GRUNDON, AVONMOUTH

NOISE IMPACT ASSESSMENT REPORT FOR ENVIRONMENTAL PERMITTING

Acoustics Report A2073 R01

8th November 2023

Report to:	Fichtner Consulting Engineers Ltd Attention: James Sturman
Report for:	Grundon Waste Management Ltd Zinc Road, Access 18, Avonmouth, BS11 8AZ
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Summary of Assessment

Ion Acoustics has carried out a noise impact assessment to support the environmental permit application for Grundon's consented Waste Management and Thermal Treatment Facility located at the site of a previously permitted low carbon waste processing facility.

The site is in an industrial area and there are no residential locations within 1000m of the Facility.

An unattended environmental noise survey was undertaken from Wednesday 8th to Friday 11th September 2023 and Wednesday 4th to Friday 6th of October 2023 in order to determine the baseline noise levels at two locations representative of the nearest residential and commercial noise sensitive receptors. The wind speed and direction were also logged during the surveys.

An attended survey was also undertaken on 4th October 2023 in order to measure baseline noise levels at additional commercial locations that were unsuitable for unattended noise monitoring.

Noise limits for the facility have been set on the basis of the new survey, a planning condition and with respect to BS 4142 for the residential locations. The proposed limits are lower than those adopted for the previous permit.

A new computer noise modelling exercise was carried out to predict noise levels from the facility. Using internal sound levels for various parts of the facility provided by the client and the same sound reduction values stated in the previous assessment, breakout sound power levels have been calculated using BS EN ISO 12354-4: 2017. Sound power data for the external sources and the stack were also provided and have been entered into the model.

The results of the assessment show that operational noise levels associated with the Facility will result in a low impact according to BS 4142 for both the daytime and night-time assessment periods. There are therefore no noise issues which would prevent the environmental permit being granted.

1 Introduction

Ion Acoustics is appointed by Grundon Waste Management to carry out a noise impact assessment to support the environmental permit application for a consented thermal treatment and waste processing facility located in an existing industrial building in Avonmouth, Bristol.

An Environmental Permit (EP) was granted by the Environment Agency (EA) to New Earth Energy (West) Operations Limited for the operation of the Avonmouth Energy Facility in January 2013. The EP was subsequently transferred to Avonmouth Bio Power Limited in October 2015. A noise assessment was prepared by Atkins for New Earth Energy as part of the planning and permitting process. This noise assessment and a baseline noise survey is detailed within Chapter 6 of the 2012 Environmental Statement.

Whilst the gasification plant was constructed and commissioned, it did not operate as it was intended. The gasification plant was eventually mothballed by Avonmouth Bio Power Limited in 2016. Grundon Waste Management Limited (Grundon) subsequently acquired the site from Avonmouth Bio Power Limited in February 2021.

Grundon has removed all of the gasification process equipment, including the waste feed and flue gas treatment systems. Grundon is currently installing a new waste incineration combustion technology, and associated waste and flue gas treatment systems to process a mix of non-hazardous, clinical and hazardous wastes which require high temperature incineration, herein referred to as the Facility.

Within this application, Grundon is applying for a Variation to the EP to allow for the high temperature incineration of hazardous and non-hazardous wastes. Planning consent was awarded for the Facility in December 2022 subject to various conditions including noise limits.

Irrespective of the planning consent, as part of the environmental permitting process for the new use, a noise impact assessment is required for submission to the Environment Agency.

This is provided herein and this report details:

- Details of a new noise survey and establish the existing background noise levels at the identified noise sensitive receptors.
- Predictions of the noise levels from the Facility using a computer modelling programme "IMMI"
- A comparison of the predicted noise levels with the measured baseline in accordance with BS 4142 to demonstrate that there are no likely adverse impacts.

The report has been prepared by Gavin Irvine and Janec Lillis-James of Ion Acoustics. Both authors have visited site and carried out noise surveys for this report. Gavin Irvine has a degree in Engineering Acoustics and Vibration from the University of Southampton. Janec Lillis-James has an MSc in Environmental and Architectural Acoustics from London South Bank University.

2 Project Details and Scheme Description

2.1 Description of Site

The site is located on Zinc Road, Avonmouth, BS11 8AZ, and is located within the industrial area of Avonmouth, behind the ASDA Retail Distribution Centre, accessed off Kings Weston Lane. Junction 18/18A of the M5 motorway is approximately 1400m to the south-east. The M4/M5 interchange is approximately 10 km miles to the north-east. Avonmouth Docks are within 1 km of the site and Bristol City Centre is 10 km to the south-east via the A4 Portway.

The site layout is shown in Figure 1. There are no residential receptor locations in the immediate vicinity. The nearest residential locations are houses on St Andrews Road in Avonmouth. These are approximately 1km from the site. The St Anthony's Park Travellers' Site is some 1300m to the south-east close to the M5 / M49 interchange (Junction 18A).

Figure 1: Site Location © Google

2.2 Process Description

The Stationary Technical Unit (the Facility) includes waste reception and preparation; waste storage; water, fuel oil and air supply systems; a rotary kiln combustion system including steam boiler; facilities for the treatment of exhaust gases; on-site facilities for treatment or storage of residues and wastewater; stack; and devices and systems for controlling the combustion process and monitoring emissions. A detailed description of the waste incineration process is provided in section 2 of the Supporting Information.

2.3 Summary of Noise Sources

Based on the proposed development and the description of the process the following noise generating areas/noise sources are identified:

- Waste Reception Area
- Boiler Hall
- Flue Gas Treatment Hall
- Turbine Hall
- New ACCs
- 36.5 m Stack
- Vehicle movements arriving and departing from site.

Detailed noise data associated with the proposed noise sources is provided in Section 5.

2.4 Assessment Locations

There are no residential receptors within study area of 1km. However, housing on St Andrews Road has been identified at just over 1km and there are further commercial receptors (offices) which are sensitive to daytime noise although most of these are already in noisy locations. Figure 2 below presents the following elements:

- The main Noise Sources Across the Site (1, 2, 3 etc)
- Identified Noise Sensitive Receptors (NSR1, NSR2 etc)
- The Proposed Site Boundary (Red Line)
- Noise Monitoring Locations MP1, MP2 etc

A detailed description of all these elements is provided below:

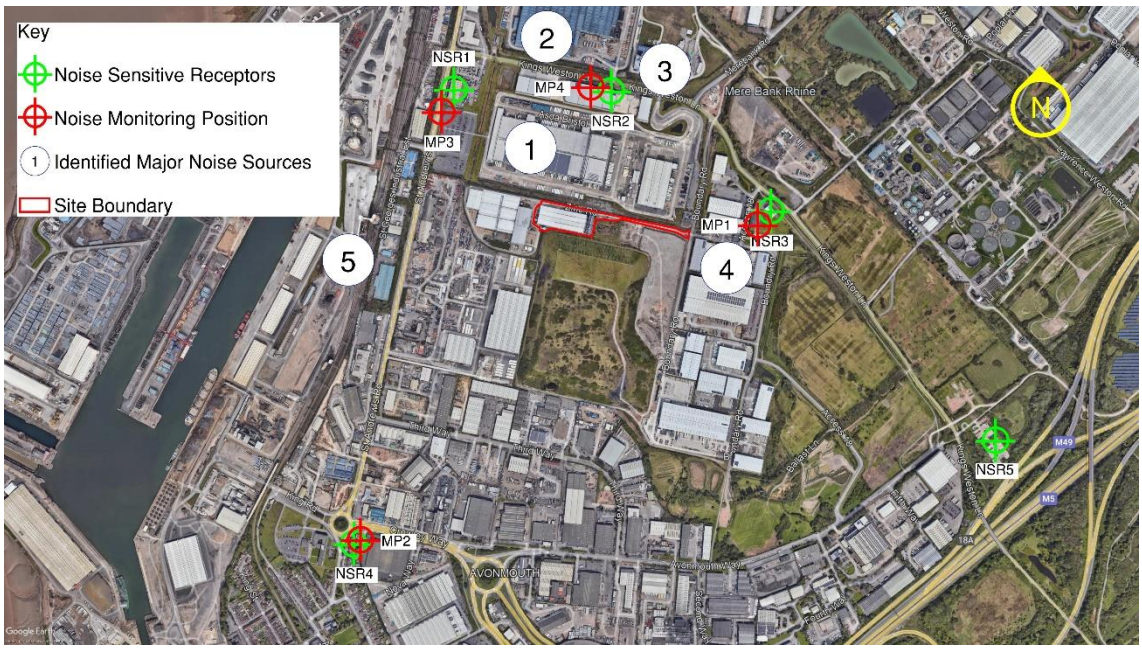


Figure 2: Noise Sensitive Receptors, Noise Monitoring Positions and Identified Noise Sources (© Google)

2.5 Identified Noise Sources Local to the Site.

As the site is within the Principle Industrial and Warehousing Area (PIWA) there are many noise sources in the local area. Table 1 below identifies the main noise sources noted at the time of the site visit.

Table 1: Main Noise Sources Identified at Time of Site Visit

Reference Number	Description	Easting	Northing
1	Asda Distribution Centre	352217	179559
2	The Park Industrial Site	352301	179993
3	SUEZ Recycling and Recover	352542	179799
4	Industrial sites in Access 18 Area.	352760	179260
5	St Georges Industrial Estate	351731	179358
6	Local Road Network, including (but not limited to): - M5 - M49 - Kings Weston Lane - Crowley Way - A403 (St Andrews Road)	N/A	N/A
7	Various Wind Turbines	N/A	N/A

2.6 Selected Noise Sensitive Receptors

The identified noise sensitive receptors to be considered as part of this noise impact assessment are detailed in Table 2 below. The St Anthony's Park Travellers' Site was outside of the 1km study area but was included in the previous Atkins assessment.

Table 2: Identified Noise Sensitive Receptors

Reference Number	Description	Easting	Northing	Approximate Distance (m)
NSR1	Offices for City West Commercials Mercedes-Benz	351968	179726	465m
NSR2	Offices on Kings Weston Lane	352394	179716	390m
NSR3	St. Modwen Offices Access 18	352860	179379	570m
NSR4	Nearest House at 94 St Andrews Road	351675	178469	1000m
NSR5	St Anthony's Park Traveller's Site	353435	178771	1300m

3 Assessment Methodology

The assessment has been carried out according to BS 4142: 2014 with the additional refinements and qualifications described in the Environment Agency's Guidance including Method Implementation Document[1].

[1] https://www.gov.uk/government/publications/method-implementation-document-mid-for-bs-4142

3.1 BS 4142: 2014+A1: 2019

The standard method for assessing noise of a commercial or industrial nature affecting housing, is British Standard BS 4142 "Method for rating and assessing industrial and commercial sound". A BS 4142 assessment is typically made by determining the difference between the industrial noise under consideration and the background sound level as represented by the L_{A90} parameter, determined in the absence of the industrial noise. The L_{A90} parameter is defined as the level exceeded for 90% of the measurement time, representing the underlying noise in the absence of short duration noise events such as dog barks or individual cars passing.

The noise under consideration is assessed in terms of the ambient noise level, L_{Aeq}, but a character correction penalty can be applied where the noise exhibits certain characteristics such as distinguishable tones, impulsiveness or, if the noise is distinctively intermittent. The ambient noise level, L_{Aeq} is defined as the steady-state noise level with the same energy as the actual fluctuating sound over the same time period. It is effectively the average noise level during the period. The noise level (L_{Aeq}) with the character correction (if necessary) is known as rating level, L_{Ar}, and the difference between the background noise and the rating level is determined to make the BS 4142 assessment. The standard then states:

a) *"Typically, the greater the difference, the greater the magnitude of the impact.*

b) *A difference of around +10dB or more is likely to be an indication of a significant adverse impact, depending on the context.*

c) *A difference of around +5dB is likely to be an indication of an adverse impact, depending on the context.*

d) *The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound will have an adverse impact or a significant adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context."*

The standard outlines a number of methods for defining appropriate 'character corrections' to determine the rating levels to account for tonal qualities, impulsive qualities, other sound characteristics and/or intermittency. Guidance from the Environment Agency indicates that a +3dB correction should be used for "readily distinguishable industrial noise".

The standard also highlights the importance of considering the context in which a sound occurs. The standard indicates that factors including the absolute sound level, the character of the sound, the sensitivity of the receptor and the existing acoustic character of the area should be considered when assessing the noise impact.

The scope of BS 4142: 2014 notes that it should not be used for assessing non-residential locations including offices. Nevertheless, the Environmental Agency guidance indicates that noise, when audible, could cause an impact at non-residential locations including: schools, hospitals, offices and public recreation areas. Therefore, an assessment must be made for offices near the site. However alternative guidance should be used.

3.2 Atkins Noise Assessment (2012 ES Chapter 6)

The Atkins noise chapter provided a noise assessment and baseline survey. A computer model of the building was presented along with information on the sound insulation of various elements

including roller shutter doors and the proposed cladding. A noise limit for the residential locations was set at parity with the background noise for residential receptors and at a level of 6dB above the background noise for noise-sensitive commercial premises. It is stated that these criteria were agreed with Bristol City Council. It is understood that this same assessment was submitted as part of the permitting process for the original Environmental Permit for New Earth Energy.

3.3 2022 Planning Conditions

Noise was scoped out of the Environmental Impact Assessment for Grundon's new use submitted in 2022. The planning conditions however include the following condition (No.10) relating to noise:

Restriction of noise from plant and equipment

The rating level of any noise generated by plant & equipment as part of the development shall be at least 5 dB below the background level as determined by BS4142: 2014 Methods for rating and assessing industrial and commercial sound.

Reason: To safeguard the amenity of nearby premises and the area generally.

