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Project: Mt Piper Power Station Ash Placement

Lamberts North – Operational Noise Assessment March 2014

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1 Introduction

1.1 Project understanding

On 16 February 2012, Delta Electricity received Project Approval (09_0186) under delegation from the Minister of Planning for the Mt Piper Ash Placement Project (the Project) under Section 75J - *Environmental Planning and Assessment Act 1979* to permit the continued disposal of ash generated by the Mt Piper Power Station. The Project Approval was granted subject to the Conditions of Approval. The project is now owned by EnergyAustralia NSW.

This report has been developed in accordance with the Lamberts North Ash Placement Project Condition of Approval (CoA) E11 and the mitigation measures specified in the Operational Environment Management Plan (*OEMP* May 2013). The OEMP outlines the requirements of the ongoing noise monitoring program and operational noise review in accordance with CoA's E7, E8, E9 and E11.

1.2 Background to the Project

Lamberts North is located to the immediate east of EnergyAustralia NSW Existing Mt Piper Ash Repository, which is described in the Environmental Assessment (EA) as Area 1 (SKM, 2010). It is located in an area characterised by both rural and industrial influences, with a number of coal mines in relatively close proximity. The project site is predominately surrounded by Ben Bullen State Forest, which lies to the north and south east of Mt Piper power Station, together with open cut coal mines and coal washers. Wallerawang Power Station which is also owned by EnergyAustralia NSW, lies to the south east of the project site, approximately 5km away. Lamberts North is approximately 53 hectares.

Historically, the Lamberts North site has been highly disturbed as a result of extensive mining activities including, underground working (from the 1950s to the early 1990s) and recent open-cut mining activities being carried out by Centennial Coal.

EnergyAustralia NSW has engaged a principle contractor (Lend Lease) to manage and operate EnergyAustralia NSW Western Ash repositories at both Wallerawang and Mt Piper Power Stations. Operations commenced with the first placement of ash on the 20th August 2013.

1.3 Scope of work

Scope of work includes noise assessment comprising of attended noise measurements at two sensitive receiver locations to determine potential noise impacts arising from the operational activities at Lamberts North site.

1.4 Sensitive receivers

In accordance with the Operation Noise Management and Monitoring Plan (*ONMMP)* which is a sub plan of the *OEMP*, the locations of sensitive receivers identified for noise impacts within the vicinity of the Project are mentioned below. The two sensitive receivers identified as being the closest to the site are located within 3.3 km of Lamberts North, at Blackmans Flat and Wallerawang, NSW and are mentioned in Table 1. Location 3 has been used as an additional location to measure the reference noise levels from the operational activities. Position of the measurement locations are shown in Figure 1.

Table 1 | Sensitive receivers nearest to Lamberts North

Location ID[1]	Description	Map Coordinates	Noise monitoring location	Distance from Mount Piper Power Station
1	Blackmans Flat	33.36468ºS 150.05904ºE	Located at the western end of Noon Street on the southern side of the road. Positioned at the boundary of the residential property 90m from the Castlereagh Highway.	Approximately 1 Km^2 East
2	Wallerawang	33.37765ºS 150.06073ºE	Situated on a rural property southeast of Lamberts North, and approximately 1300m from Castlereagh Highway.	Approximately 3.3 Km^2 East
3	Lamberts North	33.35971ºS 150.04668ºE	Additional location at the south eastern boundary of Lamberts North site	Within the Lamberts North site

[1] Refer to Figure 1 for locations
[2] Kilometres

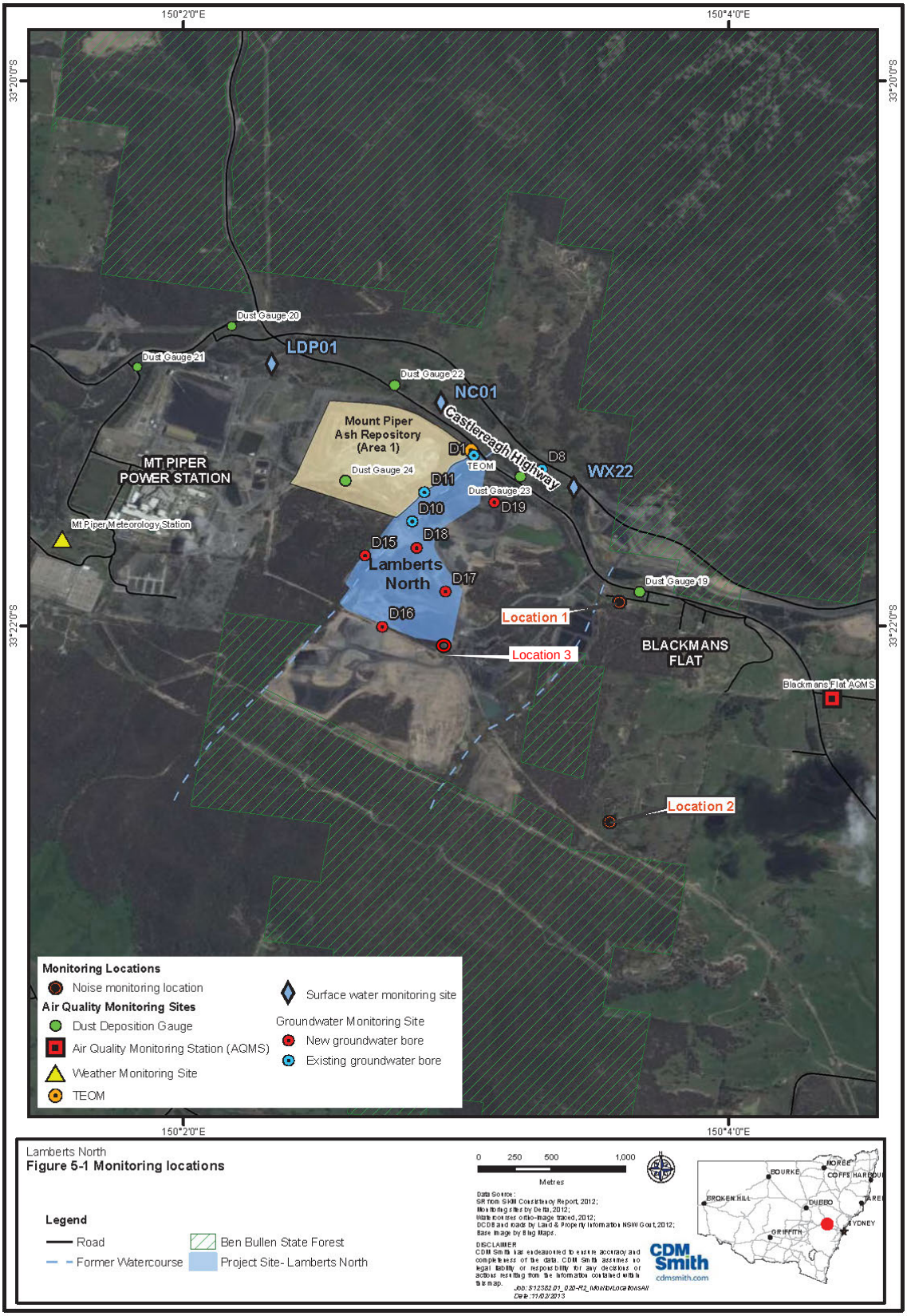


Figure 1 | Environmental noise monitoring locations

2 Operations at Lamberts North

2.1 Operation methodology

Key potential noise impacts during operational activities at Lamberts North and Mt Piper Ash Repository sites are listed below:

- Transporting fly ash and bottom ash to the ash repository using haulage trucks along the designated haul roads;
- Placing ash in stockpiles in designated areas before being spread out by a dozer;
- Compacting the ash using a dozer and roller;
- Maintenance on the haulage roads using a grader, roller, dozers and water carts;
- Dust suppression across the site using a series of techniques including but not limited to water carts and sprinklers systems;
- Developing and maintaining water management structures (containments, drains and sumps) using an excavator;
- Using variously sized pumps on site to pump water from various water sources;
- Using light vehicles on occasion to inspect the ash repository and carry out environmental monitoring;
- The machinery & plant generate noise from the engine & drive line, hydraulics and reverse warning devices.

2.2 Activities at Lamberts North

Mt Piper and Lamberts North site are located adjacent to each other and ash repository operations at Mt Piper site were ongoing during our site visit from 2 – 3 March 2014, with the first ash placement at Lamberts North occurred on the 20th August 2013. Depositing fly ash at Lamberts North site or Mt Piper site was dependant on many factors and decided on weekly basis by the site environmental manager. The equipment outlined in Table 2 were sighted at the Lamberts North site during our site attendance. Noise generated from some of the equipment at a distance of 7m was measured at Lamberts North site earlier by Aurecon. Sound Power Levels for the rest of the equipment were referenced from *AS 2436-2010 Guide to noise and vibration control on construction, demolition and maintenance sites*.

Below is the summary of activities at the Lamberts North site:

- Generally the day starts at 6:00 for a 6:15 start. Due to breakdown on 2 March 2014, the start was delayed and the activities started around 08:00.
- The equipment on site consisted of 1 dozer near the bin, 1 hydraulic excavator, 2 dump trucks working in tandem and 1 light commercial vehicle. 1 Water cart was sighted but was not

operational during both days as it had rained few days earlier and there was no requirement for wetting the haul road.

