

Environmental Permit Noise Impact Assessment

For: Total Waste Management Solutions Ltd
Site: Dales Industrial Estate, Peterhead, Aberdeen

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Synopsis

Noise impacts from the operation of TWMA site at Peterhead have been assessed. The site operates 24/7, therefore the assessment has included for both daytime and night-time periods.

Attended and unattended sound measurements were carried out at locations representative of the closest off-site sensitive receptors when the TWMA site was in a period of shutdown to quantify the prevailing sound climate. The assessment was based on the results of these measurements to determine the level of noise impact at the receptors.

Noise levels from the operation of the TWMA site have been measured at the closest receptors on Greenacres Avenue in September 2025 following the relocation of a number of assets into an existing building on site and the replacement of the Mission pump. Measurements were undertaken during daytime and nighttime periods, and an assessment of the noise impact undertaken.

A comparison of the measured levels with those predicted in June 2024 (prior to the relocation of assets to the existing building and replacement of the mission pump) indicates that there has been a reduction in the noise level incident on the closest receptors of up to 11 dB.

Further noise levels from the operation of the TWMA site have been calculated based on measurements of plant and activities at the site undertaken in September 2025. The predicted levels have been assessed to determine the potential noise impacts upon the closest receptors. The daytime BS 4142 assessment indicates that typical operational activities at the TWMA site do not result in an adverse noise impact upon the ground level of the closest noise sensitive receptors on Greenacres Avenue, and only a low impact at first floor level.

At night, the BS 4142 assessment indicates that there is a significant noise impact upon the closest noise sensitive receptors on Greenacres Avenue at both ground floor and first floor levels. Adverse impacts are also calculated at other receptors, although the level of impact is significant less.

Whilst the BS 4142 assessment indicates a significant noise impact at properties on Greenacres Avenue at night, when assessed using the PAN/2011 assessment methodology, a slight to moderate impact is calculated. In addition, the increase in the ambient level when compared with the baseline (TWMA not operational) residual level, is minor with a maximum increase of 2 dB.

An assessment of LA_{max} levels at receptors on Greenacres Avenue from the knocking of the bins during bin tipping to dislodge residual material indicates that the LA_{max} levels from this activity are similar to those measured when the TWMA site was not operational.

Analysis of the noise source contributions at the receptor locations indicates that the large bank of cooling fans located to the west of the repurposed building are the dominant noise source. It is recommended that consideration is given to enclosing these fans with an acoustic louvred enclosure.



1. Introduction

1.1 Background

Total Waste Management Alliance Ltd (TWMA) provide waste management and treatment solutions to the offshore oil and gas sectors. The facility located at Peterhead processes drill cuttings and oil recovery. The facility is permitted under The Pollution Prevention and Control (Scotland) Regulations 2012.

TWMA commissioned Mabbett & Associates Ltd (Mabbett) to provide an assessment of noise impacts from the operation of their site located at Peterhead, as required under Condition 6.4.7 of PPC Permit no. PPC/A/1000175 in January 2023.

Following the environmental noise assessment undertaken in January 2023 (Report Title: 311768 TWMA Noise Impact Assessment (v1.0 Feb 23) Final), TWMA commissioned Arthian (formerly Mabbett) to undertake a repeat assessment which would include new measured background sound levels made during a site shut down to allow for more representative background levels. The assessment and potential mitigation measures that could be employed are detailed in the Mabbett report titled '313526 TWMA Noise Impact Assessment (v6.0, August 24).

Following the relocation of assets into an existing building on site (Roto mill and decanter) and the replacement of the Mission pump, this new noise survey has been commissioned by TWMA to determine whether the measures have reduced the noise impacts upon the closest noise sensitive receptors.

This noise assessment has been completed in line with BS 4142:2014+A1:2019 – “Methods for rating and assessing industrial and commercial sound”.

It must be noted that the introduction of noise mitigation measures will be undertaken using a phased approach, with new noise measurements to be undertaken on the completion of each phase, and where required, determine what further noise mitigation measures may be required.

This noise assessment is focussed on the evaluation of noise impacts on the nearest noise sensitive receptors following the relocation of assets into the repurposed building and provides recommendations for further noise mitigation measures that could be employed.

A summary of sound terminology is given in Appendix A. The permit application boundary is given in Figure 1.





Figure 1: Permit Boundary

1.2 Site Description

The TWMA site is located within the established Dales Industrial Estate, to the east of the A90.

To the immediate north is a storage area, beyond which new residential housing is being constructed. To the north-east are established residential areas. To the south and east are industrial premises, including a household recycling centre, a blast cleaning company and a seafood processing facility. There are several isolated properties located to the south of the industrial estate on Damhead Way. To the west is the A90, beyond which the land use is rural of which there are a number of farmsteads.



1.3 Site Activities

The current noise-generating equipment at the TWMA Peterhead site includes:

Housed within the repurposed building:

- Rotomill;
- Decanter centrifuge;
- Disk stack centrifuge;
- Evaporator;

External areas:

- Thermal oxidiser;
- Carbon capture unit;
- Generators;
- Feed skid (with associated fan)
- Cooling fans;
- Blowers; and
- Pumps.

It must be noted that the thermal oxidiser and carbon capture unit are new assets and therefore were not including in the previous noise assessments for the site.

Other activities that are undertaken on site are the washing of the bins, both via an automatic bin washer (to clean the inside of the bins) and by jet washing the outside of the bins by hand. These activities are undertaken during the daytime only, Monday to Friday.

- The automatic bin washer is not required every day, and the wash cycle is approximately 15 minutes per bin. On average 12-20 are washed per day.
- Jet washing is not required every day and takes approximately 10-20 minutes per bin, with a maximum of 20 washed per day.

A full list of equipment on-site and measured noise levels is provided in Appendix B.

1.4 Mitigation Employed

The following measures have been completed since the previous noise assessment, as part of the noise mitigation plan for the site:

- Relocation of the Rotomill and other slop processing assets into the repurposed building located in the south-eastern corner of the TWMA site.
- Repositioning of Rotomill Fans to the south of the proposed repurposed building.



2. Assessment Location

2.1 Site Layout and Noise Sources

The layout of the TWMA site is provided in Figure 2.

