



Project No: 07355

Noise Compliance Study Weston Aluminium Weston, NSW

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May 2015

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INTRODUCTION

This report provides the results and findings of a triennial compliance noise monitoring and modelling programme undertaken in May 2015 for Weston Aluminium (WA), Mitchell Avenue, Weston, NSW.

The assessment has been undertaken in accordance with the requirements of WA's Environmental Protection Licence (EPL) no. 6423 and conditions of Development Consent (DA-86-04-01-MOD 8 and 10397 of 1995-Mod 6). The methodology used in this programme is in keeping with discussions held previously with Office of Environment and Heritage (OEH) to most effectively determine compliance with the noise limits in the EPL.

Spectrum Acoustics has been involved in noise monitoring and management at WA since 2007 and developed the noise compliance modelling procedures detailed in this report in consultation, and approved by, EPA. Spectrum Acoustics personnel are suitably qualified to undertake the noise compliance reporting and are approved by the Department of Planning and Infrastructure to undertake independent environmental noise audits.

NOISE LIMITS

The noise limits applicable to WA's operations are detailed below in **Table 1**.

TABLE 1 WESTON ALUMINIUM NOISE LIMITS			
Location	Day*	Evening*	Night*
Cnr Government & Tenth Streets	48 dB(A) Leq (15 min)	48 dB(A) Leq (15 min) 40 dB(A) Leq (evening)	47 dB(A) Leq (15 min) 35 dB(A) Leq (night) 57 dB(A) L1 (1 min)**
Northcote Street	44 dB(A) Leq (15 min)	44 dB(A) Leq (15 min)	44 dB(A) Leq (15 min) 40 dB(A) Leq (night) 57 dB(A) L1 (1 min)**
Mitchell & Railway Avenues	43 dB(A) Leq (15 min)	43 dB(A) Leq (15 min)	43 dB(A) Leq (15 min) 41 dB(A) Leq (night) 55 dB(A) L1 (1 min)**

* For noise assessment purposes day is 7 am to 6 pm Monday to Saturday and 8 am to 6 pm Sundays and Public Holidays, evening is 6 pm to 10 pm Monday to Sunday and night is all other times.

** The EPL document states noise levels as Leq (1 min) but it is considered the intent is to assess potential sleep disturbance impacts which are as L1 (1 min).

The EPL states that “where amenity noise levels are lower than intrusive noise levels, both levels are in the licence conditions in order to ensure that intrusive noise impacts are controlled at all times”.

METHODOLOGY

A series of attended noise measurements of 15 minutes duration were made on Thursday 14th May 2015 at residential locations representative of those in Table 1 (as shown below in **Figure 1**), during the day, evening and night time periods. At these locations the noise from WA was occasionally audible and sometimes measurable. Further measurements were also made at each of the eastern and western boundaries of the WA site. At these locations noise emissions from WA dominated the acoustic environment.



FIGURE 1 NOISE MONITORING LOCATIONS

Noise emission levels were measured with a Brüel & Kjær Type 2250 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.

Data from the site noise measurements was input into a noise model for the area and modelling was undertaken to determine EPL compliance for noise attributable to WA operations at residential receivers in the vicinity.

The production details for the monitoring period were supplied by WA. In summary, the two rotary furnaces and reverb furnace were operating at typical production levels throughout the measurement periods.

Supporting plant and equipment (e.g. dross pre-processing plant, metal reclaiming machine, baghouses, etc.) were all functional throughout the entire monitoring period.

The operational conditions and production rates for the monitoring period are, therefore, considered to be representative of normal operations at WA at the time.

Modelling was undertaken using ENM noise modelling software. Once the model was set up, and verified using the measured site data, it was used in point calculation mode to determine noise levels at an individual receiver in each residential receiver area (as per the EPL).

These receivers are considered to be the potentially most affected in each area (i.e. indicative of the worst case). The locations correspond approximately to the attended measurements locations.

Checking of model input parameters was achieved by modelling theoretical noise levels to the measurement points under the atmospheric conditions present at the time the measurements were undertaken.

Noise modelling was carried out under the following atmospheric conditions which are considered prevailing for the area at various times of the year.