- Dozer was working near the bins, loading the dump trucks in tandem with ash.
- Dump trucks were unloading the ash at the Lamberts North ash repository site.
- Hydraulic excavator was operating on the ash stock pile and loading the dump trucks in tandem.
- Generally all the activities ceased by 16:30 – 17:00. On 2 March 2014, the activities continued till 20:00.

Table 2 | E**quipment sighted at Lamberts North and Mt Piper site**

Equipment type	Number of equipment on site during the site visit	Sound Power Level SWL of each equipment dB(A)[3]
Dozer / Crawler tractor*	1	106
Hydraulic Excavator*	1	108
Dump Truck*	2	104
Light commercial vehicle	1	106

* Sound Power Levels calculated based on noise measurements at a distance of 7m was which were carried out during the site visit previously (Mt Piper Power Station Ash Placement Project – Lamberts North Construction Noise monitoring 14-15 January 2013 (Revision 2, dated 11 February 2013)

2.3 Description of the surrounding environment

Lamberts North site is predominantly surrounded by Ben Bullen State Forest with open cut coal mines and coal washeries. Some of the noise sources other than the site were audible (and visually evident) during our site visit which contributed to the cumulative noise at the measurement location. Springvale Coal operated by Centennial Coal lies to the South East of the site includes activities but not limited to transportation of coal through conveyors, operation of equipment/ mobile plant, etc. Pinedale coal mine is located to the East of the site with operations of equipment and mobile plant audible. The EnergyAustralia NSW Mount Piper Ash Repository (Area 1) lies to the West of the site. The Kerosene Vale Ash Repository (KVAR) site owned by EnergyAustralia NSW also lies to the south West of the site include activities but not limited to truck movement, ash loading and unloading, mobile plant operations, etc.

[3] SWL includes adjustment for tonality.

3 Noise criteria

3.1 Conditions of Approval relating to noise

The Operation Noise Management and Monitoring Plan (*ONMMP)* is a sub plan of the OEMP. It seeks to address the specific requirements of the CoA attached to the Project Approval for Lamberts North, insofar as they relate to noise and vibration during operation. CoA E7-D3a(ii) defines the operational noise requirement for the project to manage noise emissions from operational activities to not exceed the criteria shown in Table 3 below.

Table 3 | Construction noise criteria

Location	$L_{Aeq\ (15\ minute)}$ dB(A)		
	Day Time (7:00 – 18:00)	**Evening Time (18:00 – 22:00)**	**Night Time (22:00 – 7:00)**
All private receivers within the township of Blackmans Flat	42	38	35
All other residences	42	38	35

Note: These criteria do not apply where the Proponent and an affected landowner have reached a negotiated agreement in regard to noise, and a copy of that agreement has been forwarded to the Director-General and the NSW EPA.

4 Noise survey

4.1 Methodology

Attended day, evening and night time noise measurements were conducted from 2 – 3 March 2014 at the boundary of the nearest residential properties are likely to be exposed to noise from the ongoing construction works. The statistical noise measurements including the averaged A-weighted noise levels (L_{Aeq}), maximum A-weighted noise levels (L_{Amax}) and statistical A-weighted L_{A90} and L_{A10} noise levels[4] were conducted using a Larson Davis 831 Type 1 sound level meter equipped with a LD PRM831 pre-amplifier and a PCB 377B02 ½" microphone which was set to 'A' frequency weighting, 'F' time weighting, and was fitted with an approved windshield.

Measurements were typically taken at a height of 1.2 m and at least 3.5 m from any reflecting structure other than the ground. The measurement period at each location consisted of 15 minutes each. A Larson Davis CAL200 was utilised to calibrate the sound level meter before and after each series of measurements with no significant calibration drift noted. Measurements were typically taken in accordance with the Australian Standard *AS 1055 1997: Acoustics – Description and measurement of environmental noise*.

Table 4 shows the equipment used for all the measurements performed on site. Attended noise measurements were conducted at three locations (as shown in Figure 1) using the Type 1 sound level meter. It should be noted that it was cloudy that day and intermittent wind (< 3 m/s) conditions were prevalent over the measurement period.

Table 4 | Sound pressure level measurement equipment

Equipment	Make	Model	Serial No.	Type	Last Calibration	Calibration Due
Sound Level Meter	LD	831	0001595	1	23.08.12	23.08.14
Calibrator	LD	CAL200	6345	-	14.03.12	14.03.14

4.2 Weather data

Local weather conditions during the noise monitoring comprised of intermittent wind <3m/s at the microphone position. There was no activity during the night time period (22:00 – 07:00) as mentioned in Section 2.2. Activities at the Lamberts North Site during 06:30 – 07:00 are not considered as night time activity as this time period falls under shoulder period[5]. As per Appendix C (*Procedure of assessing noise increase due to temperature inversions*) of *NSW INP, "if the development does not operate at night, there is no potential for noise impact due to inversions, and no further consideration of these effects is required"*. Below is the summary of weather conditions prevalent during the noise monitoring in accordance with the CoA E7-D3a(ii):

- Wind speeds were less than 3m/s at 10m above ground level.

[4] For explanation of the acoustic terms please refer to the attached Glossary of Terminology in Appendix A

[5] As per NSW INP Section 3.3 (Dealing with 'shoulder' periods): For early morning (5am-7am) operations, it may be unduly stringent to expect such operations to be assessed against the night time criteria-especially if existing background noise levels are steadily rising in the these early morning hours.

- Stability Category F temperature inversion conditions were not prevalent during the operational activities.
- Stability Category G temperature inversion conditions were not prevalent during the operational activities.

4.3 Noise measurement results

Results of the noise monitoring are summarised in Table 5 below. Detailed results of continuous noise measurements over the 15-minute are shown in Appendix B. List of operating construction equipment identified at the Lamberts North site is outlined in Section 2.

Multiple 15 minutes measurements were taken at each spot and only the relevant measurements have been detailed in this report.

Table 5 | Results of environmental noise monitoring

Location	Date	Time	Period	Measured sound Pressure Level, dB(A)				Note
				$L_{Aeq, 15min}$ #	$L_{A10, 15min}$ ^^	$L_{A90, 15min}$ ^	$L_{Amax, 15min}$ *	
Location 1 *(Blackmans Flat)*	2/03/2014	08:51	Day	49	53	31	65	Note 1
	2/03/2014	18:23	Evening	52	56	40	63	
	2/03/2014	22:28	Night	45	48	35	68	
	3/03/2014	09:42	Day	49	53	36	67	
	3/03/2014	18:48	Evening	46	51	33	65	
Location 2 *(Wallerawang)*	2/03/2014	09:15	Day	46	41	36	71	Note 2
	2/03/2014	18:00	Evening	43	44	41	62	
	2/03/2014	22:03	Night	43	43	41	69	
	3/03/2014	10:04	Day	41	43	39	61	
	3/03/2014	18:12	Evening	40	42	36	62	
Location 3 *(South eastern boundary of Lamberts North)*	2/03/2014	08:01	Day	55	57	46	70	Note 3
	2/03/2014	08:16	Day	57	62	50	71	
	3/03/2014	08:48	Day	46	47	40	74	
	3/03/2014	09:03	Day	44	47	39	64	

L_{Aeq} refers to A-weighted equivalent continuous sound pressure level over measurement period. It is used to quantify the average noise level over a time period.

^^ *L_{A10} refers to the A-weighted noise level which is exceeded for only 10% of the measuring period. It is usually used as the descriptor for intrusive noise level and represents ambient road traffic noise in general.*

^ *L_{A90} refers to the A-weighted noise level which is exceeded for 90% of the measuring period. It is usually used as the descriptor for background noise level during the measurement period.*

* *L_{Amax} refers to the maximum A-weighted noise level detected during the measuring period. It refers to the minimum background noise detected.*

Note 1 *(Residence - Location 1)*

From our site observation at residential location 1 (i.e. Blackmans flat), the ambient noise was dominated by the noise resulting from the traffic along Castlereagh Highway and activities at Mt Piper Power Station. There was no audible noise from the western direction (i.e., Centennial coal, Springvale Mine, etc.) during our site attendance. Instantaneous noise level was measured in the range of L_{AF} 55-56 dBA when a vehicle was passing on Castlereagh Highway. $L_{Amax\ 15\ minute}$ of 63-68 dBA was due to insects in the night time and local domestic noise and birds during day and evening time.

Note 2 *(Residence - Location 2)*

The background noise level at the rural residential location 2 (i.e. Wallerawang) was relatively low compared to Location 1 during the day, evening and night time measurements. There was constant unidentified noise (similar to low frequency engine noise) originating from south eastern direction at this location, which dominated the background noise ($L_{A90\ 15\ minute}$ 36-41 dBA) during the entire measurement period. Noise contribution during the evening and night time period included noise from insects at this location. Other sources of ambient sound at the site include: natural sounds (from wind noise, insects, bird/wildlife, etc.) and distant vehicle traffic noise. Noise from distant operational activities at Lamberts North was inaudible during the entire survey period. Given the vast buffer distance of at least 2.5 Km between the location 2 rural residential dwelling and the Lamberts North, and the intervening topography, the operational noise impact at this location to be minimal or insignificant.

Note 3 *(Lamberts North eastern boundary - Location 3)*

From our site observation at the south eastern site boundary of Lamberts North, noise emissions from operational equipment (clearly visible) on Mt Piper site was clearly audible. The noise varies and includes sources such as engine noise from dump truck, reverse beeps from excavator, bucket bangs of excavator, loading and unloading of ash in the dump truck.