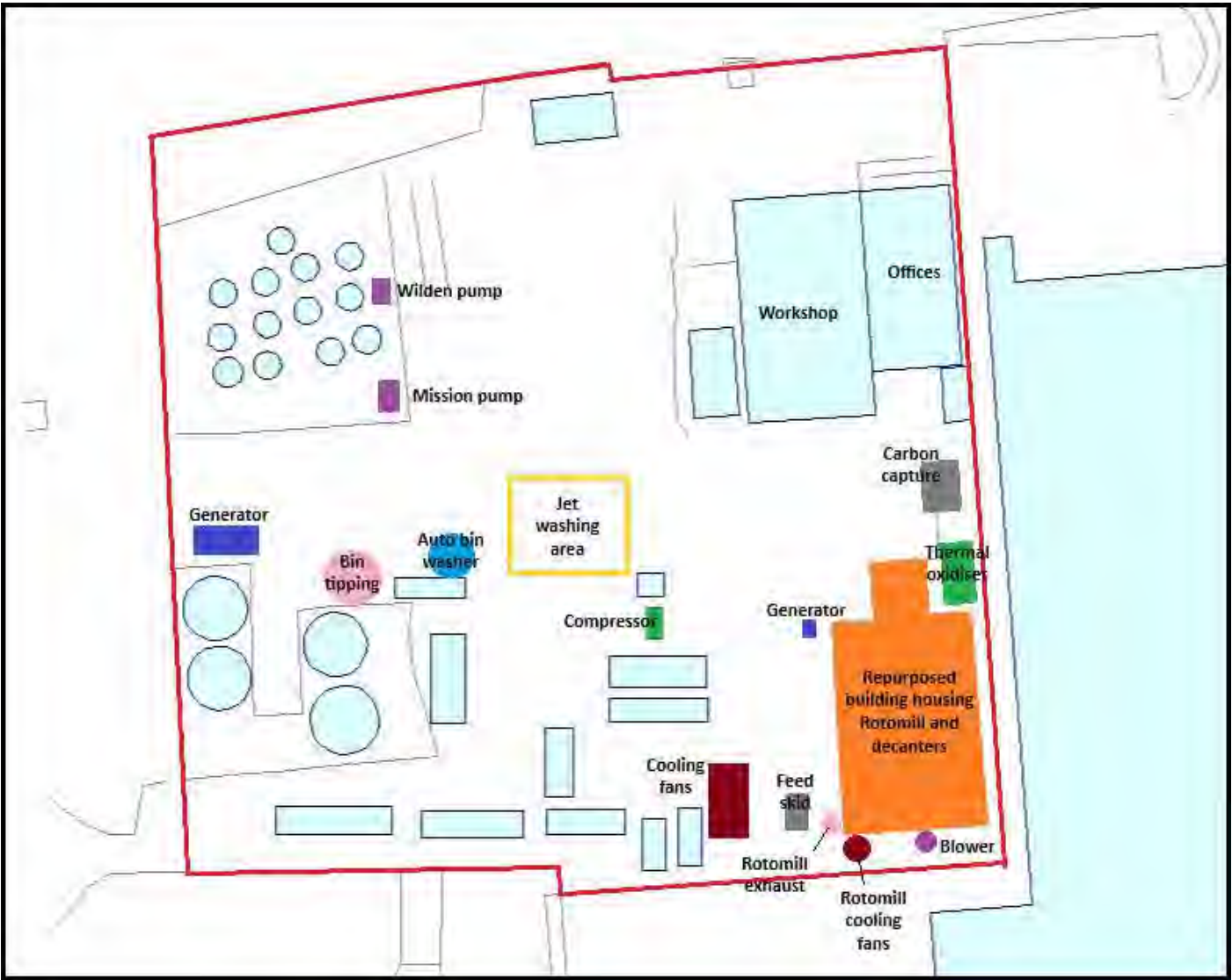


Figure 2: Site Layout

2.2 Receptor Locations

The location of the closest noise sensitive receptors relative to the site are given below in Table 1 and are illustrated in Figure 3.



Table 1: Selected Noise Sensitive Receptors

Receptor	Address	Distance from Site Boundary	Direction from Site Boundary	Grid Reference
R1	Greenacres Avenue - single storey	170m	N	NK 10914 44969
R1a	Greenacres Avenue - two storey	170m	N	NK 10851 44985
R2	Dales View Drive	485m	NE	NK 11295 45234
R3	Heath Drive	615m	ENE	NK 11573 45168
R4	Middle Cottage/ Whitehill Lodge, Damhead Way	280m	SE	NK 11262 44520

It should be noted that Receptors R1 & R1a are representative of new residential properties on Greenacres Avenue, granted permission in January 2017 under application APP/2016/0720. Evaluation of documents provided to support the planning application indicate that no noise assessment was undertaken to determine the noise impacts from existing premises at Dales Industrial Estate upon the proposed housing.

Had an assessment been undertaken it is considered that it would have established that the closest area of the proposed housing would not have been suitable for residential development, and that significant noise mitigation measures, such as stand-off distances and earth bunds, would have been required to ensure satisfactory internal and external noise levels.



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Figure 3: Noise Receptor Locations



2.3 Sound Monitoring Locations

2.3.1 Monitoring Locations

These survey locations include M1 on the bund which sits approximately 25m closer to the TWMA site than the facades of the properties at Greenacres Avenue and M1a which is representative of the facades of the receptors on Greenacres Avenue. In September 2025, monitoring was undertaken at a third location behind the rear garden fences of properties on Greenacres Avenue but behind the bund (M1b).

The October 2023 monitored background sound levels at location M1 (when the TWMA was in shutdown) have been used in the assessment.

These locations were:

Table 2: Sound Monitoring Locations

Monitoring Location	Details	Comment	Grid Reference
M1	Greenacres Avenue – base of bund	As agreed between TWMA, SEPA and Arthian (formerly Mabbett); meter installed at the base of the bund on the TWMA side (south side of the properties in direct line of TWMA site out with the tree line)	NK 10988 44954
M1a	Greenacres Avenue – between nos. 22 and 24	Simultaneous measurements undertaken at a location representative of the south facing façade of the nearest receptors to validate the long term sound measurements undertaken on the bund and to demonstrate the effect of the bund at ground floor level:	NK 10903 44956
M1b	To the rear of 28 Greenacres Avenue	To the rear of 28 Greenacres Avenue, behind the bund to demonstrate the effect of the bund at ground floor level.	NK 10970 44967

The location of the sound monitoring locations representative of the closest NSRs to the TWMA site are given below in Figure 4.

¹ Noise Monitoring Plan and Methodology, Version 4, 1 December 2022, TWMA Peterhead, Permit Reference: 6.4.2 PPC/A/1000175 VN09





Imagery © 2025 Google

Figure 4: Sound Monitoring Locations



2.3.2 Photographs



Figure 5: Sound Monitoring Location M1



Figure 6: Sound Monitoring Location M1a





Figure 7: Sound Monitoring Location M1b



3. Equipment and Meteorology

3.1 Equipment

3.1.1 Instrumentation

All measurements were taken at approximately 1.5 m above ground level, and in general accordance with the requirements of British Standard BS 7445. All monitoring locations were positioned at least 3.5 m from any reflecting surface, other than the ground (i.e. free-field). Details of ongoing activities and typical noise sources in the area were recorded during the set-up and retrieval of the monitoring equipment.

The Sound Level Meters used were a Class 1 precision instruments, programmed to log several parameters including L_{Aeq} , L_{A90} , L_{A10} and L_{Amax} values, in 30-minute contiguous intervals, as required by SEPA.

The calibration levels were checked prior to and following all measurements. No significant drift, more than 0.84 dB, occurred during the monitoring. Full calibration details are available upon request.

The following equipment was used for the sound monitoring exercise:

Table 3: Sound Monitoring Equipment Information – October 2023 (TWMA site not operational)

Monitoring Location	Equipment Item	Model & Type	Meter Serial Number	Calibration Date
M1	Sound Level Meter	CR:171C	G301856	11 October 2022
	Microphone	MK:224	23147A	11 October 2022
	Acoustic Calibrator	CR:515	93179	11 October 2022
M1a	Sound Level Meter	CR:171B	G303957	21 June 2023
	Microphone	MK:224	215828D	21 June 2023
	Acoustic Calibrator	CR:515	99089	21 June 2023



Table 4: Sound Monitoring Equipment Information – September 2025 (TWMA site operational)

Monitoring Location	Equipment Item	Model & Type	Meter Serial Number	Calibration Date
M1	Sound Level Meter	CR:171B	G303956	31 October 2023
	Microphone	MK:224	214052B	20 October 2023
	Acoustic Calibrator	CR:515	93995	02 July 2024
M1a, M1b and on-site measurements	Sound Level Meter	CR:171C	G301856	24 October 2023
	Microphone	MK:224	23147A	24 October 2023
	Acoustic Calibrator	CR:515	93179	05 November 2024

3.1.2 Calibration Details

Table 5: Calibration Details – October 2023 (site not operational)

Monitoring Location	Start Calibration dB	End Calibration dB	End off-set dB
Daytime			
M1 – 24hr	93.7	93.7	+0.1
M1a	93.7	93.7	-0.2
Night-time			
M1a	93.7	93.7	+0.1

Table 6: Calibration Details – September 2025 (site operational)

Monitoring Location	Start Calibration dB	End Calibration dB	End off-set dB
Daytime			
M1 – 24hr	93.7	93.7	+0.08
M1a	93.7	93.7	+0.74
M1b	93.7	93.7	+0.38



Night-time			
M1a	93.7	93.7	-0.15
M1b	93.7	93.7	-0.84

Monitoring data was downloaded using the Noise Tools software and exported to Microsoft Excel for manual analysis.

3.2 Meteorology

Weather conditions during the October 2023 background sound measurements are detailed in Table 7. Weather was observed whilst on site.