- 1 Neutral Atmospheric (20°C, 70% R.H., no wind),
- 2 3°C/100m positive temperature gradient, 70% R.H. (indicative of night time only),
- 3 3m/s wind from the south east, 70% R.H., 20°C (summer), and
- 4 3m/s wind from the north west, 70% R.H., 20°C (winter)

RESULTS

Attended noise measurements were made at the WA site boundaries and at 66 Northcote St., Cnr Government and Tenth Streets and in Mitchell Avenue, one during the day time period (before 6 pm), one during the evening period (from 6 pm – 10 pm) and one at night (after 10 pm).

Where the noise from WA was audible and measureable the Bruel & Kjaer “*Evaluator*” analysis software was used to quantify the contributions of the plant and other significant noise sources to the overall noise levels.

Throughout each monitoring period the atmospheric conditions were taken from the Bureau of Meteorology’s met station at Cessnock. During the day the temperature was approximately 17° with relative humidity at about 40%. The wind was from the north to north west at around 2.5 m/s. During the evening and night the temperature dropped to around 8 to 10° C with relative humidity at 60%. Winds were up to 4 m/s from the west to south west.

The results of the attended noise measurements at site boundary location are shown below in **Table 2**.

TABLE 2 MEASURED SITE NOISE LEVELS - 14 MAY 2015	
Location (start time)	Leq dB(A)
Eastern Boundary (2.18 pm)	57.2
Eastern Boundary (10.25 pm)	55.1
Western Boundary (2.35 pm)	58.0
Western Boundary (10.07 pm)	59.1

Results of the attended noise measurements at each off-site monitoring location are shown below in **Table 3**.

The total measured Leq is shown. This was analysed with the Bruel & Kjaer “*Evaluator*” software to quantify the contributions of the various noise source(s) to the overall noise levels. The noise sources are listed in the comments column with the contribution of each shown in brackets.

TABLE 3 MEASURED RESIDENTIAL NOISE LEVELS - 14 MAY 2015				
Location	Time	dB(A),Leq	Wind speed/ direction	Identified Noise Sources
66 Northcote St	3:25 pm	54	2.5 m/s, NW	Traffic (54), dogs (40), industrial noise (35), WA not measurable (est. 32)
66 Northcote St	9:42 pm	51	4.1 m/s, WSW	Traffic (51), industrial noise (36), WA barely audible
66 Northcote St	11:21 pm	49	1.1 m/s, SW	Traffic (49), industrial noise (30), WA barely audible
Cnr Government Road & Tenth St.	2:44 pm	60	2.5 m/s, NW	Traffic (60), industrial noise (40), WA inaudible
Cnr Government Road & Tenth St.	9:06 pm	54	2.5 m/s, WSW	Traffic (54), industrial noise (43), WA inaudible
Cnr Government Road & Tenth St.	10:44 pm	54	3.6 m/s, W	Traffic (56), industrial noise (37), WA inaudible
Mitchell Ave.	3:07 pm	66	2.5 m/s, NW	Traffic (66), industrial noise (48), WA barely audible
Mitchell Ave.	9:25 pm	53	4.1 m/s, WSW	Traffic (53), WA (40) , industrial noise (40)
Mitchell Ave.	11:03 pm	41	3.6 m/s, W	Traffic (41), WA (38) , industrial noise (25)

Noise from both local and distant traffic was a significant contributor the measurements at all monitoring locations at all times. Noise from other industrial sources also contributed to all measurements (shown as “industrial noise” in Table 3).

The noise from WA was only clearly discernible from other industrial noise at the Mitchell Avenue monitoring location during the evening and night.

At the Northcote Street monitoring location industrial noise was audible throughout each monitoring period, although traffic noise dominated the measurements. During the day time measurement general industrial noise was audible throughout the measurement period. The level of noise from WA was estimated from the measurement during periods when noise from traffic and other industrial sources was low.

WA was not audible at the monitoring location on the corner of Government Road and Tenth Street. At this location noise from passing traffic and other industrial sources dominated the measurement.

The results in Table 3 show that the measured noise levels did not exceed the noise goals in the EPL at any of the monitoring locations in either of the day, evening or night time periods.

Results of the noise modelling for the measured night time operations are shown in **Table 4** for the various atmospheric conditions assessed.

TABLE 4 MODELLED NOISE LEVELS - MAY 2015 dB(A) Leq (15 min) - NIGHT				
Location	Neutral	Temp. Inversion	SE Wind	NW Wind
66 Northcote St	32	34	27	37
Mitchell Avenue	39	39	38	42
Government Rd.	32	33	34	28

The results in **Table 4** show that, based on the night time noise levels measured on the site, the theoretical noise levels (determined by modelling) will not exceed the 15 minute (Intrusiveness) Leq noise goals in the EPL for any time period.