5 Noise assessment

5.1 Measured noise levels

The result of the measured noise levels at the sensitive receiver boundary can be found in Table 5. Equivalent sound pressure levels (L_{Aeq}) at both the receiver locations were predominantly contributed by the traffic noise and Mt Piper Power Station. Operational noise from Lamberts North was inaudible at both the sensitive locations. As the operational noise contribution from the Lamberts North was inaudible, we have undertaken a desktop study based noise prediction to conclusively assess the noise contribution from the construction activities explained in subsequent section.

The operational activity at Mt Piper site and Lamberts North site commenced each day from approximately 6:00 (6:00 meeting for a 6:30 start) until 16:30 during our site visit. However there was extended activities till 20:00 on day 1 (02/03/2014) due to late start in the morning. Generally there were no operational activities after 16:30 until 6:00 at these sites.

5.2 Predicted noise contribution

For the purpose of this assessment, we considered the worst case scenario of the following six pieces of equipment operating at the same time simultaneously at Lamberts North. We note that the magnitude of the noise emission during the construction of the project may vary and depending on the number of machines operating, the intensity and working location of the equipment. It will be unlikely for all the plant and equipment to be running simultaneously in the same location; the nature of activities onsite is expected to vary during the course of the project.

- Dozer/ Crawler tractor
- Hydraulic Excavator
- Articulated Dump truck
- Light commercial vehicle

The subsequent noise levels were calculated (based on sound propagation through geometric spreading) at a distance based on worst case noise emission levels (i.e. maximum sound power levels) without considering any barrier effects from the undulating surrounding terrain. However due to intermittent operational characteristics and constant change of distance between the source-receiver we have considered 50% operational efficiency (equipment operational for 50% of the time during each 15 minute measurement period) for each equipment in the calculation. The results of this calculation are shown in Table 6.

Table 6 | Predicted noise emission from Lamberts North equipment

Equipment at Lamberts North	Total SWL, dB(A)	Predicted sound pressure level at indicated distance, dB(A)		
		1.4KM (Location 1)*	2.0KM	2.5KM (Location 2)*
Dozer / Crawler tractor	106	32	29	27
Hydraulic Excavator	108	34	31	29
Dump Truck	107[6]	33	30	28
Light commercial vehicle	106	32	29	27
Cumulative overall predicted noise level from the operation of the above equipment		39	36	34

Results of our assessment revealed the following:

Table 7 | Summary of maximum predicted noise level against the noise criteria (dBA)

Location*	Description	Maximum predicted noise	Day limit 42 dBA (07:00-18:00)	Evening limit 38 dBA (18:00-22:00)^	Night limit 35 dBA (22:00-07:00)^
1	Blackman's Flat	38	✓	✓	✓
2	Wallerawang	33	✓	✓	✓

✓ Complies with the stipulated noise criteria

^ No operational activity during evening and night time periods except on 2/03/2014.

* Refer to Figure 1 for receiver locations

As evident from Table 7 above, noise associated with the operational activities at Lamberts North complied with the day, evening and night time noise criteria at both the representative locations.

As there were no activities during evening and night time periods, background noise measurements were undertaken during the site visit and outlined below.

Table 8 | Background noise measurements

Location	Description	$L_{A90\ (15\ minute)}$ dBA	
		Evening (18:00-22:00)	Night (22:00-07:00)
1	Blackman's Flat	33	35
2	Wallerawang	36	41

[6] Two dump trucks included

6 Recommendations

6.1 Noise management measures

Should complaints from the community be received, the following noise control measures could be applied to minimise environmental noise emission from Lamberts North during operation of the project:

- Avoid the coincidence of noisy plant/machine working simultaneously close together.
- Construction trucks and other heavy machinery to use loop tracks as much as possible on the site to minimise the amount of reversing activities, i.e. managed through the Construction Traffic and Transport Management Plan.
- Consider the use of alternative warning system to the conventional single tone reversing alarm, such as broadband sound reversing alarm (e.g. BBS-TEK Backalarms) and warning lights.
- Installation of appropriate silencer/muffler on the engine exhaust for each truck working at Lamberts North.
- The use of light machinery (e.g. smaller excavators and dozers) during operation when working close to eastern site boundaries.

7 Conclusion

Attended noise monitoring at Lamberts North has been carried out by Aurecon from 2 - 3 March 2014 in accordance with Australian Standard "*AS1055.1-1997 Acoustics – Description and measurement of environmental noise, Part 1: General procedures*" using a Type 1 LD 831 sound level meter.

The environmental survey results revealed that the ambient noise at Location 1 (i.e. Blackman flat) was relatively high compared to Location 2 (i.e. Wallerawang) and the maximum equivalent continuous sound pressure level over 15 minutes at Location 1 was measured at $L_{Aeq\ (15minute)}$ 52 dB(A). The measured noise levels were dominated by the intermittent road traffic along Castlereagh Highway and slight activities from the Mt Piper Power Station.

Noise from other sites (i.e. Lamberts North, Centennial Coal, and Springvale Mine) was not audible during our site attendance. The maximum predicted noise contribution resulting from the operation of all equipment plant at the Lamberts North site at Location 1 was determined as 38 dB(A).

The background noise level at the rural residential Location 2 (i.e. Wallerawang) is relatively low compared to Location 1. The main sources of ambient sound at Location 2 are the natural sounds from wind noise, insects, bird/wildlife, etc., distant vehicle traffic noise and hum from engine. Noise from distant operational activities at Lamberts North was inaudible during the entire noise survey, equivalent continuous noise over 15 minutes at Location 2 was measured at $L_{Aeq\ (15minute)}$ 46 dB(A). The maximum predicted noise contribution resulting from the operation of five equipment plant at the Lamberts North site at Location 2 was determined as 33 dB(A).

The noise contribution from the operational activities at Lamberts North site cannot be conclusively measured due the presence of other surrounding simultaneous noise sources and activities such as Pinedale coal mine, Springvale coal mine, KVAR site, road traffic, insects, etc. Based on the noise survey conducted at the predetermined locations between 2 and 3 March 2014 and noise prediction, the operational noise resulting from the operation of equipment and mobile plant at the Lamberts North site comply with the *OEMP* Lamberts North Ash Placement Project – Operational Environmental Management Plan (May 2013) at the representative residential receivers at Location 1 and Location 2.

8 References

Measurements and assessment of the construction activities were carried out in accordance with:

- Office of Environment & Heritage (OEH) *Interim Construction Noise Guideline (ICNG).*
- Australian Standard *AS 1055 1997: Acoustics – Description and measurement of environmental noise*.
- Australian Standard *AS 2436-2000 Guide to noise and vibration control on construction demolition and maintenance sites*.
- Lamberts North Ash Placement Project – Operational Environmental Management Plan (OEMP) May 2013.
- *Delta Electricity Project Conditions of Approval for Mt Piper Power Station Ash Repository Extension Project (approved on 16 February 2012).*
- *Mt Piper Power Station Ash Placement Project – Lamberts North Construction Noise monitoring 14-15 January 2013 (Revision 2, dated 11 February 2013)*

Appendix A
Glossary of terms

Term	Definition
Sound Pressure Level (Lp)	Sound or noise is the sensation produced at the ear by very small fluctuations in atmospheric pressure. The human ear responds to changes in sound pressure over a very wide range (from 20 microPascals to 60 Pascals). A scale that compresses this range to a more manageable size and that is best matched to subjective response is the logarithmic scale, rather than a linear scale.
Sound Pressure Level (Lp)	Is defined as: $L_P = 10 \log_{10}\left(\frac{p^2}{p_{ref}^2}\right) dB$ In the above equation, p is the sound pressure fluctuation (above or below atmospheric pressure), and p_{ref} is 20 microPascals (2×10^{-5} Pa), the approximate threshold of hearing. To avoid a scale which is too compressed, a factor of 10 is included, giving rise to the decibel, or dB for short.
A-Weighted Decibel (dB(A)) & Loudness	In some circumstances, the sound pressure level is expressed as C-Weighted decibels, instead of the more common A-Weighted. The C-Weighting filter is designed to replicate the response of the human ear above 85 dB, and places a greater weighting on low frequency noise.
L_{Aeq}	The time averaged C-weighted sound pressure level for a time interval, as defined in AS1055.1. It is generally described as the equivalent continuous C-weighted sound pressure level that has the same mean square pressure level as a sound that varies over time. It can be considered as the average sound pressure level over the measurement period.
L_{Ceq}	The time averaged C-weighted sound pressure level for a time interval, as defined in AS1055.1. It is generally described as the equivalent continuous C-weighted sound pressure level that has the same mean square pressure level as a sound that varies over time. It can be considered as the average sound pressure level over the measurement period.
L_{An}	The sound level, which, for a specified time interval, in relation to an investigation of a noise, means the A-weighted sound pressure level that is equalled or exceeded for n% of the interval. Commonly used percentages are 1, 10, 90 & 99%.
L_{Cpk}	The peak C-weighted sound pressure level for a time interval.

$L_{Cmax,T}$	The average maximum C-weighted sound pressure level, which, for the specified time interval, means the C-weighted sound pressure level during the interval obtained by using the fast time weighting and arithmetically averaging the maximum sound levels of the noise during the interval. Under certain conditions the 10th percentile noise level, $L_{C10,T}$, can represent the average maximum C-weighted sound pressure level.
L_{A10}	A-weighted noise level which is exceeded for only 10% of the measuring period. It is usually used as the descriptor for intrusive noise level and represents ambient road traffic noise in general.
L_{A90}	A-weighted noise level which is exceeded for 90% of the measuring period. It is usually used as the descriptor for background noise level during the measurement period.
L_{Amin}	Minimum A-weighted noise level detected during the measuring period. It refers to the minimum background noise detected.
Octave	Frequency bands allow a representation of the spectrum associated with a particular noise. They are an octave wide, meaning that the highest frequency in the band is just twice the lowest frequency, with all intermediate frequencies included and all other frequencies excluded. Each octave band is described by its centre frequency.
Maximum Exposure Time (Hours)	The maximum possible time a person can be safely exposed to a specific noise level (L_{Aeq}).

