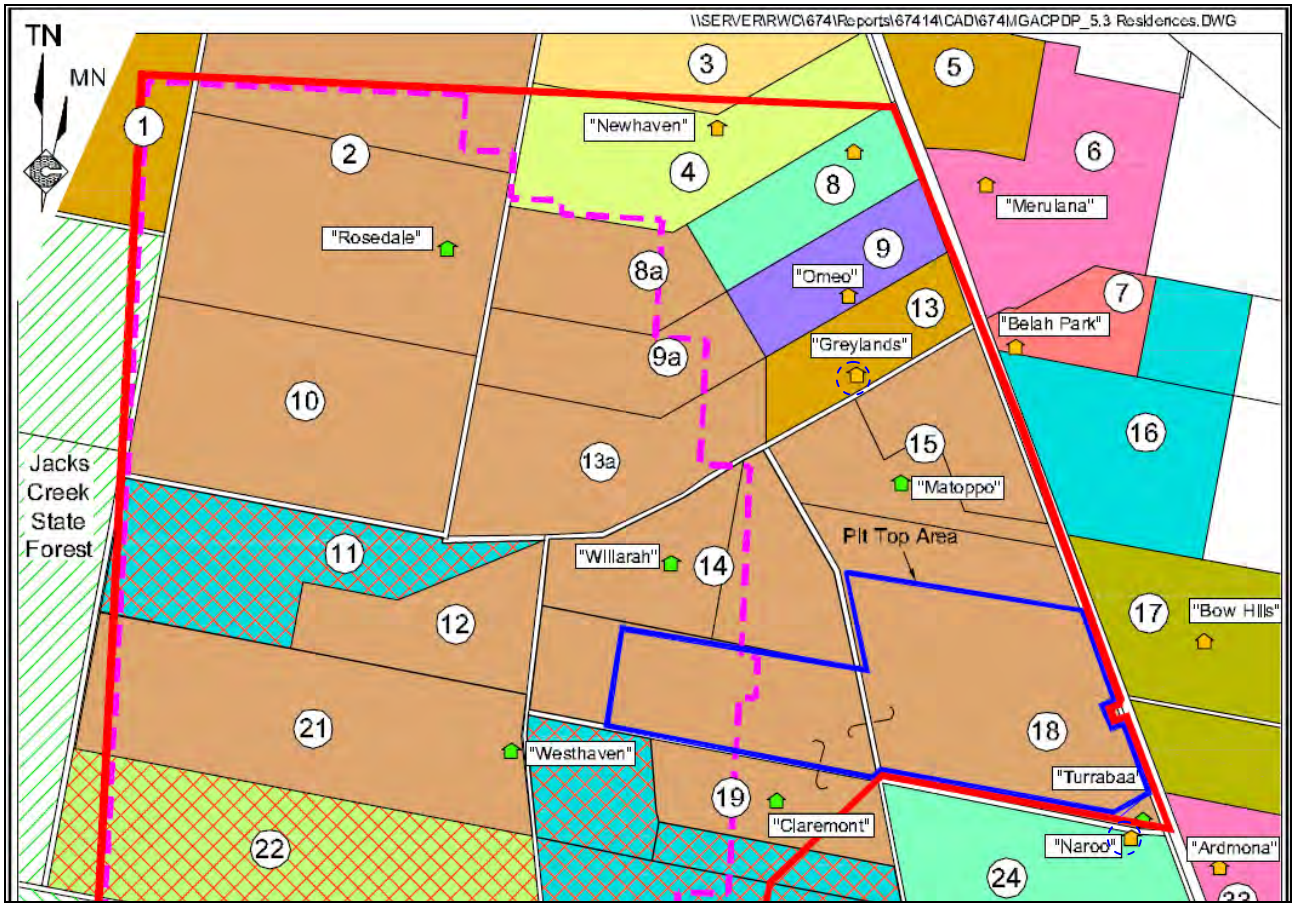


Figure 1. Unattended noise monitoring locations.

NOISE MONITORING PROGRAM

Noise levels were measured at each location for a period of at least seven days. Noise levels were measured at 15 minute statistical intervals using Svan 949 sound and vibration analysers used as environmental noise loggers. The measurements were done in accordance with relevant DECC guidelines and AS 1055-1997 "Acoustics – Description and Measurement of Environmental Noise". The noise loggers used comply with the requirements of AS 1259.2-1990 "Acoustics – Sound Level Meters", and have current NATA calibration certification (see **Appendix B**).

