

31 January 2020

Lorraine Yates
General Manager
Sydney Harbour Boat Storage
Wharf 6, Robert Street
Balmain, NSW 2041

Re: White Bay 6 - Operational noise compliance assessment 2020

1 Introduction

EMM Consulting Pty Limited (EMM) has been engaged by White Bay 6 Pty Ltd to complete an operational noise compliance assessment of the marine storage and refuelling facility (the site) at Berth 6, White Bay, NSW.

The purpose of the assessment is to address the requirements of the Minister's Condition of Approval (MCoA).

This report presents noise measurement data collected on 15 January 2020 and the results, findings and discussions of the noise compliance assessment.

The following material was referenced as part of this assessment:

- Minister's Conditions of Approval (MP 06_0037) (MCoA); and
- Environmental Protection Authority 2017, *NSW Noise Policy for Industry* (NPfI).

2 Minister's Condition of Approval (MCoA)

The Minister's Condition of Approval (MCoA) for the site was granted on 14 September 2009 and has been modified five times to date. The site is currently operating under restrictions during day, evening and night periods. Condition A7 of the MCoA, presented below, summarises time restrictions that apply at the site.

Condition A7 - Hours of Operation

Activity	Day	Time
Dry boat storage activities limited to moving boats in and out of the water and the operation of a marine forklift	From 1 September to 30 April only: - Monday – Saturday - Sunday and Public Holidays	- 7:00 am to 7:00 pm - 7:00 am to 7:00 pm
	During the remainder of the year: - Monday – Saturday - Sunday and Public Holidays	- 7:00 am to 6:00 pm - 8:00 am to 6:00 pm
Mixed marine tenancies and commercial storage & work sheds	Monday – Saturday Sunday and Public Holidays	7:00 am to 6:00 pm 8:00 am to 6:00 pm
All activities on hardstand/lay down areas eg. Power tools, travel lifts, roll on roll off ramp, cranes forklifts		
Truck movements to and from the site		
General deliveries		
Disposal and collection of garbage including cans and bottles from vessels		
Recreational vessel arrivals, departures and mooring	Monday – Sunday	5:00 am to 10:00 pm
Recreational vessel refuelling and grey water sewerage pump out *(refer to Condition F15)		
Commercial vessel arrivals, departures and mooring	Monday – Sunday	Anytime
Commercial vessel refuelling and grey water and sewerage		
Commercial offices		
Office buildings mechanical services e.g. A/C plant, compressors for chiller room etc.		

The MCoA summarises the site's noise contributions limits in Conditions F1, F2 and F3 as follows.

Condition F1 - Noise Limits:

The use of any part of the premises including vessel refuelling and other activities, and the operation of the plant, machinery or other equipment on the site must not exceed the sound pressure (noise) limits presented in the table below

a) Noise limits – During operation of the facility

Residential location	Day	Evening	Night		
	L _{Aeq} (15 minute)	L _{Aeq} (15 minute)	L _{Aeq} (15 minute)	L _{Aeq} (9 hours)	L _{A1} (1 minute)
1 Grafton St, Balmain	54	48	48	45	59 ¹
Datchett St, Balmain	49	44	44	41	54 ¹
33 Adolphus St, Balmain	36	35	35	35	60 ¹
2 Point St, Pyrmont	40	35	35	35	61

Notes: 1. The sleep disturbance limits do not apply to trucks whilst engaged in movements on the access road to enter or leave the site.

b) For the purpose of clause (a) of this condition:

Day is defined as the period from 7.00 am to 6.00 pm Monday to Saturday and 8.00 am to 6.00 pm Sundays and Public Holidays;

Evening is defined as the period from 6.00 pm to 10.00 pm; and

Night is defined as the period from 10.00 pm to 7.00 am Monday to Saturday, and 10.00 pm to 8.00 am Sundays and Public Holidays.

Condition F2 – Noise measurements

Noise from the premises is to be measured at the most affected point within the residential boundary, or at the most affected point within 30 metres of the dwelling where the dwelling is more than 30 metres from the boundary, to determine compliance with the noise level limits in Condition F1 unless otherwise stated.

Noise from the premises is to be measured at 1 metre from the dwelling facade to determine compliance with the LA1(1 minute) noise level in Condition F1.

Where it can be demonstrated that direct measurement of noise from the premises is impractical, the DECC may accept alternative means of determining compliance (See Chapter 11 of the Industrial Noise Policy).

The modification factors presented in section 4 of the NSW Industrial Noise Policy shall also be applied to the measured noise levels where practicable.