Appendix B
Photos of noise monitored locations at Blackmans Flat and Wallerawang

Figure 2 | Photograph of Measurement Location 1 (Blackman's Flat)

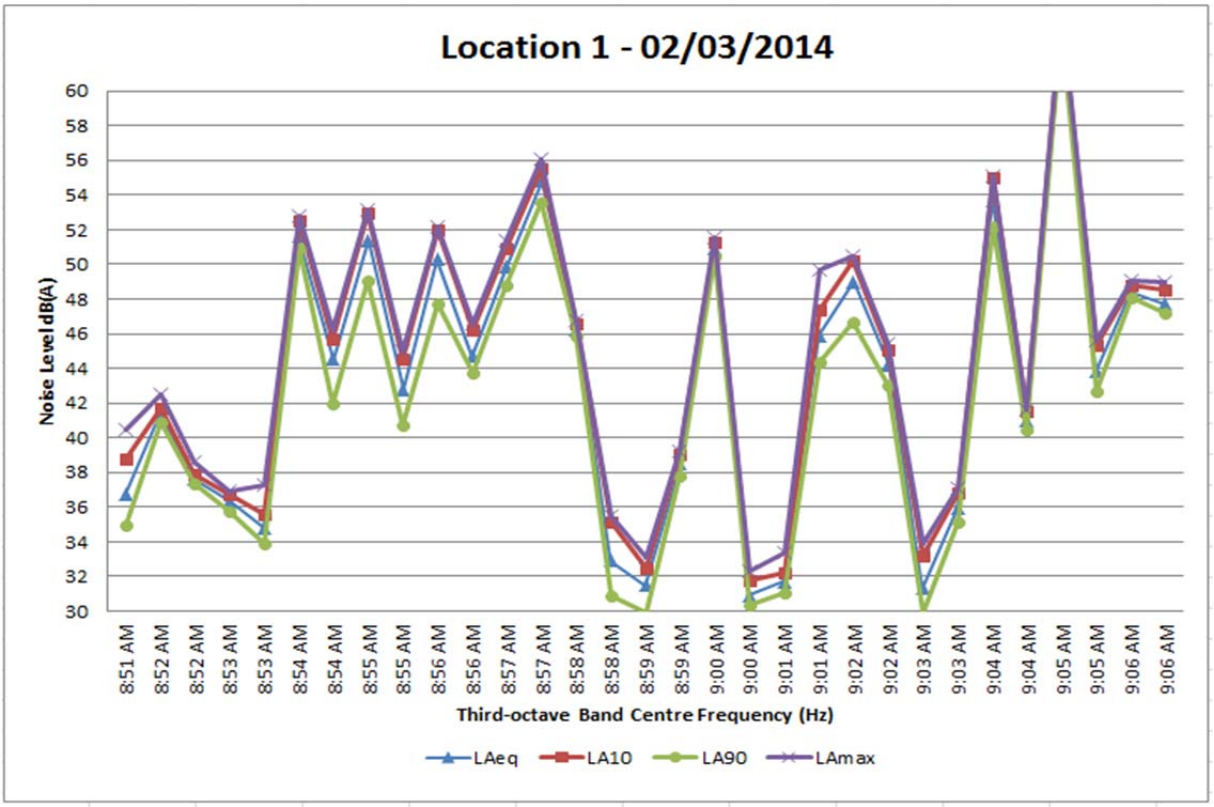
Figure 3 | Photograph of Measurement Location 2 (Wallerawang)

Figure 4 | Photograph of Lamberts North South eastern boundary

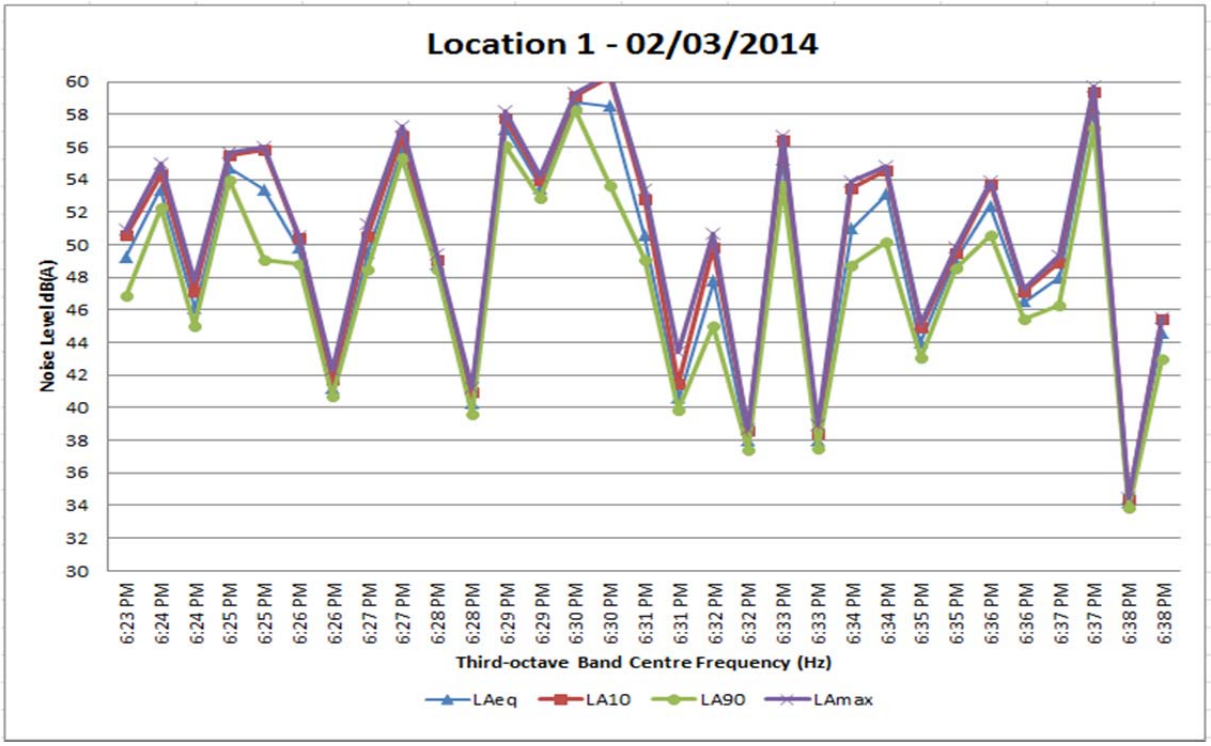
Figure 5 | Photograph of Lamberts North South eastern boundary near the bins

Appendix C
Noise monitoring graphs

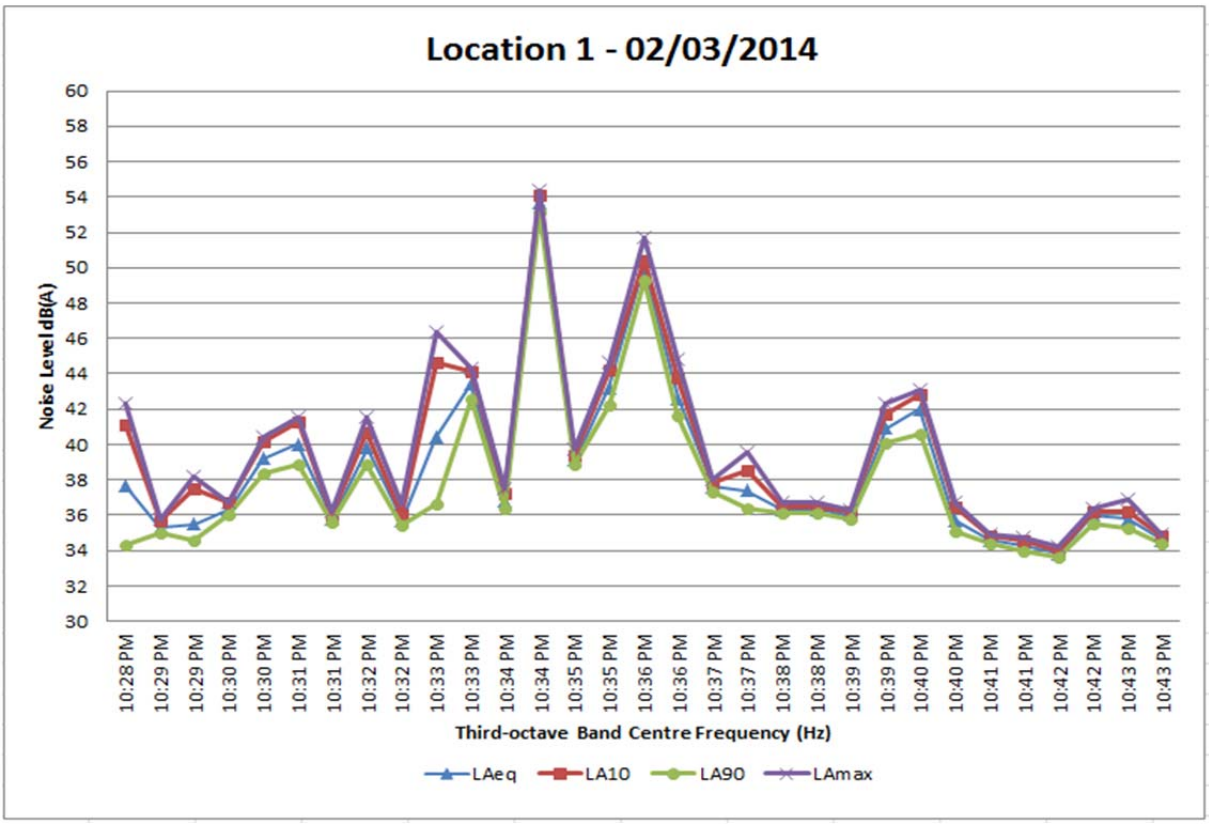
Location 1 – Residential property at Blackmans Flat (Sunday 15/09/2013)



