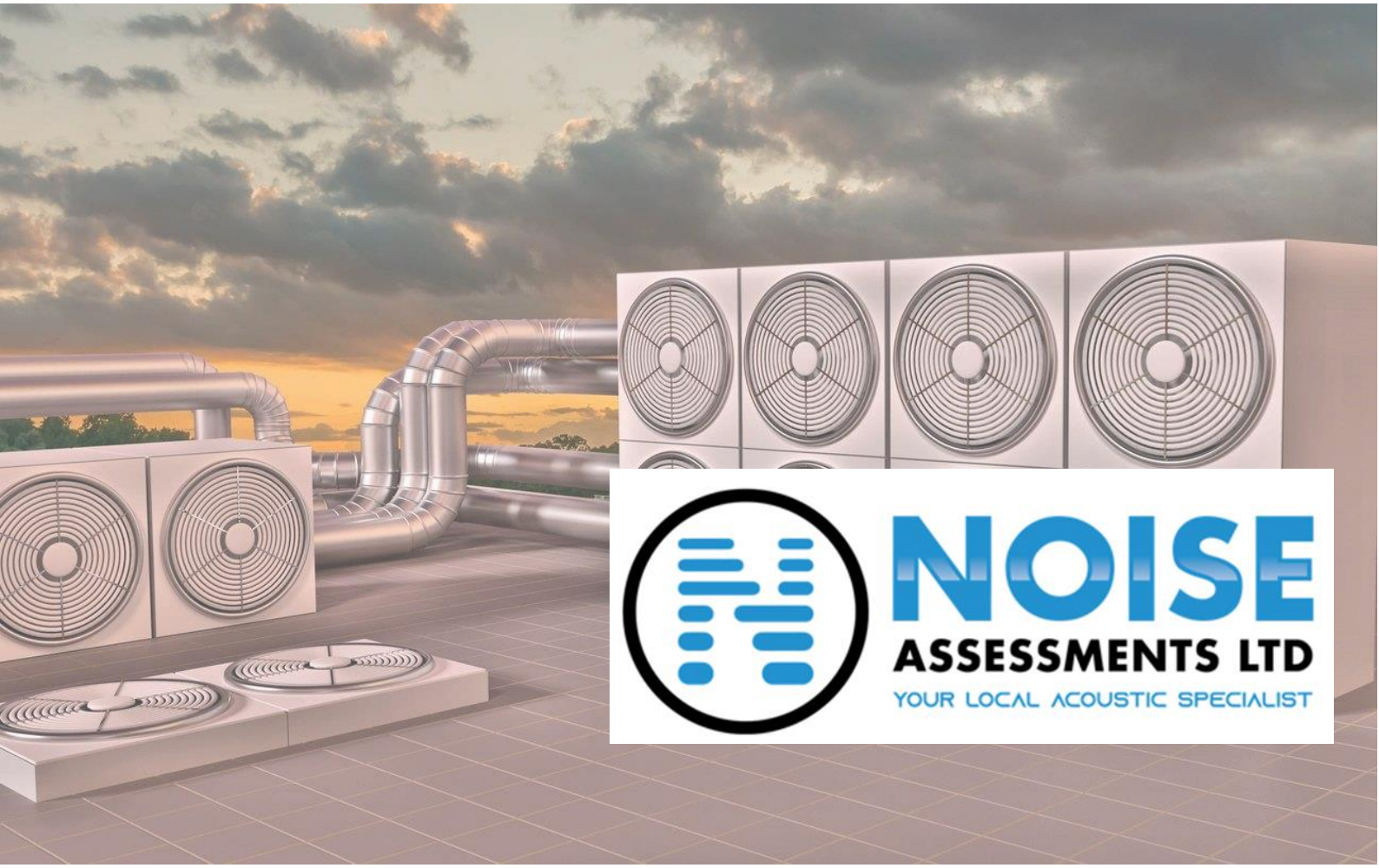


NOISE IMPACT ASSESSMENT

BS 4142:2014+A1:2019

Industrial Noise





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REPORT DETAILS

Client	Tecvyn Limited
Report Title	Noise Assessment: Industrial Noise
Site Address	Laurel Lodge, Washway Road, Holbeach, PE12 8JB
Project No.	NALPRO310321.01
Consultant Contact	jonathan@noiseassessment.org