Each logger was programmed to continuously register environmental noise levels over the 15 minute intervals, with internal software calculating and storing Ln percentile noise levels for each sampling period. Calibration of the logger was performed as part of the instrument's initialisation procedures, with calibration results being within the allowable ± 0.5 dB(A) range. Since noise loggers record the total acoustic environment, it is not possible to identify or assign noise levels to the various contributing sources. Accordingly, this report does not attempt to interpret the logger results.

MEASURED NOISE LEVELS

Measured noise levels at each location are summarised below. Tabulated results show overall L_{Aeq} and L_{90} levels for the day, evening and night time periods using procedures specified in the DECC INP. Graphs showing full data sets are shown in **Appendix A**.

Greylands

Date	Leq(day)	Leq(eve)	Leq(night)	L90(day)	L90(eve)	L90(night)
12/12/2008	45.4	49.3	49.4	34.7	31.8	42.2
13/12/2008	52.3	55.8	53.9	42.9	44.4	37.5
14/12/2008	48.2	50.4	47.9	36.1	34.2	36.9
15/12/2008	49.9	48.8	47.9	32.7	32.8	33.5
LAeq	50	52	51			
L90				35	34	37

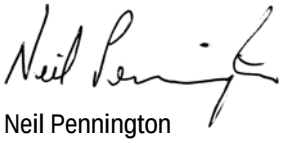
Naroo

Date	Leq(day)	Leq(eve)	Leq(night)	L90(day)	L90(eve)	L90(night)
12/12/2008	50.0	55.7	49.6	36.8	37.7	44.2
13/12/2008	55.5	50.1	46.5	44.3	43.2	36.5
14/12/2008	47.4	48.1	44.0	36.1	37.0	33.6
15/12/2008	52.0	52.6	39.7	32.3	33.3	35.9
LAeq	52	53	46			
L90				36	37	36

We trust this report fulfils your requirements at this time, however, should you require additional information or assistance please contact the undersigned on 4954 2276 or 0406 670677.

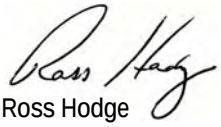
Yours faithfully,
SPECTRUM ACOUSTICS PTY LIMITED

Author:



Neil Pennington
Acoustical Consultant

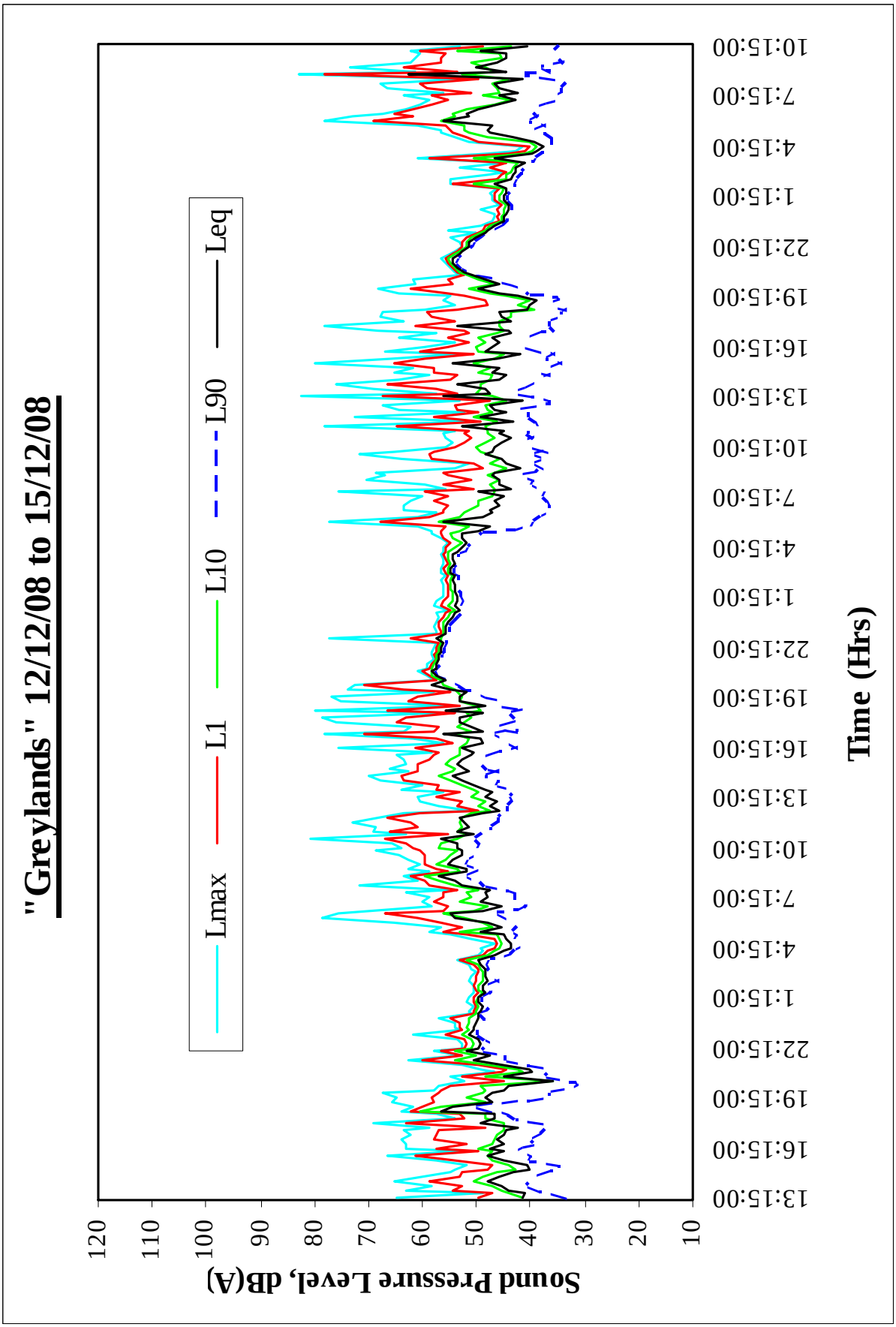
Review:



Ross Hodge
Acoustical Consultant

APPENDIX A

NOISE DATA CHARTS


"Greylands" 12/12/08 to 15/12/08
Lmax
L1
L10
L90
Leq
Sound Pressure Level, dB(A)
120
110
100
90
80
70
60
50
40
30
20
10
Time (Hrs)
13:15:00
16:15:00
19:15:00
22:15:00
1:15:00
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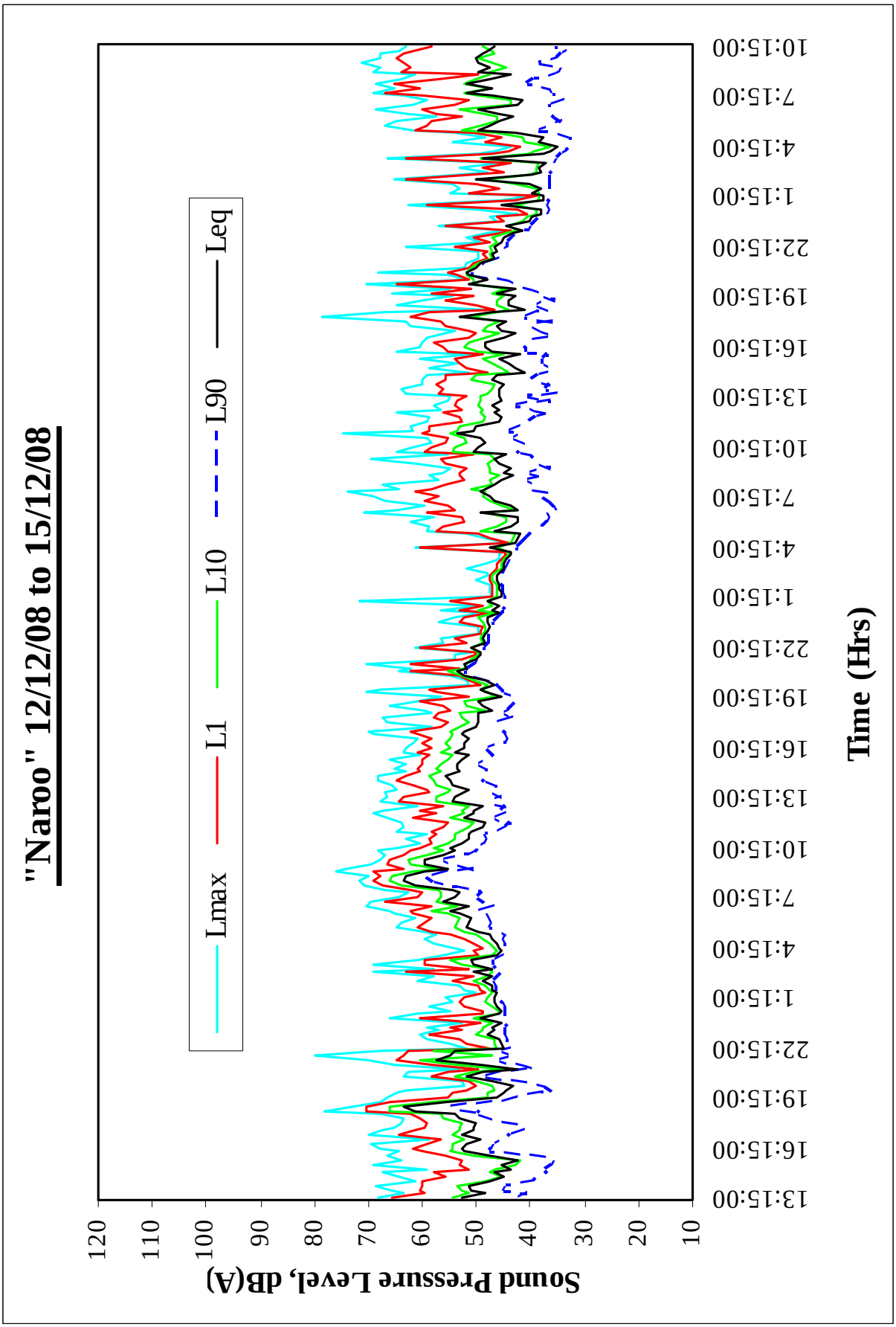
"Narroo" 12/12/08 to 15/12/08
Lmax
L1
L10
L90
Leq
Sound Pressure Level, dB(A)
120
110
100
90
80
70
60
50
40
30
20
10
Time (Hrs)
13:15:00
16:15:00
19:15:00
22:15:00
1:15:00
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16:15:00
19:15:00
22:15:00
1:15:00
4:15:00
7:15:00
10:15:00