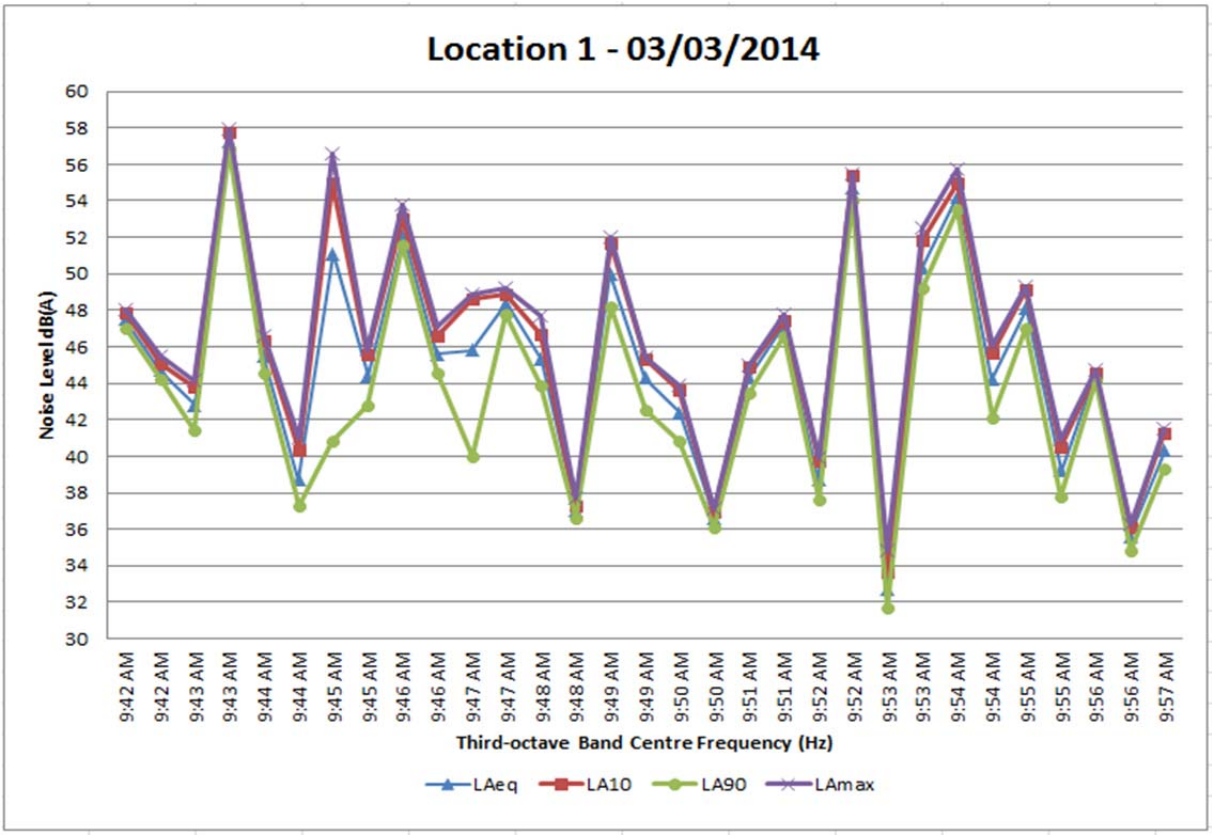
Location 1 – Residential property at Blackmans Flat (Day time 02/03/2014)



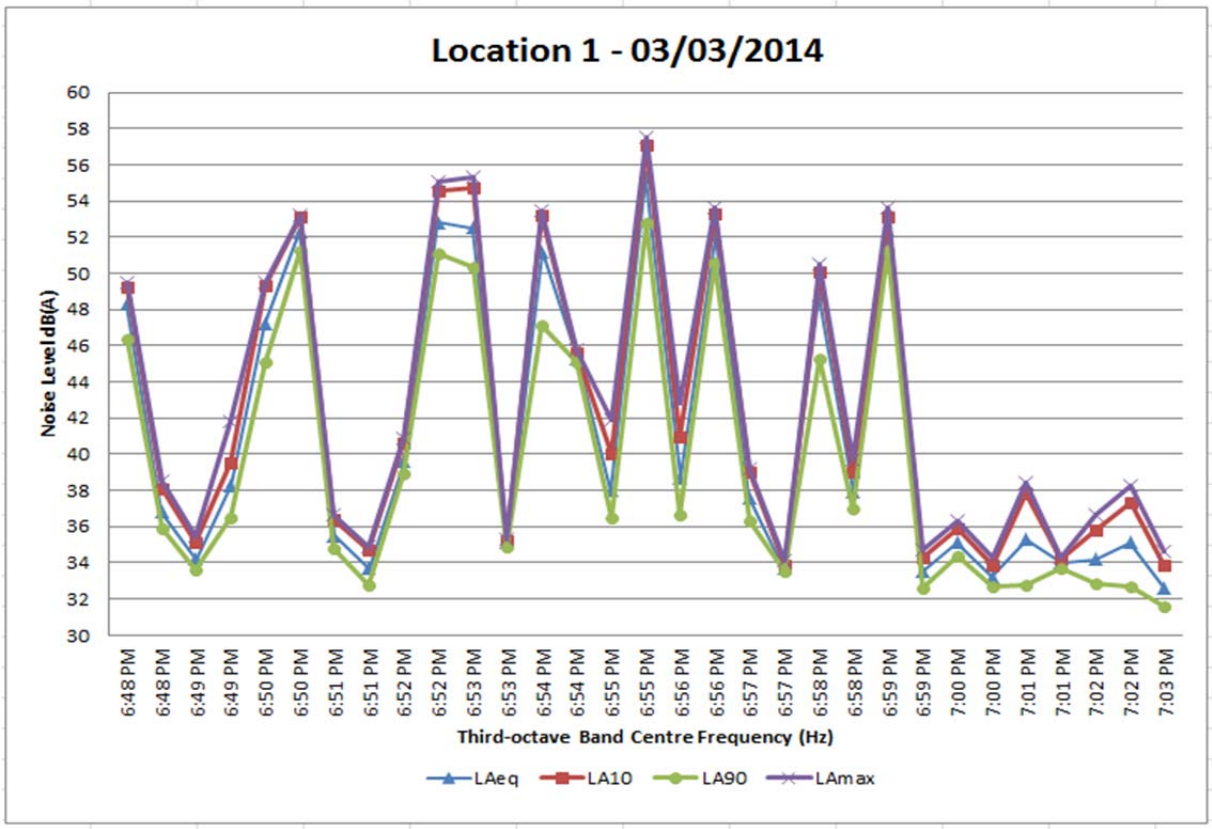
Location 1 – Residential property at Blackmans Flat (Evening time 02/03/2014)



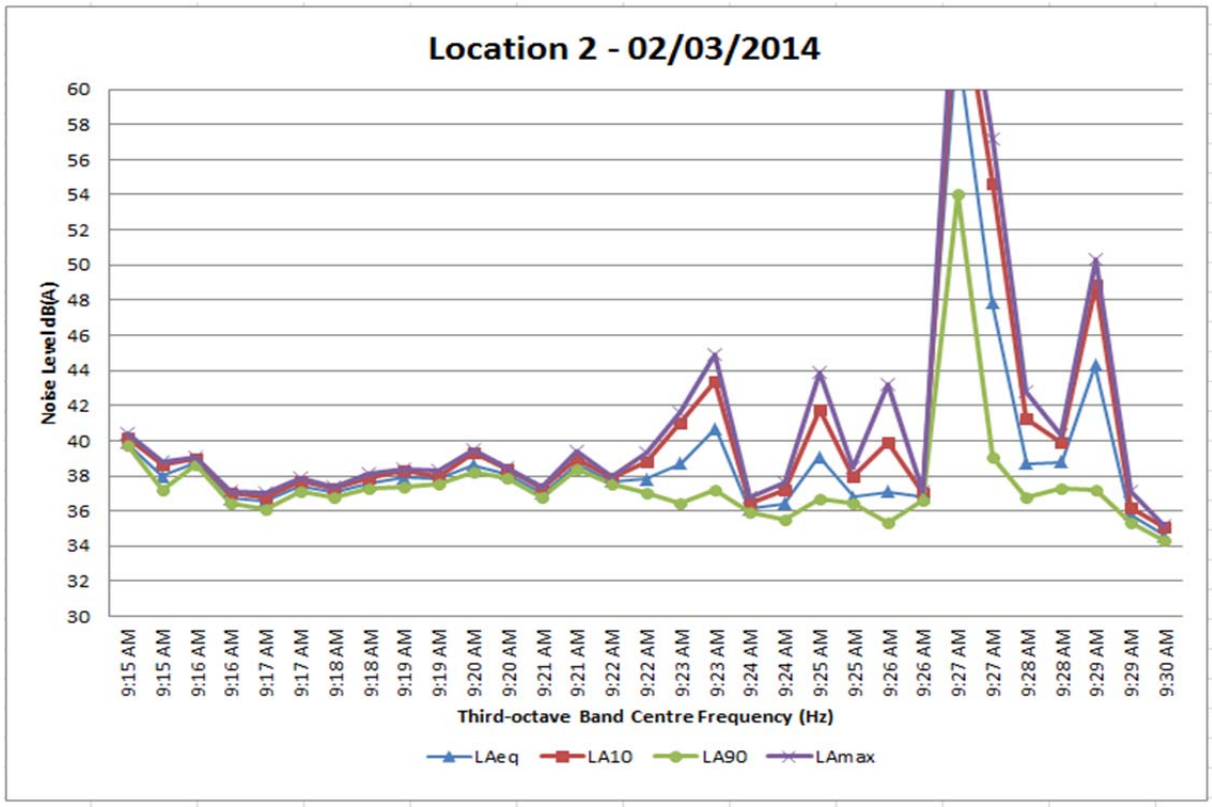
Location 1 – Residential property at Blackmans Flat (Night time 02/03/2014)