QUALITY ASSURANCE

Issue No.	Status	Issue Date	Comments	Author	Approved
1	FINAL	26/04/21	-		
				J Mape BSc (Hons) PgDip IOA Cert. Environ. Noise TechIOA Noise Consultant	D Warren Director

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Contents

Assessment Summary	1
1. Proposal	2
2. Existing Context.....	2
3. Criteria.....	3
4. Noise Policy and Guidance.....	3
5. Nearest Sensitive Receptor Locations.....	5
6. Subjective Impressions	6
7. Measurement Locations	6
8. Measurement Procedure.....	6
9. Measurement Equipment.....	7
10. Weather Conditions	7
11. Background Sound Level.....	7
12. Noise Level Predictions	7
BS4142:2014 Assessment	10
13. Specific Sound Levels	10
14. Rating Level.....	11
15. Rating Level Vs Background	11
16. Mitigation.....	12
17. Summary.....	12
APPENDIX A – Assumed plant locations	13
APPENDIX B - Measurement Details.....	14
APPENDIX C - Equipment Details	14
APPENDIX D - Calibration Details.....	14
APPENDIX E - Meteorology Details	14
APPENDIX F – Calibration Certificates	15
APPENDIX G – Terminology and Definitions.....	18

Assessment Summary

A proposed industrial site with associated building (herein referred to as the site) is currently applying for permission to assess the likely noise impact from noise generated from the proposed recycling baled PET bottles plant operations at the nearest sensitive receptors which will comply with external noise guidance. The client has been requested by the Local Council to complete a noise assessment at Laurel Lodge, Washway Road, Holbeach, PE12 8JB

Low Impact noise has been identified based on the processes at the site in operation at the NSRs, therefore further mitigation is not required.

1. Proposal

- 1.1 A proposed industrial site with associated building (herein referred to as the site) is currently applying for permission to assess the likely noise impact from noise generated from the proposed recycling baled PET bottles plant operations at the nearest sensitive receptors which will comply with external noise guidance. The client has been requested by the Local Council to complete a noise assessment at Laurel Lodge, Washway Road, Holbeach, PE12 8JB.

The Proposed Operation of the Site

- 1.2 All material is received by HGV as a squashed down bale and transferred to an operations shed where bottles pass through a trommel, dry cleaned and sorted using an optical beam that separates the different types of plastic. This is important as different plastics melt at different temperatures. However, to ensure efficient melting, first, the bottles need to be broken down.
- 1.3 Thus, the bottles are ground into little flakes which are then washed and sorted once again. Depending on the kind of plastic in the bottles, the flakes are either decontaminated using a chemical solution or melted down and sieved to form beads as the plastic cools.
- 1.4 These beads or flakes can then be melted down again and turned into a huge array of new products.
- 1.5 A noise assessment is required to assess the likely noise impact from noise generated from the external and internal mobile and static plant around the site to nearby sensitive receptors during the daytime and night-time
- 1.6 The proposed hours of operation are:
- Monday to Saturday - 24r hrs/day
 - Sunday - 08:00-17:00 Shutdown and maintenance
- 1.7 HGV Delivery trucks will deliver and collect between 07:00 – 17:00, Monday-Friday. Movement of onsite vehicles will run constantly during working hours.

2. Existing Context

- 2.1 The site is surrounded by a mixture open farmland, the A17 main road, residential properties to the west, a busy fast-food truck stop restaurant and other commercial units.
- 2.2 The environmental health department of the local planning authority raised concerns of noise emissions from the various mobile and static plant on neighbouring noise sensitive residential properties at west of the site during the daytime and night-time.