APPENDIX B

CALIBRATION CERTIFICATES

CONFORMANCE CERTIFICATE

We certify that the equipment listed below has been checked, adjusted and aligned to conform to manufacturers specifications.

Certificate No: 7759

INSTRUMENT: Sound & Vibration Anayser
Svantek

Type No: Svan-949 **Serial No:** 9757

Owner: Spectrum Acoustics Pty Ltd
1 Roath St
Cardiff NSW 2285

CONDITION OF TEST:

Ambient Pressure: 1007 **mbar**

Temperature: 23 °C **Relative Humidity:** 37 %

Date of Calibration: 6/10/06

CHECKED BY: JK **AUTHORISED SIGNATORY:** .....
Jack Kielt

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WORLD RECOGNISED ACCREDITATION
Accredited Lab. No. 9262
Acoustic and Vibration Measurements

ACU-VIB
ELECTRONICS

HEAD OFFICE
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CONFORMANCE CERTIFICATE

We certify that the equipment listed below has been checked, adjusted and aligned to conform to manufacturers specifications.

Certificate No: 7758

INSTRUMENT: Sound & Vibration Anayser
Svantek

Type No: Svan-949 **Serial No:** 9758

Owner: Spectrum Acoustics Pty Ltd
1 Roath St
Cardiff NSW 2285

CONDITION OF TEST:

Ambient Pressure: 1007 **mbar**

Temperature: 23 **°C** **Relative Humidity:** 37 **%**

Date of Calibration: 6/10/06

CHECKED BY: JK **AUTHORISED SIGNATORY:** .....
Jack Kielt

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8 April 2009

Ref: 05168/3041

Mr Danny Young
Narrabri Coal Pty Ltd
PO Box 600
GUNNEDAH NSW 2380

RE: MARCH 2009 UNATTENDED NOISE MONITORING RESULTS

This letter report presents the results of unattended operational noise monitoring conducted for the Narrabri Coal Mine (NCM) during March 2009.