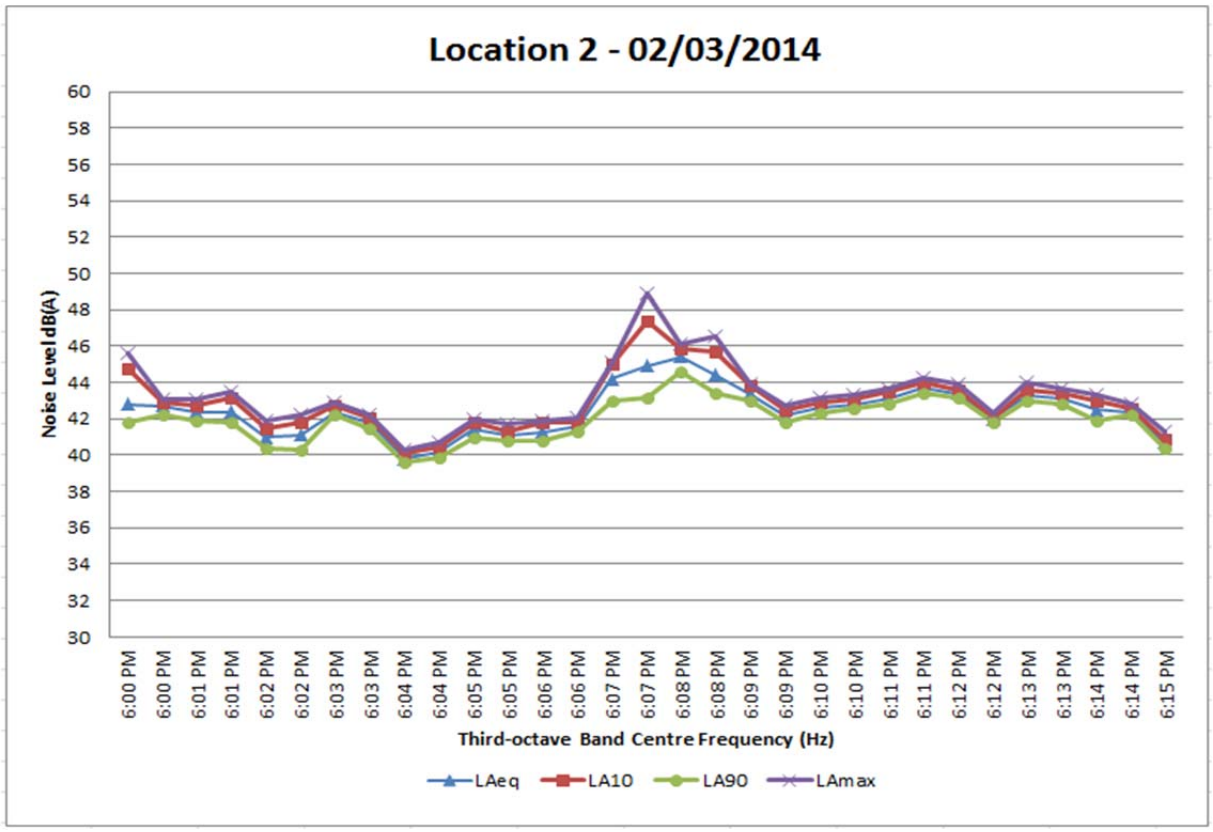
Location 1 – Residential property at Blackmans Flat (Day time 03/03/2014)



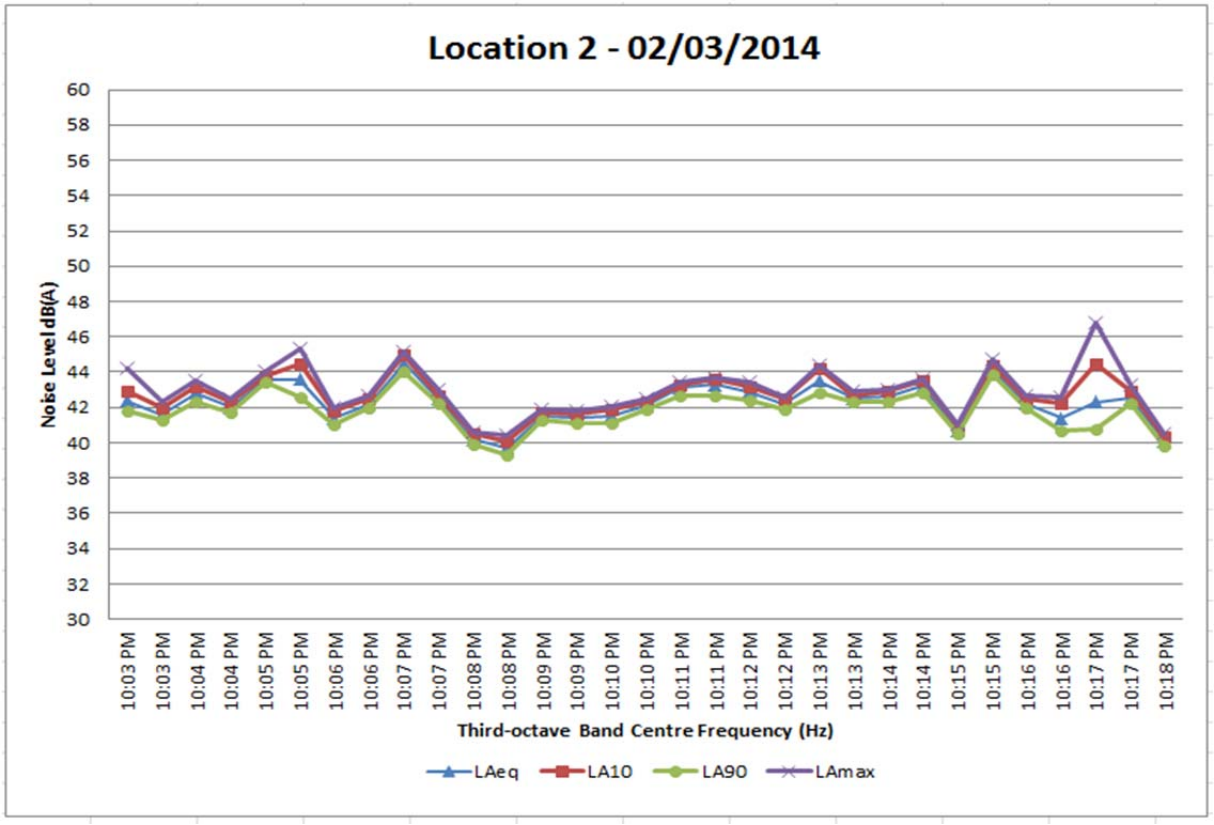
Location 1 – Residential property at Blackmans Flat (Evening time 03/03/2014)



