Tonkin+Taylor

Job No: 84466.005
26 January 2021

Hutt City Council
Private Bag 31-912
Lower Hutt 5040

Attention: Team Leader, Resource Consents

Dear Hutt City Council - Enforcements (c/- Parvati Rotherham)

Noise Monitoring Results 17 December 2020

1 Introduction

This letter report presents the results of recent noise monitoring conducted at Wainuiomata Cleanfill on 17 December 2020. Monitoring is undertaken on a 3-monthly basis to fulfil Condition 16 of Resource Consent RM190050. Noise limits for the cleanfill are contained in Condition 12 and reproduced below:

a Monday to Friday (excluding public holidays) 7.30 am to 5.00 pm – 50 dB LAeq

b Saturday (excluding public holidays) 7.30 am to 12.00 pm – 50 dB LAeq

c All other times - 40 dB LAeq

d 10.00 pm to 7.00 am (all days) – 75 dB LAfmax.

These noise limits apply at the notional boundary of nearby receivers. The relevant noise limit is the time averaged sound level for the operating period, i.e. 9.5 hours on weekdays and 4.5 hours on Saturdays.

This is the third round of noise monitoring undertaken for this resource consent.

2 Survey

The noise monitoring was undertaken on Thursday 17 December over the course of a day. Measurements were taken at three different locations with two measurements made at each location. Measurements were 15 minutes long in accordance with NZS 6801:2008.

Figure 2.1 shows the monitoring locations in relation to the cleanfill site and surrounding area.

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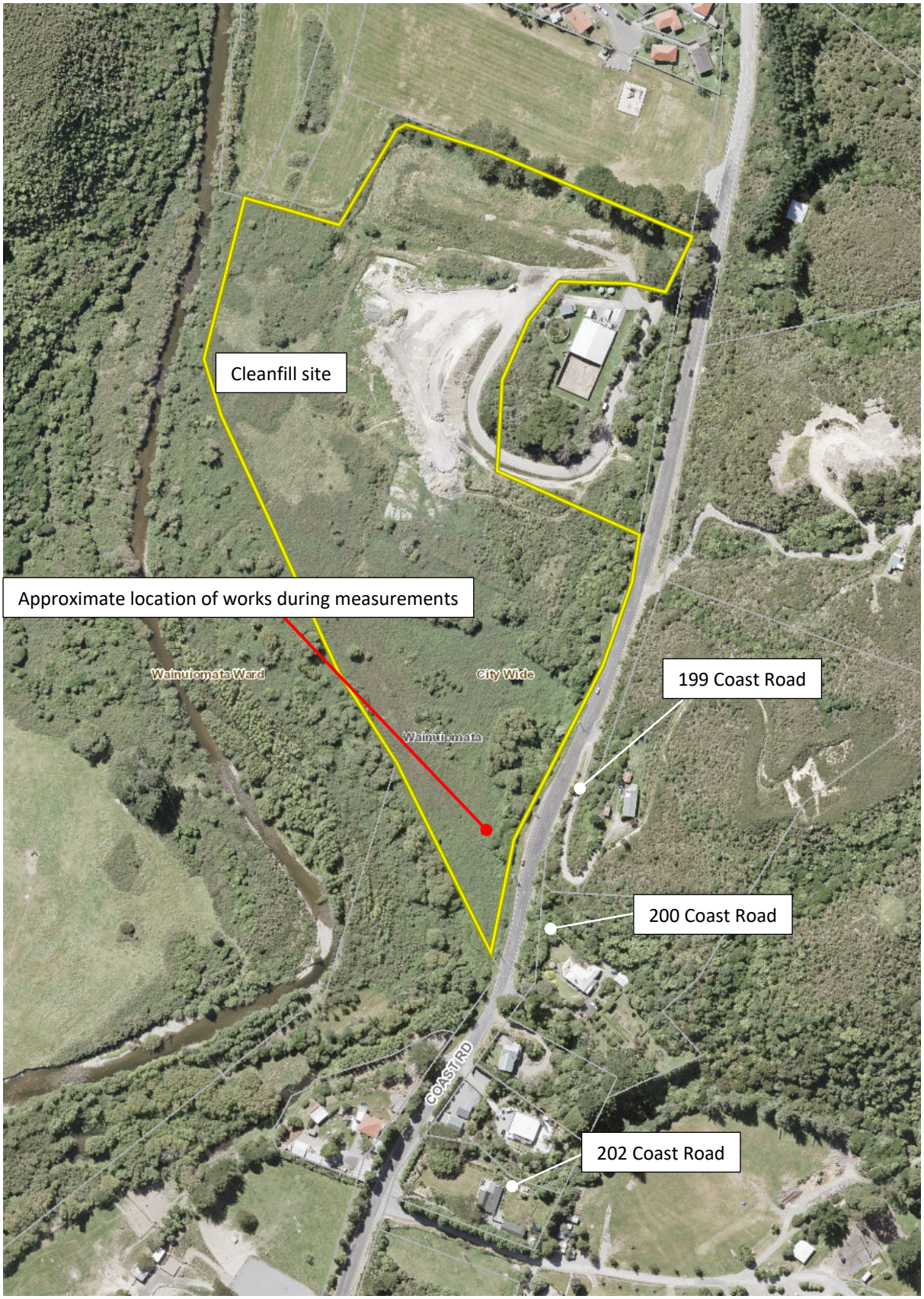