Table 7: Typical Weather Conditions during Sound Monitoring – October 2023 (site not operational)

Date	Period	Typical Temperature	Typical Wind speed	Typical Wind Direction	Conditions
02/10/2023	Day	13 - 15°C	0.2 – 2.2 m/s	SW / SSW	Dry, partial cloud & light breeze
	Night	12°C	0 – 0.4 m/s	SSW	Dry, very light breeze & clear skies
03/10/2023	Day	13°C	0 – 1.6 m/s	SW	Dry, sunny & light breeze

Weather conditions during the October 2023 background sound measurements are detailed in Table 8. Weather was observed whilst on site.

Table 8: Typical Weather Conditions during Sound Monitoring – September 2025 (site operational)

Date	Period	Typical Temperature	Typical Wind speed	Typical Wind Direction	Conditions
23/09/2025	Day	13°C	2.7-4.0 ms ⁻¹	NW	Overcast, dry
	Night	4°C	0.5-1.1 ms ⁻¹	S/SW	Partly cloudy, dry
24/09/2025	Day - AM	14°C	0.5-1.9 ms ⁻¹	S/SSE	Clear skies and dry

Based on the weather conditions observed and measured during the attended surveys, the prevailing conditions were considered suitable for noise monitoring for the duration of the measurement period. However, for consistency with the October 2023 background survey, measurements undertaken at M1a and M1b at night, and at M1 during the morning of 24 September 2025 has been utilised in this report due to the lower wind speeds and the wind direction being from the site towards the receptors at R1 and R1a.



4. Methodology

4.1 Sound Measurements

4.1.1 Measurements at Receptors – Background Survey October 2023

To capture background sound levels at the receptors, a survey of background sound levels was undertaken at Greenacres Avenue between Monday 02 and Tuesday 03 October 2023 for representative periods during the day and night when the TWMA site was not operational.

The sound measurements undertaken consist of periods when the site was operational and when was not operational over a period of 24 hours. During the 24-hour monitoring period the site was fully operational between 11:00 – 15:00 on Monday 02 October 2023. From 15:00 on Monday 02 October 2023 until 02:00 on Tuesday 03 October 2023, the site was shut down. From 02:00 until 11:00 on Tuesday 03 October 2023, the site was operational again.

The baseline sound monitoring was carried out in general accordance with the guidance in British Standard BS 7445: 2003 'Description and Measurement of Environmental Noise'².

4.1.2 Measurements at Receptors – September 2025

To assess the noise levels incident upon the closest receptors to the TWMA site, measurements were undertaken between Tuesday 23 September 2025 and Wednesday 24 September 2025. Measurements were undertaken at one location for a period of 24 hours when the TWMA site was fully operational. Further measurements at two locations were undertaken for representative periods during the day and night.

4.1.3 Specific Sound Measurements

Measurements were undertaken of activities and operational plant at the site on Thursday 11 September 2025 for inclusion in the noise model.

Details of the measured sound levels are given in Appendix B.

² BS 7445: 2003 'Description and Measurement of Environmental Noise'. British Standards Institution.



4.2 Calculations and Assessment

4.2.1 BS 4142 Operational Noise Assessment

Response to sound is subjective and affected by many factors, both acoustic and non-acoustic. In general, the likelihood of complaints in response to sound depends on factors, including:

- the margin by which it exceeds the background sound level;
- the absolute sound level;
- the character of the sound;
- the time of day;
- the change in the sound environment; and
- the nature of the local area.

The standard used for assessing industrial sound and determining community reaction is British Standard BS 4142: 2014 'Methods for rating and assessing industrial and commercial sound'³. According to the standard, it can be used for:

- investigating complaints;
- assessing sound from proposed, new, modified or additional source(s) of sound of an industrial and/or commercial nature; and
- assessing sound at proposed new dwellings or premises used for residential purposes.

The basis of BS 4142 is a comparison between the rating level of the noise source under consideration and the background sound level in the vicinity of residential locations. The relevant parameters in this instance are as follows:

- Background Sound Level – $L_{A90,T}$ – defined as the 'A' weighted sound pressure level that is exceeded by the residual sound at the assessment location for 90% of a given time interval, T. This is measured using time weighting F and quoted to the nearest whole number of decibels;
- Specific Sound Level – $L_{Aeq,T}$ – the equivalent continuous 'A' weighted sound pressure level produced by the specific sound source at the assessment location over a given time interval, T;
- Residual Sound Level – $L_{Aeq,T}$ – the equivalent continuous 'A' weighted sound pressure level at the assessment location in the absence of the specific sound source under consideration, over a given time interval, T; and
- Rating Level – $L_{Ar,T}$ – the specific sound level plus any penalties applied for the characteristic features of the specific sound source such as tonality, impulsivity and intermittency.

To determine the overall Rating Level, characteristics of the specific sound need to be considered, and corrections applied (if deemed appropriate). These corrections can include the following:

³ BS 4142: 2014+A1:2019 'Methods for rating and assessing industrial and commercial sound'. British Standards Institution.



Subjective Assessment of Tonality:

- +2 dB if tonal noise was slightly perceptible;
- +4 dB if tonal noise was clearly perceptible; and
- +6 dB if tonal noise was highly perceptible.

Impulsivity:

- +3 dB if impulsive noise was slightly perceptible;
- +6 dB if impulsive noise was clearly perceptible; and
- +9 dB if impulsive noise was highly perceptible.

Intermittency:

When the specific sound is identified as being of an inherently intermittent in nature, and the intermittency is perceived to be distinctive against the residual acoustic environment, a correction of +3 dB can be applied to the specific noise level.

Other Sound Characteristics:

Where the specific sound features characteristics that are neither tonal nor impulsive but is perceived to be distinctive against the residual acoustic environment, a correction of +3 dB can be applied to the specific noise level.

Following the calculation of the rating level, this is then compared to the background noise level in order to estimate the potential impact of the noise on the receptor. Generally, as the margin by which the rating level exceeds the background level increases, the magnitude of impact also increases.

Section 11 of BS 4142 provides the following guidance:

Table 9: BS 4142 Magnitude of Impact from Industrial Noise

Excess of Rating Level over Background Level	Indicative Outcome	Arthian Assessment
Around 10 dB or more	Likely to be an indication of a significant adverse impact, depending upon the context.	Significant Adverse Impact
Around 5 dB to 10 dB	Likely to be an indication of an adverse impact, depending upon the context.	Adverse Impact
0 dB to 5 dB	Some impact, but less likely to be an adverse impact, depending upon the context.	Low Impact
0 dB or below	Indication of no/low impact, depending on the context.	Negligible/No Impact

Importantly, BS 4142:2014+A1:2019 also requires that the rating level of the sound source under assessment is considered in the context of the environment when defining the overall significance of the impact. The standard suggests that in assessing the context, all relevant factors should be taken into consideration, including the following:



- The absolute level of sound;
- The character and level of the residual sound compared to the character and level of the specific sound; and
- The sensitivity of the receptor and whether dwellings or other premises used for residential purposes will already incorporate design measures that secure good internal and/or outdoor acoustic conditions.

4.2.2 PAN 1/2011 and TAN

In addition to a BS4142 assessment, PAN1/2011 and TAN provides a further methodology for assessing noise impacts from developments. Whilst it is based on the principles in BS4142, it provides a further assessment of impact by also examining the change in the ambient level at receptors. The assessment therefore provides a more realistic assessment of potential noise impact upon receptors.

Based on the assessment methodology given in TAN, the sensitivity of each selected receptor is assessed based on the likelihood of complaint, whereby the difference between the Rating Level and measured background noise level determines the sensitivity of the receptor.

Table 10: Determination of Receptor Sensitivity

Difference (X) between Rating Level and Background Level dB	Assessed Sensitivity
$X < 5$	Low
$5 \leq X < 10$	Medium
$X \geq 10$	High

The level of significance of the noise impacts from an industrial development on residential properties is then determined from Table 11 below (which is reproduced from Table 3.3 of the TAN).