The noise emission limits identified in F1 apply under meteorological conditions of wind speed up to 3 metres per second at 10 metres above ground level, and temperature inversion conditions.

Condition F3 – Noise Compliance Monitoring

A noise compliance assessment must be undertaken within three months of commencement of operations at the premises and submitted to the Director General. The assessment must be prepared by a suitably qualified and experienced acoustical practitioner and must assess compliance with noise limits in Condition F1.

Should the assessment indicate any non-compliance with the specified noise limits the Proponent must take appropriate measures to limit any impacts and must submit a further report upon the implementation of the measures. Further reporting must be undertaken every 12 months unless otherwise directed by the Director General."

3 Assessment methodology

Attended noise measurements were completed on 15 January 2020 to quantify noise emissions from the site during the day period. Measurements taken directly at noise sensitive receivers found that existing ambient noise levels were generally too high to determine a noise contribution from the site. Measurements were subsequently taken at three points on the boundary of the site, where extraneous noise sources did not significantly contribute to the noise profile. The relevant measurement points are indicated in Table 4.1 (measurement points 1, 2 and 3).

The site noise contribution at each noise sensitive location was determined as per condition 7.1 of the NSW Environmental Protection Authority's (EPA) 20017 Noise Policy for Industry (NPfI) requirements, which states that:

Where direct measurement of noise at a compliance location is not practical because of poor signal-to-noise ratios (that is, extraneous noise is louder than the noise under investigation), or where access to the

location has been denied or is unavailable, measurements at intermediate locations between the source and the receiver location, where signal-to-noise ratios are higher, may be a viable option.

The attended noise monitoring was carried out using a Brüel & Kjær 2250 Type 1 sound analyser (serial number 3008201). The sound analyser was calibrated before and on completion of the survey using a Rion NC74 calibrator (serial number 34372752). The instruments were within their NATA laboratory calibration period during the time of these readings, and also comply with *Australian Standard AS 2659.1 - 1998: Guide to the use of sound measuring equipment - Portable sound level meters*. All measurements were taken in accordance with AS 1055.1-1997 *Acoustics - Description and measurement of environmental noise - General procedures*. Refer to Appendix B for calibration certificates.

Based on site observations and experience from previous annual compliance monitoring, it was considered that the noise contribution from the plant and equipment operating during evening and night periods (refuelling only) would not be quantifiable over existing ambient noise levels at residential locations. Therefore, for evening and night operations site noise predictions were made using onsite sound power measurements. The adopted calculation method for evening and night operations accounts for measured sound power levels (at source), distance from sources to receivers, air absorption and any shielding effects from terrain or building structures.

4 Noise measurements

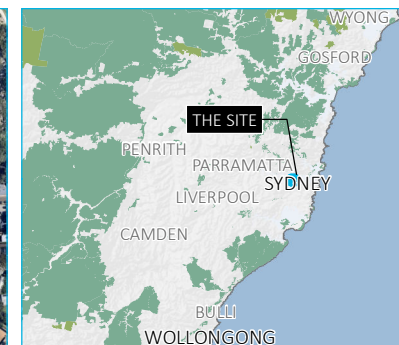
Short-term 15-minute attended noise measurements were conducted at the site boundaries and residential locations as shown in Figure 4.1.

The noise measurements were conducted in accordance with NPfl requirements. The weather conditions at the time of monitoring were partly cloudy and hazy with calm to light easterly winds (<3 m/s). No modification factors from the NPfl Fact Sheet C were found to be applicable to site noise.

Onsite plant and equipment items are provided in the list below. Note that concurrent operation of several items was captured during the measurement period, which is typical of the site's daytime operations.

- two boat hoists;
- two marina bulls;
- one 3.5 tonne forklift;
- one compressor in shed;
- one hand-held water pressure cleaner; and
- one compressor and fuel pump.

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- The site
- Sensitive receiver
- Short-term attended noise monitoring location

Site locality and noise monitoring locations

White Bay 6
Operational noise compliance assessment
Figure 4.1

Table 4.1 summarises the attended noise measurements.