Figure 2.1: Noise monitoring locations

2.1 Meteorological conditions

Meteorological conditions during the survey are shown in **Table 2.1**.

Table 2.1: Meteorological conditions during survey

Wind speed	Up to 25km/h
Cloud cover	Light
Temperature	Up to 18 °C
Precipitation	None

2.2 Monitoring equipment

A 01dB Solo sound level meter was used for the noise survey. It was calibrated before and after measurements and no drift was observed between the calibrations. Measurements were undertaken at 1.5 m above ground level. All measurements were performed in accordance with NZS 6801:2008.

2.3 Monitoring locations

Noise monitoring locations are shown in **Figure 2.1** and listed in **Table 2.2**.

Condition 12 states that the noise limit applies at the notional boundary. For some of the monitoring locations it was not possible to monitor at the notional boundary which is a line 20 m from any side of any dwelling or the legal boundary where this is closer than 20 m.

Noise measurement locations are consistent between each round of noise monitoring and are described below.

Measurements at 199 Coast Road were taken approximately 6 m closer to the cleanfill than the notional boundary. At this property the edge of the notional boundary is on a steep slope covered with vegetation to the point that it is not reasonably accessible. The nearest amenity area to the cleanfill within the notional boundary is approximately 6 m further from cleanfill operations than the measurement location. It was not possible to tell if 199 Coast Road has line of sight from within the amenity area; it is assumed their view is slightly obstructed by light foliage. The distance and obstruction would each have a small contribution to noise reduction, although the noise within amenity areas is not expected to be more than a few decibels less than that measured at the nearer location.

Measurements at 200 Coast Road were taken on the notional boundary.

At 202 Coast Road the measurements were taken further from the cleanfill than the edge of the notional boundary in order to ensure line of sight within the relevant amenity area. Measurements at these two locations will differ little between the measurement point and the notional boundary location. At the distances from the cleanfill a variation of a couple of metres would not make a measurable difference to measurements; any apparent lack of line of sight to the operations is significantly more impactful.

Table 2.2: List of noise monitoring locations

Monitoring location	Description	Comment
199 Coast Road	Entrance to 199 Coast Road	6 m closer to the site than the notional boundary location.
200 Coast Road	Seating area overlooking Coast Road to North West of property boundary	At the notational boundary
202 Coast Road	Within property of 202 Coast Road	On the boundary of the site with direct line of sight to the cleanfill, at a location advised by the residents to be the most exposed and relevant to amenity.