The condition is listed a "post-occupation management" condition which means it sets a limit. There is no requirement to discharge the formally condition. An assessment location is not given but it is assumed that this should apply to residential locations as other types of receptor are not within the scope of BS 4142.

3.4 BS 8233: 2014

This standard gives guidance on acoustic design requirement in general building types and can be used to determine acceptable noise levels for offices. For offices, suggested noise limits are as follows:

Internal Noise Limits

The design internal noise levels "*should not normally exceed*" the following ranges:

- Open plan offices 45-50 dB L_{Aeq}
- Meeting Rooms, Training Room 35-45 dB L_{Aeq}
- Executive Offices: 35-45 dB L_{Aeq}
- Canteen: 50-55 dB L_{Aeq}

Where offices are ventilated using openable windows the internal limits can be translated to an external limit by adding 10dB for the sound insulation provided by an openable windows. If there sealed windows, then around 25 dB can be added. Therefore the following limits can be derived:

- 50 dB L_{Aeq} (office hours) for offices with openable windows
- 65 dB L_{Aeq} (office hours) for offices with sealed windows

Where ambient noise levels already exceed these limits, it is suggested that the new noise source should be 5dB below the ambient noise level so that any increase in noise is limited to no more than 1dB.

3.5 Operational Noise Prediction Methodology

A noise model has been constructed using IMMI[2] noise modelling software to predict noise levels to the nearest noise-sensitive receptor locations. Within the modelling software, propagation of noise has been calculated in accordance with ISO 9613-2 with the following input parameters:

- Downwind propagation (noise levels under crosswind and upwind conditions will be less);
- Hard ground for industrial locations and roads (G = 0) and soft ground for areas of reclaimed grass,
- A receptor height of 4m to replicate the likely location bedroom windows and in this case offices
- Ambient air temperature of 10°C and 70% Relative Humidity; and,
- Barriers and screening influence calculated in accordance with ISO 9613-2.

Further details on the prediction including source levels are provided in Section 5.

4 Baseline Noise Survey

An environmental noise survey was undertaken over two periods to determine baseline noise levels at the nearest noise-sensitive locations. The measurement comprised unattended and attended noise monitoring as follows:

Logging Measurements

- Friday 8th to Monday 11th September 2023 at 94 St Andrews Road
- Wednesday 4th to Friday 6th October 2023 at St Modwen Offices

Attended Measurements

- St Andrews Road (by City Mercedes Benz) 4th October 2023
- Kings Weston Lane 4th October 2023

4.1 Noise Survey Instrumentation

The equipment used to undertake the noise survey is detailed below. Field calibration checks were undertaken before and after each survey.

Table 3: Noise Survey Instrumentation

Description	Manufacturer	Type No.	Serial Number	Calibration Date	Next Cal. Date
Sound Level Meter	Rion	NL-52	420770	07/10/2021	07/10/2023
Pre-amplifier		UC-59	5738		
Sound Level Meter		NL-52	1032453	18/05/2022	18/05/2024
Pre-amplifier		UC-59	5845		
Sound Level Meter	Norsonic	140	1403241	18/11/2022	18/11/2024
Pre-amplifier		1225	91832		
Calibrator	B&K	4231	3010847	07/12/2022	07/12/2023

[2] https://immi.woelfel.de/en/calculating-industrial-noise.html

For the unattended noise surveys Rion NL52 sound level meters with Type WS-15 wind shields were set up to log noise levels in consecutive 15-minute periods. For the attended survey, a Norsonic 140 sound level meter was used.

The meters were also set to make sample audio recordings (as .wav files) to assist in the identification of noise sources. At both sites, the microphone and windshield were mounted on a tripod at a height of approximately 1.5m above local ground level. Field calibrations were performed at set up and at collection using a Brüel & Kjær Type 4231 sound level calibrator. There was no drift (0.0 dB) between the calibration readings for the monitoring at MP1 and MP2. All equipment used in the survey was within an appropriate calibration window. Calibration certificates are available upon request.

4.2 Measurement Locations

The measurement positions are shown in Figure 1 and described in Table 4. Photos of the measurement positions are available in Appendix A.

Table 4 Environmental Noise Survey Measurement Locations

Measurement Location	Type	Measurement Description
MP1	Unattended	The microphone was located in the rear garden of 94 St Andrews Road. The microphone was at a height of approximately1.5 m in a free field position.
MP2	Unattended	The microphone was located in the Car Park of St Modwen Properties office building approximately 30 m from the south-east façade of the building. The microphone was at a height of approximately1.5 m in a free field position.
ST1	Attended	The microphone approximately 13 m to the north of the façade of the offices and 10 m to the south of Kings Weston Lane. The microphone was at a height of approximately1.5 m in a free field position.
ST2	Attended	The microphone approximately 30 m to the south of the façade of City West Commercial Mercedes Benz building and 15 m to the east of the A403. The microphase was at a height of approximately1.5 m in a free field position.

4.3 Meteorological Conditions

Weather conditions during the survey were suitable for noise measurement, with mostly dry conditions, generally overcast, and wind speed below acceptable levels. A Kestrel 4500 NV anemometer was used at MP1 to log wind speed and direction and a Davis Vantage Vue weather station was installed at Position MP2 for the duration of the survey monitoring wind speed and direction, rainfall, and temperature. The weather conditions were suitable for noise monitoring. The weather data for the survey periods is presented in Appendix B.

4.4 Environmental Sound Climate

Based on observations made at the beginning and end of the survey period, and analysis of sample audio recordings undertaken during the survey period, the dominant noise source across the site was from road traffic noise on the surrounding road network, including the A403, Kings Weston Lane, M5 and M49 and LGVs and HGVs using the internal roads of the industrial estate.

Due to the nature of the local area, there were many industrial processes audible at noise sensitive receptors. At the survey position MP1 flocks of seagulls were also audible. Noise from the Asda distribution centre was audible at MP2 including HGV movements.

4.5 Unattended Survey Results

The data has been processed to show the time history in each 15-minute period. These are shown below in Figures 3 and 4. Tabulated data for the survey period is provided in Appendix C. This data is available in spreadsheet form.

Noise levels at MP1 (Rear Garden of 92 St Andrew Road)

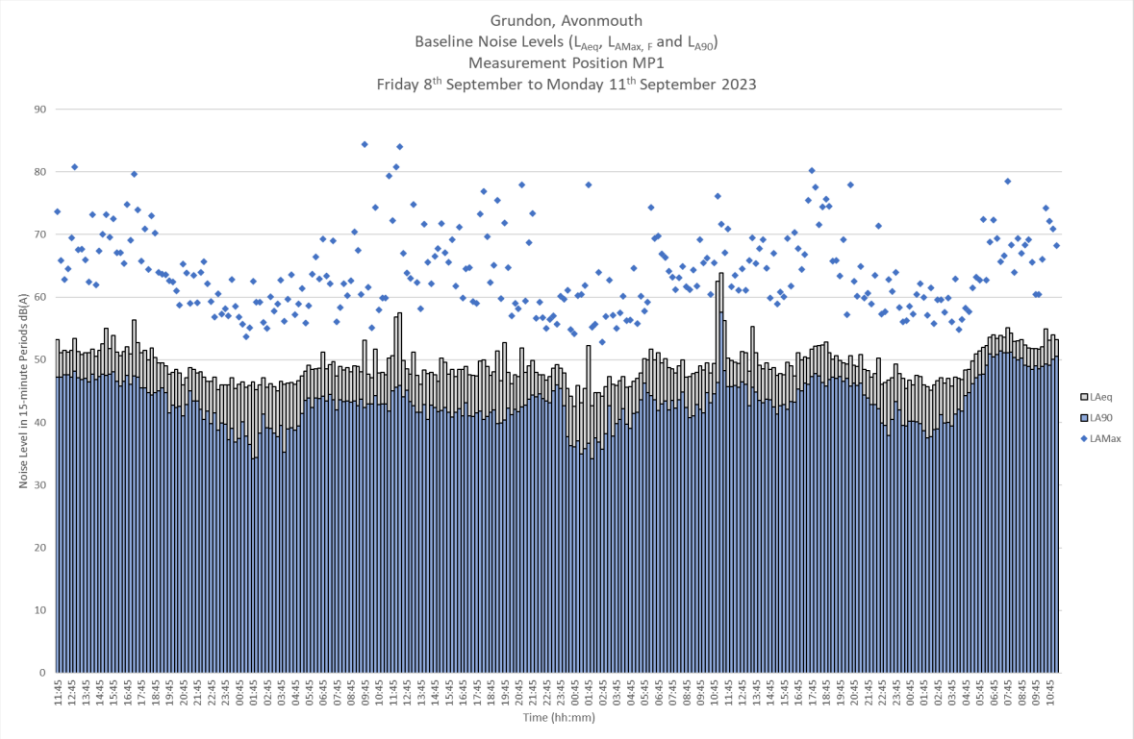


Figure 3 Noise Time History at MP1

Figure 3 shows that noise levels are generally between 51 dB and 55 dB during the day and then noise levels start dropping from 8pm; this would coincide with less traffic on the local roads, and noise generating industrial units finishing up daytime activities. Background noise levels vary between 45 dB L_{A90} and 58 dB L_{A90} during the day and 34 dB L_{A90} and 51 dB L_{A90} during the night.

Noise Levels at MP2

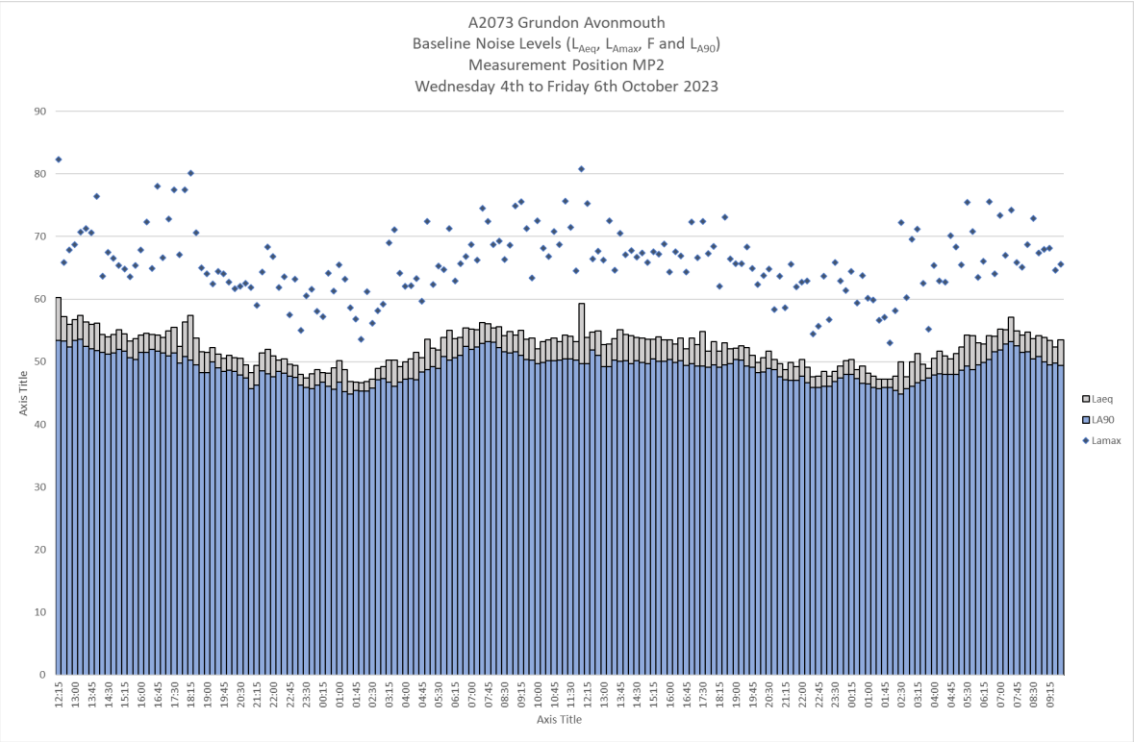


Figure 4 Noise Time History at MP2

The results indicate less of a variation in sound level at this location with values between 45 and 55 dB L_{Aeq} generally.

The offices were not assessed in the 2012 environment impact assessment. However, a similar location FlexiPads Offices was assessed. Since the 2012 assessment, the Asda distribution centre has been built and is now operational. This is likely to have increase noise levels in the area due to the HGV movements and external cooling plant which is clearly audible around the site.

4.6 Attended Survey Results

Noise Levels at ST1

Noise levels were dominated by the road traffic noise from Kings Weston Lane, it was noted that the road traffic consisted mostly of HGVs and LGVs. Industrial noise from the process occurring in The Park Industrial Site and SUEZ Recycling and Recovery areas was audible at this location. The wind turbine at The Park was operational and was audible at this location.

Table 5 sets out the measured L_{Aeq}, L_{AMax} and L_{A90} at this location.

Table 5: ST1 Noise Survey Results

Start Time (hh:mm)	Duration, T (mm:ss)	$L_{Aeq, T}$	$L_{AMax, T}$	$L_{A90, T}$
12:57	15:00	69	86	56
13:43	15:00	71	85	58
14:35	15:00	71	85	56
15:15	15:00	71	84	59
19:05	07:51	71	84	56
19:20	15:00	70	92	55
19:58	15:00	65	83	54
20:38	15:00	64	82	53

Noise Levels at ST2

Noise levels were dominated by road traffic noise, mainly HGVs on the A403 St Andrews Road. In gaps between traffic, noise from the ASDA distribution centre to the east was audible along with noise from the St Georges Industrial Estate to the west.

Table 6 sets out the measured L_{Aeq}, L_{AMax} and L_{A90} at this location.