Table 4.1 Attended daytime noise measurements – 15 January 2020

ID	Location (Refer to Figure 1)	Time ¹ (24-hour)	Noise measurement, dB			Comments/observations
			L _{Aeq} , 15min	L _{A90}	L _{Amax}	
1	South east boundary of site	9:34	53	46	72	Site noise included: Air-conditioning condenser unit constant hum. Reverse alarms of on-site machinery. Boat engines idling/testing. Truck traversing with boat. Workers using hand tools (scrapers, buffers). 'Bang' of opening/closing shipping container. Compressor operating for 1 minute. Other noise sources included: Birdsong. Boat pass-bys on harbour. Jet boats on harbour. Frequent aircraft overflights.
2	North east boundary of site	9:52	58	45	81	Site noise included: Workers using hand tools (electric screwdriver, scrapers). Gate to wharf opening/closing. Marina bull traversing. Reverse alarms and quackers. Other noise sources included: Jet boat on harbour. Aircraft overflights. Insects. General distant hum of CBD audible in lulls.
3	North west boundary of site	10:10	59	45	72	Site noise included: Workers using hand tools (hammer, scraper, buffer). Boat engine testing (idling, revving). Marina bull traversing, unloading trailer. Reverse quackers. Boat hoist operating/revving. Vacuuming on boat. Other noise sources included: Two helicopter overflights. Aircraft overflights.
4	Grafton Street, Balmain	10:54	49	46	61	Site noise included: Reverse quackers. Workers using hand tools (buffers, hammering). Compressor/high pressure hose. Boat hoist traversing and launching boat. Marina bull traversing. Other noise sources included: Aircraft overflights. Local car pass-bys. Hum of condenser units at passenger terminal audible at times. Neighbour activities (doors opening/closing, unloading car). General hum of CBD.
5	Further west on Grafton Street, Balmain	11:12	55	45	85	Site noise included: Reverse quackers. Workers using hand tools (buffers, hammering). Other noise sources included: Boat pass-bys on harbour. Helicopter overflight. General hum of CBD. Frequent aircraft overflights.
6	Datchett Street, Balmain	11:54	55	50	47	Site noise included: Hand tools (buffers, hammering). Marina bull deploying boat. Other noise sources included: Helicopter overflight. Police boat pass-bys. Construction noise from Barangaroo audible (barge with crane). General hum of CBD. Ferry and other boat pass-bys. Aircraft overflights.
7	2 Point Street, Piermont	12:33	52	48	67	Site inaudible. Other noise sources included: Frequent aircraft overflights. Boat pass-bys. Wind in trees. People jogging/walking past. Local traffic on Pirrama Road.

Notes: 1. All measurements were 15 minutes in duration.

5 Noise compliance assessment

Table 5.1 summarises the site noise contributions at the noise sensitive receivers. The contribution for 1 Grafton Street is based on the measured contribution at position 4, all other receivers contributions are based on predictions from measured noise levels at positions 1, 2 and 3 in Table 4.1. The total noise levels presented for these locations are assumed to be generated by White Bay 6. This is a conservative assumption given that other extraneous noise sources were also observed during the noise measurements. At all receivers, the predicted noise levels satisfy the limits specified in the MCoA.

Table 5.1 Noise compliance assessment

Location	Criteria					Calculated noise levels, dB					Compliance		
	Day	Evening	Night			Day ²	Evening ³		Night ³		Day	Evening	Night
	L _{Aeq} (15min)	L _{Aeq} (15min)	L _{Aeq} (15min)	L _{Aeq} (9 hour)	L _{A1} (1min)	L _{Aeq} (15min)	L _{Aeq} (15min)	L _{Aeq} (15min)	L _{Aeq} (9 hour)	L _{A1} (1min)	L _{Aeq} (15min)	L _{Aeq} (15min)	L _{Aeq} (15min) / L _{Aeq} (9 hour) / L _{A1} (1min)
1 Grafton Street, Balmain	54	48	48	45	59	48 ⁴	<25	<25	<25	<25	Yes	Yes	Yes
Datchett Street, Balmain	49	44	44	41	54	36	<25	<25	<25	<25	Yes	Yes	Yes
33 Adolphus Street, Balmain	36	35	35	35	60	34	<25	<25	<25	<25	Yes	Yes	Yes
2 Point Street, Pyrmont	40	35	35	35	61	30	<25	<25	<25	<25	Yes	Yes	Yes

- Notes:
1. Only refuelling activities included during evening and night-time periods.
 2. Noise contribution from site determined by applying distance attenuation adjustments to reference measurements from Table 4.1.
 3. Noise contribution from site determined by calculating sound pressure levels from activity sound power measurements of refuelling activities on site.
 4. Based on measured contribution at measurement location 4.

6 Conclusion

EMM has completed a noise compliance assessment for Berth 6 White Bay, Balmain. The assessment was completed in accordance with the requirements of the Minister's Conditions of Approval (MCoA) and the EPA's Noise Policy for Industry (NPfI).