2.4 Site activity

It was established prior to the survey that the site was operating in normal conditions during that week. Site personnel were not notified of the measurements in advance, however due to line-of-sight between the cleanfill and measurement positions they could be aware of any measurements undertaken.

Non-cleanfill related noise was predominantly from vehicles on Coast Road, these noise events were effectively excluded from the measurements in processing. Other sounds including sound from trees in the wind also influenced the measurements at times. These events were excluded where they could be clearly attributed to a non-cleanfill related source.

3 Results

The following definitions in **Table 3.1** may be useful for interpreting the results of the noise level monitoring completed at Wainuiomata Cleanfill.

Table 3.1: Glossary of terms

Term	Definition
dB	Decibel - a unit of measurement on a logarithmic scale which describes the magnitude of sound pressure with respect to a reference value (20 μPa).
$L_{Aeq(t)}$	The A-weighted time-average sound level over a period of time (t), measured in units of decibels (dB).
L_{Amax}	The maximum A-weighted sound pressure level over a period of time or of a particular noise event, measured in units of decibels (dB).
L_{A90}	The A-weighted 90th percentile sound level over a period of time (t), measured in units of decibels (dB). The L_{A90} is indicative of the underlying noise level. For a constant noise source, the $L_{Aeq(t)}$ and the L_{A90} will be similar.
L_{A10}	The maximum A-weighted 10th percentile level over a period of time or of a particular noise event, measured in units of decibels (dB).
Residual noise	The ambient sound remaining when noise from a specific source or sources is supressed.

Noise monitoring data are presented in **Table 3.2** with residual noise emitted from sources other than the cleanfill excluded, this included road traffic and ambient noise from significant wind gusts. Plots of the results from this monitoring period are attached in **Appendix A**.

Table 3.2: Noise monitoring data

Measurement	Time	LAeq(t)	LAmax	LA90	LA10	Cleanfill equipment operating & other sources of sound heard at measurement location
199 Coast Road Measurement 1	10:09 – 10:24	54	61	36	57	Intermittent traffic, bird sound. Front end loader active pushing out dumped material.
199 Coast Road Measurement 2	11:38 – 11:53	49	61	37	53	Dump truck, intermittent traffic, front loader pulling beached truck.
200 Coast Road Measurement 1	10:41 – 10:56	54	80	44	54	Pump truck gravels. Intermittent traffic. Skip tipping and dozer/front end loader pushing out fill.
200 Coast Road measurement 2	12:07 – 12:22	44	53	42	45	Bird noise, intermittent traffic.
202 Coast Road Measurement 1	11:18 – 11:33	48	62	46	48	Bulldozer operational, bird/insect noise, stream noise, dump truck northern end of site.
202 Coast Road Measurement 2	12:29 – 12:44	48	54	46	49	Stream noise in background, truck with skip dumping concrete, bird noise, truck dumping soil, intermittent traffic

4 Results and discussion

4.1 Summary of noise monitoring results

The measured data presented in **Table 3.2** has been analysed taking into account the assessment procedures of NZS 6802:2008, which requires adjustments to be made for the duration of the noise, the applicability of any Special Audible Characteristic and the influence of the residual noise level.

Table B1 in NZS6802:2008 includes an adjustment to account for residual sound. Measurements at 199 Coast Road and measurement 1 at 200 Coast Road are sufficiently above the residual noise level such that no adjustment is required. Measurement 2 at 200 Coast Road and the measurements at 202 Coast Road are less than 3dB above the residual noise level and therefore NZS6802:2008 states that a valid assessment cannot be performed.

Noise from the cleanfill complied with the 50 dB noise limit without adjustment in all three measurements with elevated residual noise.

In 199 Coast Road Measurement 1 the cleanfill was only active for 5 minutes 16 seconds of the 15-minute measurement period and the 54dB(A) sound level is the LAeq over the time when the cleanfill was active. Therefore, the noise contribution from the cleanfill is calculated to be 50 dB(A) over the full 15-minute assessment period.