The noise model was based on and verified against the noise levels measured at the site boundaries. A direct comparison between the modelled noise levels and the measured noise levels at the compliance locations is not considered viable due to the disparity in atmospheric conditions between actual and modelled conditions.

The noise modelling was carried out based on verification of the measured night time noise levels. During the night the noise was relatively steady state and did not include any noise from trucks arriving or departing the site (which particularly influence measured levels at the western boundary, near the access road).

During the day the measured noise level at the western boundary was lower than the night time measurement, but it did include noise from one truck arriving and one truck departing the site. Similarly the noise level at the eastern boundary included noise from a truck being unloaded and leaving the site.

Table 5 shows the results of the noise modelling under the measured day time noise levels. Only the north west and south east winds are considered as these are the potential worst case conditions.

TABLE 5 MODELLED NOISE LEVELS - MAY 2015 dB(A) Leq (15 min) - DAY		
Location	SE Wind	NW Wind
66 Northcote St	30	40
Mitchell Avenue	39	44
Government Rd	39	32

The results in **Table 5** show that, based on the measured day time noise levels, the received noise could exceed the day time noise goal at the nearest residence to the site in Mitchell Avenue. The exceedance would be 1 dB(A), which would, typically, be regarded as

marginal and not be considered a non-compliance as per Chapter 11.1.3 of the NSW Industrial Noise Policy as reproduced below;

“A development will be deemed to be in non-compliance with a noise consent or licence condition if the monitored noise level is more than 2 dB above the statutory noise limit specified in the consent or licence condition.”

It is noted that the noise criteria for Weston Aluminium were developed a relatively long time ago and in the intervening period there has been considerable development along Mitchell Avenue. There are now only two residences in this area with the remainder of blocks occupied by industrial and commercial premises. The measured noise level during the day at the Mitchell Avenue monitoring location was 66 dB(A) with 48 dB(A) of industrial noise not related to Weston Aluminium. Under such circumstances the modelled worst case noise from Weston Aluminium would not be likely to be considered intrusive.

Where it was measureable at night the noise from WA was relatively steady state and it was not possible to accurately measure any maximum noise events from WA at the monitoring locations (i.e. the L1 (1 min) contribution).

The measured night time site data was analysed for its L1 (1 min) component with the results shown below in **Table 6**. Both of these measured L1 (1 min) levels represent impact noise.

TABLE 6 MEASURED L1 (1 min) NOISE LEVELS – 14 MAY 2015	
Location (start time)	L1 (1 min)
Eastern Boundary (10.25 pm)	63.9
Western Boundary (10.07 pm)	67.2

Based on the measured L1 (1 min) levels the modelled received noise is shown below in **Table 7**.

TABLE 7 MODELLED NOISE LEVELS - MAY 2015 dB(A) L1 (1 min) - NIGHT			
Location	Temp Inversion	SE Wind	NW Wind
66 Northcote St	41	35	44
Mitchell Avenue	44	45	48
Government Rd	42	43	45

The results in Table 7 show that, under the modelled conditions, there will be no exceedance of the sleep disturbance criteria as a result of the measured noise emissions.

To avoid undue disturbance to residents the L1 (1 min) noise level from the operational measurements are used to show general compliance with the sleep disturbance criterion. That is, as the distance between the noise source and the operational noise monitoring location is significantly greater than the distance between the operational noise monitoring location and the sleep disturbance monitoring location (i.e. 1m from the facade of the house) there will be little variation in L1 (1 min) levels between the two monitoring locations.

It must be noted, however, that the sleep disturbance criterion is to be measured near a bedroom window. As the internal layout of each residence is not known, to consider a worst case, this is assumed to be facing towards WA.

Data from those times where WA operations were audible was analysed using the "Evaluator" software. This analysis showed the noise did not contain any tonal, impulsive or low frequency components as per definitions in the NSW Industrial Noise Policy and would, therefore, not be associated with nuisance or amenity impact.

CONCLUSIONS

The assessment of noise emissions from WA has been undertaken by measuring noise levels at the site and theoretically modelling these to nearby residential areas to determine compliance with requirements of the EPL.

Further attended noise monitoring was carried out at the residential locations detailed in the EPL to determine compliance where this was possible.

The results of the monitoring and modelling have shown that noise emissions from WA were compliant with regulatory requirements under all of the operational and atmospheric conditions assessed.