3. Criteria

- 3.1 The following targets have been selected in accordance with 'BS 4142:2014+A1:2019 – Methods for rating and assessing industrial and commercial sound.' This will be achieved when the Rating Level is below the representative background sound level.

4. Noise Policy and Guidance

Noise Policy Statement for England (NPSE)

- 4.1 The NPSE sets out the Government's policy on noise and includes the long-term vision of promoting good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development.
- 4.2 This long-term vision is supported by the following aims:
- 4.3 Through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development:
- avoid significant adverse impacts on health and quality of life;
 - mitigate and minimise adverse impacts on health and quality of life; and
 - where possible, contribute to the improvement of health and quality of life.
- 4.4 There are two established concepts from toxicology that are currently being applied to noise impacts, for example, by the World Health Organisation. They are:
- NOEL (No Observed Effect Level) – this is the level below which no effect can be detected. In simple terms, below this level, there is no detectable effect on health and quality of life due to the noise;
 - LOAEL (Lowest Observed Adverse Effect Level) – this is the level above which adverse effects on health and quality of life can be detected.
- 4.5 Extending these concepts further, NPSE leads to the concept of a significant observed adverse effect level:
- SOAEL (Significant Observed Adverse Effect Level) – this is the level above which significant adverse effects on health and quality of life occur.
- 4.6 NPSE acknowledges that it is not possible to have a single objective noise-based measure that defines NOEL, LOAEL and SOAEL that is applicable to all sources of noise in all situations. It is therefore suggested that more specific advice from other applicable noise standards and guidance could be employed to determine suitable noise level criteria within the overall principles of the NPSE.

National Planning Policy Framework (NPPF)

4.7 The revised NPPF was updated on 19 February 2019 and sets out the government's planning policies for England and how these are expected to be applied. This document replaces the first NPPF published in March 2012 and includes minor clarifications to the revised version published in July 2018.

4.8 Where issues of noise impact are concerned the NPPF provides brief guidance in Chapter 15 '*Conserving and enhancing the natural environment*' as follows:

Paragraph 170:

Planning policies and decisions should contribute to and enhance the natural and local environment by preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability.

Paragraph 180:

Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should:

- a) mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life;
- b) identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason; and
- c) limit the impact of light pollution from artificial light on local amenity, intrinsically dark landscapes and nature conservation.

Paragraph 182:

Planning policies and decisions should ensure that new development can be integrated effectively with existing businesses and community facilities (such as places of worship, pubs, music venues and sports clubs). Existing businesses and facilities should not have unreasonable restrictions placed on them as a result of development permitted after they were established. Where the operation of an existing business or community facility could have a significant adverse effect on new development (including changes of use) in its vicinity, the applicant (or 'agent of change') should be required to provide suitable mitigation before the development has been completed.

Planning Practice Guidance (PPG)

- 4.9 PPG is written in support of the NPPF and provides an increased level of specific planning guidance.
- 4.10 It suggests that noise needs to be considered when new developments may create additional noise and when new developments would be sensitive to the prevailing acoustic environment. It is also suggested that noise should not be considered in isolation and separately from issues such as the economic, social and other environmental dimensions of proposed development.
- 4.11 Local planning authorities' plan-making and decision taking should take account of the acoustic environment and in doing so consider:
- whether or not a significant adverse effect is occurring or likely to occur;
 - whether or not an adverse effect is occurring or likely to occur; and
 - whether or not a good standard of amenity can be achieved.

Technical Guidance

BS 4142:2014+A1:2019 – Methods for rating and assessing industrial and commercial sound'

BS4142 is a recognised standard for assessing the noise impact of fixed plant machinery via relation of noise emissions to current background noise levels.