In all other measurements the cleanfill was either operating for the whole measurement period, or it was unclear if the cleanfill was operating. As a conservative assessment, the cleanfill contribution was therefore considered to be present over the whole 15-minute period, requiring no adjustment.

SAC was deemed not to apply due to the observed infrequency of reversing beepers and tailgate slamming which would require an SAC. A site management approach has been effective in reducing the occurrence of these events and is continuously in action.

Noise from the cleanfill was measured to be 54 dB LAeq in measurement 1 at 200 Coast Road. This included a particularly busy period of the day where there were five trucks dumping and nine minutes of front-end loader use. Based on the operational conditions from the site and observations undertaken during this survey a 4 dB reduction would apply, for works occurring for less than 40% of the consented period. The reduction from duration is prescribed in Table 2 of NZS 6802:2008.

The estimated noise levels from cleanfill deposition activities, as measured in accordance with NZS 6801:2008 and assessed in accordance with NZS 6802:2008, are presented in **Table 4.1**.

Table 4.1: Analysed measurement data

Measurement	Time	LAeq noise rating level post-NZS6802 adjustments
199 Coast Road Measurement 1	10:09 – 10:24	50
199 Coast Road Measurement 2	11:38 – 11:53	49
200 Coast Road Measurement 1	10:41 – 10:56	50
200 Coast Road Measurement 2	12:07 – 12:22	44
202 Coast Road Measurement 1	11:18 – 11:33	48
202 Coast Road Measurement 2	12:29 – 12:44	48

Values rounded to the nearest whole number.

A discussion of each monitoring location is provided below.

4.2 Results at 199 Coast Road

Measurements outside the driveway gate of 199 Coast Road were within the 50 dB LAeq noise limit. These measurements were taken closer to the cleanfill than the edge of the notional boundary where the noise limit applies. This was due to the notional boundary lying on steep terrain with heavy foliage cover and not being able to gain access to the property. Within the notional boundary the noise level would be further reduced.

The analysed LAeq values at 199 Coast Road complied with the 50 dB LAeq noise limit in the resource consent (#RM190050).

4.3 Results at 200 Coast Road

Works were observed to be very close to the South East corner of the site, near to 200 Coast Road, i.e. the closest location to the 200 Coast Road. It was confirmed by the site that within approximately one month, the works will move towards the west and north, away from 200 Coast Road.

The analysed LAeq values at 200 Coast Road exceeded the 50 dB LAeq noise limit in the resource consent (#RM190050) by less than 1 dB.

4.4 Results at 202 Coast Road

The analysed LAeq values at 202 Coast Road complied with the 50 dB LAeq noise limit in the resource consent (#RM190050).

4.5 204 Coast Road

Measurements were not made at 204 Coast Road in this round of monitoring as the measured levels were significantly below the limits in the previous round. While work has extended closer to 204 Coast Road than in September, the difference is more notable at the South-Eastern receivers.

4.6 Comparison to previous measurements

Compared to the results of the September 2020 monitoring, analysed site noise levels are less at 199 Coast Road. Measurements were not made at 200 Coast Road in September.

Use of the bulldozer has been decreased such that it is now used only when the front-end loader is not suitable for performing the task. This is considered to have a notable reduction in the noise from the cleanfill.

At 200 Coast Road measured noise levels were above the consent condition noise limits and as noted above, noise levels will subsequently reduce as works move away from the property. At 199 and 202 Coast Road measured noise levels were within the consent noise limits.

A comparison with the rating levels from the prior round of monitoring is included in Table 4.2 below.