Table 6: ST2 Noise Survey Results

Start Time (hh:mm)	Duration, T (mm:ss)	$L_{Aeq, T}$	$L_{AMax, T}$	$L_{A90, T}$
13:25	15:00	71	93	60
13:20	15:00	69	83	63
14:03	15:00	70	86	61
14:54	11:52	71	94	60
19:39	15:00	70	96	53
20:18	15:00	68	85	49

4.7 Results Summary

The summary of the noise survey for the daytime and night-time periods is shown below. The data has also been assessed in terms of the daytime (07:00 – 23:00) and night-time (23:00 – 07:00) assessment periods.

For the ambient level (dB L_{Aeq}) the results in the assessment periods have been logarithmically averaged. BS 4142 requires the assessment to be made using the "typical" background noise levels. This can be derived by considering the frequency of occurrence of the integer background noise values over the relevant time periods. Histograms showing the distribution of these values are provided in Appendix D.

Table 7 Summary of Noise Survey Results

Location	Date	Period, T	Sound Level dB(A)	
			$L_{Aeq, T}$	Typical $L_{A90, T}$
MP1	08/09/2023 – 11/09/2023	Daytime Period (07:00 – 23:00)	54	43
		Night-time Period (23:00 – 07:00)	46	39
MP2	04/10/2023 – 06/10/2023	Daytime Period (07:00 – 23:00)	54	50
		Night-time Period (23:00 – 07:00)	51	47
ST1	04/10/2023	Daytime Period (07:00 – 23:00)	71	59
ST2	04/10/2023	Daytime Period (07:00 – 23:00)	70	60

4.8 Noise Targets

BS 4142 states that industrial noise levels which are no greater than the typical background noise level represent a low impact (subject to context). From the baseline noise survey, (Table 7 above) the target for St Andrew's Road has been taken 5dB below the measured background noise level as required by the planning condition. For the St Antony's Travellers' Site, Atkins measured background noise levels of 49 and 48 dB L_{A90} during the daytime and night-time respectively due to high levels from the motorways. This data has been used to set noise limits for this receptor, 5dB below these values although as it is some 1300m away it is unlikely there will be any impact here.

The noise targets are set out below in Table 8. The target is set in terms of the BS 4142 rating level including any appropriate character penalties.

Table 8 – Noise Targets for the Rating Level at the Noise Sensitive Receptors

Assessment Point	Description	Daytime Noise Target dB L_{Ar} (Operational Hours 07:00 – 23:00)	Night-time Noise Target dB L_{Ar} (Operational Hours 23:00 – 07:00)
NSR1	City West Commercials Mercedes-	65[2]	N/A[1]
NSR2	King's Weston Lane	66[2]	N/A[1]
NSR3	St. Modwen Office	49[2]	N/A[1]
NSR4	94 St Andrews Road	38	34
NSR5	St Anthony's Park Traveller's Site	44	43

[1] Due to the nature of these receptors (i.e. non-residential, a night-time noise assessment is not required) a noise limit during the night time period has not been set.
[2] 5dB below the ambient noise level to limit any increase in noise

For comparison, the previously noise target criteria detailed in the Atkins Noise Chapter are presented below in Table 9. The previous EA permit was based on these noise levels meeting these targets.

Table 9 – Noise Targets for Previous Permit

ID / Atkins Ref	Location	Day / Night	Atkins Background Noise Level	Atkins Target Criterion
NSR1 (B)	City West Mercedes	Day	51	57
NSR2 (E)	King's Weston Lane	Day	45	51
NSR3 (D)	St. Modwen Office	Day	45	51
NSR4 (A)	94 St Andrews Road	Day	50	50
NSR4 (A)	94 St Andrews Road	Night	44	44
NSR5 (F)	St Anthony's Park	Day	49	49
NSR5	St Anthony's Park	Night	48	48

It can be seen that for the residential locations and the critical office location (St Modwen's) noise monitoring data from the 2023 logging survey and the planning condition has resulted in lower noise targets than adopted for the previous permit application.

5 Noise Impact Assessment

A new computer modelling exercise has been carried out for the Facility. This assessment assumes that noise generating activities and sources will be operational daytime and night-time with exception of the Waste Reception Area which will only be active during the daytime. The assessment also assumes that the noise generating activities and sources will be active 100% of the time with no on-time correction.

Based on the nature of the receptors, the night-time assessment only considers the noise impact at the residential receptors NSR4 (94 St Andrews Road) and NSR5 (St Andrews Park).

The input source data for the model is described below. Fichtner Consulting Engineers Ltd have provided source data in the form of internal reverberant sound pressure levels for various internal areas within the facility and sound power levels for external sources. These are shown in Table 10 below.

Table 10: Provided Noise Data

Noise Source	Noise Level
Waste Reception	85 dB(A) Sound Pressure Level
Boiler Area	85 dB(A) Sound Pressure Level
Flue Gas Treatment	85 dB(A) Sound Pressure Level
Turbine Hall	95 dB(A) Sound Pressure Level
Air-cooled Condensers (ACC)	95 dB(A) Sound Power Level
Stack (36.5 m High)	84 dB(A) Sound Power Level

The noise data provided is in single-figure A-weighted values. To undertake a robust assessment, it is necessary to have octave band data for each noise source. To determine this, similar noise data from internal library has been used to apply an octave band spectrum to the provided noise data.

Table 11 sets out the chosen octave band spectrums for the noise sources.

Table 11 Noise Spectra

Area	Sound Levels (dB) in Octave Bands, Hz							L_{pA} / L_{WA} (dB)
	63	125	250	500	1000	2000	4000	
Waste Reception	88	83	83	82	80	77	74	85 L_{pA}
Boiler Area	75	75	75	80	80	80	65	85 L_{pA}
Flue Gas Treatment	84	84	79	79	79	79	79	85 L_{pA}
Turbine Hall	90	91	86	87	92	88	86	95 L_{pA}
ACCs	84	89	96	87	91	89	77	95 L_{WA}
Stack	87	86	90	82	75	68	62	84 L_{WA}

The reverberant sound pressure levels for the noise generating areas inside the building specified in Table 10 have been used to determine the noise emitted from the building. The internal noise levels are reduced by the sound insulation of the building enveloper. Element sound reduction indices given in Table 12 have been taken from the previous Atkins 2012 Environmental Statement describing the sound insulation of various elements of the building.

Table 12: Sound reduction Indices of Various Construction Elements

Elements	Sound Reduction dB in Octave Band Frequencies, Hz							R_w
	63	125	250	500	1k	2k	4k	
Industrial Door	19	23	28	28	31	30	30	30
Roller Shutter Door	3	3	4	8	11	14	18	11
4 mm Glass Windows	19	19	22	24	25	25	25	25
Euroclad Metal Cladding with Insulation in Cavity	19	26	36	41	49	56	65	45
Roof	18	19	22	29	31	40	58	32

These values have been used to determine the building noise breakout level for the Facility. Break-out sound power levels were calculated following the guidance given in BS EN 12354-4: 2017 (equation 2) using a diffusivity index C_d of -5dB.

All of the enclosed turbines and air-cooled condensers are assumed to be running at full duty, although in practice when the ambient air temperature is below 15°C, it is anticipated that air cooled condensers would not be operating. Screening from the building and other neighbouring has been included as appropriate. There is also a bund to the south at the border of the landfill which has been incorporated into the model.

To reflect a worst-case scenario, it has also been assumed that one lorry delivery/collection occurs during the 1-hour assessment period with a 5-minute event duration.

On the above basis, operational rated noise levels from the application site against the background noise levels has been carried out at the nearest residential and commercial noise-sensitive receptors.

5.1 Character Corrections

As per the guidance set out by the Environmental Agency a +3dB 'other' correction is to be applied for readily distinguishable industrial noise, although at the residential locations it is unlikely that the sound from the Facility would be heard.

5.2 Assessment Scenarios

As part of the noise impact assessment, a daytime and nighttime assessment will be undertaken. It is understood that all sources of noise will be operational during the daytime and night-time excluding the waste reception area, as no deliveries will take place during the night time assessment period.

5.3 Daytime Scenario

Table 13 below sets out the daytime noise impact assessment at the identified noise sensitive receptors based on the information provided above.

Table 13: Daytime Noise Impact Assessment

Receptor	Description	Predicted Daytime Specific Level, L_{Aeq} dB	Character Correction, dB	Rating Level, L_{Ar} dB	Noise Limit, L_{Ar} dB	Difference Rating Level to Noise Limit, dBA
NSR1	City West Commercials Mercedes-Benz	32	+3dB	35	65	-30
NSR2	Kings Weston Offices	43		46	66	-20
NSR3	St. Modwen Properties Ltd - Bristol	46		49	49	0
NSR4	94 St Andrews Road	32		35	38	-3
NSR5	St Anthony's Park Traveller's Site	40		43	44	-1

The daytime assessment indicates that noise levels from the Facility are compliant with the proposed noise limits. This indicates a low impact according to BS 4142. There will also be no impact at the office locations although it is possible that noise from the Facility will be audible at the St Modwen Offices.

5.4 Night-time Scenario

Table 14 below sets out the daytime noise impact assessment at the identified noise sensitive receptors based on the information provided above.

Table 14: Night-time Noise Impact Assessment

Receptor	Description	Predicted Daytime Specific Level, L_{Aeq} dB	BS4142 Character Correction, dB	Rating Level, L_{Ar} dB	Noise Limit, L_{Ar} dB	Difference Rating Level to Noise Limit, dBA
NSR4	94 St Andrews Road	28	+3dB	31	34	-3
NSR5	St Anthony's Park Traveller's Site	39		42	43	-1

Noise levels are also within the proposed limits and BS 4142 would indicate a low impact.

5.5 Uncertainty and Context

BS 4142 requires an assessment of uncertainty and of context.

There is uncertainty in all measurements and predictions. ISO 9613-2 indicates that the uncertainty is typically ±3dB. However, the method of using an internal reverberant level to calculate the sound power emissions is likely to overestimate the sound power emitted due to the large surface areas involved. In generally it is likely that the reverberant sound level is not uniform across a large volume, and this will result in lower estimates of the sound power emitted and lower predicted noise levels. The predictions also assume downwind conditions. The prevailing wind direction will tend to result in low noise levels for most of the time at most locations.
Uncertainty in the background noise levels has been minimised by adopting longer-term logging rather than sampled measurements at the critical receptors. It should be noted that the derived limits at these locations are lower than that previous adopted for the original permit.

The context in this case is that of an industrial site in a noisy industrial area. The Facility is similar to that previously permitted use on the same site and since then a large ASDA distribution centre has been built to the north is a major source of noise in the area. Therefore, the operation of the Facilities is in keeping with the context of the area.

6 Noise Control

The noise assessment has indicated that during the daytime and night-time, operational noise levels from the proposed Facility will meet the noise limits at the nearest receptors. However it is recommended that the following noise control options should be implemented to further reduce the potential noise impact of the proposed development.

There are a number of mechanisms available for controlling operational noise emissions from the application site to help ensure compliance. These are detailed below and should be considered and applied where necessary:

- The proposed noise limits shall be taken into consideration during the specification and design of plant and building systems;
- A low plant noise procurement policy shall be adopted when sourcing plant that is most efficient for the job;
- Plant shall be positioned and orientated away from noise sensitive uses, exploiting the reduction of noise with distance and that afforded by intervening obstacles, wherever possible;

- The composite sound insulation qualities of the structure and materials used in construction shall be considered, particularly at low frequency (20-200Hz) to maximise the containment of noise at source;
- Plant when not in demand shall be configured to reduce to idle or shut down;
- Regular maintenance of noisy plant should be undertaken to ensure there is no increase in noise;
- Regular assessment of the effectiveness of noise control measures should be carried out. Implementing the above-mentioned noise control measures should help to control the noise emission levels from the proposed waste treatment building. Therefore, assuming that the above recommended noise control measures are implemented it is not anticipated that operational noise levels from the Facility would have any significant and permanent long-term impact on the prevailing noise climate in the area concerned.
- A 15 m high land fill bank is located towards the south of the development.

7 Conclusions

A noise impact assessment has been carried out for Grundon's Waste Management and Thermal Treatment Facility which will be located on the site of a similar low carbon facility. The assessment is required for an Environmental Permit but nevertheless noise levels must also meet the planning noise limits. New noise limits were derived from a new baseline noise monitoring survey. This has resulted in lower limits than adopted for the previous permit. The assessment carried out indicates a low impact according to BS 4142 for the residential receptors. Ther will also be no impact at any commercial receptors although it is possible that noise from the facility will be heard at the nearest location.