Table 11: Significance of Effect Criteria Table

Change in Ambient dB	Sensitivity of Receptor based on Likelihood of Complaint $x = (\text{Rating } (L_{Ar,Tr}) - \text{Background } (L_{A90,T}) \text{ dB})$		
	Low ($x < 5$)	Medium ($5 \leq x < 10$)	High ($x \geq 10$)
Major (≥ 5)	Slight/Moderate	Moderate/Large	Large/Very Large
Moderate (3 to 4.9)	Slight	Moderate	Moderate/Large
Minor (1 to 2.9)	Neutral/Slight	Slight	Slight/Moderate
Negligible (0.1 to 0.9)	Neutral/Slight	Neutral/Slight	Slight
No Change (0)	Neutral	Neutral	Neutral



The sensitivity of the receptor is based on the likelihood of complaint as determined by the difference between the Rating level and the Background noise level. The sensitivity of the receptor to noise increases from 'Low' to 'High' as the probability of complaint increases. The level of significance depends on the difference in noise levels as determined by the magnitude of the impact and the sensitivity of the receptor as determined by the probability of complaint.

With regards to the significance of effect, the following applies (taken from Section 2.52 of TAN):

- Neutral: No effect, not significant, noise need not be considered as a determining factor in the decision making process.
- Slight: These effects may be raised but unlikely to be of importance in the decision making process.
- Moderate: These effects, if adverse, while important, are not likely to be key decision making issues.
- Large: These effects are likely to be important considerations but where mitigation may be effectively employed such that resultant adverse effects are likely to have a Moderate or Slight significance.
- Very Large: these effects represent key factors in the decision-making process. They are generally, but not exclusively associated with impacts where mitigation is not practical or would be ineffective.



5. Noise Monitoring Data and Calculations

5.1 Survey Results

5.1.1 TWMA Site Not Operational (October 2023)

The measured data were processed to define the L_{Aeq} , L_{A90} and L_{AFmax} sound levels during the daytime and night-time periods. The results are presented in Table 12 for the background levels when the site was not operational.

Table 12: Unattended Sound Monitoring Results – October 2023 Site Not Operational

Monitoring Location	Date	Monitoring Period	Duration Hr:min	Sound Levels		
				L _{Aeq,T} dB	Typical L _{A90,T} dB	L _{AFmax} dB
DAYTIME						
M1	02/10/23	16:00 - 23:00	07:00	48	43	58 – 69
	02/10/23	16:00 – 18:00	02:00	50	45	63 – 65
NIGHT-TIME						
M1	02/10/23 – 03/10/23	23:00 – 02:00	03:00	46	28	52 - 62

It should be noted that the period 15:00 - 16:00 has not been incorporated as the site was partially operational during this hour period, as the site was closing down. From 16:00 hours onward the site was fully shut down.

When the site was shut down during the day, the sound environment at the receptors on Greenacres Avenue were dominated by road traffic on the A90. Reverse warning alarms (tonal) from the Peterson site adjacent to TWMA were audible, in addition to an impulsive banging noise from metal objects being dropped. A variable noise consistent with a distant jet engine was also audible during attended monitoring. The sound environment also consisted of high altitude aircraft and helicopters, a barking dog, the voices of children playing, and music from a nearby house.

During the shut down of the site at night, the sound environment consisted of occasional road traffic on the A90 and distant road traffic. A distant constant industrial noise consistent with a generator was audible throughout attended monitoring, in addition to a number of reverse warning alarms also distant from the same site to the south of TWMA.



5.1.2 TWMA Site Operational (September 2025)

The processed results for when the site was fully operational are given in Table 13. The full data set has not been included, with data being extracted for when wind speed and direction was similar to that during the October 2023 survey to allow a more representative comparison.

Table 13: Sound Monitoring Results – September 2025 Site Fully Operational

Monitoring Location	Date	Monitoring Period	Duration Hr:min	Sound Levels		
				L _{Aeq,T} dB	Typical L _{A90,T} dB	L _{AFmax} dB
DAYTIME*						
M1	24/09/25	07:00 - 11:00	04:00	49	41	55-65
NIGHT-TIME						
M1	23/09/25 – 24/09/25	23:00 - 02:30	03:30	42	38	53-76
M1a	24/09/25	23:30 – 00:30	01:00	41	35	63-71
M1b	24/09/25	00:30 – 02:00	01:30	41	37	52-64

* Only measurements undertaken on 24/09/2025 have been provided for the daytime due to wind speeds and direction on 23/09/2025 being different to those during the October 2023 background sound survey

During the monitoring, throughout the daytime the TWMA site was the dominant noise source and was constant throughout the survey. Road traffic on the A90 also marginally contributed to the sound climate and there were occasional audible reversing alarms, both from the TWMA site and on adjacent sites. At night, the TWMA was dominant and constant, with very little road traffic on the A90.

5.1.3 Background Sound Levels Used in Assessment

Baseline sound monitoring was also undertaken at receptors located further away in January 2023, and are detailed in the Mabbett report titled '311768 TWMA Noise Impact Assessment (1.0 Feb 23)'.

The baseline sound levels to be implemented in this assessment are shown in Table 14. These values include the baseline sound levels monitored with the site shut down in October 2023 for receptors R1 and R1a in addition to the sound levels measured previously in January 2023 for the remaining receptors R2, R3 & R4.

Table 14: Derived Background Levels Used in Report

Receptor	Measured Sound Levels (dB)		
	L _{Aeq,T} dB	Typical L _{A90,T} dB	L _{AFmax} dB
DAYTIME			
R1	50	46	63 - 65
R1a	50	46	63 - 65



R2	52	45	66 - 72
R3	52	45	66 - 72
R4	57	42	76 - 90
NIGHT-TIME			
R1	46	28	52 - 62
R1a	46	28	52 - 62
R2	35	26	57 - 60
R3	35	26	57 - 60
R4	44	33	57 - 73

The derived baseline sound levels in Table 14 will be used in all the assessments within this report.

5.2 Calculated Levels

5.2.1 Calculated Operational Noise Levels - June 2024 – Pre-mitigation

Table 15 presents the calculated free-field specific sound levels at each selected receptor location and monitoring location, based on noise sources on the site prior to mitigation options being employed.

Table 15: Calculated Operational Sound Levels – June 2024 (Pre-Mitigation)

Receptor		Specific Sound Level $L_{Aeq,Tr}$ (dB)	
		Daytime 0700 – 2300	Night-time 2300 – 0700
Residential Locations			
R1	Greenacres Avenue (single storey)	44	44
R1a	Greenacres Avenue (two storey)	45	51
R2	Dales View Drive (two storey)	31	32
R3	Heath Drive (two storey)	24	28
R4	Middle Cottage/ Whitehill Lodge, Damhead Way (single storey)	40	40
Monitoring Locations			
M1	Greenacres Avenue – base of bund	49	49
M1a	Greenacres Avenue – between nos. 22 and 24	43	43
M1b	Rear of 28 Greenacres Avenue	43	43



Sound levels at receptors R1a, R2 and R3 are higher at night than during the day as the predicted levels are at first floor level (all others at ground floor level).

5.2.2 Calculated Operational Noise Levels - September 2025 – With mitigation

Table 16 presents the calculated free-field specific sound levels at each selected receptor location and monitoring location, based on noise sources on the site following the employment of the mitigation options detailed in Section 1.4. All calculations assume the roller door to the repurposed building is open.