Table 4.2: Comparison with noise rating levels in previous measurement

Measurement	LAeq noise rating level post-NZS6802 adjustments September 2020	LAeq noise rating level post-NZS6802 adjustments December 2020
199 Coast Road Measurement 1	52	50
199 Coast Road Measurement 2	48	49
200 Coast Road Measurement 1	Not measured	50
200 Coast Road Measurement 2	Not measured	44
204 Coast Road Measurement 1	44	Not measured
204 Coast Road Measurement 2	N/A[1]	Not measured
202 Coast Road Measurement 1	43	48
202 Coast Road Measurement 2	43	48

1 – no site activity

5 Conclusion

Monitoring was undertaken at three nearby properties to determine compliance with the 50 dB LAeq noise limit in the resource consent (#RM190050).

At the time of monitoring the tipping edge of the cleanfill was at the South Eastern corner of the site, close to 200 Coast Road and other properties to the south.

Measurements captured a range of cleanfill activities across the three locations including trucks tipping and use of the bulldozer and front-end loader. During the survey use of the bulldozer was minimal, which is in accordance with current site practices. It was determined that no noise sources would warrant the application of a Special Audible Characteristic. Adjustments were made in accordance with NZS6802:2008 regarding duration of activity. Residual noises from other sources can be dominant at times although the noise rating level was not adjusted for the contribution of background noise.

The processed noise rating levels were compliant at 199 and 202 Coast Road, and in one measurement at 200 Coast Road. The other measurement at 200 Coast Road resulted in an exceedance of the 50dB LAeq limit of less than 1dB.

6 Applicability

This report has been prepared for the exclusive use of our client Hutt City Council, with respect to the particular brief given to us and it may not be relied upon in other contexts or for any other purpose, or by any person other than our client, without our prior written agreement.

We understand and agree that this report will be used by Hutt City Council in undertaking its regulatory functions in connection with Wainuiomata Cleanfill site.

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Appendix A: Plot of noise monitoring results

1s logged LAeq noise levels are shown below for each measurement. The blue sections are excluded traffic noise. The red section in 199 Coast Road measurement 1 is cleanfill activity. 202 Coast Road measurement 2 also includes coding for noise from wind and calibration, both of which were excluded from analysis.