Appendix A – Site Photos

MP1

Appendix A – Site Photos

MP2

Appendix A – Site Photos

ST1

ST2

Appendix B – Weather Data

Appendix B Weather Data

MP1

Date and Time	Wind Speed m/s	Wind Direction	Date and Time	Wind Speed m/s	Wind Direction	Date and Time	Wind Speed m/s	Wind Direction
08/09/2023 09:40	0	N	08/09/2023 19:30	0	ENE	09/09/2023 05:20	0	SSE
08/09/2023 09:50	0	NNE	08/09/2023 19:40	0	ENE	09/09/2023 05:30	0	SSE
08/09/2023 10:00	0	NNW	08/09/2023 19:50	0	ENE	09/09/2023 05:40	0	SSE
08/09/2023 10:10	0	N	08/09/2023 20:00	0	ENE	09/09/2023 05:50	0	SSE
08/09/2023 10:20	0	N	08/09/2023 20:10	0	ENE	09/09/2023 06:00	0	SE
08/09/2023 10:30	0	NE	08/09/2023 20:20	0	ENE	09/09/2023 06:10	0	W
08/09/2023 10:40	0	NE	08/09/2023 20:30	0	ENE	09/09/2023 06:20	0	S
08/09/2023 10:50	0	NE	08/09/2023 20:40	0	ENE	09/09/2023 06:30	0	SE
08/09/2023 11:00	0	NE	08/09/2023 20:50	0	ENE	09/09/2023 06:40	0	SSE
08/09/2023 11:10	0	NE	08/09/2023 21:00	0	ENE	09/09/2023 06:50	0	SSE
08/09/2023 11:20	0	SE	08/09/2023 21:10	0	ENE	09/09/2023 07:00	0	SSE
08/09/2023 11:30	0	ESE	08/09/2023 21:20	0	ENE	09/09/2023 07:10	0	SSE
08/09/2023 11:40	0	ENE	08/09/2023 21:30	0	ENE	09/09/2023 07:20	0	SSE
08/09/2023 11:50	0	S	08/09/2023 21:40	0	SSE	09/09/2023 07:30	0	SSE
08/09/2023 12:00	0.6	SE	08/09/2023 21:50	0	SSE	09/09/2023 07:40	0	SSE
08/09/2023 12:10	0	SSE	08/09/2023 22:00	0	SSE	09/09/2023 07:50	0	SSE
08/09/2023 12:20	0	SSE	08/09/2023 22:10	0	SE	09/09/2023 08:00	0	SSE
08/09/2023 12:30	0.8	SE	08/09/2023 22:20	0	SSE	09/09/2023 08:10	0	SSE
08/09/2023 12:40	0.5	SSE	08/09/2023 22:30	0	S	09/09/2023 08:20	0	SSE
08/09/2023 12:50	1.2	SE	08/09/2023 22:40	0	SE	09/09/2023 08:30	0	SE
08/09/2023 13:00	1.2	SE	08/09/2023 22:50	0	SE	09/09/2023 08:40	0	SE
08/09/2023 13:10	1.3	SE	08/09/2023 23:00	0	S	09/09/2023 08:50	0	ENE
08/09/2023 13:20	0.7	ESE	08/09/2023 23:10	0	ENE	09/09/2023 09:00	0	ENE
08/09/2023 13:30	0	SE	08/09/2023 23:20	0	SW	09/09/2023 09:10	0	ENE
08/09/2023 13:40	0.6	ESE	08/09/2023 23:30	0	SSE	09/09/2023 09:20	0	ENE
08/09/2023 13:50	0	NE	08/09/2023 23:40	0	SSE	09/09/2023 09:30	0	ENE
08/09/2023 14:00	0.7	SE	08/09/2023 23:50	0	SSE	09/09/2023 09:40	0	ENE
08/09/2023 14:10	0.8	NE	09/09/2023 00:00	0	SSE	09/09/2023 09:50	0	ENE
08/09/2023 14:20	0.3	SE	09/09/2023 00:10	0	SSE	09/09/2023 10:00	0	ENE
08/09/2023 14:30	1	SE	09/09/2023 00:20	0	SE	09/09/2023 10:10	0	ENE
08/09/2023 14:40	0.6	ENE	09/09/2023 00:30	0	SE	09/09/2023 10:20	0	ENE
08/09/2023 14:50	0.8	ESE	09/09/2023 00:40	0	SSW	09/09/2023 10:30	0	NE
08/09/2023 15:00	0	SSE	09/09/2023 00:50	0	SSE	09/09/2023 10:40	0	SSE
08/09/2023 15:10	0	NE	09/09/2023 01:00	0	ESE	09/09/2023 10:50	0	SSE
08/09/2023 15:20	0	ESE	09/09/2023 01:10	0	SSE	09/09/2023 11:00	0	ENE
08/09/2023 15:30	0.7	SE	09/09/2023 01:20	0	SSE	09/09/2023 11:10	0	SSE
08/09/2023 15:40	0.4	E	09/09/2023 01:30	0	SSE	09/09/2023 11:20	0	SSE
08/09/2023 15:50	1.1	SSE	09/09/2023 01:40	0	SSE	09/09/2023 11:30	0	SSE
08/09/2023 16:00	0.5	SE	09/09/2023 01:50	0	SSE	09/09/2023 11:40	0	SE
08/09/2023 16:10	0	NE	09/09/2023 02:00	0	SSE	09/09/2023 11:50	0	NE
08/09/2023 16:20	0.3	SE	09/09/2023 02:10	0	SSW	09/09/2023 12:00	0	SE
08/09/2023 16:30	0.7	NE	09/09/2023 02:20	0	WNW	09/09/2023 12:10	0	SE
08/09/2023 16:40	0.5	ENE	09/09/2023 02:30	0	WNW	09/09/2023 12:20	0	ESE
08/09/2023 16:50	0.3	SSE	09/09/2023 02:40	0	WNW	09/09/2023 12:30	0	ESE
08/09/2023 17:00	0	SE	09/09/2023 02:50	0	WNW	09/09/2023 12:40	0.7	SE
08/09/2023 17:10	0.6	SE	09/09/2023 03:00	0	WNW	09/09/2023 12:50	0.9	SE
08/09/2023 17:20	0.6	SE	09/09/2023 03:10	0	WNW	09/09/2023 13:00	0.8	SE
08/09/2023 17:30	0	SE	09/09/2023 03:20	0	WNW	09/09/2023 13:10	0	SSE
08/09/2023 17:40	0	SE	09/09/2023 03:30	0	WNW	09/09/2023 13:20	0.9	SSE
08/09/2023 17:50	0	ESE	09/09/2023 03:40	0	SSE	09/09/2023 13:30	0.7	SE
08/09/2023 18:00	0	ENE	09/09/2023 03:50	0	SE	09/09/2023 13:40	0.6	SE
08/09/2023 18:10	0	ENE	09/09/2023 04:00	0	SE	09/09/2023 13:50	0	S
08/09/2023 18:20	0	ENE	09/09/2023 04:10	0	SE	09/09/2023 14:00	1	ESE
08/09/2023 18:30	0	ENE	09/09/2023 04:20	0	SE	09/09/2023 14:10	0.5	ESE
08/09/2023 18:40	0	ENE	09/09/2023 04:30	0	SE	09/09/2023 14:20	0	SE
08/09/2023 18:50	0	ENE	09/09/2023 04:40	0	SSE	09/09/2023 14:30	0.9	SSE
08/09/2023 19:00	0	ENE	09/09/2023 04:50	0	SE	09/09/2023 14:40	1	ENE
08/09/2023 19:10	0	ENE	09/09/2023 05:00	0	SE	09/09/2023 14:50	0.7	SSE
08/09/2023 19:20	0	ENE	09/09/2023 05:10	0	SSE	09/09/2023 15:00	0.9	SSE

Appendix B – Weather Data

Date and Time	Wind Speed m/s	Wind Direction	Date and Time	Wind Speed m/s	Wind Direction	Date and Time	Wind Speed m/s	Wind Direction
09/09/2023 15:10	1	ESE	09/09/2023 23:10	0	SE	10/09/2023 07:10	0	ENE
09/09/2023 15:20	0	ESE	09/09/2023 23:20	0	SE	10/09/2023 07:20	0	ENE
09/09/2023 15:30	0	ESE	09/09/2023 23:30	0	SE	10/09/2023 07:30	0	ENE
09/09/2023 15:40	0.7	SE	09/09/2023 23:40	0	SE	10/09/2023 07:40	0	ENE
09/09/2023 15:50	0.6	SE	09/09/2023 23:50	0	SE	10/09/2023 07:50	0	ENE
09/09/2023 16:00	0.7	SE	10/09/2023 00:00	0	SE	10/09/2023 08:00	0	ENE
09/09/2023 16:10	0.9	ESE	10/09/2023 00:10	0	SE	10/09/2023 08:10	0	ENE
09/09/2023 16:20	0	SE	10/09/2023 00:20	0	SE	10/09/2023 08:20	0	ENE
09/09/2023 16:30	0.6	ENE	10/09/2023 00:30	0	SE	10/09/2023 08:30	0	ENE
09/09/2023 16:40	0.3	SSE	10/09/2023 00:40	0	SE	10/09/2023 08:40	0	ENE
09/09/2023 16:50	0.9	SSE	10/09/2023 00:50	0	SE	10/09/2023 08:50	0	E
09/09/2023 17:00	0.4	SSE	10/09/2023 01:00	0	SE	10/09/2023 09:00	0	E
09/09/2023 17:10	0	ENE	10/09/2023 01:10	0	SE	10/09/2023 09:10	0	ENE
09/09/2023 17:20	0	NE	10/09/2023 01:20	0	SE	10/09/2023 09:20	0	ENE
09/09/2023 17:30	0	NE	10/09/2023 01:30	0	SE	10/09/2023 09:30	0	ENE
09/09/2023 17:40	0	NE	10/09/2023 01:40	0	SE	10/09/2023 09:40	0	ENE
09/09/2023 17:50	0	SE	10/09/2023 01:50	0	SE	10/09/2023 09:50	0	ENE
09/09/2023 18:00	0	SSE	10/09/2023 02:00	0	SE	10/09/2023 10:00	0	ENE
09/09/2023 18:10	0	SE	10/09/2023 02:10	0	SE	10/09/2023 10:10	0	ENE
09/09/2023 18:20	0	SE	10/09/2023 02:20	0	SE	10/09/2023 10:20	0	ENE
09/09/2023 18:30	0	SE	10/09/2023 02:30	0	SE	10/09/2023 10:30	0	ENE
09/09/2023 18:40	0	SE	10/09/2023 02:40	0	SE	10/09/2023 10:40	0	ENE
09/09/2023 18:50	0	SE	10/09/2023 02:50	0	NE	10/09/2023 10:50	0	ENE
09/09/2023 19:00	0	SE	10/09/2023 03:00	0	SE	10/09/2023 11:00	0	SSE
09/09/2023 19:10	0	SE	10/09/2023 03:10	0	NNE	10/09/2023 11:10	0	ESE
09/09/2023 19:20	0	SE	10/09/2023 03:20	0.5	E	10/09/2023 11:20	0	ENE
09/09/2023 19:30	0	SE	10/09/2023 03:30	0	E	10/09/2023 11:30	0	ENE
09/09/2023 19:40	0	SE	10/09/2023 03:40	0	E	10/09/2023 11:40	0.7	ENE
09/09/2023 19:50	0	SE	10/09/2023 03:50	0	ESE	10/09/2023 11:50	0.7	NW
09/09/2023 20:00	0	SE	10/09/2023 04:00	0	ESE	10/09/2023 12:00	0	ENE
09/09/2023 20:10	0	SE	10/09/2023 04:10	0	E	10/09/2023 12:10	0	ENE
09/09/2023 20:20	0	SE	10/09/2023 04:20	0	E	10/09/2023 12:20	0	SE
09/09/2023 20:30	0	SE	10/09/2023 04:30	0	SE	10/09/2023 12:30	0	N
09/09/2023 20:40	0	SE	10/09/2023 04:40	0	SE	10/09/2023 12:40	0	ENE
09/09/2023 20:50	0	SE	10/09/2023 04:50	0	SE	10/09/2023 12:50	0	SE
09/09/2023 21:00	0	SE	10/09/2023 05:00	0.7	E	10/09/2023 13:00	0	NNE
09/09/2023 21:10	0	SE	10/09/2023 05:10	0.8	SE	10/09/2023 13:10	0	SE
09/09/2023 21:20	0	SE	10/09/2023 05:20	0	S	10/09/2023 13:20	0.9	ENE
09/09/2023 21:30	0	SE	10/09/2023 05:30	0	SE	10/09/2023 13:30	1.2	ENE
09/09/2023 21:40	0	SE	10/09/2023 05:40	0	SE	10/09/2023 13:40	0.4	ESE
09/09/2023 21:50	0	SE	10/09/2023 05:50	0	SE	10/09/2023 13:50	0	ENE
09/09/2023 22:00	0	SE	10/09/2023 06:00	0	ESE	10/09/2023 14:00	0.3	SE
09/09/2023 22:10	0	SE	10/09/2023 06:10	0	NE	10/09/2023 14:10	0	SE
09/09/2023 22:20	0	SE	10/09/2023 06:20	0.7	ENE	10/09/2023 14:20	0.4	SE
09/09/2023 22:30	0	SE	10/09/2023 06:30	0	ENE	10/09/2023 14:30	1.4	ESE
09/09/2023 22:40	0	SE	10/09/2023 06:40	1	ENE	10/09/2023 14:40	0	SE
09/09/2023 22:50	0	SE	10/09/2023 06:50	0	ENE	10/09/2023 14:50	0	ESE
09/09/2023 23:00	0	SE	10/09/2023 07:00	0	SE	10/09/2023 15:00	0	ENE