Table 16: Calculated Operational Sound Levels –September 2025 (Post-Mitigation)

Receptor		Specific Sound Level $L_{Aeq,Tr}$ (dB)	
		Typical Site Activities	Typical Site Activities + Bin Washing and Jet Washing
Residential Locations – Ground Floor			
R1	Greenacres Avenue (single storey)	38	43
R1a	Greenacres Avenue (two storey)	39	42
R2	Dales View Drive (two storey)	30	32
R3	Heath Drive (two storey)	22	25
R4	Middle Cottage/ Whitehill Lodge, Damhead Way (single storey)	39	40
Residential Locations – First Floor			
R1	Greenacres Avenue (single storey)	-	-
R1a	Greenacres Avenue (two storey)	43	47
R2	Dales View Drive (two storey)	31	34
R3	Heath Drive (two storey)	25	28
R4	Middle Cottage/ Whitehill Lodge, Damhead Way (single storey)	-	-
Monitoring Locations			
M1	Greenacres Avenue – base of bund	42	47
M1a	Greenacres Avenue – between nos. 22 and 24	37	42
M1b	Rear of 28 Greenacres Avenue	36	40



6. Noise Impact Assessment

6.1 Comparison with June 2024 (Pre-Mitigation) and September 2025 Measured Levels

A comparison of the operational noise at the monitoring locations M1 and M1a and M1b for the September 2025 mitigated scenario (Rotomill and slop processing assets housed within the repurposed building and the upgraded Mission pump) has been made with the calculated operational scenario in June 2024 (pre-mitigation), and is detailed in Table 17.

Table 17: Comparison of June 2024 and September 2025 Measured Operational Noise

Receptor	June 2024 L_{Aeq} dB (calculated)	September 2025 L_{A95} dB (measured)	Difference dB
DAYTIME			
M1 (bund)	49	41	-8
M1a (between houses)	43	-	-
M1b (behind no. 30)	43	-	-
NIGHT-TIME			
M1 (bund)	49	38	-11
M1a (between houses)	43	35	-8
M1b (behind no. 30)	43	37	-6

As shown in Table 17, the relocation of the Rotomill and slop processing assets into the repurposed building, and the upgraded mission pump has resulted in a reduction in the noise level experienced at the measurements location M1 by up to 8 dB, and by 11 dB at M1, 8 dB at M1a and 6 dB at M1b at night.

6.2 Comparison of Measured and Calculated September 2025 Levels

A comparison of the calculated operational noise at the monitoring locations M1 and M1a and M1b for the September 2025 mitigated scenario (Rotomill and slop processing assets housed within the repurposed building and the upgraded Mission pump) has been made with the measured levels in September 2025. This has been undertaken to demonstrate that the calculated levels are similar, and therefore that the noise model is representative. The comparison is detailed in Table 18.



Table 18: Comparison of Measured and Calculated Levels (September 2025)

Receptor	September 2025 L_{A95} dB (measured)	September 2025 L_{Aeq} dB (calculated)	Difference dB
DAYTIME			
M1 (bund)	41	42	+1
M1a (between houses)	-	37	-
M1b (behind no. 30)	-	36	-
NIGHT-TIME			
M1 (bund)	38	42	+4
M1a (between houses)	35	37	+2
M1b (behind no. 30)	37	36	-1

The comparison above indicates that the noise model is generally within the typical standard deviation tolerances, with the calculated levels being within 1 dB of the measured levels. Only at the long-term monitoring location of the TWMA side of the bund are the calculated levels up to 4 dB higher. Whilst the calculated levels are higher, this will allow a reasonable worst-case assessment to be made.

6.3 BS 4142 Assessment

Observations made at receptor locations during monitoring when the site was operational, indicated that is a distinguishable tone audible during the daytime and night-time periods. Analysis of the measured data indicates a tone at 160Hz. For a worst-case assessment, and to correlate with the previous noise assessment for the site, a penalty of +6 dB has been applied to the daytime assessment for receptors R1 and R1a for a distinguishable tone.

Generally, there are no impulsive features associated with the general operations at the site and hence no penalty has been applied for impulsiveness for the assessment of typical activities. During bin tipping/washing, predicted L_{Amax} levels are similar to levels experienced at the receptors when the TWMA site was not operational (please see Section 6.6), therefore a 3 dB penalty has been applied.

The plant operates continuously and no penalty for intermittency is applicable.

Following the procedures outlined in BS 4142: 2014, the rating level of the specific sound from the typical operations at the site has been compared to the daytime and night-time background sound levels. The assessment has been undertaken for both the monitoring locations, as shown in Table 19, and at the receptor locations for the ground floor and first floor levels, as given in Table 20 and Table 21.



Table 19: BS 41421 Assessment – September 2025 - Measured Levels at Monitoring Locations – Typical Activities

Receptor	Measured Specific Sound Level $L_{Aeq,Tr}$ dB	Acoustic Feature Correction dB	Rating Level $L_{Ar,Tr}$ dB	Typical Background Level $L_{A90,T}$ dB	Excess of Rating Level over Background dB	BS 4142 Assessment Outcome
DAYTIME						
M1	42	+6	48	46	+2	Low impact
NIGHT-TIME						
M1	42	+6	48	28	+20	Significant adverse impact
M1a	37	+6	43	28	+15	Significant adverse impact
M1b	36	+6	42	26	+16	Significant adverse impact

Table 20: BS 4142 Assessment – September 2025 – Calculated Levels at Receptors – Typical Activities - Daytime

Receptor	Specific Sound Level $L_{Aeq,Tr}$ dB	Acoustic Feature Correction dB	Rating Level $L_{Ar,Tr}$ dB	Typical Background Level $L_{A90,T}$ dB	Excess of Rating Level over Background dB	BS 4142 Assessment Outcome
DAYTIME – Ground Floor						
R1	38	+6	44	46	-2	Negligible impact
R1a	39	+6	45	46	-1	Negligible impact
R2	30	0	30	45	-15	No impact
R3	22	0	22	45	-23	No impact
R4	39	0	39	42	-3	Negligible impact
DAYTIME – First floor						
R1	-	-	-	-	-	-
R1a	43	+6	49	46	+3	Low impact
R2	31	0	31	45	-14	No impact
R3	25	0	25	45	-20	No impact
R4	-	-	-	-	-	-



Table 21: BS 4142 Assessment – September 2025 – Calculated Levels at Receptors – Typical Activities – Night-time

Receptor	Specific Sound Level $L_{Aeq,Tr}$ dB	Acoustic Feature Correction dB	Rating Level $L_{Ar,Tr}$ dB	Typical Background Level $L_{A90,T}$ dB	Excess of Rating Level over Background dB	BS 4142 Assessment Outcome
NIGHT-TIME – Ground Floor						
R1	38	+6	44	28	+16	Significant adverse impact
R1a	39	+6	45	28	+17	Significant adverse impact
R2	30	0	30	26	+4	Low impact
R3	22	0	22	26	-4	Negligible impact
R4	39	0	39	33	+6	Adverse impact
NIGHT-TIME – First floor						
R1	-	-	-	-	-	-
R1a	43	+6	49	28	+21	Significant adverse impact
R2	31	0	31	26	+5	Low/adverse impact
R3	25	0	25	26	-1	Negligible impact
R4	-	-	-	-	-	-

During daytime hours, the noise impact upon the ground floor level of the closest residential receptors to the TWMA site fall below the measured background sound levels, resulting in a negligible noise impact.

At night, the BS 4142 assessment indicates that generally there is an adverse to significant adverse noise impact upon the closest residential receptors located to the north of the TWMA site (R1 and R1a). At two receptor locations (R2 and R3) a negligible or low impact was calculated.

Analysis of the noise source contributions at the receptor locations indicates that the large bank of cooling fans located to the west of the repurposed building are the dominant noise source.

An assessment of the typical activities and the additional bin washing activities has also been undertaken and is provided in Table 22. As the bin washing activities are only undertaken during daytime hours, the assessment has only been undertaken for the daytime period.



Table 22: BS 4142 Assessment – September 2025 – Calculated Levels at Receptors – Typical Activities + Bin Washing and Jet Washing (Daytime Only)

Receptor	Specific Sound Level $L_{Aeq,Tr}$ dB	Acoustic Feature Correction dB	Rating Level $L_{Ar,Tr}$ dB	Typical Background Level $L_{A90,T}$ dB	Excess of Rating Level over Background dB	BS 4142 Assessment Outcome
DAYTIME – Ground Floor						
R1	43	+9	49	46	+6	Adverse impact
R1a	42	+9	48	46	+5	Low/adverse impact
R2	32	0	32	45	-13	No impact
R3	25	0	25	45	-20	No impact
R4	40	0	40	42	-2	Negligible impact
DAYTIME – First floor						
R1	-	-	-	-	-	-
R1a	47	+6	53	46	+10	Adverse/significant impact
R2	34	0	34	45	-11	No impact
R3	28	0	28	45	-17	No impact
R4	-	-	-	-	-	-

As illustrated in Table 22, when bin washing activities are also undertaken this results in a low to adverse impact at the ground floor level of the closest receptors on Greenacres avenue, and a negligible to no impact at all other receptors. At first floor level, at properties on Greenacres Avenue there is the potential for an adverse to significant adverse impact.

