STATEMENT OF EVIDENCE OF PETER IBBOTSON ON BEHALF OF THE APPLICANT **ACOUSTICS AND VIBRATION**

4 August 2023

1. INTRODUCTION

- 1.1 My full name is Peter Alexander Ibbotson. I am an acoustic consultant at Marshall Day Acoustics. I hold a Bachelor of Mechanical Engineering with Honours from the University of Auckland.
- 1.2 I have been engaged in the field of acoustics for 21 years. I have been employed with Marshall Day Acoustics for the past 18 years. I am a shareholder of the company with responsibility for our Northland operations. Marshall Day Acoustics is a leading international acoustical consultancy with offices in New Zealand, Australia, China, Hong Kong and France.
- 1.3 I have been involved in many environmental sound assessment projects in New Zealand, Australia and the South Pacific. I have appeared as an expert and presented expert evidence in New Zealand at council resource consent hearings and Environment Court hearings, and in Supreme Court hearings overseas.
- 1.4 I have provided advice on policy for private plan changes and appeals. Most recently, I was involved with the Marsden City PC150 plan change and the Dargaville Racecourse PC81 Plan Change. I assisted my colleagues with the large Sleepyhead development in the Waikato. I provide expert advice to District Councils on District Plan noise and vibration reviews: most recently to the Far North District Council (as part of their District Plan revisions) and previously to the Whangārei District Council.
- 1.5 This evidence is in respect of an application by Moonlight Heights for Private Plan Change 82 which proposes to rezone an area of land to Residential.

1.6 My evidence will:

- (a) Summarise my recent involvement with the development of PC82;
- (b) Provide a summary of my analysis of the matter raised in the Section 42A report.
- 1.7 I have read and agree to abide by the Environment Court's Code of Conduct for Expert Witnesses as specified in the Environment Court's Practice Note 2023. This evidence is within my area of expertise, except where I state that I rely upon the evidence of another expert witness as presented to this hearing or a report that formed part of PC82. I have not omitted to consider any material facts known to me that might alter or detract from any opinions expressed. I have no conflict of interest to declare.

2. SCOPE OF EVIDENCE

- 2.1 My evidence relates to the recent matter raised in Sections 206 and 207 of the Section 42A report. The s42A report author (Ms Buckingham) notes that a separation distance of 300 metres is required for noise sensitive activities (including residential) from a building used for an industrial or commercial activity under Rule 13.10.8 of the District Plan. Ms Buckingham states that:
- 2.2 "...I consider that this [300m] rule would adequately address reverse sensitivity effects for the transfer station, however, the rule may be excessive for the circumstances, and cannot be relied upon for the likely life of the development (as the rule is subject to change during the District Plan review). In my view, it would be more certain and preferable to apply a location-specific setback, or impose alternative reverse sensitivity management mechanisms through the precinct provisions. This would be a more efficient and effective way of achieving the precinct objective, which refers to managing reverse sensitivity effects. However, I do not currently have any evidence as to what the setback or provisions should be. The Applicant's comments would be appreciated."
- 2.3 As I will show in my evidence, Ms Buckingham rightly notes that some noise will be generated by the Transfer Station across the adjacent plan change area, and correctly notes that the 300metre rule is an overly conservative way to control this. My evidence provides the information on this matter requested by Ms Buckingham and suggests ways that the effects and be mitigated and reverse sensitivity risks can be managed.

3. INVOLVEMENT WITH PC82

- 3.1 My involvement in PC82 is only recent, as I understand this matter was not raised until the S42A report. I was briefed by Ms McGrath on 17 July 2023. During that week, I was involved in a noise survey campaign at several sites across New Zealand and was unable to provide evidence by 21 July 2023. Since my return, I have been engaged by the applicant and have proceeded with my analysis.
- 3.2 A key matter that the hearing panel should be aware of is that I have not been engaged by Moonlight Heights to visit the site and I have not done so prior to the hearing. Site visits and noise measurements of the actual activity that occurs on-site are important aspects of a robust acoustic analysis and helps to reduce uncertainties. It is my strong preference to visit sites prior to providing any evidence, but in this case the applicant has requested I provide a desktop study only. Even though I have not been engaged to visit the site, I have still decided to give evidence on this matter on the basis that I believe the information I provide will be of assistance to the hearing panel. However, the hearing panel should be aware of this limitation, and should consider my evidence in light of the additional uncertainty that this introduces.
- 3.3 My analysis has been carried out using the following information:
 - (a) Measurements I have carried out at other waste transfer sites. The measurements I have referred to are those I have carried out over the past eight years in Northland. These have included measurements of people disposing of bottles (at two separate sites) and of truck and loader activity moving bottles to and from concrete bunkers and trucks. I have also carried out other measurements, such as of waste truck movements and bin moving activity. I consider the measurements I have used will likely be representative of the actual activity that occurs at the Dargaville Refuse Transfer station. Though, measurements of the actual activity that occurs on-site would of course be preferable.
 - (b) Topographical GIS data sourced from the Northland Regional Council Open Data site.
 This LIDAR contour data provides a high resolution of topography across this site.
 - (c) Property GIS data sourced from LINZ.
 - (d) A telephone discussion with Kaipara Refuse Ltd about the type of activity that occurs at the Dargaville refuse transfer station. I subsequently reviewed publicly available photos and Google street view images to confirm my understanding of the above.

