

# Malcolm Hunt Associates



Memo To: Max Dunn  
Principal Planning and Policy Consultant  
4Sight  
Max Dunn <maxd@4sight.co.nz>

From: Malcolm Hunt, Malcolm Hunt Associates

Date: 27 November 2017

Re; *EPL Wharf 6/7 Resource Consent - Response to GDC's s.92 Noise Questions*

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Dear Max

On behalf of Eastland Port Limited, Malcolm Hunt Associates prepared the Noise AEE report for Wharf 6 /7 Upgrades entitled "*Assessment of Environmental Noise and Vibration Effects - Wharf 6 & 7 Redevelopment, Eastland Port*" dated October 2017 Reference: 974-12/004/10. In this letter we are responding to noise matters raised regarding this report by Gisborne District Council in a s.92 request for further information dated 10 November 2017 (ref. LU-2017-107936-00/CD-2017-107937-00/LL-2017-107938-00). The requested information is set out under the following headings:

## **Section 8.5**

Section 8.5 of the Noise AEE sets out information and analysis to assess whether the proposed works would have the result of increasing the port handling capacity and if so, whether operational port noise emission levels would comply with noise Standards set out in Part C of the Tairāwhiti Resource Management Plan (TRMP)<sup>1</sup>. The assessment is based on the expected limited additional use of Wharf 7 for log handling. To clarify, the assumed growth in log vessels using the port has been taken into account by predicting additional noise associated with approximately 25%, or 80 extra log ships/year that would use Wharf 7, above the ships currently utilising the wharf<sup>2</sup>. The Noise AEE report erroneously refers to current port traffic at 230 log vessels/year. In fact this figure represents the port company's expected growth above the current level of 150 vessels per year. Further detail is provided below on how additional noise from increased utilisation of Wharf 7 has been modelled.

Although the proposed works will enable more efficient use of the wharves for log handling, we understand additional dredging in front of Wharf 7 will be necessary for this extra usage to occur with consent for this dredging not being sought at this stage. We understand a separate Resource Consent application will be lodged for this dredging when required.

As further background to Section 8.5, the port company are planning to prepare a plan change to revise the port noise provisions of the TRMP owing to several inconsistencies and issues with the rules as currently drafted. It would seem more appropriate to consider the issue of port noise predictions in detail at the time this plan change is applied for. However, we set out below the basis of our predictions and the requested additional information.

The requested information regarding sound power levels and their locations are set out below. The sound power levels are listed in the attached table with the locations of these noise sources shown in the Figure 1. The sound power levels are based on field measurements of actual equipment operating in and around the port during 'essential port activity' adjusted to take account of increased port activity.

Sound level predictions were conducted using a computer-based prediction program developed by Malcolm Hunt Associates which has as its base the algorithms set out within ISO 9613-2 *Acoustics — Attenuation of sound during propagation outdoors — Part 2: General method of calculation*. This method for calculating the attenuation of sound during propagation outdoors predicts levels of environmental noise at a distance from a variety of sources in terms of the equivalent continuous A-weighted sound pressure level (LAeq). The following information describes the main attributes of the prediction method;