Appendix B – Weather Data

Date and Time	Wind Speed m/s	Wind Direction	Date and Time	Wind Speed m/s	Wind Direction	Date and Time	Wind Speed m/s	Wind Direction
10/09/2023 15:10	0	ESE	10/09/2023 23:30	0	NE	11/09/2023 07:50	0.9	SE
10/09/2023 15:20	0.5	SE	10/09/2023 23:40	1	ESE	11/09/2023 08:00	0	ENE
10/09/2023 15:30	0	ENE	10/09/2023 23:50	2.4	ESE	11/09/2023 08:10	0.7	SE
10/09/2023 15:40	0.6	E	11/09/2023 00:00	1.1	E	11/09/2023 08:20	1.2	ESE
10/09/2023 15:50	0	ENE	11/09/2023 00:10	1.7	SE	11/09/2023 08:30	0	SE
10/09/2023 16:00	0	ENE	11/09/2023 00:20	0.6	NNE	11/09/2023 08:40	0.4	S
10/09/2023 16:10	0	ENE	11/09/2023 00:30	0.3	ESE	11/09/2023 08:50	0.8	ESE
10/09/2023 16:20	0	SSE	11/09/2023 00:40	0	ESE	11/09/2023 09:00	0.5	SE
10/09/2023 16:30	0.7	NW	11/09/2023 00:50	1.3	ESE	11/09/2023 09:10	0.8	SE
10/09/2023 16:40	0	SW	11/09/2023 01:00	1.2	SSE	11/09/2023 09:20	0	SE
10/09/2023 16:50	1.5	W	11/09/2023 01:10	1.9	ENE	11/09/2023 09:30	1.2	SSE
10/09/2023 17:00	0	WNW	11/09/2023 01:20	0	ESE	11/09/2023 09:40	1.1	ENE
10/09/2023 17:10	0.5	ENE	11/09/2023 01:30	0.6	ESE	11/09/2023 09:50	0.6	ESE
10/09/2023 17:20	0.9	S	11/09/2023 01:40	1.5	SSE	11/09/2023 10:00	1	SE
10/09/2023 17:30	0	SSE	11/09/2023 01:50	1.4	ENE	11/09/2023 10:10	0	SSE
10/09/2023 17:40	1.1	WNW	11/09/2023 02:00	0.7	SE	11/09/2023 10:20	0.5	SE
10/09/2023 17:50	1.1	WSW	11/09/2023 02:10	0.7	SE	11/09/2023 10:30	0.6	SE
10/09/2023 18:00	1.1	SSW	11/09/2023 02:20	1.5	SE	11/09/2023 10:40	1	ESE
10/09/2023 18:10	0	SE	11/09/2023 02:30	0	E	11/09/2023 10:50	0.8	ESE
10/09/2023 18:20	1.2	NW	11/09/2023 02:40	0.9	ESE	11/09/2023 11:00	0.4	E
10/09/2023 18:30	0.4	NNW	11/09/2023 02:50	0	ESE	11/09/2023 11:10	0.7	ESE
10/09/2023 18:40	0.8	SSE	11/09/2023 03:00	0	ESE	11/09/2023 11:20	0.6	SSE
10/09/2023 18:50	0	ENE	11/09/2023 03:10	0.4	ESE	11/09/2023 11:30	0	SE
10/09/2023 19:00	0	ESE	11/09/2023 03:20	0.8	SW	11/09/2023 11:40	1.2	NE
10/09/2023 19:10	0	WSW	11/09/2023 03:30	1.8	ESE	11/09/2023 11:50	0	NE
10/09/2023 19:20	1.2	SSW	11/09/2023 03:40	1	SE	11/09/2023 12:00	0	NE
10/09/2023 19:30	0	SSE	11/09/2023 03:50	1.2	SE	11/09/2023 12:10	0	E
10/09/2023 19:40	0	ESE	11/09/2023 04:00	0	SE	11/09/2023 12:20	0	ENE
10/09/2023 19:50	0	ESE	11/09/2023 04:10	0	ESE	11/09/2023 12:30	0	E
10/09/2023 20:00	0	SSE	11/09/2023 04:20	0	SE	11/09/2023 12:40	0	ENE
10/09/2023 20:10	0	SE	11/09/2023 04:30	0.6	SE	11/09/2023 12:50	0	ENE
10/09/2023 20:20	0.5	SE	11/09/2023 04:40	0.8	SSE	11/09/2023 13:00	0	ENE
10/09/2023 20:30	0	W	11/09/2023 04:50	0.5	ESE	11/09/2023 13:10	0	ENE
10/09/2023 20:40	0.6	SE	11/09/2023 05:00	1.2	SE	11/09/2023 13:20	0	ENE
10/09/2023 20:50	1.1	ESE	11/09/2023 05:10	0	SE	11/09/2023 13:30	0	ENE
10/09/2023 21:00	0.7	SSE	11/09/2023 05:20	0	S	11/09/2023 13:40	0	ENE
10/09/2023 21:10	1.9	SE	11/09/2023 05:30	0	SE	11/09/2023 13:50	0	ENE
10/09/2023 21:20	2.2	ESE	11/09/2023 05:40	0	SE	11/09/2023 14:00	0	ENE
10/09/2023 21:30	1.7	S	11/09/2023 05:50	0	SSE	11/09/2023 14:10	0	ENE
10/09/2023 21:40	0.7	SE	11/09/2023 06:00	0	SSE	11/09/2023 14:20	0	ENE
10/09/2023 21:50	0.7	SSW	11/09/2023 06:10	0	E	11/09/2023 14:30	0	ENE
10/09/2023 22:00	0.8	SE	11/09/2023 06:20	0	ESE	11/09/2023 14:40	0	ENE
10/09/2023 22:10	0.7	SSE	11/09/2023 06:30	0.3	SE	11/09/2023 14:50	0	ENE
10/09/2023 22:20	0	SSE	11/09/2023 06:40	0.7	SE	11/09/2023 15:00	0	ENE
10/09/2023 22:30	1.2	SE	11/09/2023 06:50	0.8	SSE	11/09/2023 15:10	0	ENE
10/09/2023 22:40	0.7	SE	11/09/2023 07:00	0	ESE	11/09/2023 15:20	0	NNE
10/09/2023 22:50	1.2	ENE	11/09/2023 07:10	1.2	SE	11/09/2023 15:30	0	NNW
10/09/2023 23:00	0.6	ENE	11/09/2023 07:20	0	SSW	11/09/2023 15:40	0	NNW
10/09/2023 23:10	0	ESE	11/09/2023 07:30	1	SSE	11/09/2023 15:50	0	NNW
10/09/2023 23:20	0	ESE	11/09/2023 07:40	0	ESE	11/09/2023 16:00	0	NE

Appendix B – Weather Data

MP2

Date	Time	Wind Speed m/s	Wind Direction	Date	Time	Wind Speed m/s	Wind Direction	Date	Time	Wind Speed m/s	Wind Direction
04/10/2023	10:45	2.9	E	05/10/2023	04:00	1.3	SE	05/10/2023	20:45	1.8	ESE
04/10/2023	11:00	2.9	SE	05/10/2023	04:15	1.3	SE	05/10/2023	21:00	1.8	SSE
04/10/2023	11:15	3.1	SSE	05/10/2023	04:30	1.3	SE	05/10/2023	21:15	1.8	SSE
04/10/2023	11:30	3.1	SSE	05/10/2023	04:45	1.3	SSE	05/10/2023	21:30	1.8	SSE
04/10/2023	11:45	3.6	SSE	05/10/2023	05:00	0.9	SE	05/10/2023	21:45	2.2	SSE
04/10/2023	12:00	3.6	SE	05/10/2023	05:15	0.9	SE	05/10/2023	22:00	1.8	SE
04/10/2023	12:15	3.6	SE	05/10/2023	05:30	0.4	SE	05/10/2023	22:15	2.2	SE
04/10/2023	12:30	3.6	SE	05/10/2023	05:45	0.9	SE	05/10/2023	22:30	2.7	SSE
04/10/2023	12:45	3.6	SE	05/10/2023	06:00	0.9	ESE	05/10/2023	22:45	2.2	SE
04/10/2023	13:00	3.1	SE	05/10/2023	06:15	0.9	SE	05/10/2023	23:00	2.2	SSE
04/10/2023	13:15	3.1	SE	05/10/2023	06:30	0.9	ESE	05/10/2023	23:15	2.2	SE
04/10/2023	13:30	3.6	SSE	05/10/2023	06:45	1.3	SE	05/10/2023	23:30	2	SSE
04/10/2023	13:45	3.6	SE	05/10/2023	07:00	1.3	SE	05/10/2023	23:45	1.9	SSE
04/10/2023	14:00	3.6	SE	05/10/2023	07:15	1.8	SE	06/10/2023	00:00	1.9	SSE
04/10/2023	14:15	2.7	SE	05/10/2023	07:30	1.8	SE	06/10/2023	00:15	1.8	S
04/10/2023	14:30	3.1	SE	05/10/2023	07:45	1.8	SE	06/10/2023	00:30	1.1	SSE
04/10/2023	14:45	3.1	SE	05/10/2023	08:00	1.8	SSE	06/10/2023	00:45	1.1	S
04/10/2023	15:00	2.2	SE	05/10/2023	08:15	2.2	SSE	06/10/2023	01:00	1.2	SSE
04/10/2023	15:15	2.7	SE	05/10/2023	08:30	1.8	SSE	06/10/2023	01:15	1.3	SSE
04/10/2023	15:30	3.1	SE	05/10/2023	08:45	2.2	SSE	06/10/2023	01:30	1.3	SSE
04/10/2023	15:45	3.1	SE	05/10/2023	09:00	2.7	SE	06/10/2023	01:45	1.3	SSE
04/10/2023	16:00	3.1	SSE	05/10/2023	09:15	2.2	SE	06/10/2023	02:00	0.4	SSE
04/10/2023	16:15	2.7	SE	05/10/2023	09:30	2.2	SE	06/10/2023	02:15	0.4	SE
04/10/2023	16:30	2.2	SSE	05/10/2023	09:45	2.2	SE	06/10/2023	02:30	0.4	SE
04/10/2023	16:45	2.7	SE	05/10/2023	10:00	2.7	SSE	06/10/2023	02:45	0.4	SSE
04/10/2023	17:00	2.2	SE	05/10/2023	10:15	2.7	SE	06/10/2023	03:00	0.9	SSE
04/10/2023	17:15	2.7	SE	05/10/2023	10:30	3.1	SE	06/10/2023	03:15	0.9	SSE
04/10/2023	17:30	2.7	ESE	05/10/2023	10:45	3.1	SE	06/10/2023	03:30	1.3	SE
04/10/2023	17:45	2.7	SE	05/10/2023	11:00	3.1	SE	06/10/2023	03:45	0.9	SSE
04/10/2023	18:00	3.1	SE	05/10/2023	11:15	3.1	SSE	06/10/2023	04:00	1.9	SSE
04/10/2023	18:15	3.1	SE	05/10/2023	11:30	2.7	SE	06/10/2023	04:15	1.9	SSE
04/10/2023	18:30	2.7	ESE	05/10/2023	11:45	3.1	SSE	06/10/2023	04:30	1.3	ESE
04/10/2023	18:45	1.8	S	05/10/2023	12:00	2.7	SE	06/10/2023	04:45	1.9	SSE
04/10/2023	19:00	1.8	SSE	05/10/2023	12:15	2.7	SE	06/10/2023	05:00	1.4	SSE
04/10/2023	19:15	1.3	S	05/10/2023	12:30	2.7	SE	06/10/2023	05:15	1.1	SSE
04/10/2023	19:30	1.3	S	05/10/2023	12:45	2.7	SE	06/10/2023	05:30	1.2	SE
04/10/2023	19:45	1.9	S	05/10/2023	13:00	2.7	SE	06/10/2023	05:45	1.2	SE
04/10/2023	20:00	1.9	SSE	05/10/2023	13:15	2.2	SE	06/10/2023	06:00	1.1	SE
04/10/2023	20:15	1.3	SSE	05/10/2023	13:30	2.7	E	06/10/2023	06:15	1	SE
04/10/2023	20:30	1.9	SSE	05/10/2023	13:45	2.2	SE	06/10/2023	06:30	1	SE
04/10/2023	20:45	1.4	SSE	05/10/2023	14:00	1.8	SE	06/10/2023	06:45	0.9	SE
04/10/2023	21:00	1.1	SE	05/10/2023	14:15	2.2	E	06/10/2023	07:00	0.9	SE
04/10/2023	21:15	1.2	SSE	05/10/2023	14:30	2.2	E	06/10/2023	07:15	1.3	ESE
04/10/2023	21:30	1.2	SE	05/10/2023	14:45	1.8	ESE	06/10/2023	07:30	1.3	E
04/10/2023	21:45	1.1	SE	05/10/2023	15:00	2.2	ESE	06/10/2023	07:45	1.8	SE
04/10/2023	22:00	1	SSE	05/10/2023	15:15	2.7	ESE	06/10/2023	08:00	1.8	SE
04/10/2023	22:15	1	SSE	05/10/2023	15:30	1.8	E	06/10/2023	08:15	1.3	SSE
04/10/2023	22:30	0.9	SSE	05/10/2023	15:45	1.8	E	06/10/2023	08:30	1.3	SSE
04/10/2023	22:45	0.9	SSE	05/10/2023	16:00	2.2	ESE	06/10/2023	08:45	1.8	SSE
04/10/2023	23:00	1.3	SSE	05/10/2023	16:15	2.7	ESE	06/10/2023	09:00	1.8	SSE
04/10/2023	23:15	1.3	SSE	05/10/2023	16:30	2.7	ESE	06/10/2023	09:15	1.8	SSE
04/10/2023	23:30	1.8	SE	05/10/2023	16:45	3.6	ESE	06/10/2023	09:30	1.8	SSE
04/10/2023	23:45	1.8	SSE	05/10/2023	17:00	4	ESE	06/10/2023	09:45	1.8	SE
05/10/2023	00:00	1.3	SSE	05/10/2023	17:15	4	ESE	06/10/2023	10:00	1.8	ESE
05/10/2023	00:15	1.3	SSE	05/10/2023	17:30	3.1	ESE	06/10/2023	10:15	2.2	SE
05/10/2023	00:30	0.9	SE	05/10/2023	17:45	3.1	ESE	06/10/2023	10:30	1.8	SE
05/10/2023	00:45	0.9	SSE	05/10/2023	18:00	3.1	ESE	06/10/2023	10:45	1.8	SE
05/10/2023	01:00	1.3	SSE	05/10/2023	18:15	3.1	ESE	06/10/2023	11:00	2.2	SE
05/10/2023	01:45	1.2	SSE	05/10/2023	18:30	3.1	ESE	06/10/2023	11:15	2.2	ESE
05/10/2023	02:00	1.2	SSE	05/10/2023	18:45	2.7	ESE				
05/10/2023	02:15	1.4	SSE	05/10/2023	19:00	2.7	ESE				
05/10/2023	02:30	1.3	SSE	05/10/2023	19:15	2.2	ESE				
05/10/2023	02:45	1.3	SSE	05/10/2023	19:30	1.8	ESE				
05/10/2023	03:00	1.2	SSE	05/10/2023	19:45	1.8	ESE				
05/10/2023	03:15	1.2	SSE	05/10/2023	20:00	1.3	ESE				
05/10/2023	03:30	1.2	SSE	05/10/2023	20:15	1.3	ESE				
05/10/2023	03:45	1.1	SSE	05/10/2023	20:30	1.3	ESE				