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4. ACTIVITY AT THE REFUSE TRANSFER STATION

- 4.1 From a telephone conversation with Kaipara Refuse Ltd, my understanding of typical activity at the refuse transfer station is as follows:
 - (a) Opening hours are five days a week (9am to 4pm Tuesday to Friday, and 10am to 4pm on Saturday). I understand that there has been some discussion of extending the days the transfer station is open to Sunday and/or Monday in the future.
 - (b) Saturday and Tuesday are the busiest days of activity. There are "regular" customers throughout on a typical busy Saturday between 9am and 4pm.
 - (c) The loudest regular activity is customers throwing or "pouring" bottles in skip bins. This can occur multiple times a day and can happen at any time during the opening hours. These skip bins are housed inside (or near) shipping containers on the southern boundary. Customers also can dispose of non-recyclable rubbish at the site, though anecdotally this does not normally generate significant noise.
 - Skip bins are moved around by forklift or hydraulic excavator when they are full. On busy days this can happen a few times a day, but moving these bins takes a relatively short period of time (perhaps 20 minutes)
 - (e) Skip bins are emptied into the concrete upstands on the southern boundary around two to three times per week. Each event is quite short (both anecdotally and in my experience) normally taking a few minutes to empty a single skip bin. In my experience, this is a noisy, but brief activity.
 - (f) Glass is loaded-out from the concrete upstands into truck and trailer units only once every 3 to 4 months. In my experience this is a noisy activity, taking around an hour to load a road truck and trailer unit (by front end loader, loading by excavator may take longer if the truck is large).
 - (g) Truck movements occur on site. These comprise of daily waste truck movements. Kaipara Waste did not identify these as undertaking any particularly noisy activity when on site, other than typical movements.
 - (h) Baling and retail occurs on site, but these are anecdotally quiet activities.
- 4.2 I reiterate that I have not been to the site to confirm the above. It is possible that a site visit may identify activities that are different or additional to those identified above.

5. NOISE ASSESSMENT CRITERIA

- 5.1 Plan Change 82 proposes to rezone the site from *Rural* to *Residential*. I understand the adjacent Awakino Road Refuse Transfer Station is a designated site with an underlying *Residential Zone*. The relevant designation is *Designation 34 Refuse Disposal Purposes* (Dargaville Landfill).
- 5.2 The refuse transfer station is a designated site and is not subject to the same District Plan obligations as other permitted activities would be in the Residential zone. Nevertheless, the District Plan zone limits form a basis for determining where amenity of the proposed adjacent *Residential* sites may be affected to a greater extent than the District Plan envisages.
- 5.3 The Kaipara District Plan *Residential* zone noise rules apply the following noise limit to activity between 7am and 7pm:

Any activity is permitted if noise from the site does not exceed the following limits, as measured either at or within any other site zoned Residential, or within the notional boundary of a dwelling in a Rural or Maori Purpose Zoned Site:

a) 7:00am – 7:00pm: 50 dB L_{Aeq}

Note 1: Sound levels shall be measured in accordance with NZS 6801:2008 Acoustics – Measurement of Environmental Sound, and assessed in accordance with NZS 6802:2008 Acoustics – Environmental Noise.

- 5.4 Note that the above *Residential* noise limits are the same as those used for activity in the *Rural* zone¹.
- 5.5 The rules are at the lower end of the range of daytime noise limits that are applied in rural and residential zones throughout New Zealand and are at the lower end of the range of annoyance criteria recommended by national and international standards and guidelines².

¹ Noting that some periodic farming and forestry activities are excluded from complying with the *Rural* zone noise rules

² For instance, the 1999 World Health Organization (WHO) Guidelines for Community Noise suggests that few people are moderately annoyed by noise levels of 50 dB $L_{Aeq (16 hour)}$ and few people are seriously annoyed by noise levels of 55 dB $L_{Aeq(16 hour)}$ where noise is received over the daytime and evening.