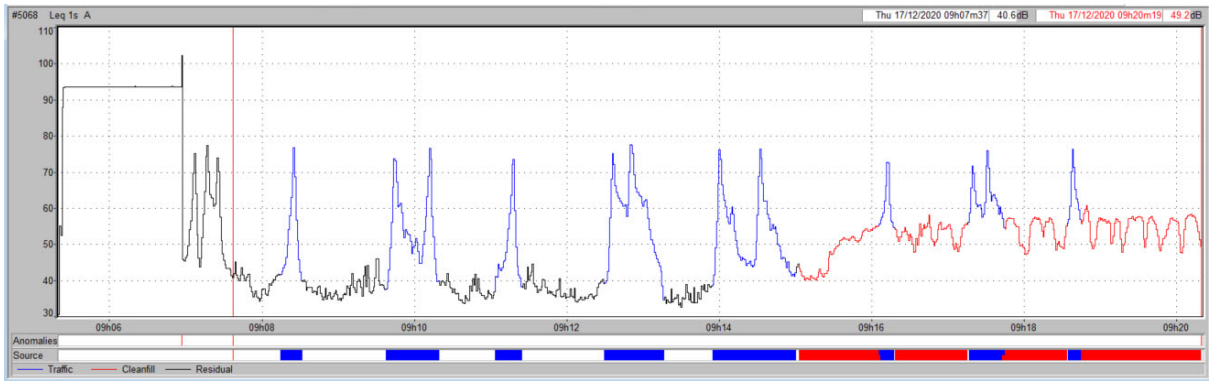

Figure Appendix A.1: 199 Coast Road measurement 1

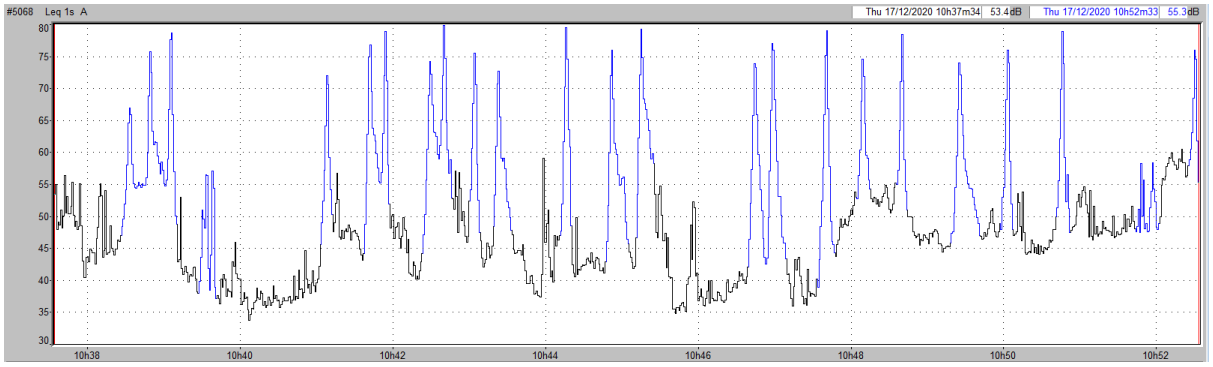

Figure Appendix A.2: 199 Coast Road measurement 2

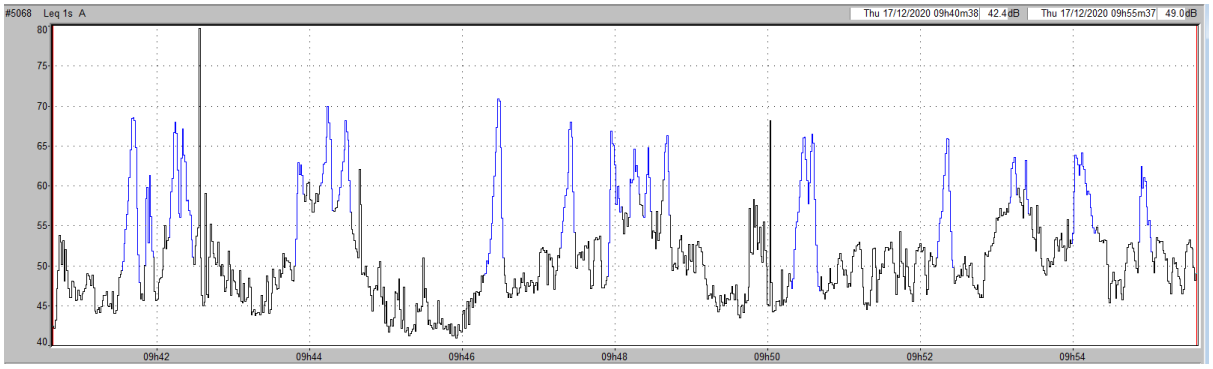

Figure Appendix A.3: 200 Coast Road measurement 1