Appendix C – Noise Survey Data

Appendix C- Raw Noise Data

MP1

Time	L_{Aeq}	$L_{Amax,F}$	L_{AF90}	Time	L_{Aeq}	$L_{Amax,F}$	L_{AF90}	Time	L_{Aeq}	$L_{Amax,F}$	L_{AF90}
	dB	dB	dB		dB	dB	dB		dB	dB	dB
08/09/2023 11:45:00	51.1	65.9	47.2	08/09/2023 23:45:00	46	57	37.3	09/09/2023 11:45:00	56.8	80.8	45.6
08/09/2023 12:00:00	51.5	62.8	47.6	09/09/2023 00:00:00	47.1	62.8	39.1	09/09/2023 12:00:00	57.5	84	45.9
08/09/2023 12:15:00	51.2	64.5	47.6	09/09/2023 00:15:00	45.4	58.5	36.9	09/09/2023 12:15:00	49.9	67	44.1
08/09/2023 12:30:00	51.5	69.5	47.2	09/09/2023 00:30:00	46.1	56.8	37.4	09/09/2023 12:30:00	48.6	63.9	45.1
08/09/2023 12:45:00	53.4	80.8	48.2	09/09/2023 00:45:00	46.5	55.7	40.1	09/09/2023 12:45:00	47.7	63	43.3
08/09/2023 13:00:00	51.3	67.6	47.1	09/09/2023 01:00:00	45.6	53.7	37.8	09/09/2023 13:00:00	51.2	74.8	42.7
08/09/2023 13:15:00	50.8	67.7	46.9	09/09/2023 01:15:00	45.9	55.1	36.5	09/09/2023 13:15:00	47.5	62.3	41.6
08/09/2023 13:30:00	51.1	66	47	09/09/2023 01:30:00	46.5	62.5	34.2	09/09/2023 13:30:00	46.1	58.2	41.6
08/09/2023 13:45:00	51.1	62.4	46.5	09/09/2023 01:45:00	45.2	59.2	34.4	09/09/2023 13:45:00	48.4	71.7	42.9
08/09/2023 14:00:00	51.7	73.2	47.7	09/09/2023 02:00:00	46	59.2	38.3	09/09/2023 14:00:00	47.8	65.6	40.5
08/09/2023 14:15:00	50.6	62	46.9	09/09/2023 02:15:00	47.1	56	41.3	09/09/2023 14:15:00	48	62.2	42.8
08/09/2023 14:30:00	51.5	67.4	47.3	09/09/2023 02:30:00	45.6	55	39.2	09/09/2023 14:30:00	47.6	66.5	42.4
08/09/2023 14:45:00	52.6	70	47.7	09/09/2023 02:45:00	46.2	60.1	39.1	09/09/2023 14:45:00	46.6	67.8	41.7
08/09/2023 15:00:00	55	73.2	47.5	09/09/2023 03:00:00	45.7	57.8	38.3	09/09/2023 15:00:00	50.3	71.8	41.9
08/09/2023 15:15:00	51.8	69.6	47.7	09/09/2023 03:15:00	45	58.9	37.7	09/09/2023 15:15:00	49.6	67.1	42.4
08/09/2023 15:30:00	53.9	72.5	48.1	09/09/2023 03:30:00	46.6	62.7	39.5	09/09/2023 15:30:00	47.7	65.6	41.6
08/09/2023 15:45:00	51.2	67.1	46.6	09/09/2023 03:45:00	46.1	56.2	35.3	09/09/2023 15:45:00	48.5	69.2	40.9
08/09/2023 16:00:00	50.7	67.1	45.8	09/09/2023 04:00:00	46.3	59.7	39	09/09/2023 16:00:00	47.3	61.8	41.6
08/09/2023 16:15:00	51.3	65.4	46.6	09/09/2023 04:15:00	46.4	63.6	39.2	09/09/2023 16:15:00	48.5	71.2	42.2
08/09/2023 16:30:00	52.1	74.8	47.5	09/09/2023 04:30:00	46.1	57.2	38.8	09/09/2023 16:30:00	48.5	59.9	41.1
08/09/2023 16:45:00	50.9	69.1	46.1	09/09/2023 04:45:00	46.7	58.9	39.4	09/09/2023 16:45:00	48.9	64.5	43.1
08/09/2023 17:00:00	56.4	79.6	47.4	09/09/2023 05:00:00	47.4	61.4	41.4	09/09/2023 17:00:00	47.6	64.7	41.1
08/09/2023 17:15:00	52.7	73.9	47.2	09/09/2023 05:15:00	48.2	55.9	43.5	09/09/2023 17:15:00	47.5	59.3	41
08/09/2023 17:30:00	51.1	65.8	45.5	09/09/2023 05:30:00	49.1	58.6	43.9	09/09/2023 17:30:00	47.4	59	41.5
08/09/2023 17:45:00	51.5	70.9	45.5	09/09/2023 05:45:00	48.5	63.7	42.4	09/09/2023 17:45:00	49.8	73.3	41.8
08/09/2023 18:00:00	50	64.4	44.8	09/09/2023 06:00:00	48.6	66.4	43.9	09/09/2023 18:00:00	50	76.9	40.5
08/09/2023 18:15:00	51.9	73	44.4	09/09/2023 06:15:00	48.7	62.9	43.8	09/09/2023 18:15:00	48.9	69.7	41
08/09/2023 18:30:00	50.4	70.2	44.8	09/09/2023 06:30:00	51.2	69.3	44.2	09/09/2023 18:30:00	47.5	62.3	41.6
08/09/2023 18:45:00	49.5	64	45	09/09/2023 06:45:00	48.6	63.4	43.4	09/09/2023 18:45:00	48.1	65.1	42
08/09/2023 19:00:00	49.5	63.7	45.5	09/09/2023 07:00:00	49.2	62.2	44.5	09/09/2023 19:00:00	51.4	75.5	39.8
08/09/2023 19:15:00	49	63.6	44.8	09/09/2023 07:15:00	49.7	69	43.6	09/09/2023 19:15:00	46.7	59.8	39.9
08/09/2023 19:30:00	47.7	62.6	41.5	09/09/2023 07:30:00	47.4	56.1	42	09/09/2023 19:30:00	52.7	71.9	40.4
08/09/2023 19:45:00	48	62.4	42.8	09/09/2023 07:45:00	48.9	58.4	43.6	09/09/2023 19:45:00	48	64.7	42.3
08/09/2023 20:00:00	48.5	61	42.4	09/09/2023 08:00:00	48.4	62.2	43.3	09/09/2023 20:00:00	46.2	57	41.2
08/09/2023 20:15:00	47.9	58.7	42.6	09/09/2023 08:15:00	48.8	60.3	43.4	09/09/2023 20:15:00	47.6	59	42.1
08/09/2023 20:30:00	46	65.3	41.1	09/09/2023 08:30:00	48.1	62.6	43.2	09/09/2023 20:30:00	47.3	58.2	41.7
08/09/2023 20:45:00	47.1	63.9	42.9	09/09/2023 08:45:00	49	70.4	43.4	09/09/2023 20:45:00	51.9	77.9	42.5
08/09/2023 21:00:00	48.8	59	45	09/09/2023 09:00:00	48.9	67.5	42.7	09/09/2023 21:00:00	48	59.4	42.8
08/09/2023 21:15:00	48.5	63.5	43.4	09/09/2023 09:15:00	48.1	60.4	43.7	09/09/2023 21:15:00	49	68.7	43.7
08/09/2023 21:30:00	47.9	59.1	43.4	09/09/2023 09:30:00	53.1	84.4	42.4	09/09/2023 21:30:00	49.9	73.4	44.4
08/09/2023 21:45:00	48.1	64	42.1	09/09/2023 09:45:00	47.7	61.6	43	09/09/2023 21:45:00	48	56.6	44.1
08/09/2023 22:00:00	47.2	65.7	40.5	09/09/2023 10:00:00	47.1	55.1	43	09/09/2023 22:00:00	47.6	59.2	44.6
08/09/2023 22:15:00	46.6	62.2	41.8	09/09/2023 10:15:00	51.7	74.3	44.3	09/09/2023 22:15:00	47.6	56.7	43.8
08/09/2023 22:30:00	46.6	59.3	39.8	09/09/2023 10:30:00	47.9	58	42.9	09/09/2023 22:30:00	46.8	55	43.4
08/09/2023 22:45:00	47.2	56.8	41.5	09/09/2023 10:45:00	48	59.9	43	09/09/2023 22:45:00	47.3	56.5	43.1
08/09/2023 23:00:00	45.2	60.5	38.8	09/09/2023 11:00:00	47.6	59.9	43	09/09/2023 23:00:00	48.7	57	45
08/09/2023 23:15:00	46	57.3	39.9	09/09/2023 11:15:00	50.3	79.4	41.8	09/09/2023 23:15:00	49.2	55.7	46
08/09/2023 23:30:00	46	58.2	39.7	09/09/2023 11:30:00	50.7	72.2	45	09/09/2023 23:30:00	48.7	60.2	45.4