It is understood that the bin washing activities are to be re-sited to the western side of the site, which would allow the existing tank farm to act as a barrier and therefore the level of impact upon the receptors to the north may reduce. In addition, there are plans to replace the slops reception box which may provide further attenuation.

Context

The context is that the TWMA site is in proximity to mixed industrial and residential properties since the approval of planning reference APP/2016/0720. The operation of the TWMA site therefore requires actions which are reflective of mitigation necessary to protect residential properties in close proximity.

6.4 PAN 1/2011 and TAN Assessment – Typical Activities – Night-time

An assessment based on the assessment methodology given in TAN has been undertaken for the night-time period.



The sensitivity of each selected receptor has been assessed based on the likelihood of complaint, whereby the difference between the Rating Level and measured background noise level determines the sensitivity of the receptor.

The sensitivity for each of the selected receptors is given in Table 23 below.

Table 23: Sensitivity of Receptor – Night-time

Receptor	Typical Background Level L_{A90} dB	Calculated Specific Sound Level L_{Aeq} dB	Rating Level $L_{Ar,Tr}$ dB	Difference Between Rating Level and Background L_{A90} dB	Sensitivity
GROUND FLOOR					
R1	28	38	44	+16	High
R1a	28	39	45	+17	High
R2	26	30	30	+4	Low
R3	26	22	22	-4	Low
R4	33	39	39	+6	Medium
FIRST FLOOR					
R1	28	-	-	-	-
R1a	28	43	49	+21	High
R2	26	31	31	+5	Low/Medium
R3	26	25	25	-1	Low
R4	33	-	-	-	-

Based on the assessment methodology given in TAN, the magnitude of impact from the operation of the TWMA site has been assessed, whereby the difference between the total calculated noise level (measured ambient level plus noise from the TWMA site) and the measured ambient noise level is calculated.

The magnitude of impact calculated at each of the NSRs selected receptors is given in Table 24 below.

Table 24: Magnitude of Impact – Night-time

Receptor	Measured Residual Level L_{Aeq} dB	Calculated Specific Sound Level L_{Aeq} dB	Overall Calculated Operational Level L_{Aeq} dB	Difference Between Calculated and Measured L_{Aeq} dB	Magnitude of Impact
GROUND FLOOR					
R1	46	38	47	+1	Negligible/Minor
R1a	46	39	47	+1	Negligible/Minor
R2	35	30	36	+1	Negligible/Minor
R3	35	22	35	0	No change
R4	44	39	45	+1	Negligible/Minor



FIRST FLOOR					
R1	-	-	-	-	-
R1a	46	43	48	+2	Minor
R2	35	31	36	+1	Negligible/Minor
R3	35	25	35	0	No change
R4	-	-	-	-	-

The overall significance of effect at each selected receptor, based on the sensitivity of the receptor and the magnitude of impact, is given in Table 25 below.

Table 25: Significance of Effect – Night-time

Receptor	Sensitivity	Magnitude of Impact	Significance of Effect
GROUND FLOOR			
R1	High	Negligible/Minor	Slight/moderate
R1a	High	Negligible/Minor	Slight/moderate
R2	Low	Negligible/Minor	Neutral/slight
R3	Low	No change	Neutral
R4	Medium	Negligible/Minor	Neutral/slight
FIRST FLOOR			
R1	-	-	-
R1a	High	Minor	Slight/moderate
R2	Low/Medium	Negligible/Minor	Neutral/slight
R3	Low	No change	Neutral
R4	-	-	-

The calculated noise levels result in a magnitude of impact of neutral to slight/moderate during the daytime, and a neutral or slight, with the potential for moderate impact at night.

6.5 Assessment of Absolute Noise Levels

An assessment of the increase in the ambient levels at night due to the operation of the TWMA site has been undertaken. The change in ambient levels is determined by logarithmically adding the measured residual level (when TWMA was not operational) to the calculated operational noise levels at the receptors and compared with the measured baseline residual levels.

The increase in the residual sound level at the closest receptors at night is given in Table 26 below.



Table 26: Increase in Sound Level from Operational Noise – Night-time

Receptor	Measured Residual Level L_{Aeq} dB	Calculated Specific Sound Level L_{Aeq} dB	Overall Calculated Operational Level L_{Aeq} dB	Difference Between Calculated and Measured L_{Aeq} dB	Magnitude of Impact
GROUND FLOOR					
R1	46	38	47	+1	Negligible/Minor
R1a	46	39	47	+1	Negligible/Minor
R2	35	31	36	+1	Negligible/Minor
R3	35	22	35	0	No change
R4	44	40	45	+1	Negligible/Minor
FIRST FLOOR					
R1	-	-	-	-	-
R1a	46	43	48	+2	Minor
R2	35	31	36	+1	Negligible/Minor
R3	35	25	35	0	No change
R4	-	-	-	-	-

As illustrated in Table 26, ambient levels are calculated to marginally increase at night at both ground floor and first floor levels. This level of increase is not considered significant when taking into account noise from other sources (road traffic on the A90).

6.6 Assessment of LAMax Levels

During bin tipping, the bins are ‘knocked’ to dislodge any residual material left in the bin before being placed in the automatic bin washer.

An assessment of the LAMax levels during this activity has been undertaken to determine if a noise impact occurs at the closest receptors on Greenacres Avenue.

Measurements of the bins being knocked were undertaken on site, and the resulting LAMax level calculated at the receptor locations. An LAMax level of 95 dB(A) was measured at a distance of 4m.

The calculated LAMax level within the gardens of the closest receptors has been calculated using the standard distance propagation calculation and compared against the measured LAMax level range measured during the period that the TWMA site was not operational. The results are given in Table 27.



Table 27: LAMax Assessment

Monitoring Location	Distance from Bin Tipping (m) to Centre of Garden	Calculated LAMax Level dB	October 2023 Measured LAMax Level Range dB
R1	237	60	58-69
R1a	245	59	

As illustrated in Table 27, LAMax levels within the gardens of the closest receptors when the bins are ‘knocked’ during bin tipping are similar to those measured when the TWMA site was not operational.

It is understood that the bin washing activities are to be re-sited to the western side of the site, which would allow the existing tank farm to act as a barrier and therefore the level of impact upon the receptors to the north may reduce. In addition, there are plans to replace the slops reception box which may provide further attenuation.



7. Uncertainty

Some uncertainty in the measured data and calculations is unavoidable. Arthian have undertaken the following reasonable steps with a view to minimising the level of uncertainty in the results.

With regards to the measured data, this has been minimised as follows:

- Undertaking baseline sound monitoring at locations representative of the closest receptors to the site for representative periods of time, and when the TWMA site was not operational. This enabled a comprehensive consideration of the baseline sound levels at the receptors, giving representative background sound levels for the relevant time periods.
- Consideration of weather conditions based on observations while onsite. Uncertainties due to weather conditions are considered to be low, as during the monitoring conditions remained dry and windspeeds were below 5 m/s. Please refer to Section 3 for details of the prevailing weather data recorded.
- Use of suitable Class 1 sound level meters which comply with the relevant standards and have been calibrated at a UKAS accredited laboratory within the previous year.
- Field calibration of the measurement system on site at the start and end of each monitoring period, and offset noted.
- Local sound generating facilities (i.e. background industrial and commercial noise) and road traffic noise was noted during the survey.