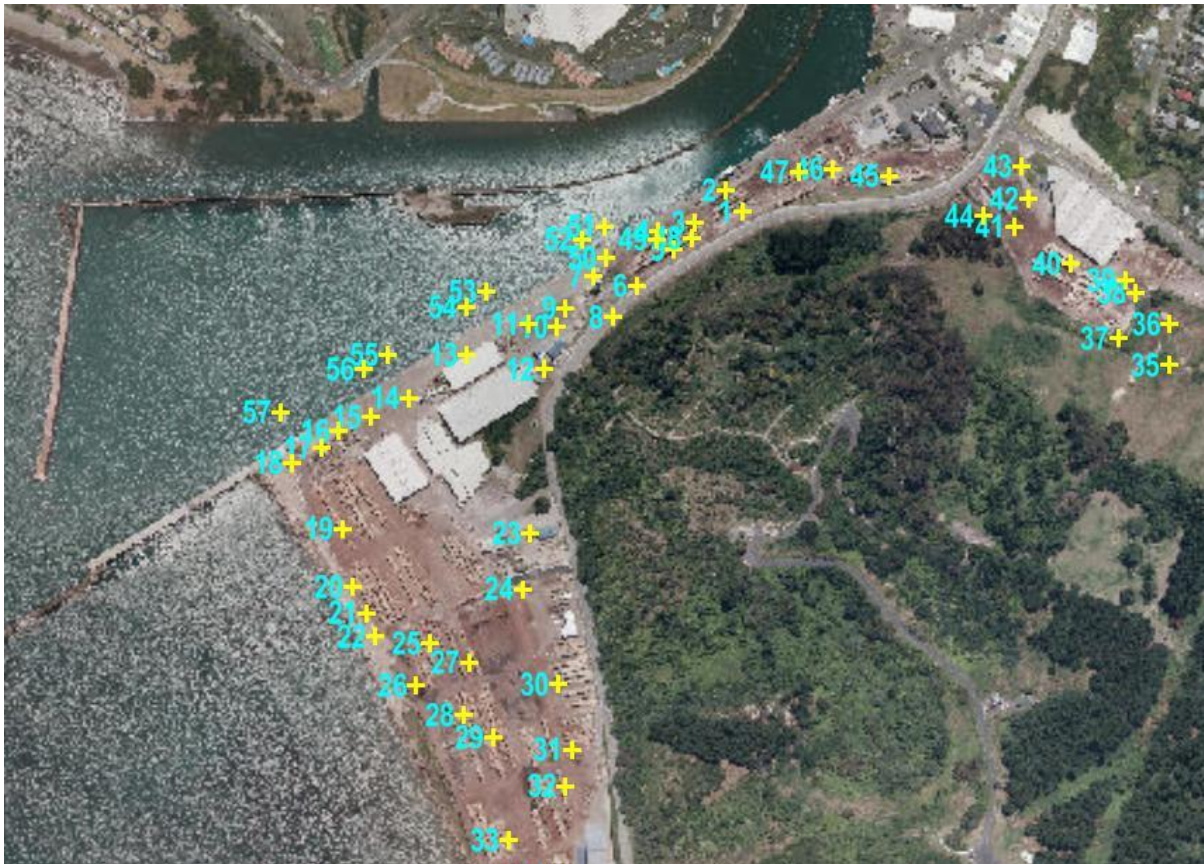
- a) The prediction method utilises various input variables including octave band sound power levels at source, air absorption values based on temperature and humidity. Sound power data used within the model are the sound power levels presented in Table 1 (attached).

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<sup>1</sup> Rule C11.2.15.1 G(1)(c) requires non-essential port activities conducted in the Port Management zones to comply with the specific long term and short term noise limits specified in C11.2.15.1.

<sup>2</sup> See Section 1.1 of the Worley Parsons engineering report Ref. 301015-03380-MA-REP-005.

- b) The predictions were designed to conform with the recommendations of NZS6801:2008 *Acoustics – Measurement of Environmental Sound* which states, at clause 7.1.2, that slightly enhanced sound propagation conditions should be adopted for predictions of environmental sound. The ISO9613-Part 2 method predicts sound levels under meteorological conditions favourable to propagation of sound (such as light downwind conditions or under mild temperature inversions).



**Figure 1** Numbered locations of sound sources used in modelling of increased log handling at Eastland Port.

- c) Sound attenuation due to acoustic screening has been taken into account by use of a digital terrain model sourced from Council's LIDAR data for the area. Where screening occurs (i.e. there is no line of sight between the source and the receiving position) acoustic screening values are included in the calculation based on noise screening principles of Maekawa<sup>3</sup>.
- d) No acoustic screening effects have been included caused by vessels at berth which do form an effective shielding for log handling activities taking place close to the vessel for noise received at sites located to the south of the port, across the Turanganui River. This is likely to have caused an over-estimate of received noise received in this area.

In closing on the topic of noise modelling, compliance under a scenario of future more intensive use of the port (should this occur as a result of the proposed works) is confirmed by examining the results of recent monitoring during a relatively intensive period of log loading (section 5.4 of the Noise AEE). The measured Ldn values at the selected site (which includes a contribution from extraneous sources) are at least 3 dB below the allowable limit at the port noise boundary. This means the current levels of activity could increase by 100% and still marginally comply with port noise boundary located on land outside the port area.

Our response to the remaining s.92 requested information is set out under the following headings:

***How the modelling has accounted for increased sound from larger vessels that may use the port?***

The advice received from the port company and their advisors (WorleyParsons) is that the works at Wharves 6 / 7 may enable 'Handymax' sized vessels to use the port in the future, however this is only once additional consents are obtained for further dredging in the port basin. It is therefore not likely that the current consent will lead directly to larger ships using the port.