Section 7.1 of the NPfI states that where direct measurement of noise at a compliance location is not practical due to poor signal-to-noise ratios (that is, extraneous noise is louder than the noise under investigation), measurements at intermediate locations between the source and the receiver location, where signal-to-noise ratios are higher, is permissible. This method has been adopted to calculate the site noise contribution at residential locations listed in the MCoA.

The measured and calculated site noise contributions, based on a three-dimensional model that was calibrated using measurements at intermediate locations, satisfied the MCoA noise limits at all residences outlined in the MCoA, for all periods.

We trust this information satisfies your requirements and if you require any further details please contact the undersigned.

Yours sincerely



Rick Scully

Acoustic Consultant

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Reviewed: DW 16.1.20

Appendix A

Glossary of acoustic terms

Several technical terms are discussed in this report. These are explained in Table A.1

Table A.1 **Glossary of acoustic terms**

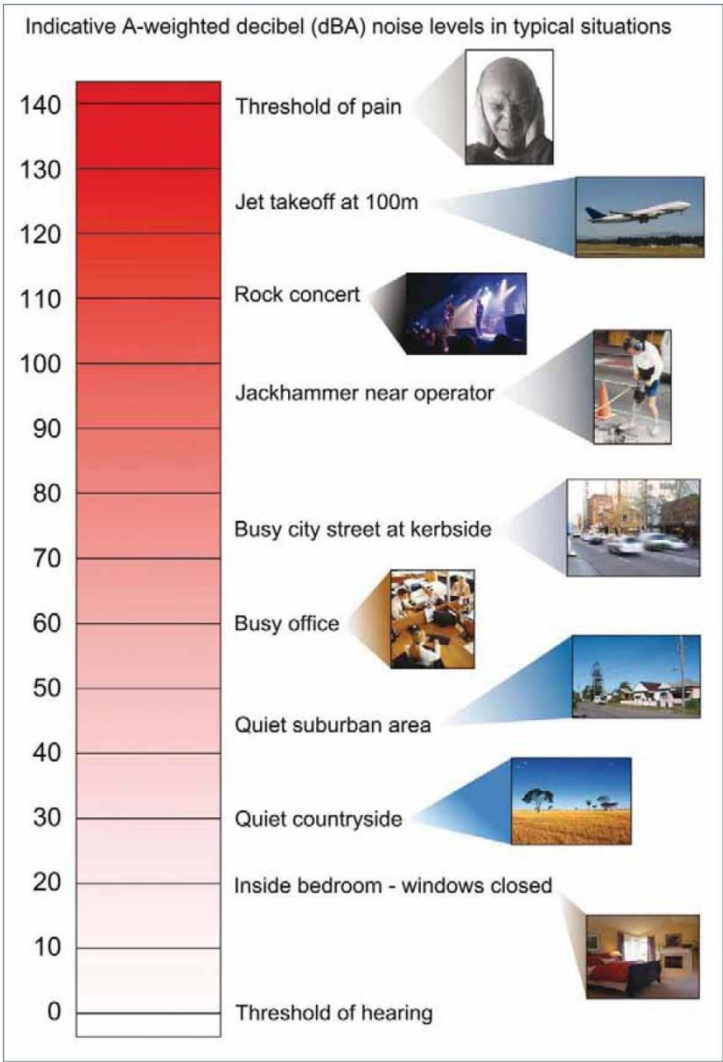
Term	Description
dB	Noise is measured in units called decibels (dB). There are several scales for describing noise, the most common being the 'A-weighted' scale. This attempts to closely approximate the frequency response of the human ear.
L _{A1}	The 'A-weighted' noise level which is exceeded 1% of the time.
L _{A1(1-min)}	The 'A-weighted' noise level exceeded for 1% of the specified time period of 1 minute.
L _{A10}	The 'A-weighted' noise level which is exceeded 10% of the time. It is approximately equivalent to the average of maximum noise level.
L _{A90}	Commonly referred to as the background noise level. The 'A-weighted' noise level exceeded 90% of the time.
L _{Aeq}	The energy average noise from a source. This is the equivalent continuous 'A-weighted' sound pressure level over a given period. The L _{Aeq(15-min)} descriptor refers to an L _{Aeq} noise level measured over a 15-minute period.
L _{Amin}	The minimum 'A-weighted' noise level received during a measuring interval.
L _{Amax}	The maximum root mean squared 'A-weighted' sound pressure level (or maximum noise level) received during a measuring interval.
L _{Ceq}	This is the equivalent continuous 'C-weighted' sound pressure level over a given period. The L _{Ceq(15-min)} descriptor refers to an L _{Ceq} noise level measured over a 15-minute period. C-weighting can be used to measure low frequency noise.
Day period	Monday – Saturday: 7 am to 6 pm, on Sundays and Public Holidays: 8 am to 6 pm.
Evening period	Monday – Saturday: 6 pm to 10 pm, on Sundays and Public Holidays: 6 pm to 10 pm.
Morning shoulder	Monday – Saturday: 6 am to 7 am.
Temperature Inversion	A meteorological condition where the atmospheric temperature increases with altitude.