With regards to the calculations, uncertainties have been minimised as follows:

- The calculations have been completed using a reputable noise mapping software package (SoundPLAN) which implements a validated method of calculation (BS ISO 9613-2:1996). This methodology calculates sound propagation under typical down-wind conditions and hence presents a reasonable worst case in terms of sound levels at the receptor locations.
- Ground absorption properties for input to the noise propagation model have been identified from aerial photography and the site visits.
- Input data for the calculations was taken from data measured on site.



8. Recommendations

The following recommendations which TWMA should consider are:

- Review and update their formal noise management plan for the facility, taking into account the measurement data and additional information obtained from this assessment. This should not only assist in reducing the environmental noise impact at the nearest residential receptors, but to ensure that the noise produced as a result of site operations is minimised wherever possible.
- During the night-time make sure that processing plant building doors are kept closed, if possible.
- Consider the completion of periodic sound monitoring at receptor locations to determine if noise emissions from the TWMA site have increase and therefore potentially resulting in a greater noise impact upon the locality.
- Evaluate the feasibility, in a systematic fashion, according to BAT principles, of implementing proprietary acoustically rated insertion losses, silencers and enclosures to reduce noise emission of cooling fans, extract/ventilation fans and other similar items of plant.
- Analysis of the noise source contributions at the receptor locations indicates that the large bank of cooling fans located to the west of the repurposed building are the dominant noise source. It is recommended that consideration is given to enclosing these fans with an acoustic louvred enclosure.
- Relocation of bin washing activities to utilise existing structures to provide attenuation.



9. Conclusions and Recommendations

Noise impacts from the operation of TWMA site at Peterhead have been assessed. The site operates 24/7, therefore the assessment has included for both daytime and night-time periods.

Attended and unattended sound measurements were carried out at locations representative of the closest off-site sensitive receptors when the TWMA site was in a period of shutdown to quantify the prevailing sound climate. The assessment was based on the results of these measurements to determine the level of noise impact at the receptors.

Noise levels from the operation of the TWMA site have been measured at the closest receptors on Greenacres Avenue in September 2025 following the relocation of a number of assets into an existing building on site and the replacement of the Mission pump. Measurements were undertaken during daytime and nighttime periods, and an assessment of the noise impact undertaken.

A comparison of the measured levels with those predicted in June 2024 (prior to the relocation of assets to the existing building and replacement of the mission pump) indicates that there has been a reduction in the noise level incident on the closest receptors of up to 11 dB.

Further noise levels from the operation of the TWMA site have been calculated based on measurements of plant and activities at the site undertaken in September 2025. The predicted levels have been assessed to determine the potential noise impacts upon the closest receptors. The daytime BS 4142 assessment indicates that typical operational activities at the TWMA site do not result in an adverse noise impact upon the ground level of the closest noise sensitive receptors on Greenacres Avenue, and only a low impact at first floor level.

At night, the BS 4142 assessment indicates that there is a significant noise impact upon the closest noise sensitive receptors on Greenacres Avenue at both ground floor and first floor levels. Adverse impacts are also calculated at other receptors, although the level of impact is significant less.

Whilst the BS 4142 assessment indicates a significant noise impact at properties on Greenacres Avenue at night, when assessed using the PAN/2011 assessment methodology, a slight to moderate impact is calculated. In addition, the increase in the ambient level when compared with the baseline (TWMA not operational) residual level, is minor with a maximum increase of 2 dB.

An assessment of L_{Amax} levels at receptors on Greenacres Avenue from the knocking of the bins during bin tipping to dislodge residual material indicates that the L_{Amax} levels from this activity are similar to those measured when the TWMA site was not operational.

Analysis of the noise source contributions at the receptor locations indicates that the large bank of cooling fans located to the west of the repurposed building are the dominant noise source. It is recommended that consideration is given to enclosing these fans with an acoustic louvred enclosure.



Appendix A: Glossary

For the avoidance of confusion, the terms used in this report follow the definitions given below:

Fundamentally, ‘sound’ are vibrations of the air which are detectable by the ear. Noise is defined as a sound or sounds which is unwanted, considered unpleasant or loud. Sound or noise levels are commonly measured in terms of the sound pressure level in terms of decibels (dB). The sound pressure level is commonly given as ‘A’-weighted to simulate the human ear’s response to sounds at different frequencies. Examples of typical A-weighted sound pressure levels from typical noise sources are shown in the table below.

Sound Level dB(A)	Typical Noise Source
130	Threshold of pain
120	Large jet aircraft on take-off
110	Rock Band
100	Pneumatic Drill
90	Heavy lorry
80	Medium-sized lorry
70	Passenger car
60	Normal conversation
50	Suburban residential neighbourhood
40	Quiet living room
30	Quiet rural setting, within a bedroom at night
20	Speaking in a whisper
10	
0	

In this report, the terms sound and noise are used interchangeably.

Noise levels are usually expressed with an associated measurement parameter. Commonly used measurement parameters are presented below.

Parameter	Definition
dB	Decibel – A logarithmic scale applied to acoustic units such as sound pressure and sound power.
L _{PA}	The instantaneous A-weighted sound pressure level measured in terms of dB
L _{A90}	This is the ‘A’-weighted sound pressure level exceeded for 90% of the measurement period over which the measurement is taken. It is commonly used to represent the “background noise level”.



Parameter	Definition
L_{Aeq}	This is the equivalent 'A'-weighted sound pressure level of steady noise which, under the period under consideration, contains the same amount of (A-Weighted) sound energy as the time-varying noise over the same period. Also called the time-averaged sound level.
L_{A10}	This is the 'A'-weighted sound pressure level exceeded for 10% of the measurement period over which the measurement is taken. It is the accepted noise metric for describing road traffic noise.
L_{AMax}	This is the maximum root-mean-square (RMS) 'A'-weighted sound pressure level measured during the measurement period.

Other relevant acoustic parameters are defined below:

Parameter	Definition
R_w	The weighted Sound Reduction Index is the single figure value of laboratory measured sound reduction according to the procedures in British Standard BS EN ISO 717-1 and used for rating and comparing partitions and based on the measured sound reductions at different frequencies
$D_{nT,w}$	The weighted standardised level difference is a single figure value of airborne sound insulation performance, derived according to the procedures in British Standard BS EN ISO 717-1 and used for rating and comparing partitions and based on the measured sound level difference at different frequencies and standardised to a reverberation time (normally 0.5 seconds).
$D_{ne,w}$	The weighted normalised sound level difference is used to describe the sound insulation provided by small building elements and derived according to the procedures in British Standard BS EN ISO 717-1 and used for rating and comparing partitions and based on the measured sound level difference at different frequencies and normalised to an absorptive area (normally 10m ²).
C	A spectral adaptation term used in connection with the measurement and assessment of airborne sound insulation and defined in British Standard BS EN ISO 717-1. This is considered equivalent to the A-weighted weighted normalised sound level difference ($D_{nT,A}$)
C_{tr}	A spectral adaptation term used in connection with the measurement and assessment of airborne sound insulation and defined in British Standard BS EN ISO 717-1. This is considered equivalent to the normalised sound level difference weighted for road traffic noise ($D_{nT,tr}$)
$L'_{nT,w}$	The weighted standardized impact sound pressure level is a single-figure value of impact sound insulation performance, derived according to the procedures in British Standard BS EN ISO 717-2, used for comparing and rating floors and based on the values of measured impact sound pressure level at different frequencies and standardised to a reverberation time (normally 0.5 seconds).



Appendix B: Sound Model Inputs

Data sources

OS mapping: 1:10,000 Vector Raster Map, purchased from EmapSite.