<sup>3</sup> Z.Maekawa, *Noise reduction by screens*, Applied Acoustics, 1 (1968), p.157.

Should these additional works be approved and carried out, Handymax sized vessels may visit the port<sup>4</sup>. These vessels are up to 40,00 to 50,000 tonnes, and up to 200 metres in length. Currently vessels using the port are between 20,000 and 30,000 tonnes and 180 metres in length. It is likely that the larger Handymax sized vessels will result in an increased loading period (say 3.0 days instead of the typical 2.5 days in port). Such an increase in activity has already been modelled in the information set out within Section 8.5 of the Noise AEE report.

***Why are the 65 and 55 dB Ldn contours are unusually close together in some areas?***

As above, the predictions have been based on detailed LIDAR terrain data. The screening effects of buildings have not been included. This is very detailed information. This is the likely reason for the Ldn contours to be bunched closely together in some areas. For example, the terrain data has picked up the acoustic screening effect of the 1.2 m high existing Training Wall separating the river from the port basin. We adopted a receiver height of 1 metre which may have had the unintended consequence of exaggerating terrain screening effects. Nevertheless, we are of the view the forecast 5 day Ldn contours depicted in Figure 8 are sufficiently robust to demonstrate that the increased use of the port (should this occur) will not be likely to cause an exceedance of the noise limits applying to essential or non-essential port activities on any site beyond the port itself.

***Predicted sound levels for higher future utilisation of wharf 7?***

As described within Section 8.5 of the Noise AEE, the predictions for future 5 day Ldn values provided Figure 8 of the report have incorporated the acoustic effect of increased usage of Wharf 7 by assuming an additional 25% activity for all LAeq sound sources associated with loading log vessels. This has included increasing the utilisation of wharftside log handling sources and the sources operating at the logyards located within the port management areas. All LAeq sound power values were increased above their current 75% utilisation so that 100% utilisation was assumed within the modelling. As this includes the log handling also taking place at Wharf 8, this is an over estimate of the likely effect. No increase in predicted LAFMax levels are expected to result from the increased utilisation of Wharf 7.

***What are the sources of the 50 Hz tone shown in sections 5.1 and 5.3 of the Port Noise Monitoring Report?***

The elevated levels measured in the 50Hz third octave band were most likely due to the Crawford Road substation (Section 5.1) and the local street lighting close to the measurement location (Section 5.3). None of the port noise sources were assessed as containing any noticeable tones.

Section 7.4 of the Noise AEE report sets out confirmation that none of the 50Hz tones detected were subjectively assessed in the field as being tonal. A comparison of the measured third octave band sound levels with the 'trigger' levels for tonal assessment set out within Table A1 at Clause A6.2 of NZS6809:1999 indicates no correction for tonality would be warranted. On this basis no recordings made to enable the tonal audibility of these tones be determined.

***Comment on the peaks shown in the graph of measured sound levels in Section 5.4 towards the end of the measurement period and the potential for the 60 dB short-term noise limit to be exceeded?***

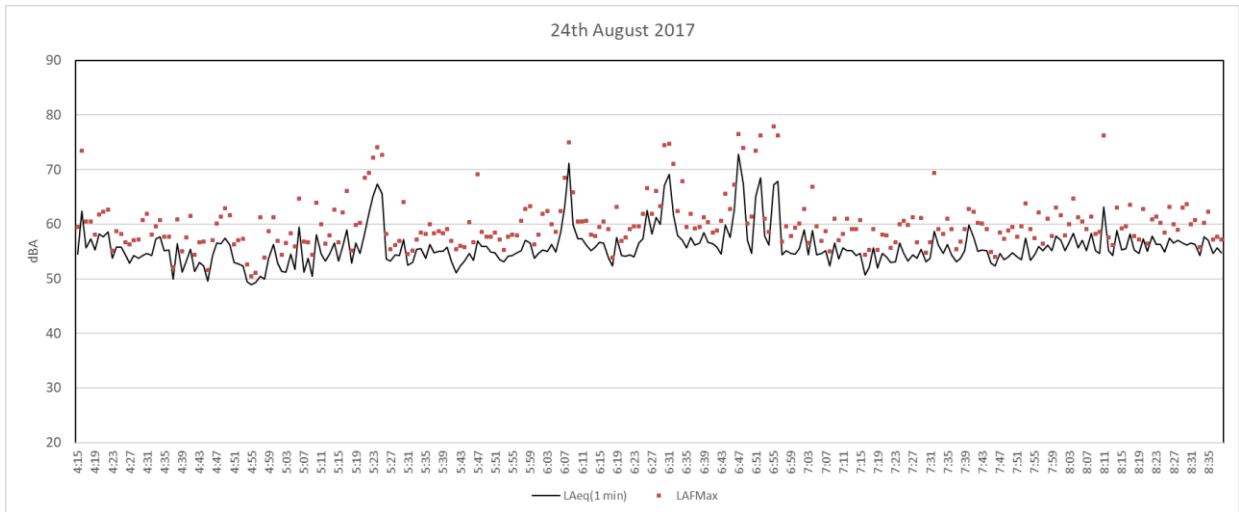
The measured LAeq(15 min) sound levels for the relevant time period are:

<u>Time</u>	<u>LAeq(15min)</u> <u>dB</u>
5:30	60.8
5:45	54.3
6:00	55.1
6:15	61.5
6:30	59.5
6:45	60.4
7:00	65.3

We are unable to comment on the reasons for the exceedances over 60 dB via direct observations at the time as the measurements were unattended at that time (measurements were taken by an automated logger). We have been able to reproduce the data for the relevant time period in minute x minute format in Figure 2 in the interests of providing more detail.

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<sup>4</sup> This is by no means certain as vessels exporting logs experience constraints in size and draft at other NZ ports. Possible expansion at Gisborne will not necessarily result in larger vessels visiting the port regularly or frequently.



**Figure 2** Detailed minute x minute measured LAeq and LAFMax sound levels for the morning of 24 August, as per Section 5.4 of the Noise AEE.

Figure 2 shows the elevated noise levels are present over short time periods of 1 to 2 minutes which occur intermittently between 5.30am and 7am.

We have enquired with the hotel management who have not been able to shed any light on this. As can be seen by the sound levels shown in Section 5.4 of the report, we consider the elevated sound levels are out of place compared to longitudinal noise profile exhibited by the essential or non-essential port activities taking place over the three preceding days (during which more or less continuous log loading activities took place).

We consider the most likely cause was localised sound due to non-port related source. Most likely these extraneous sounds are due to vehicle movements within the hotel car park, close to the monitoring location. A public walkway also passes near the location where the logger was positioned. Ideally these events should have been excluded from the graph, however the monitoring results shown in Section 5.4 include all port and non-port noise occurring in the area and some 'contamination' by extraneous sources at times is not unexpected.

Please do not hesitate to contact the writer should any further information be required.

Regards,

**Malcolm Hunt** B.Sc., M.E.(mech), Dip Noise Control

TABLE 1: Sound Power Levels Employed In Modelling Future Port Noise

Source No.	Easting	Northing	Sound Power (dBA)
1	2947330	6268938	99
2	2947313	6268960	99
3	2947281	6268926	99
4	2947243	6268917	99
5	2947259	6268898	99
6	2947220	6268860	99
7	2947174	6268870	99
8	2947195	6268827	99
9	2947146	6268837	99
10	2947137	6268817	99
11	2947107	6268820	99
12	2947123	6268773	99
13	2947043	6268788	99
14	2946982	6268743	99
15	2946942	6268723	99
16	2946909	6268708	99
17	2946891	6268691	99
18	2946860	6268675	99
19	2946913	6268606	99
20	2946923	6268545	99
21	2946938	6268518	99
22	2946947	6268493	99
23	2947109	6268601	99
24	2947101	6268543	99
25	2947004	6268486	99
26	2946990	6268442	99
27	2947045	6268466	99
28	2947039	6268411	99
29	2947070	6268388	99
30	2947138	6268443	99
31	2947152	6268375	99
32	2947146	6268337	99
33	2947086	6268280	99
34	2947135	6268240	99
35	2947776	6268777	94
36	2947777	6268820	94
37	2947723	6268805	94
38	2947741	6268853	94
39	2947730	6268866	94
40	2947673	6268883	94
41	2947614	6268922	94
42	2947629	6268951	94
43	2947622	6268985	94
44	2947582	6268933	94
45	2947483	6268975	94
46	2947425	6268982	94
47	2947389	6268979	94
48	2947277	6268910	94
49	2947241	6268909	94
50	2947188	6268889	94
51	2947187	6268922	115
52	2947163	6268909	115
53	2947063	6268854	115
54	2947042	6268838	115
55	2946960	6268788	115
56	2946935	6268773	115
57	2946848	6268728	115