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Re: White Bay 6 - Operational noise compliance assessment, 2018

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 18 January 2018 and the results, findings and discussions of the compliance noise assessment.

The following material was referenced as part of this assessment:

- Minister's Condition of Approval (MP 06_0037) (MCoA); and
- NSW Environmental Protection Authority's (EPA) 2017 *NSW Noise Policy for Industry* (NPI)

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 four times to date. The site is currently operating under restrictions during day, evening and night periods. Condition A7 of the MCoA summarises time restrictions that apply at the site.

Condition A7 - Hours of Operation

Activity	***Day***	***Time***
Mixed marine tenancies and commercial storage & work sheds & dry boat storage use	*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*

Condition A7 - Hours of Operation

Activity	***Day***	***Time***
*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 sites 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**
Datchett St, Balmain	*49*	*44*	*44*	*41*	*54**
33 Adolphus St, Balmain	*36*	*35*	*35*	*35*	*60**
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:

i. *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;*
ii. *Evening is defined as the period from 6.00 pm to 10.00 pm; and*
iii. *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

(1) *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.*
(2) *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.*

(3) 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).
(4) The modification factors presented in section 4 of the NSW Industrial Noise Policy shall also be applied to the measured noise levels where practicable.
(5) 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 18 January 2017 to quantify noise emissions from the site during the day period. Measurements were not taken directly at noise sensitive receivers because it was found that existing ambient noise levels were generally too high to determine a noise contribution from the site. Measurements were 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 Figure 1 as 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) 2017 *NSW Noise Policy for Industry* (NPI) 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), measurements at intermediate locations between the source and the receiver location, where signal-to-noise ratios are higher, may be a viable option."

The contribution of the site can then be calculated at the receiver by accounting for attenuation losses by distance and/or acoustically significant topographical features.

The attended noise monitoring was carried out using a SVAN 979 Type 1 integrating sound level meter (serial number 21095). The unit carries current manufacturer conformance certificates and complies with *Australian Standard AS 2659.1 - 1998: Guide to the use of sound measuring equipment - Portable sound level meters*. The sound level meter was calibrated in the field prior to and following the noise measurements. All measurements were taken in accordance with AS 1055.1-1997 Acoustics - *Description and measurement of environmental noise - General procedures*.

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 and building structures.

4 Noise measurements

Short-term 15-minute attended noise measurements were conducted on 18 January 2018 at the site boundaries as shown in Figure 1.

The noise measurements were conducted in accordance with NPI requirements. The weather conditions at the time of monitoring were clear with calm to light winds (<3m/s).

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

- two boat hoists;
- two marina bulls;
- one 3.5 tonne forklift;
- one compressor in shed;
- one gerni; and
- one compressor and fuel pumps.

Table 1 summarises the attended noise measurements.

EMM

Site locality and noise monitoring locations

White Bay 6

Operational noise compliance assessment

Figure 1

Table 1 Attended noise measurements – 18 January 2018

ID	Location (Refer Figure 1)	Time[1]	Noise measurement, dB			Comments/noise source observations
			L_{Aeq}	L_{A90}	L_{Amax}	
1	South east boundary of site	10:39	57	55	70	Forklift operating (55 dB idling, 58 dB raising/lowering forks, 58 dB traversing). Boat hoist operating (56 dB idling, 58 dB traversing 65 dB raising/lowering hoist). Water traffic and low rumble of passenger ship faintly audible. Hand tools from site audible on occasion.
2	North east boundary of site	10:17	61	54	70	Forklift operating near point 2 (61 dB idling, 64 dB raising/lowering forks, 67 dB traversing). Boat hoist operating near point 2 (54 dB idling, 61 dB traversing, 68 dB raising/lowering hoist). Cicadas, water traffic and Barangaroo construction faintly audible. Hand tools from site audible on occasion.
3	North west boundary of site	9:50	52	48	70	Compressor and power tools (51 – 53 dB). Idling forklift (50 dB) Hand tools from nearest workshop (55 – 60 dB). More distant hand tools also audible on occasion. Boat hoist raising/lowering (52 dB). Occasional car Pass-bys (69 dB). Cicadas audible.

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

5 Noise compliance assessment

Table 2 summarises the predicted site noise contributions at the noise sensitive receivers based on measured noise levels in Table 1. The total noise levels presented in Table 1 are assumed to be generated by White Bay 6. This is a conservative assumption given that other extraneous noise sources (e.g., cicadas) were also observed during the noise measurements. At all receivers, the predicted noise levels satisfy the limits specified in the MCoA.