- 5.6 I have used a daytime noise level **50 dB L**Aeq as the basis for my assessment. I consider that dwellings exposed to refuse transfer station noise levels of less than 50 dB LAeq (as assessed using NZS6802:2008) will result in few people being moderately annoyed by noise. In my view, although noise at 50 dB LAeq or below will likely be audible in this environment³, there does not need to be additional controls on development in those areas.
- 5.7 Dwellings receiving noise levels of between **50 and 55 dB L**_{Aeq} would receive higher levels of noise than the District Plan anticipates in the *Residential* zone, and there may be increased annoyance and some consequential risks to the refuse transfer station. In these areas there may need to be further controls on noise sensitive development to reduce noise effects. However, these effects may not be able to be avoided entirely.
- 5.8 Noise levels of above **55 dB L**_{Aeq} are more likely to be unacceptable to some people. In my view, development where noise levels will be above 55 dB L_{Aeq} is best avoided.

6. NOISE MODELLING

- 6.1 I have prepared a noise model to calculate noise across the proposed Plan Change subject site. The noise model is based on the sound power levels set out in Appendix 1. I have acquired this data at other waste transfer stations in Northland for previous projects.
- 6.2 I have calculated and assessed noise using the method set out in NZS6802:2008. This results in a fairly conservative noise level for this site which potentially overstates the noise level that will typically occur on most days (refer to following sections). The situation I have allowed for would represent a significant growth in day-to-day activity at the refuse transfer station.
- 6.3 The situation I have allowed for is as follows:
 - (a) Customer bottle disposal to skips on the southern boundary. I have allowed for this to occur for up to six hours of the daytime period, which would be a very busy day of activity. I have allowed bottle disposal to occur into skips that are unscreened from the adjacent site by any shipping container or other structure.
 - (b) Glass disposal (tipping) from the skips into the concrete upstand bunkers. I understand this only occurs at the site two to three times per week, however the

³ As discussed, I have not been to site and have not measured ambient or background noise near the site. My comment here is made on the basis that

NZS6802:2008 duration correction provisions do not allow noise to be duration corrected over week-long periods. My calculations of noise effectively allow for glass tipping to occur four times per hour for up to four hours per day (16 times per day). This is very conservative.

- (c) An assumption of four truck movements per hour on up to four hours of the day (16 movements).
- (d) An assumption of 30 passenger vehicles movements per hour on up to seven hours of the day (210 movements).
- 6.4 I have allowed for a special audible characteristics correction (+5 dBA) to be applied to glass bottle disposal and tipping, in accordance with the provisions in NZS 6802:2008. This accounts for the increased annoyance that occurs due to the impulsive nature of the noise.
- 6.5 I have not included noise from glass being loaded-out from the concrete upstands into truck and trailer units. This is a noisy activity, but only occurs once every 3 to 4 months at this site. On these few days, any dwellings within 300 metres of the loading activity would receive rating noise levels of above 50 dB L_{Aeq} if there is no barrier attenuation between the source and receiver (an effective barrier close to the source would reduce this distance to 170 metres). However, as this activity occurs only three or four times per year, I do not consider that this activity should form the main basis for assessment.

7. RESULTS

- 7.1 I have calculated noise across the subject site based on the assumptions discussed above. I have shown this as noise contours in the following figures. I have presented two scenarios:
 - (a) The abovementioned situation, without any noise barrier in place.
 - (b) The abovementioned situation, with a 2.5-metre-high noise barrier along the southern boundary of the transfer station (I have assumed this would be constructed on the subject site). The barrier could be constructed as a bund, barrier or combination of both.
- 7.2 The noise contour plots are shown on the figures overleaf. I discuss the results in the sections following:

Figure 1: Noise Contours – No Bund



Figure 2:- 2.5-metre-high bund along southern boundary



7.3 The calculations show the following results:

"NO BARRIER" SITUATION

(a) Without any noise bund or barrier along the interface between the subject site and the transfer station, dwellings/sites within around 70 metres ⁽⁴⁾ of the glass disposal areas will receive daytime rating noise levels above 50 dB L_{Aeq}. This level of noise will be higher than anticipated by the District Plan for *Residentially* zoned dwellings. Some future residents within this distance would potentially experience "moderate" annoyance, especially if dwellings and site design does not give consideration to the adjacent noise.

Future residents outside around 70 metres distance would receive noise levels that are no higher than expected in the *Residential* zone and in my view do not require further controls.

(b) Without any noise bund or barrier along the interface between the subject site and the transfer station, dwellings/sites within around 35 metres of the southern boundary of the waste transfer station could receive rating noise levels above 55 dB L_{Aeq} over the daytime. This is appreciably higher than anticipated by the District Plan and some future residents within this distance may experience significant annoyance. If a barrier is not constructed, I do not recommend developing land for residential activity within 35 metres of the glass disposal area.