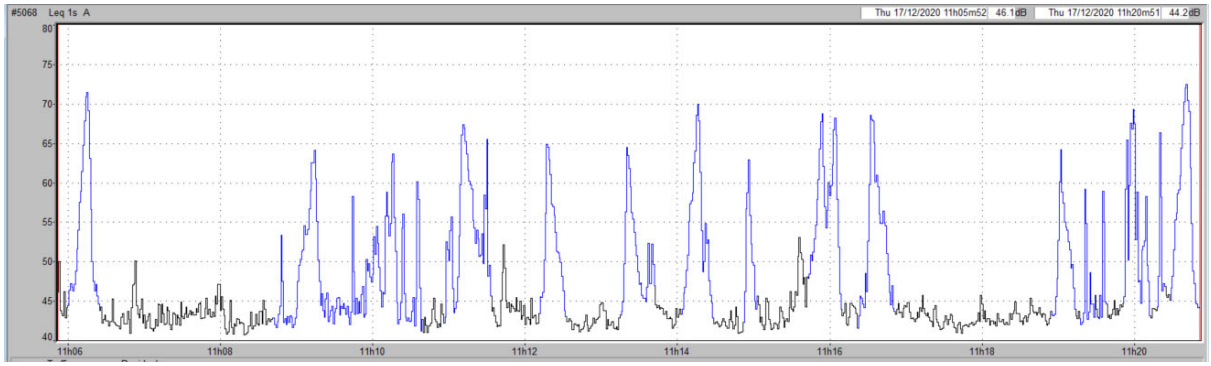

Figure Appendix A.4: 200 Coast Road measurement 2

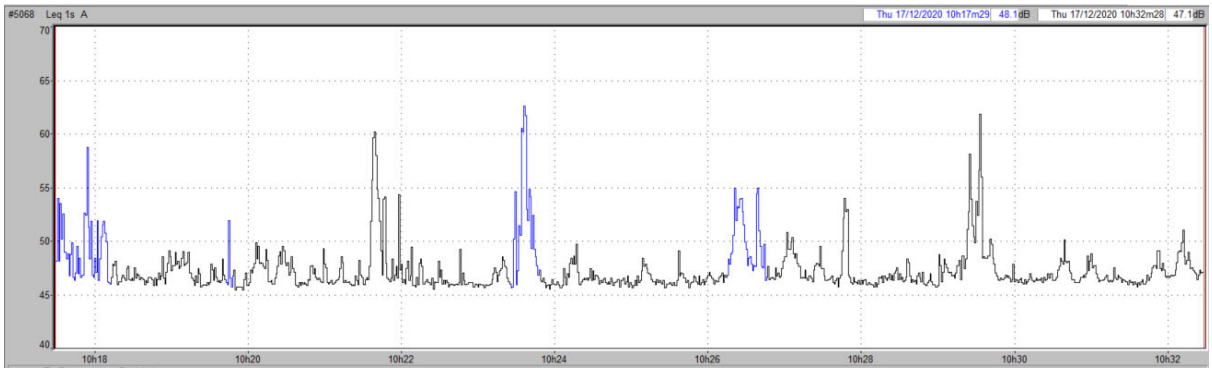

Figure Appendix A.5: 202 Coast Road measurement 1

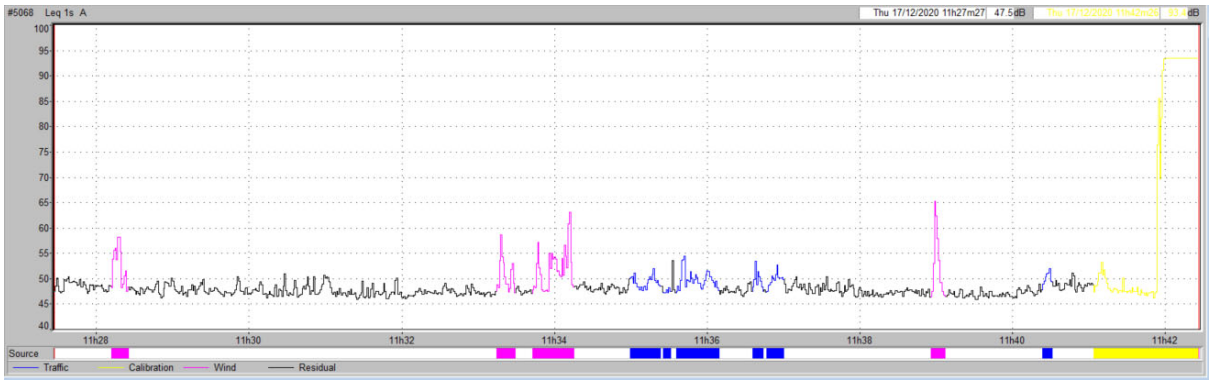

Figure Appendix A.6: 202 Coast Road measurement 2