It is useful to have an appreciation of decibels (dB), the unit of noise measurement. Table A.2 gives an indication as to what an average person perceives about changes in noise levels. Examples of common noise levels are provided in Figure A1.

Table A.2 **Perceived change in noise**

Change in sound level (dB)	Perceived change in noise
3	just perceptible
5	noticeable difference
10	twice (or half) as loud
15	large change
20	four times (or quarter) as loud

Figure A1 Common noise levels



Source: Road Noise Policy (Department of Environment, Climate Change and Water 2011)

Appendix B

Calibration certificates

CERTIFICATE OF CALIBRATION

CERTIFICATE No.: **SLM 25410 & FILT 5368**

Equipment Description: Sound Level Meter

Manufacturer: B & K

Model No: 2250 **Serial No:** 3008201

Microphone Type: B&K 4189 **Serial No:** 2983733

Preamplifier Type: B&K ZC0032 **Serial No:** 22666

Filter Type: 1/3 Octave **Serial No:** 3008201

Comments: All tests passed for class 1.
(See over for details)

Owner: EMM Consulting
Ground Floor, Suite 01, 20 Chandos St
St Leonards NSW 2065

Ambient Pressure: 1002 hPa ± 1.5 hPa

Temperature: 23 °C $\pm 2^\circ$ C **Relative Humidity:** 29% $\pm 5\%$

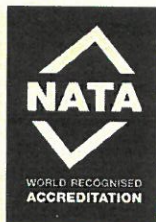
Date of Calibration: 21/08/2019 **Issue Date:** 21/08/2019

Acu-Vib Test Procedure: AVP10 (SLM) & AVP06 (Filters)

CHECKED BY: *LAB*

AUTHORISED SIGNATURE: *Hein Soc*

Accredited for compliance with ISO/IEC 17025 - Calibration
The results of the tests, calibration and/or measurements included in this document are traceable to
Australian/national standards.



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Accredited Lab. No. 9262
Acoustic and Vibration
Measurements

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AVCERT10 Rev. 1.3 15.05.18

CERTIFICATE OF CALIBRATION

CERTIFICATE NO: 24147

EQUIPMENT TESTED: Sound Level Calibrator

Manufacturer: Rion
Type No: NC-74 Serial No: 34372752
Owner: EMM Consulting
20 Chandos Street
St Leonards NSW 2065

Tests Performed: Measured output pressure level was found to be:

Parameter	Pre-Adj	Adj Y/N	Output: (db re 20 μ Pa)	Frequency: (Hz)	THD&N (%)
Level 1:	NA	N	94.10	1002.70	2.24
Level 2:	NA	N	NA	NA	NA
Uncertainty:			± 0.11 dB	$\pm 0.05\%$	$\pm 0.20\%$
Uncertainty (at 95% c.i.) k=2					

CONDITION OF TEST:

Ambient Pressure: 991 hPa ± 1.5 hPa Relative Humidity: 45% $\pm 5\%$

Temperature: 23 $^{\circ}$ C $\pm 2^{\circ}$ C

Date of Calibration: 13/02/2019

Issue Date: 13/02/2019

Acu-Vib Test Procedure: AVP02 (Calibrators)

Test Method: AS IEC 60942 - 2017

CHECKED BY: *[Signature]* AUTHORISED SIGNATURE: *[Signature]*

Jack Kiehl

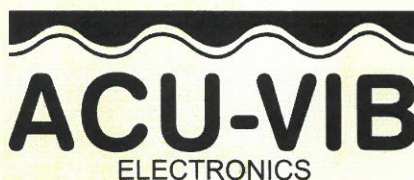
Accredited for compliance with ISO/IEC 17025 - Calibration

The results of the tests, calibration and/or measurements included in this document are traceable to Australian/national standards.

The uncertainties quoted are calculated in accordance with the methods of the ISO Guide to the Uncertainty of Measurement and quoted at a coverage factor of 2 with a confidence interval of approximately 95%.



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