"BUND/BARRIER" SITUATION

- (c) With a 2.5-metre-high noise barrier between the subject site and the refuse transfer station, only dwellings within around 45 metres ⁽⁵⁾ of the glass disposal areas would receive rating noise levels of above 50 dB L_{Aeq}.
- (d) With a 2.5-metre-high noise barrier between the subject site and the refuse transfer station, no dwellings would receive noise levels of above 55 dB L_{Aeq}.

⁴ around 8,000m² of the subject site

⁵ around 3,000m² of the site

7.4 The decision whether to provide for development of land exposed to noise levels of above 50 dB L_{Aeq} needs to be considered by the hearing panel. Land within this zone would be affected by bottle recycling noise and I expect some at least moderate annoyance could result at times especially if dwellings and site design does not give consideration to the adjacent noise. In other areas where land pressures result in dwellings being constructed in noise affected areas (e.g near airports, ports, roads, and rail), it is common to require the sound insulation of dwelling façades to be improved and for air-conditioning and mechanical ventilation to be installed (to ensure that windows can remain closed during periods of noise). However, this does not always avoid the effect of environmental noise on the outdoor area and thus there can still be compromises on amenity.

8. PROPOSED PLANNIG RULES

- 8.1 My advice has formed the basis for the proposed planning rules submitted by Ms McGrath. I understand that the following is proposed:
 - (a) Specific "Noise Areas" near the refuse transfer station will be shown on the precinct planning maps. I attach my mark-up of where I consider these Noise Areas should fall in Appendix 2. These will comprise two alternative scenarios:
 - (i) If a 2.5m noise barrier is constructed along the southern side of the transfer station (on the applicant's land), noise sensitive activities will be a permitted activity *outside* of Noise Area A and a restricted discretionary activity *in* Noise Area A.

Noise Area A marks the extent of the 50 dB L_{Aeq} contour. The controls would therefore not place any restriction on noise sensitive activities exposed to less than 50 dB L_{Aeq} but would allow Council discretion over whether noise sensitive activity should be exposed to noise levels higher than 50 dB L_{Aeq} .

(ii) If no noise barrier is constructed, noise sensitive activities will be a permitted activity if they are *outside* of Noise Area B <u>and</u> Noise Area C. If activities are located *in* Noise Area B, they will be restricted discretionary activities. If activities are located *in* Noise Area C, they will be non-complying activities.

Noise Area C marks the extent of the 55 dB L_{Aeq} contour. If no noise barrier is constructed, I recommend noise sensitive development in this area is avoided.

Ms McGrath has advised me that the non-complying status is appropriate in her view.

Noise Area B marks the extent of the 50 dB L_{Aeq} contour. The controls would not place restriction on noise sensitive activities exposed to less than 50 dB L_{Aeq} but would allow Council discretion over whether noise sensitive activity should be exposed to noise levels higher than 50 dB L_{Aeq}.

- 8.2 The proposed restricted discretionary rule allows Council to consider health and residential amenity, whether the noise sensitive activity could be better located, the risks to the operation of the landfill and any further noise mitigation proposed. An information requirement would mean any application would need to be supported by an acoustic report addressing façade sound insulation measures, any mitigation of noise levels in the outdoor area, and cooling and ventilation methods to ensure doors and windows can remain closed during periods of high noise.
- 8.3 In my view the above seems a reasonable approach of managing noise sensitive activity exposed to between 50 and 55 dB L_{Aeq} of waste transfer station noise without prohibiting it entirely. Noise from glass handling at the waste transfer station is predominantly high frequency and I expect that a well-considered dwelling design, construction and layout will mitigate noise levels inside the dwelling and in outdoor areas that are screened by walls or building structure. These measures (or similar measures) are often used in residentially zoned areas that are subject to higher-than-ideal environmental noise levels. Such approaches are normally considered sufficient to balance the need for land development against amenity and reverse sensitivity risks.

Peter Ibbotson

4 August 2023

APPENDIX 1: SOUND POWER LEVELS

	Octave Band Centre Frequency (Hz)								NZS 6802:2008	
	dB Lwa (15 min)								Corrections	
Source	63	125	250	500	1000	2000	4000	dBA	SAC?	Duration
One person throwing	79	79	76	75	80	84	88	93	+5	-3
bottles continuously										
into a skip										
Truck activity (e.g. hook	113	104	106	102	97	93	89	104	-	-5
truck moving bins)										
Tipping bottles into	104	101	98	97	98	97	98	104	+5	-5
bunkers										
Truck movement*	104	104	105	101	96	92	89	103	-	-5
Passenger vehicles*	82	81	80	80	80	78	78	86	-	-5

* average sound power level during vehicle movement, not over 15 minutes

APPENDIX 2: RECOMMENDED AREAS OF LANDUSE CONTROLS FOR THE EXISTING TRANSFER STATION OPERATION