Appendix C – Noise Survey Data

Time	L_{Aeq} dB	$L_{Amax,F}$ dB	L_{AF90} dB	Time	L_{Aeq} dB	$L_{Amax,F}$ dB	L_{AF90} dB	Time	L_{Aeq} dB	$L_{Amax,F}$ dB	L_{AF90} dB
09/09/2023 23:45:00	47.9	59.7	42.7	10/09/2023 12:15:00	49.4	61.1	45.6	11/09/2023 00:45:00	46	57.3	40.2
10/09/2023 00:00:00	45.4	61.1	37.7	10/09/2023 12:30:00	51.3	64.5	46.5	11/09/2023 01:00:00	47.5	60.4	40.1
10/09/2023 00:15:00	44.2	54.8	36.3	10/09/2023 12:45:00	51.1	61.1	46.1	11/09/2023 01:15:00	47.3	62.2	39.8
10/09/2023 00:30:00	42.6	54.2	36.1	10/09/2023 13:00:00	48.2	65.9	42.7	11/09/2023 01:30:00	46	60	38.7
10/09/2023 00:45:00	45.9	60.3	37.1	10/09/2023 13:15:00	55.3	69.5	45.6	11/09/2023 01:45:00	45.7	57.1	37.5
10/09/2023 01:00:00	43.1	60.4	35	10/09/2023 13:30:00	51.1	65.4	44.9	11/09/2023 02:00:00	45.1	61.5	37.7
10/09/2023 01:15:00	45.4	61.9	35.8	10/09/2023 13:45:00	49.1	67.8	43.5	11/09/2023 02:15:00	46	55.8	38.9
10/09/2023 01:30:00	52.3	77.9	36.7	10/09/2023 14:00:00	48.6	69.2	43.1	11/09/2023 02:30:00	46.7	59.6	39
10/09/2023 01:45:00	42.7	55.2	34.2	10/09/2023 14:15:00	49.5	64.6	43.7	11/09/2023 02:45:00	47.1	59.6	41.2
10/09/2023 02:00:00	44.8	55.7	37.5	10/09/2023 14:30:00	48.5	59.9	43.6	11/09/2023 03:00:00	46.3	57.6	39.9
10/09/2023 02:15:00	44.8	64	36.9	10/09/2023 14:45:00	48.8	67	42.5	11/09/2023 03:15:00	47	59.9	40
10/09/2023 02:30:00	44.2	52.8	35.7	10/09/2023 15:00:00	47.5	58.9	41.3	11/09/2023 03:30:00	45.8	56.1	39.4
10/09/2023 02:45:00	45.7	56.9	38.2	10/09/2023 15:15:00	47.8	60.8	42.7	11/09/2023 03:45:00	47.2	62.9	41.3
10/09/2023 03:00:00	47.3	62.7	42.7	10/09/2023 15:30:00	47.6	60.1	42.9	11/09/2023 04:00:00	47	54.8	42.1
10/09/2023 03:15:00	46.1	57.1	37.8	10/09/2023 15:45:00	49.6	69.4	42.1	11/09/2023 04:15:00	46.9	56.5	41.8
10/09/2023 03:30:00	45.9	55	39.8	10/09/2023 16:00:00	49	61.8	43.3	11/09/2023 04:30:00	48.4	58.3	44.3
10/09/2023 03:45:00	46.7	57.5	40.5	10/09/2023 16:15:00	47.4	70.3	43.2	11/09/2023 04:45:00	48.5	57.7	44.8
10/09/2023 04:00:00	47.3	60.2	42.2	10/09/2023 16:30:00	51.1	67.8	45.3	11/09/2023 05:00:00	49.8	61.5	46.2
10/09/2023 04:15:00	45.6	56.3	39.7	10/09/2023 16:45:00	50	64.4	45	11/09/2023 05:15:00	50.9	63.2	47.1
10/09/2023 04:30:00	45.7	56.4	39.1	10/09/2023 17:00:00	50.5	66.8	46.3	11/09/2023 05:30:00	51.4	62.7	47.6
10/09/2023 04:45:00	46.6	64.6	41.4	10/09/2023 17:15:00	50.3	75.5	46.1	11/09/2023 05:45:00	52	72.4	47.7
10/09/2023 05:00:00	47	55.8	41.6	10/09/2023 17:30:00	51.7	80.2	47.3	11/09/2023 06:00:00	52.3	62.7	49.1
10/09/2023 05:15:00	47.9	60.2	43.6	10/09/2023 17:45:00	52.2	77.6	47.8	11/09/2023 06:15:00	53.6	68.8	50.9
10/09/2023 05:30:00	50.2	57.8	46.3	10/09/2023 18:00:00	52.3	71.6	47.4	11/09/2023 06:30:00	54	72.3	50.5
10/09/2023 05:45:00	50	59.2	44.8	10/09/2023 18:15:00	52.4	74.4	46.4	11/09/2023 06:45:00	53.4	69.4	50.8
10/09/2023 06:00:00	51.7	74.3	44.3	10/09/2023 18:30:00	52.8	75.7	45.8	11/09/2023 07:00:00	53.9	65.7	51.4
10/09/2023 06:15:00	50	69.4	43.6	10/09/2023 18:45:00	51.1	74.5	46.9	11/09/2023 07:15:00	53.6	66.6	51.1
10/09/2023 06:30:00	51.1	69.8	41.9	10/09/2023 19:00:00	50.1	65.8	47.2	11/09/2023 07:30:00	55.1	78.5	51.1
10/09/2023 06:45:00	49.5	66.9	43	10/09/2023 19:15:00	50.7	65.9	47	11/09/2023 07:45:00	54.3	68.3	51.2
10/09/2023 07:00:00	50.2	66.3	43.4	10/09/2023 19:30:00	49.9	63.4	47.3	11/09/2023 08:00:00	52.9	64	50.4
10/09/2023 07:15:00	48.8	64.2	42	10/09/2023 19:45:00	49.5	69.2	46.6	11/09/2023 08:15:00	53	69.4	50
10/09/2023 07:30:00	48.6	63.2	43.5	10/09/2023 20:00:00	49.3	57.2	47	11/09/2023 08:30:00	53.2	67	50.3
10/09/2023 07:45:00	47.9	61.2	42.3	10/09/2023 20:15:00	50.7	77.9	45.8	11/09/2023 08:45:00	52.4	68.3	49.1
10/09/2023 08:00:00	49	63.1	43.6	10/09/2023 20:30:00	49.1	62.5	46.3	11/09/2023 09:00:00	51.9	69.2	48.9
10/09/2023 08:15:00	50	64.9	44.9	10/09/2023 20:45:00	48.9	60.2	45.9	11/09/2023 09:15:00	51.8	65.6	48.5
10/09/2023 08:30:00	47.2	61.7	42.4	10/09/2023 21:00:00	50.8	64.9	46.3	11/09/2023 09:30:00	51.8	60.4	49
10/09/2023 08:45:00	47.3	61.2	40.8	10/09/2023 21:15:00	48.5	59.9	44.4	11/09/2023 09:45:00	51.7	60.4	48.6
10/09/2023 09:00:00	47.8	64.3	41.1	10/09/2023 21:30:00	48.3	60.6	43.9	11/09/2023 10:00:00	52.1	66.1	48.9
10/09/2023 09:15:00	48	61.8	42.9	10/09/2023 21:45:00	47.2	58.9	42.9	11/09/2023 10:15:00	54.9	74.2	49.3
10/09/2023 09:30:00	49	69.2	42.1	10/09/2023 22:00:00	47.8	63.5	42.9	11/09/2023 10:30:00	53.1	72.1	49.1
10/09/2023 09:45:00	48.4	65.5	41.5	10/09/2023 22:15:00	50.3	71.4	42.2	11/09/2023 10:45:00	54	70.9	50.1
10/09/2023 10:00:00	49.5	66.2	44.8	10/09/2023 22:30:00	46.1	57.3	39.9	11/09/2023 11:00:00	53.2	68.2	50.6
10/09/2023 10:15:00	47.9	60.4	43.1	10/09/2023 22:45:00	46.4	57.7	39.5				
10/09/2023 10:30:00	49.4	65.5	44.6	10/09/2023 23:00:00	46.8	62.8	37.9				
10/09/2023 10:45:00	62.5	76.1	46.4	10/09/2023 23:15:00	47.1	60.9	40.5				
10/09/2023 11:00:00	63.9	71.7	57.6	10/09/2023 23:30:00	49.3	64	43.3				
10/09/2023 11:15:00	56.3	67.1	48.3	10/09/2023 23:45:00	47.8	58.4	42				
10/09/2023 11:30:00	50.3	70.9	45.7	11/09/2023 00:00:00	47	56.1	39.5				
10/09/2023 11:45:00	49.9	61.7	45.7	11/09/2023 00:15:00	45.4	56.3	39.4				
10/09/2023 12:00:00	49.6	63.5	45.9	11/09/2023 00:30:00	46.8	58.5	40.2				