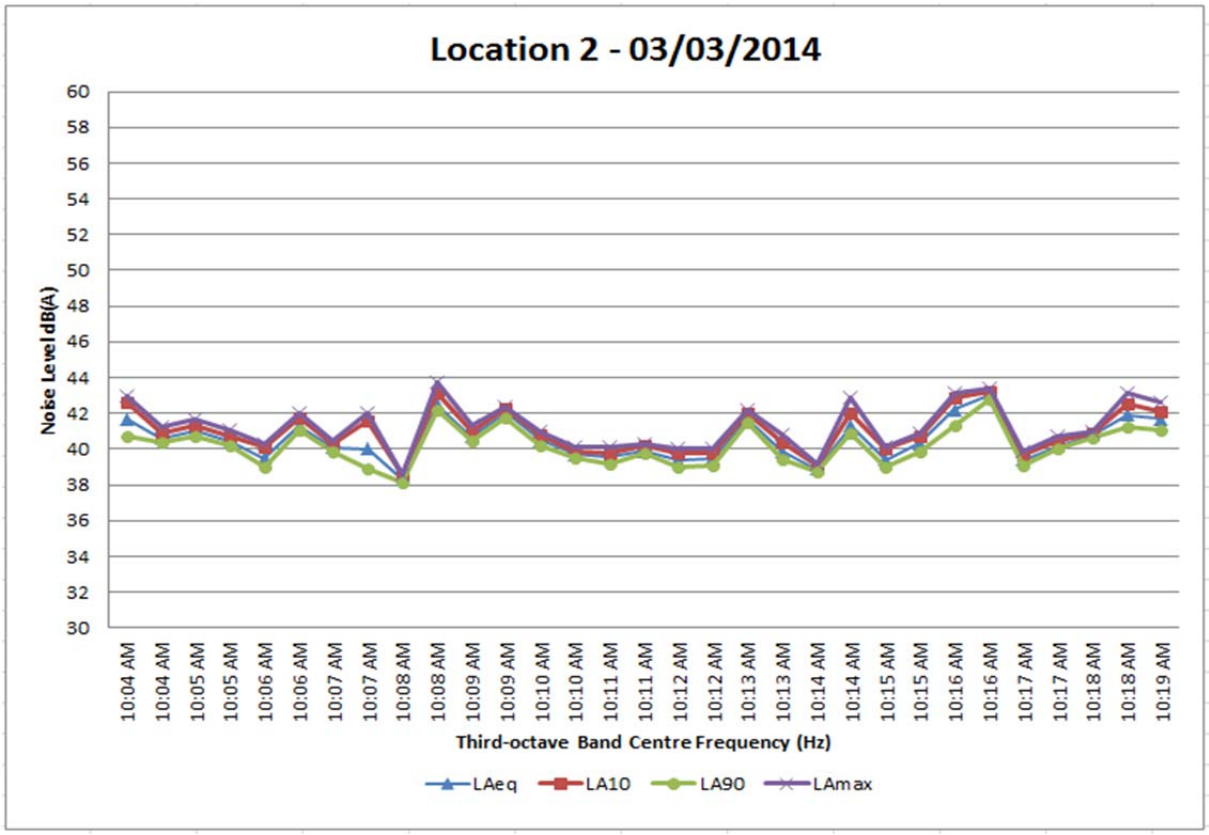
Location 2 – Residential property at Wallerawang (Day time 02/03/2014)



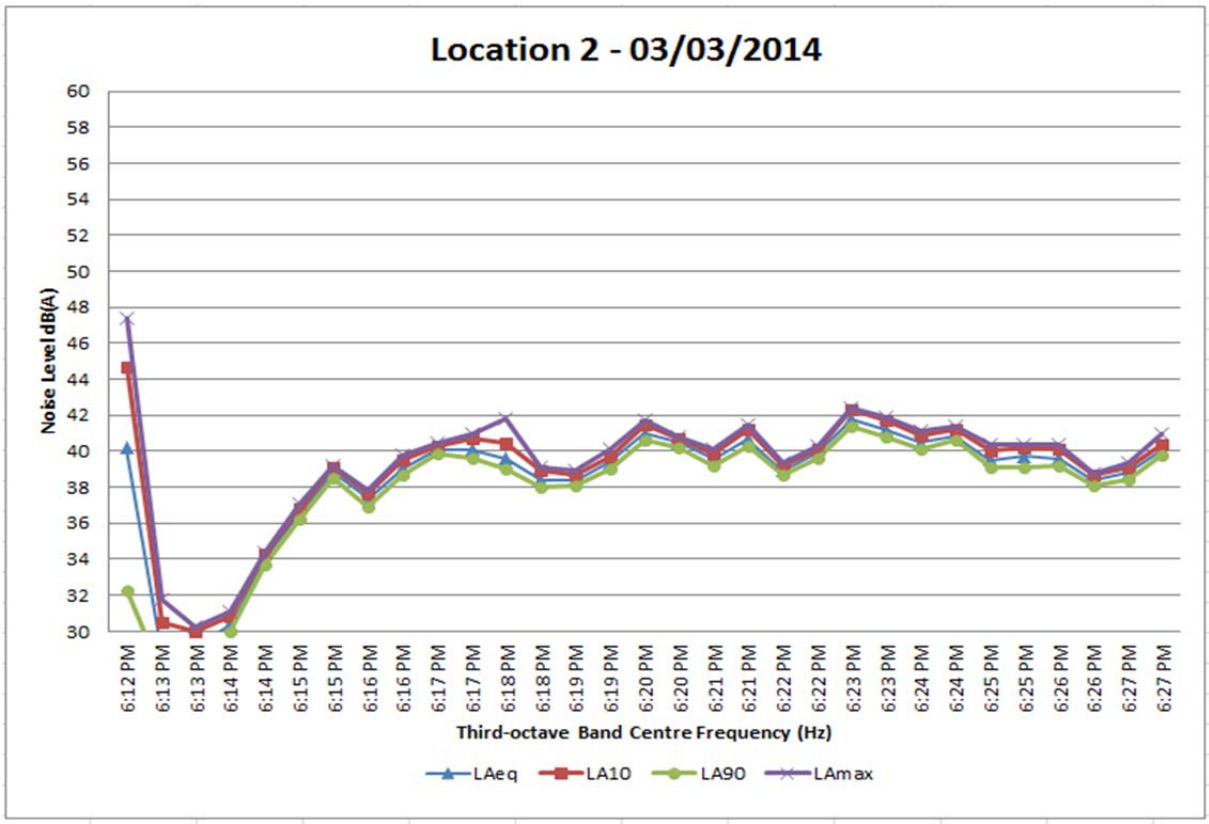
Location 2 – Residential property at Wallerawang (Evening time 02/03/2014)



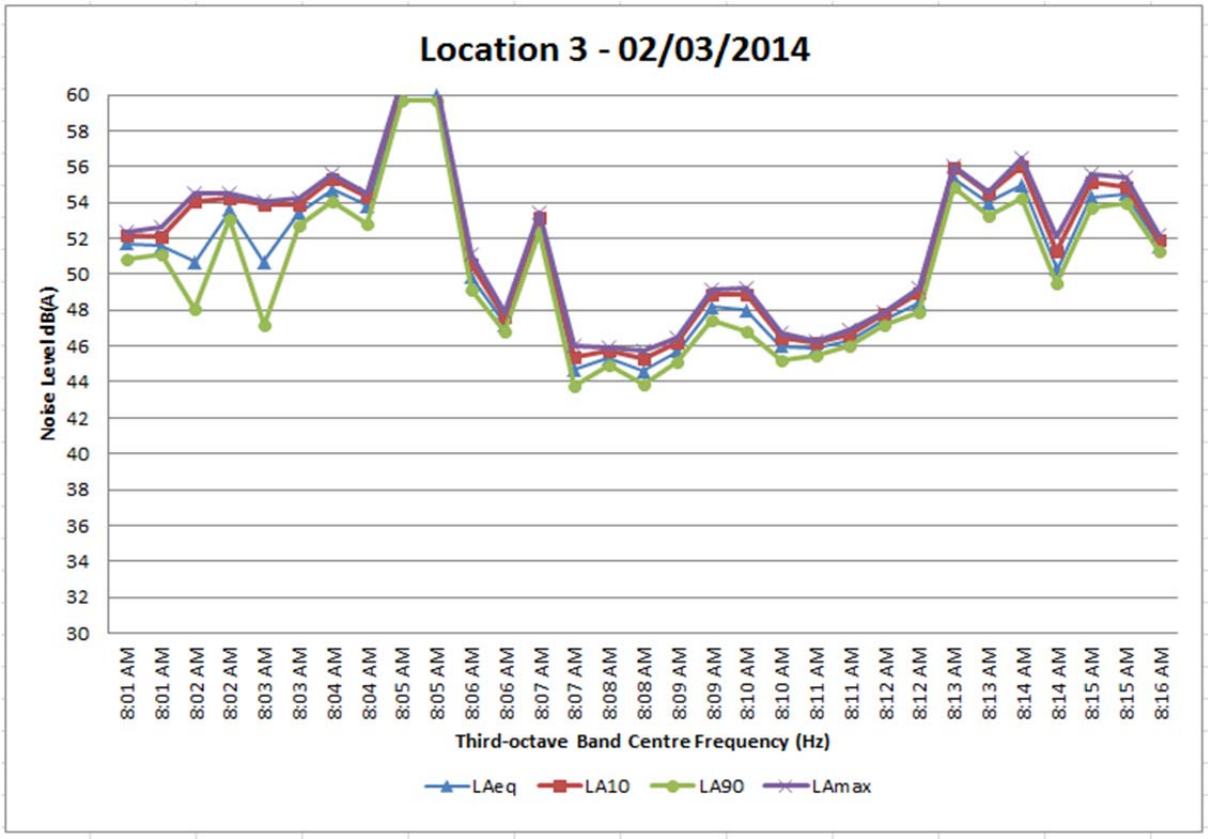
Location 2 – Residential property at Wallerawang (Night time 02/03/2014)