NOISE CRITERIA

The following is an extract from the Narrabri Coal NMP:

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

Noise Limits

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

Location	Day	Evening	Night	
	$L_{Aeq(15\ minute)}$	$L_{Aeq(15\ minute)}$	$L_{Aeq(15\ minute)}$	$L_{A1(1\ minute)}$
All Privately owned Residences	35	35	35	45

Table 1: Impact assessment criteria dB(A)

Notes:

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

NOISE MONITORING LOCATIONS

Noise measurement locations for the attended noise survey are listed below and indicated in Figure 1.

Location N4: Entrance gate to Matoppo (north of site)
Location N3: Naroo (south of site)

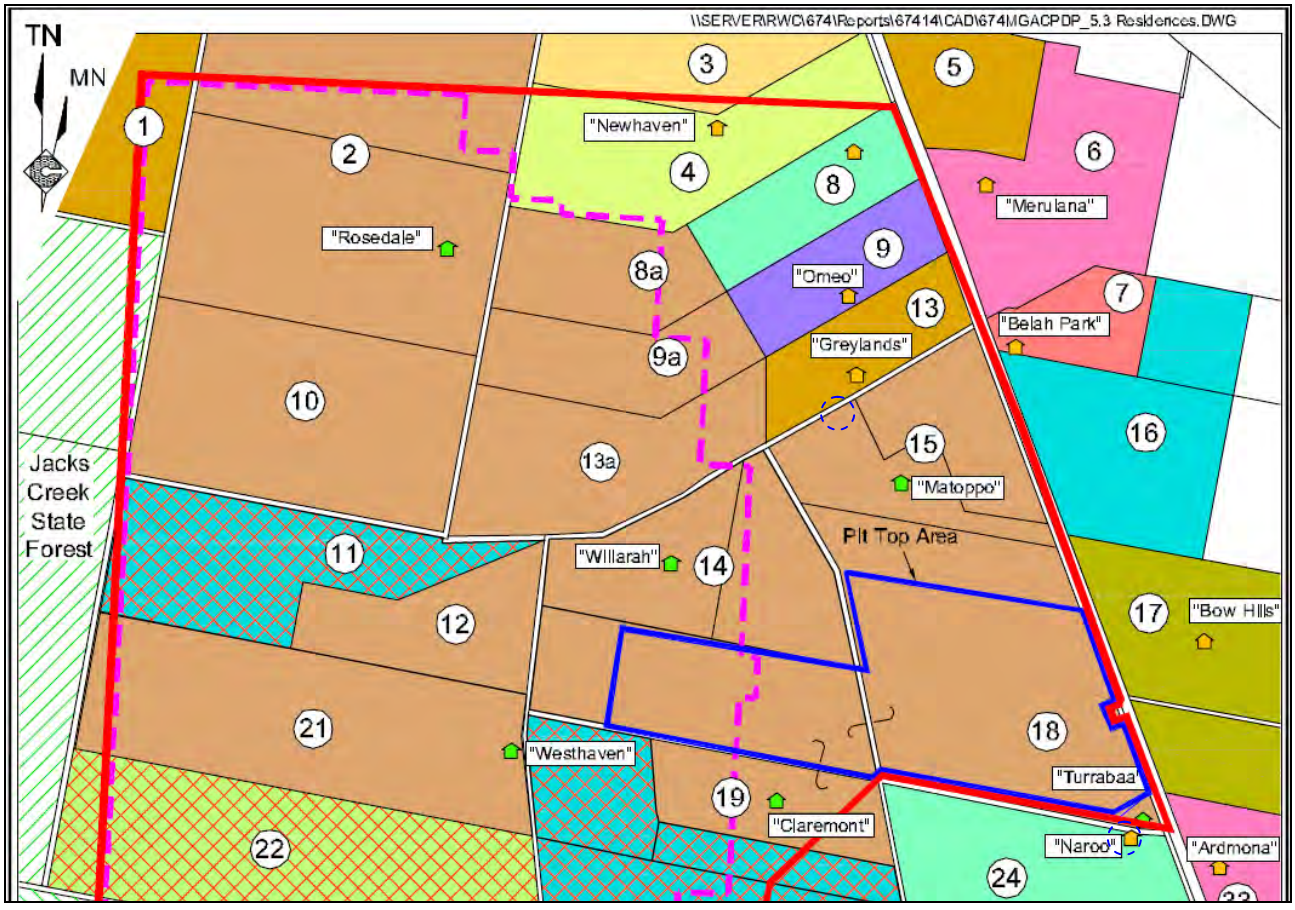


Figure 1. Unattended noise monitoring locations.