Appendix C – Noise Survey Data

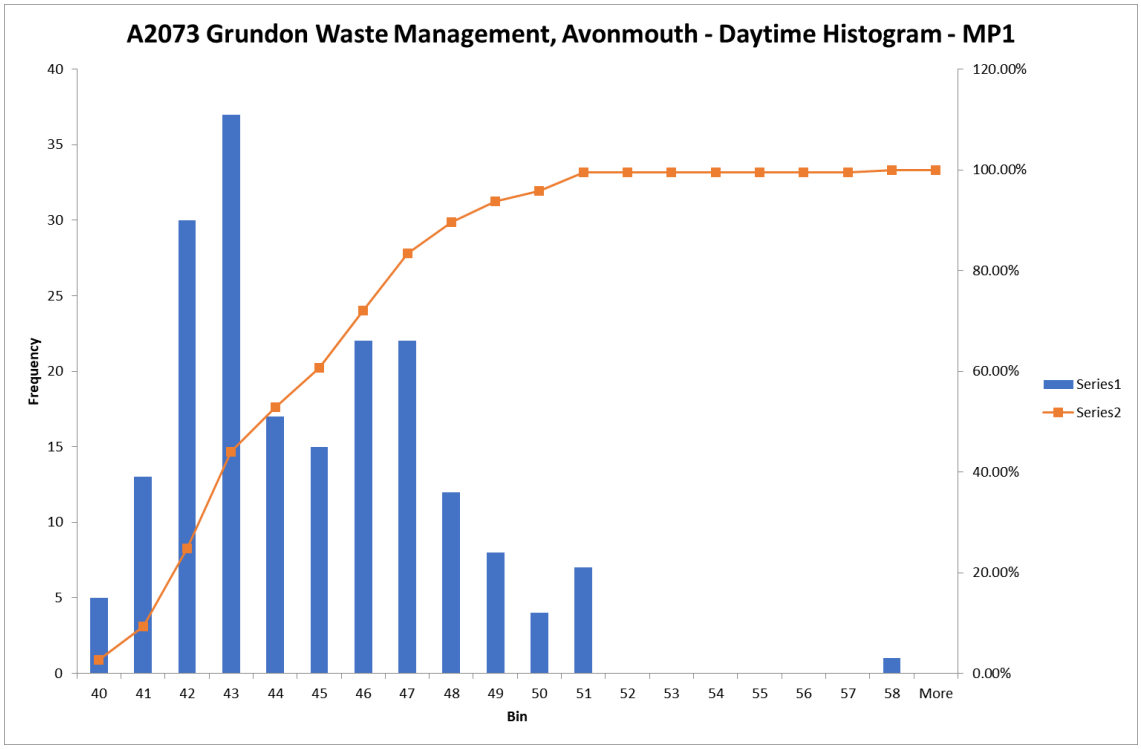
MP2

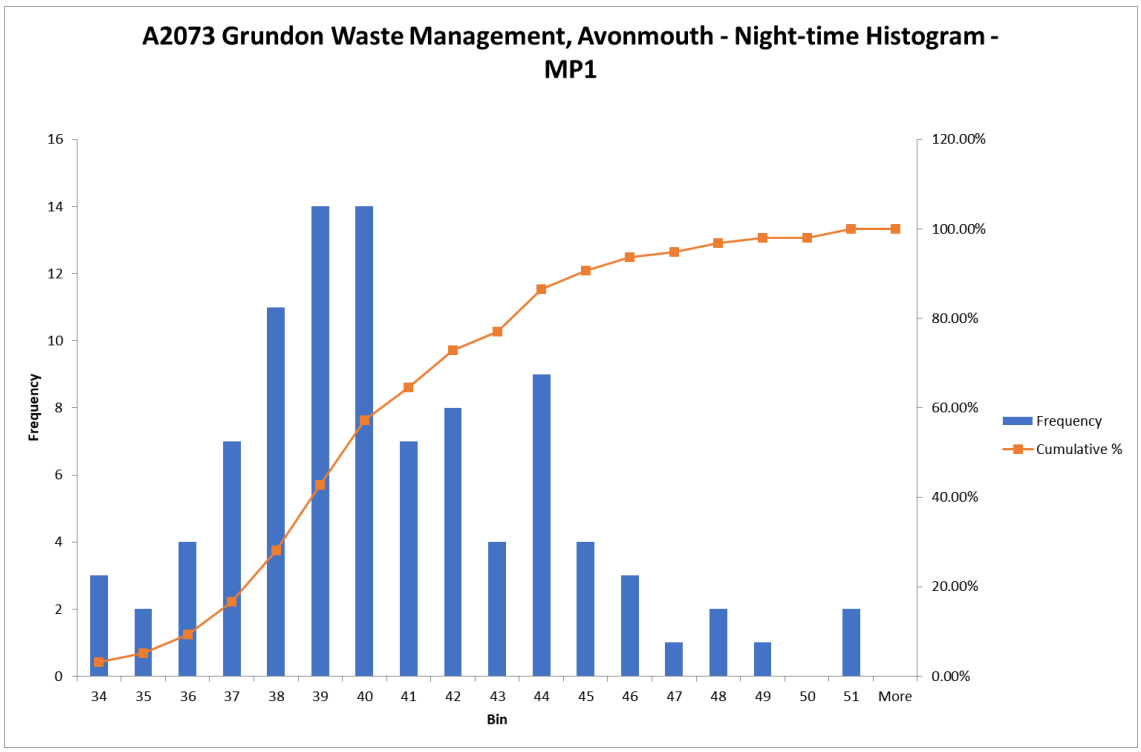
Time	L_{Aeq}	$L_{Amax,F}$	L_{AF90}	Time	L_{Aeq}	$L_{Amax,F}$	L_{AF90}	Time	L_{Aeq}	$L_{Amax,F}$	L_{AF90}
	dB	dB	dB		dB	dB	dB		dB	dB	dB
04/10/2023 12:00:00	60.3	82.3	53.4	05/10/2023 03:15:00	50.3	71.1	46.1	05/10/2023 18:30:00	52.1	66.4	49.7
04/10/2023 12:15:00	57.2	65.9	53.3	05/10/2023 03:30:00	49.2	64.2	46.8	05/10/2023 18:45:00	52.2	65.7	50.4
04/10/2023 12:30:00	56	67.9	52.4	05/10/2023 03:45:00	50	62.1	47.2	05/10/2023 19:00:00	52.6	65.7	50.3
04/10/2023 12:45:00	56.7	68.7	53.4	05/10/2023 04:00:00	50.5	62.2	47.3	05/10/2023 19:15:00	52.3	68.3	49.3
04/10/2023 13:00:00	57.4	70.7	53.6	05/10/2023 04:15:00	51.5	63.3	47.1	05/10/2023 19:30:00	51	64.9	49.1
04/10/2023 13:15:00	56.4	71.3	52.5	05/10/2023 04:30:00	50.7	59.7	48.4	05/10/2023 19:45:00	49.9	62.3	48.3
04/10/2023 13:30:00	56	70.6	52.1	05/10/2023 04:45:00	53.6	72.4	48.8	05/10/2023 20:00:00	50.7	63.8	48.4
04/10/2023 13:45:00	56.2	76.4	51.8	05/10/2023 05:00:00	52.2	62.3	49.2	05/10/2023 20:15:00	51.7	64.8	48.9
04/10/2023 14:00:00	54.4	63.7	51.5	05/10/2023 05:15:00	51.9	65.3	48.9	05/10/2023 20:30:00	50.4	58.4	48.8
04/10/2023 14:15:00	54	67.5	51.2	05/10/2023 05:30:00	53.9	64.7	50.8	05/10/2023 20:45:00	49.7	63.7	47.6
04/10/2023 14:30:00	54.4	66.5	51.4	05/10/2023 05:45:00	55	71.3	50.3	05/10/2023 21:00:00	48.8	58.6	47.1
04/10/2023 14:45:00	55.1	65.4	52	05/10/2023 06:00:00	53.7	62.9	50.7	05/10/2023 21:15:00	49.9	65.6	47
04/10/2023 15:00:00	54.5	64.8	51.7	05/10/2023 06:15:00	53.9	65.7	51	05/10/2023 21:30:00	49.2	62	47
04/10/2023 15:15:00	53.3	63.6	50.7	05/10/2023 06:30:00	55.4	66.8	52.5	05/10/2023 21:45:00	50.4	62.7	47.7
04/10/2023 15:30:00	53.7	65.4	50.4	05/10/2023 06:45:00	55.2	68.7	52	05/10/2023 22:00:00	49.1	62.9	46.7
04/10/2023 15:45:00	54.3	67.9	51.5	05/10/2023 07:00:00	55.1	66.2	52.4	05/10/2023 22:15:00	47.6	54.5	45.9
04/10/2023 16:00:00	54.6	72.3	51.5	05/10/2023 07:15:00	56.3	74.5	52.9	05/10/2023 22:30:00	47.7	55.7	45.9
04/10/2023 16:15:00	54.4	64.9	52	05/10/2023 07:30:00	56.1	72.4	53.2	05/10/2023 22:45:00	48.5	63.7	46.1
04/10/2023 16:30:00	54.3	78	51.7	05/10/2023 07:45:00	55.4	68.7	53.1	05/10/2023 23:00:00	47.7	56.7	46.1
04/10/2023 16:45:00	53.9	66.6	51.4	05/10/2023 08:00:00	55.6	69.3	52.3	05/10/2023 23:15:00	48.5	65.9	46.9
04/10/2023 17:00:00	54.9	72.8	50.9	05/10/2023 08:15:00	54.2	66.3	51.6	05/10/2023 23:30:00	49.3	62.9	47.4
04/10/2023 17:15:00	55.5	77.5	51.4	05/10/2023 08:30:00	54.8	68.6	51.4	05/10/2023 23:45:00	50.2	61.4	48
04/10/2023 17:30:00	52.5	67.1	49.8	05/10/2023 08:45:00	54.3	74.9	51.6	06/10/2023 00:00:00	50.4	64.4	48
04/10/2023 17:45:00	56.4	77.5	50.8	05/10/2023 09:00:00	55	75.6	51	06/10/2023 00:15:00	48.8	59.4	47.3
04/10/2023 18:00:00	57.4	80.1	50.3	05/10/2023 09:15:00	53.6	71.3	50.4	06/10/2023 00:30:00	49.3	63.8	46.6
04/10/2023 18:15:00	53.8	70.6	49.5	05/10/2023 09:30:00	53.8	63.4	50.3	06/10/2023 00:45:00	48.2	60.2	46.5
04/10/2023 18:30:00	51.6	65	48.3	05/10/2023 09:45:00	52.1	72.5	49.7	06/10/2023 01:00:00	47.7	59.9	45.9
04/10/2023 18:45:00	51.5	64.1	48.3	05/10/2023 10:00:00	53.2	68.1	49.9	06/10/2023 01:15:00	47.2	56.6	45.7
04/10/2023 19:00:00	52.3	62.4	50	05/10/2023 10:15:00	53.5	66.8	50.2	06/10/2023 01:30:00	47.2	57.1	45.9
04/10/2023 19:15:00	51.2	64.4	49	05/10/2023 10:30:00	53.8	70.8	50.2	06/10/2023 01:45:00	47.2	53	45.9
04/10/2023 19:30:00	50.6	64.1	48.5	05/10/2023 10:45:00	53.2	68.7	50.3	06/10/2023 02:00:00	47.7	58.2	45.4
04/10/2023 19:45:00	51	62.7	48.7	05/10/2023 11:00:00	54.3	75.7	50.5	06/10/2023 02:15:00	50	72.2	44.9
04/10/2023 20:00:00	50.7	61.7	48.5	05/10/2023 11:15:00	54.1	71.5	50.5	06/10/2023 02:30:00	47.6	60.3	45.7
04/10/2023 20:15:00	50.6	62.1	47.9	05/10/2023 11:30:00	53.2	64.5	50.3	06/10/2023 02:45:00	50	69.6	46.1
04/10/2023 20:30:00	49.5	62.5	47.4	05/10/2023 11:45:00	59.3	80.8	49.7	06/10/2023 03:00:00	51.3	71.2	46.7
04/10/2023 20:45:00	48.3	61.9	45.7	05/10/2023 12:00:00	53.9	75.3	49.7	06/10/2023 03:15:00	49.6	62.5	47
04/10/2023 21:00:00	49.4	59	46.3	05/10/2023 12:15:00	54.7	66.4	51.9	06/10/2023 03:30:00	48.9	55.2	47.4
04/10/2023 21:15:00	51.4	64.3	48.6	05/10/2023 12:30:00	54.9	67.7	51	06/10/2023 03:45:00	50.6	65.4	47.9
04/10/2023 21:30:00	52	68.3	48.1	05/10/2023 12:45:00	52.7	66.2	49.2	06/10/2023 04:00:00	51.7	62.9	48.1
04/10/2023 21:45:00	50.9	66.8	47.6	05/10/2023 13:00:00	52.8	72.5	49.2	06/10/2023 04:15:00	50.9	62.7	48
04/10/2023 22:00:00	50.3	61.9	48.5	05/10/2023 13:15:00	53.7	64.6	50.3	06/10/2023 04:30:00	50.5	70.1	48
04/10/2023 22:15:00	50.5	63.6	48.2	05/10/2023 13:30:00	55.1	70.5	50.1	06/10/2023 04:45:00	51.3	68.3	48
04/10/2023 22:30:00	49.6	57.5	47.7	05/10/2023 13:45:00	54.4	67.1	50.2	06/10/2023 05:00:00	52.4	65.5	48.7
04/10/2023 22:45:00	49.4	63.2	47.5	05/10/2023 14:00:00	54.2	67.8	49.7	06/10/2023 05:15:00	54.3	75.5	49.3
04/10/2023 23:00:00	48	55	46.3	05/10/2023 14:15:00	53.9	66.7	50.2	06/10/2023 05:30:00	54.2	70.8	48.8
04/10/2023 23:15:00	47.4	60.5	45.9	05/10/2023 14:30:00	53.8	67.4	49.9	06/10/2023 05:45:00	53	63.5	49.5
04/10/2023 23:30:00	48.1	61.6	45.7	05/10/2023 14:45:00	53.6	65.9	49.7	06/10/2023 06:00:00	52.8	66.1	49.9
04/10/2023 23:45:00	48.8	58.1	46.3	05/10/2023 15:00:00	53.6	67.6	50.5	06/10/2023 06:15:00	54.2	75.6	50.4
05/10/2023 00:00:00	48.3	57.2	46.8	05/10/2023 15:15:00	54	67.2	50.1	06/10/2023 06:30:00	54.1	64.1	51.6
05/10/2023 00:15:00	48.2	64.2	46.1	05/10/2023 15:30:00	53.5	68.8	50.1	06/10/2023 06:45:00	55.2	73.4	51.9
05/10/2023 00:30:00	49	61.3	45.6	05/10/2023 15:45:00	53.5	64.3	50.4	06/10/2023 07:00:00	55.1	67	52.8
05/10/2023 00:45:00	50.2	65.5	46.8	05/10/2023 16:00:00	52.8	67.6	49.9	06/10/2023 07:15:00	57.1	74.2	53.2
05/10/2023 01:00:00	48.8	63.2	45.2	05/10/2023 16:15:00	53.8	66.9	50.2	06/10/2023 07:30:00	54.9	65.9	52.6
05/10/2023 01:15:00	46.9	58.6	44.9	05/10/2023 16:30:00	52.1	64.3	49.4	06/10/2023 07:45:00	54.3	65.1	51.5
05/10/2023 01:30:00	46.8	56.8	45.4	05/10/2023 16:45:00	53.8	72.3	49.7	06/10/2023 08:00:00	54.7	68.7	51.6
05/10/2023 01:45:00	46.7	53.6	45.3	05/10/2023 17:00:00	52.7	66.6	49.3	06/10/2023 08:15:00	53.7	72.9	50.5
05/10/2023 02:00:00	46.9	61.2	45.3	05/10/2023 17:15:00	54.8	72.4	49.3	06/10/2023 08:30:00	54.2	67.4	50.8
05/10/2023 02:15:00	47.2	56.2	45.8	05/10/2023 17:30:00	51.7	67.3	49.1	06/10/2023 08:45:00	53.9	68	50
05/10/2023 02:30:00	48.9	58.2	47.1	05/10/2023 17:45:00	53.2	68.4	49.5	06/10/2023 09:00:00	53.4	68.1	49.5
05/10/2023 02:45:00	49.2	59.2	47.3	05/10/2023 18:00:00	51.7	62.1	49.1	06/10/2023 09:15:00	52.4	64.6	49.8
05/10/2023 03:00:00	50.3	69	46.8	05/10/2023 18:15:00	53	73.1	49.5	06/10/2023 09:30:00	53.5	65.6	49.4

Appendix D – Background Noise Histograms

Appendix D – Background Noise Level Histograms

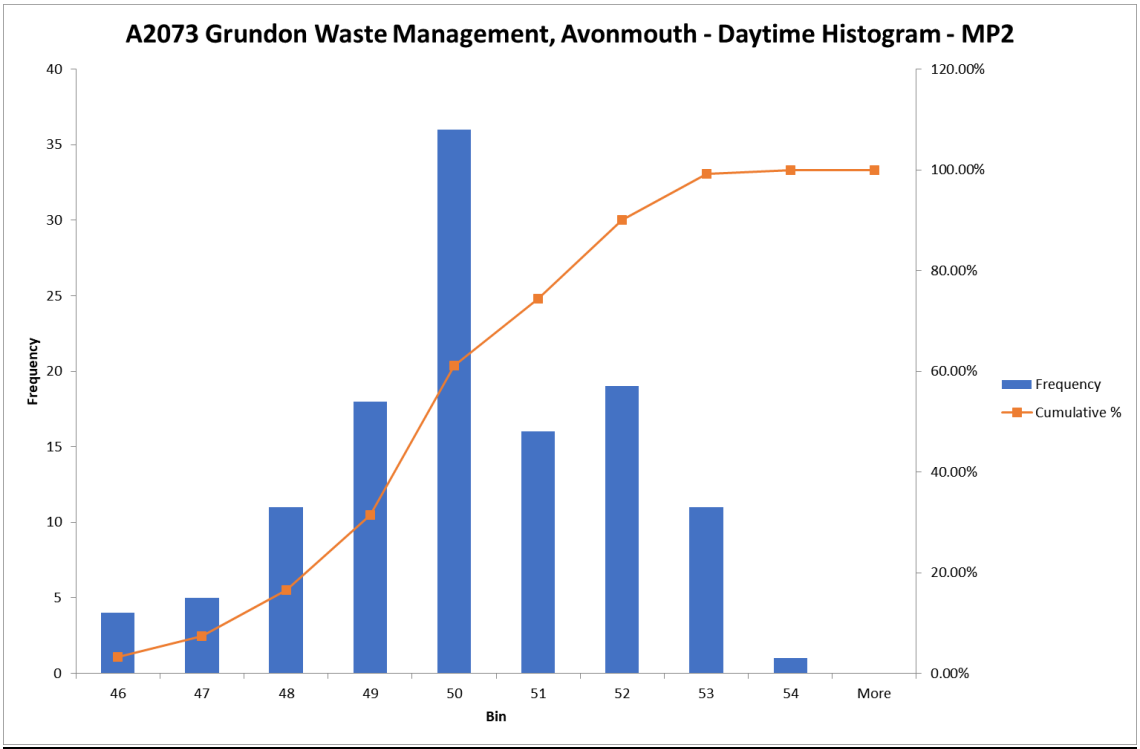
MP1

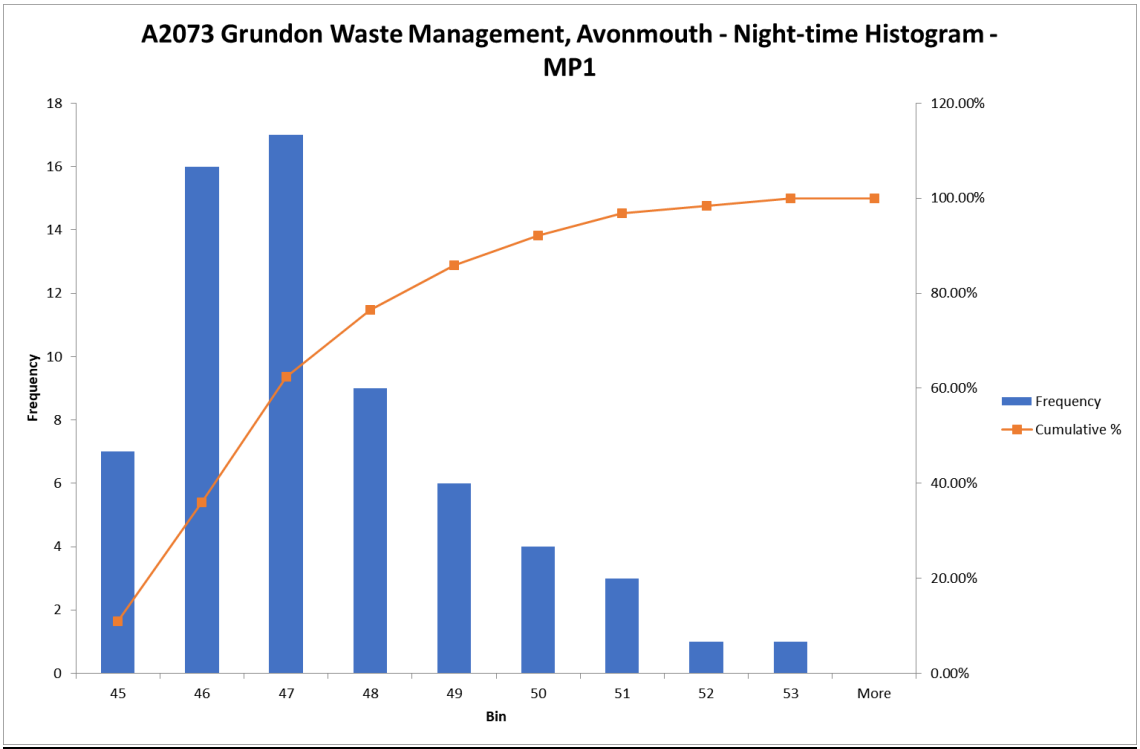




Appendix D – Background Noise Histograms

MP2





Appendix D – Background Noise Histograms