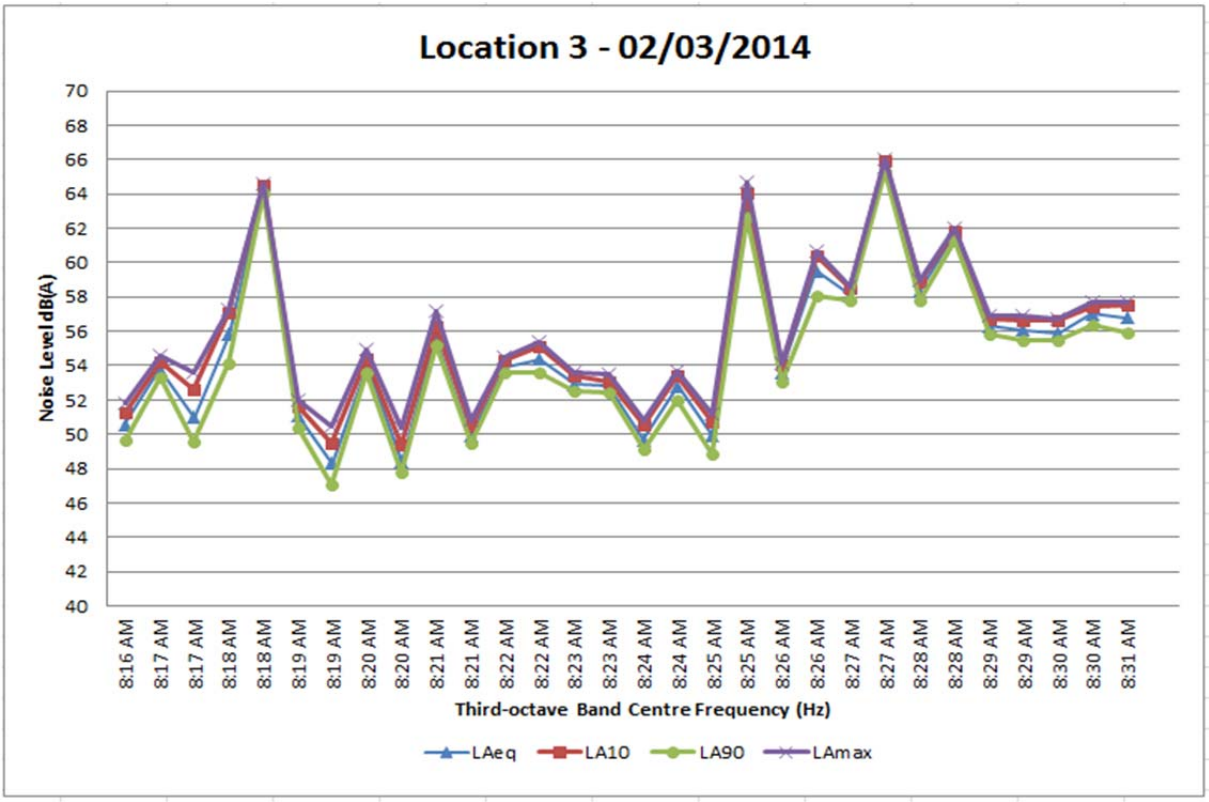
Location 2 – Residential property at Wallerawang (Day time 03/03/2014)



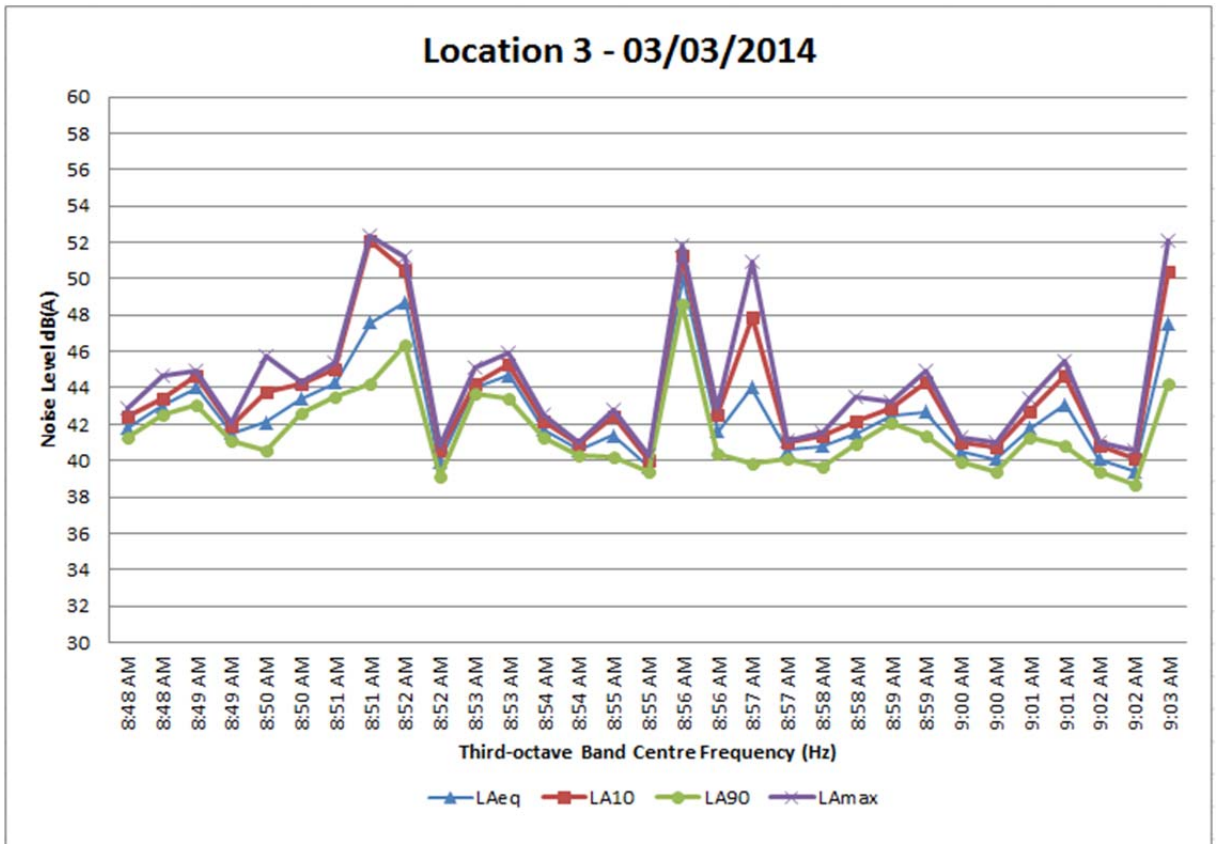
Location 2 – Residential property at Wallerawang (Evening time 03/03/2014)



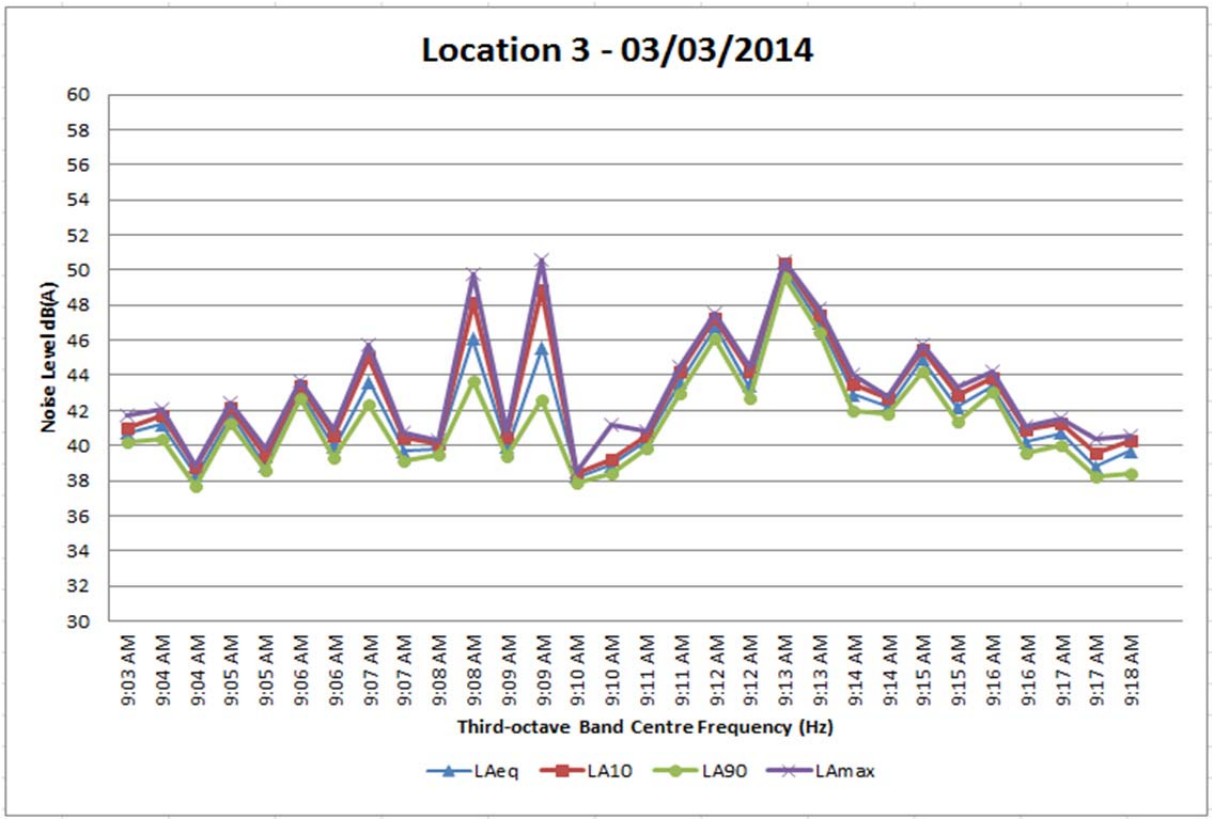
Location 3 – Lamberts South Eastern site boundary (Day time 02/03/2014) - 1



Location 3 – Lamberts South Eastern site boundary (Day time 02/03/2014) - 2



Location 3 – Lamberts South Eastern site boundary (Day time 03/03/2014) - 1



Location 3 – Lamberts South Eastern site boundary (Day time 03/03/2014) - 2

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