NOISE MONITORING PROGRAM

Noise levels were measured at each location for a period of at least seven days. Noise levels were measured at 15 minute statistical intervals using Svan 949 sound and vibration analysers used as environmental noise loggers. The measurements were done in accordance with relevant DECC guidelines and AS 1055-1997 "Acoustics – Description and Measurement of Environmental Noise". The noise loggers used comply with the requirements of AS 1259.2-1990 "Acoustics – Sound Level Meters", and have current NATA calibration certification (see **Appendix B**).

Each logger was programmed to continuously register environmental noise levels over the 15 minute intervals, with internal software calculating and storing Ln percentile noise levels for each sampling period. Calibration of the logger was performed as part of the instrument's initialisation procedures, with calibration results being within the allowable ± 0.5 dB(A) range. Since noise loggers record the total acoustic environment, it is not possible to identify or assign noise levels to the various contributing sources. Accordingly, this report does not attempt to interpret the logger results.

MEASURED NOISE LEVELS

Measured noise levels at each location are summarised below. Tabulated results show overall L_{Aeq} and L_{90} levels for the day, evening and night time periods using procedures specified in the DECC INP. Graphs showing full data sets are shown in **Appendix A**.

Matoppo

Date	Leq(day)	Leq(eve)	Leq(night)	L90(day)	L90(eve)	L90(night)
27-Mar-09	48.4	50.2	44.5	32.8	41.4	24.9
28-Mar-09	44.1	45.9	41.6	28.7	29.1	23.2
29-Mar-09	43.5	47.9	45.1	26.5	28.8	24.4
LAeq	46	48	44	--	--	--
L90	--	--	--	31	29	24

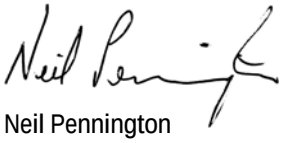
Naroo

Date	Leq(day)	Leq(eve)	Leq(night)	L90(day)	L90(eve)	L90(night)
27-Mar-09	51.0	51.5	44.5	38.6	42.5	27.9
28-Mar-09	49.2	44.9	39.7	32.0	29.3	22.0
29-Mar-09	49.1	46.6	42.3	31.2	30.8	27.2
LAeq	50	49	43	--	--	--
L90	--	--	--	35	31	27

We trust this report fulfils your requirements at this time, however, should you require additional information or assistance please contact the undersigned on 4954 2276 or 0406 670677.

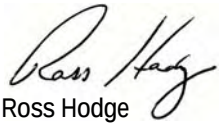
Yours faithfully,
SPECTRUM ACOUSTICS PTY LIMITED

Author:



Neil Pennington
Acoustical Consultant

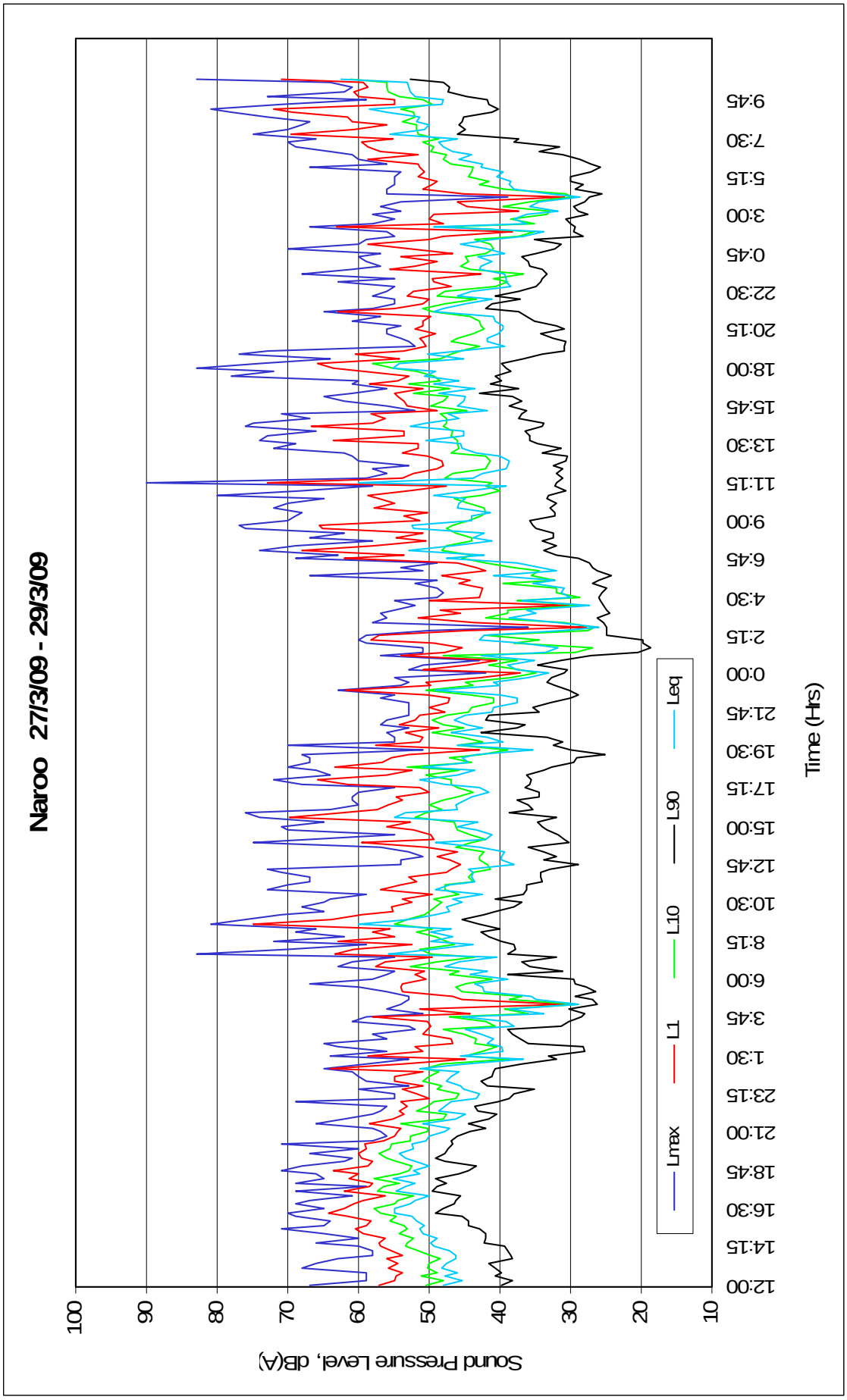
Review:



Ross Hodge
Acoustical Consultant

APPENDIX A

NOISE DATA CHARTS


Naroo 27/3/09 - 29/3/09
Sound Pressure Level, dB(A)
100
90
80
70
60
50
40
30
20
10
Time (Hrs)
12:00
14:15
16:30
18:45
21:00
23:15
1:30
3:45
6:00
8:15
10:30
12:45
15:00
17:15
19:30
21:45
0:00
2:15
4:30
6:45
9:00
11:15
13:30
15:45
18:00
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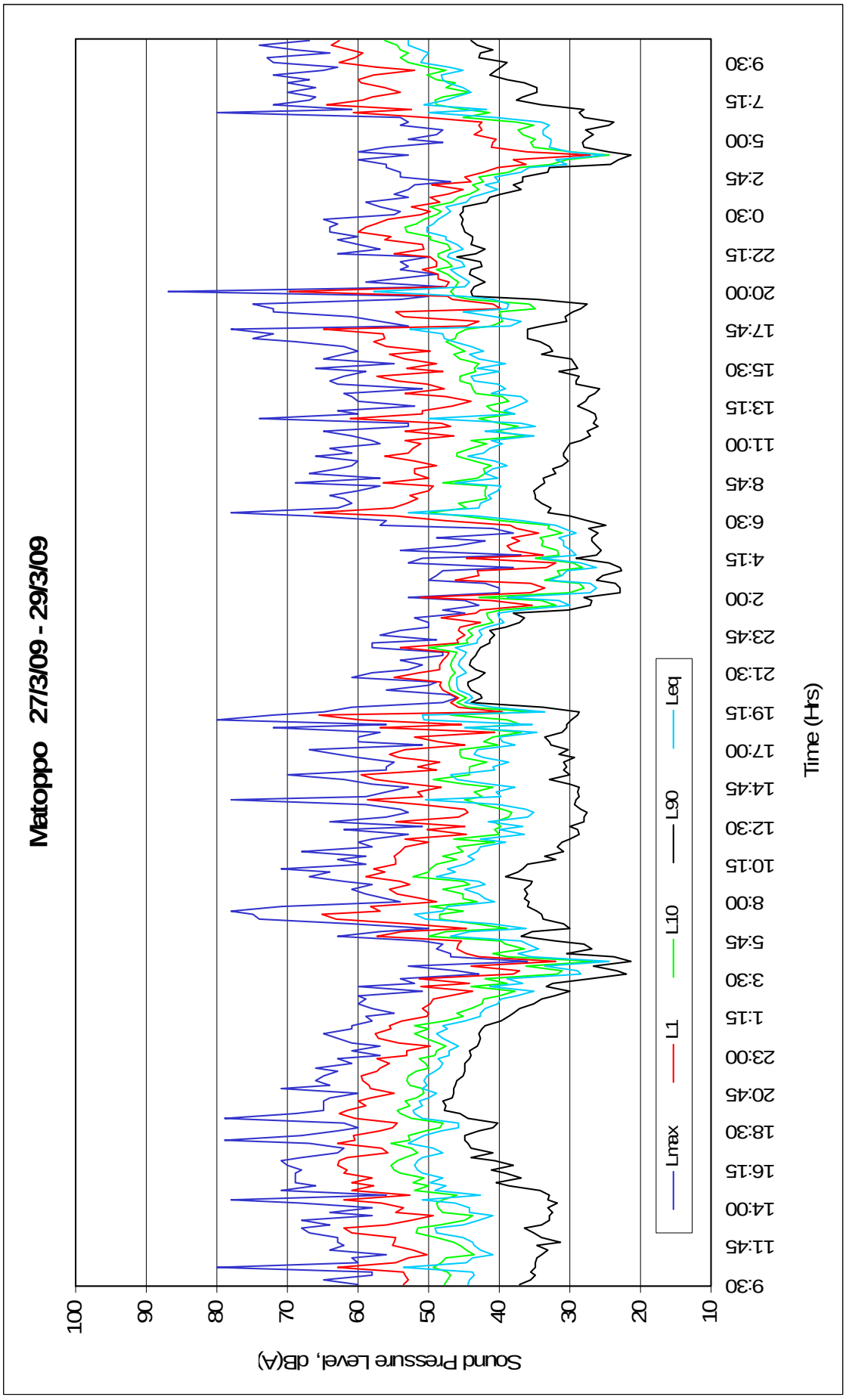
0:45
3:00
5:15
7:30
9:45
Lmax
L1
L10
L90
Leq


Matoppo 27/3/09 - 29/3/09
Sound Pressure Level, dB(A)
100
90
80
70
60
50
40
30
20
10
Time (Hrs)
9:30
11:45
14:00
16:15
18:30
20:45
23:00
1:15
3:30
5:45
8:00
10:15
12:30
14:45
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6:30
8:45
11:00
13:15
15:30
17:45
20:00
22:15
0:30
2:45
5:00
7:15
9:30
Lmax
L1
L10
L90
Leq

APPENDIX B

CALIBRATION CERTIFICATES

CONFORMANCE CERTIFICATE

We certify that the equipment listed below has been checked, adjusted and aligned to conform to manufacturers specifications.

Certificate No: 7759

INSTRUMENT: Sound & Vibration Anayser
Svantek

Type No: Svan-949 **Serial No:** 9757

Owner: Spectrum Acoustics Pty Ltd
1 Roath St
Cardiff NSW 2285

CONDITION OF TEST:

Ambient Pressure: 1007 **mbar**

Temperature: 23 °C **Relative Humidity:** 37 %

Date of Calibration: 6/10/06

CHECKED BY: JK **AUTHORISED SIGNATORY:** .....
Jack Kielt

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CONFORMANCE CERTIFICATE

We certify that the equipment listed below has been checked, adjusted and aligned to conform to manufacturers specifications.

Certificate No: 7758

INSTRUMENT: Sound & Vibration Anayser
Svantek

Type No: Svan-949 **Serial No:** 9758

Owner: Spectrum Acoustics Pty Ltd
1 Roath St
Cardiff NSW 2285

CONDITION OF TEST:

Ambient Pressure: 1007 **mbar**

Temperature: 23 **°C** **Relative Humidity:** 37 **%**

Date of Calibration: 6/10/06

CHECKED BY: JK **AUTHORISED SIGNATORY:** .....
Jack Kielt

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