Table 2 Noise compliance assessment

Location	Criteria					Predicted noise levels, dB[1]					Compliance		
	Day	Evening	Night			Day[2]	Evening	Night			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 St, Balmain	54	48	48	45	59	50	<25	<25	<25	<25	Yes	Yes	Yes/Yes/Yes
Datchett St, Balmain	49	44	44	41	54	44	<25	<25	<25	<25	Yes	Yes	Yes/Yes/Yes
33 Adolphus St, Balmain	36	35	35	35	60	<36	<25	<25	<25	<25	Yes	Yes	Yes/Yes/Yes
2 Point St, Pyrmont	40	35	35	35	61	<40	<25	<25	<25	<25	Yes	Yes	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 1.

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 NSW Environmental Protection Authority's (EPA) 2017 *NSW Noise Policy for Industry* (NPI).

Section 7.1 of the NPI 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), measurements at intermediate locations between the source and the receiver location, where signal-to-noise ratios are higher, may be a viable option. This method has been adopted to predict the site noise contribution at residential locations listed in the MCoA.

The predicted site noise contributions 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,

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Reviewed by: DW

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

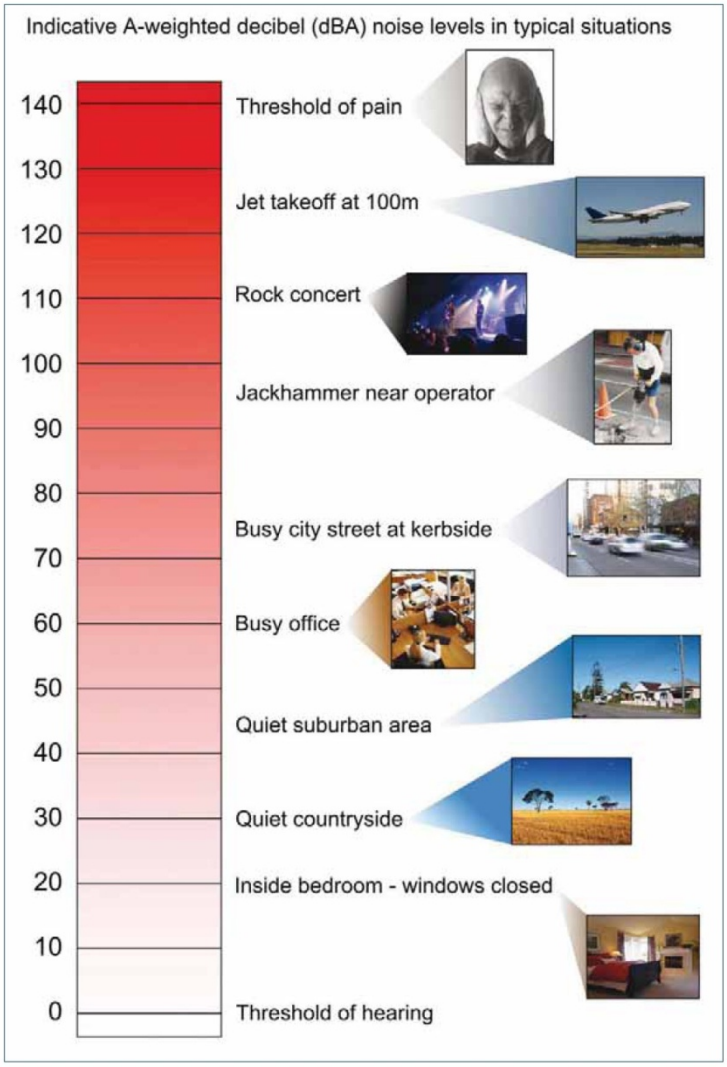
Term	Description
dB(A)	Noise is measured in units called decibels (dB). There are several scales for describing noise, the most common being the 'A-weighted' scale. This attempts to closely approximate the frequency response of the human ear.
L_{90}	Commonly referred to as the background noise level. The noise level exceeded 90% of the time.
L_{eq}	The energy average noise from a source. This is the equivalent continuous sound pressure level over a given period. The $L_{eq(15min)}$ descriptor refers to an L_{eq} noise level measured over a 15 minute period.
L_{max}	The maximum root mean squared sound pressure level received during a measuring interval.

It is useful to have an appreciation of decibels, the unit of noise measurement. Table A.2 gives an indication as to what an average person perceives about changes in noise levels:

Table A.2 Perceived change in noise

Change in sound level (dB)	Perceived change in noise
0-2	Typically indiscernible
3	just perceptible
5	noticeable difference
10	twice (or half) as loud
15	large change
20	four times as loud (or quarter) as loud

Examples of common noise levels are provided in Figure A.1.



Source : RNP (Department of Environment, Climate Change and Water (DECCW), 2011)

Figure A.1 Common noise levels