Terrain data: OS 5m Terrain, purchased from EmapSite

Modelling assumptions & parameters

Ground absorption: 0.6 – residential areas

Ground absorption: 0.0 - TWMA site and surrounding Industrial Estate

Ground absorption: 0.1 – industrial/commercial areas and road network

Ground absorption 0.9 – earth bund

(Note: Acoustically Soft = 1, Acoustically Hard = 0)

Calculation grid size: 3m

Other Settings

Order of Reflections = 3

ISO 9613-2:1996 calculation methodologies

Grid height = 1.5 metres for ground floor height

Grid height = 4 metres for first floor height



Noise Source Data

Table B.1: Operational Noise Source Data – Internal Reverberant Levels

Plant/Equipment	Details	Octave Band Centre Frequency (Hz)								LpA dB
		63	125	250	500	1000	2000	4000	8000	
Repurposed building housing Rotomill and decanters	Internal level	83	84	84	81	82	79	72	66	86

Table B.2: Operational Noise Source Data – External Noise Sources

Plant/Equipment	Details	Octave Band Centre Frequency (Hz)								LwA dB
		63	125	250	500	1000	2000	4000	8000	
Rotomill exhaust	Point source	83	84	84	81	82	79	72	66	86
Rotomill cooling fans	Point source	86	90	88	84	80	83	79	67	88
Cooling fan bank	Area source	93	98	96	82	87	83	76	71	94
Blower	Point source	92	92	89	93	93	97	93	78	101
Silo pump motor	Point source	92	98	93	90	83	79	72	75	91
Thermal oxidiser fan	Point source	96	93	90	92	93	92	87	79	98
Carbon capture unit	Area source	78	79	79	76	77	74	67	61	81
Carbon capture fan	Point source	87	91	87	86	89	81	73	66	91



Compressor	Point source	91	94	98	93	89	84	77	72	95
Feed skid unit	Area source	84	88	90	85	83	84	83	79	91
Feed skid fan	Point source	82	95	89	86	85	84	79	72	91
Terex	Point source	107	103	101	98	95	91	85	77	100
Bin washing unit	Point source	95	90	90	91	93	95	95	92	101
Jet washing	Point source	96	90	91	96	95	94	94	93	101
Generator (near mission pump)	Point source	97	95	95	86	83	78	71	64	90
Generator (next to repurposed building)	Point source	95	89	88	83	85	82	74	65	89
Mission pump	Point source, 50% on-time	85	78	75	74	87	79	71	64	89
Wilden pump	Point source	75	73	71	77	79	80	76	77	85



Table B.3: Building Cladding Sound Reduction Data

Plant/Equipment	Octave Band Centre Frequency (Hz)								Rw dB
	63	125	250	500	1000	2000	4000	8000	
Repurposed building cladding (walls and roof)	6	7	10	14	17	13	30	21	15
Block work	12	17	18	20	24	30	38	43	25

* To account for potential building junction weaknesses and deterioration of panel effectiveness over time, this low sound reduction has been applied.



Noise Contour Maps

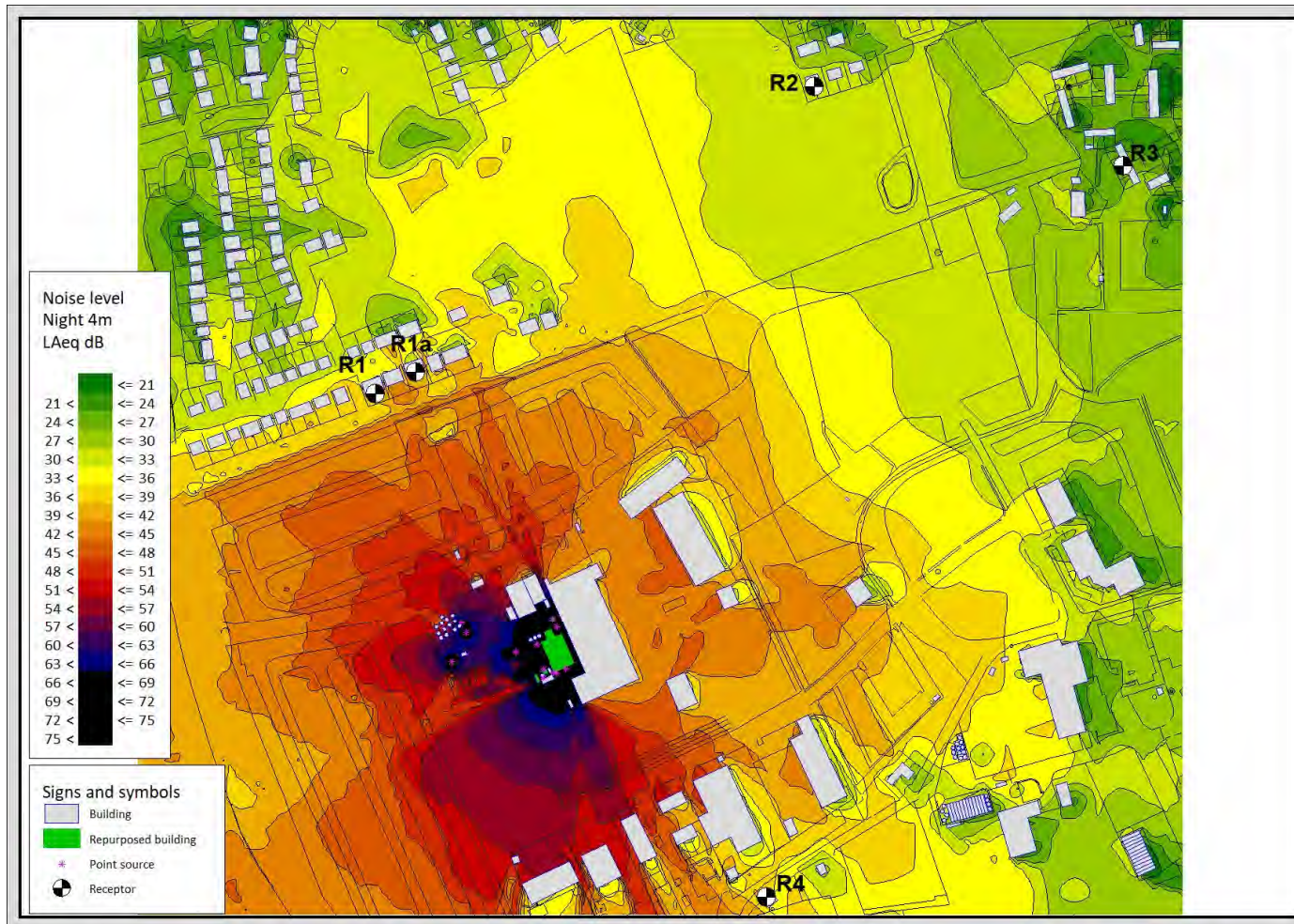


Figure B.1: Noise Contour Plot – Night, 4m



Appendix C: Author Details

Qualifications and Experience

REDACTED BA (Hons) TechIOA – Monitoring

REDACTED has 3 and half years of experience working in environmental acoustics. REDACTED has worked as an acoustic consultant conducting noise and vibration assessments on a variety of industrial and commercial sites, primarily focused in the aggregates industry, but also including waste management facilities, factories and fish processing sites. In addition, he has also worked to provide noise and vibration impact assessments to support planning applications, mainly for renewables developments such as solar farms and battery storage sites.

In addition to obtaining a bachelor's degree in Sound Production, REDACTED has also obtained the IoA Certificate of Competence in Environmental Noise Measurement, and is a Technician Member of the Institute of Acoustics.

REDACTED MSc BSc(Hons) MIOA –Assessment

REDACTED has worked on sound and vibration related projects for over 20 years. Since completing a Bachelors Degree in Environmental Science, a Masters in Environmental Management, and a Diploma in Acoustics and Noise Control, she has gained a wide range of practical experience in Environmental acoustics and vibration in a consultancy role. REDACTED is a Member of the Institute of Acoustics.

The majority of REDACTED'S experience relates to the provision of sound and vibration impact assessments to support planning applications and full Environmental Impact Assessments. These include large residential and mixed use schemes, waste management facilities, power generation schemes and mineral/quarry facilities.

She is experienced in the use of environmental sound modelling software SoundPLAN, which implements a range of methodologies including Calculation of Road Traffic Sound (CRTN), Calculation of Railway Sound (CRN), BS 5228 and ISO 9613-2.

REDACTED MEng CEng MIOA - Review

Since graduating from the University of Southampton with a degree in Engineering Acoustics and Vibration, REDACTED has gained 30 years of experience working in consultancy. She is a Chartered Engineer and a Corporate Member of the Institute of Acoustics.



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