ISO 9613-2 Attenuation of sound during propagation outdoors

The ISO 1996 series of standards specifies methods for the description of noise outdoors in community environments. Part 2 of ISO 9613 is intended to enable noise levels in the community to be predicted from sources of known sound emission. The method is general in the sense that it may be applied to a wide variety of noise sources, and cover most of the major mechanisms of attenuation.

This standard provides guidance on the outdoor propagation of sound. It is widely used to establish the different attenuations that occur during the transmission of the sound from the sources to the receivers. The total attenuation is the sum of the following: geometrical divergence, atmospheric absorption, ground effect, barriers, and miscellaneous other effects.

5. Nearest Sensitive Receptor Locations

- 5.1 The nearest noise sensitive receptors (NSRs) have been identified as a small group of residential properties 5m to the west of the site boundary and over 80m to where most of the noise will occur.

6. Subjective Impressions

- 6.1 The noise climate at the rear of the site is dominated by road traffic throughout the day and evening including cars and HGVs / LGVs where tyre / road interaction noise was most prominent from the A17 60mph Washway Road, HGV noise from the adjacent fast food truck stop restaurant. Secondary noise sources have been identified as bird song.

7. Measurement Locations

- 7.1 Attended and unattended background noise measurements were undertaken outside the rear of the proposed site boundary, adjacent to the residential properties. The data collected during this period has been used to characterise the existing acoustic environment around the site.
- 7.2 Measurement, NSR locations are shown in figure 1 below, with proposed plant operation location shown in **Appendix A**:

Figure 1: Site & Measurement Location



- Background measurement location M1
- Site location
- ★ NSR1

8. Measurement Procedure

- 8.1 Noise levels were measured on Saturday 10th to Tuesday 13th April 2021. Full measurement times and durations can be found in **Appendix B**.

9. Measurement Equipment

- 9.1 Measurements were undertaken using a calibrated, Pulsar N45 class 1 sound level meter. Full equipment details can be found in **Appendix C**.
- 9.2 During all measurements the microphone was protected with an outdoor windshield.
- 9.3 The calibration level of the meter was checked before and after the survey with a Pulsar N45 sound calibrator. No significant drift (i.e. no greater than ± 0.5 dB) in the calibration value was observed between the initial and final checks.
- 9.4 The sound level meters were set to measure various noise parameters including LAeq and LMax values using a 'fast' time weighting.
- 9.5 Full calibration details can be found in **Appendix D**.

10. Weather Conditions

- 10.1 Weather conditions were deemed acceptable for background noise measurement. Full meteorological conditions are detailed in **Appendix E**.

11. Background Sound Level

- 11.1 Environmental noise levels were measured on Saturday 10th to Tuesday 13th April 2021.
- 11.2 The lowest daytime background sound level was measured between 14:30-15:00 as 52 dB LA90,15min.
- 11.3 The lowest night-time background sound level was measured between 01:45-02:15 as 39 dB LA90,15min.

12. Noise Level Predictions

- 12.1 The level of noise in the local environs that arises from a site will depend on a number of factors. The more significant of which are:
 - (a) the sound level output of the plant or equipment used on site;
 - (b) the periods of operation of the plant on site;
 - (c) the distance between the source noise and the receiving position;
 - (d) the presence of screening due to barriers;
 - (e) the reflection of sound;
 - (f) hard ground attenuation.

- 12.2 The parameter that is in general use and is recommended internationally for the description of environmental noise at a receptor position is the equivalent continuous sound pressure level, Leq (expressed in dB).
- 12.3 The parameter that is in general use and is recommended internationally for the description of environmental noise at a receptor position is the equivalent continuous sound pressure level, Leq (expressed in dB).
- 12.4 The Leq describes the total amount of acoustic energy measured but does not take any account of the ear's ability to hear certain frequencies more readily than others. Instead, an A-weighting is applied to form the LAeq (expressed in dB(A)) as this is found to relate better to the loudness of the sound heard.

Noise levels associated with the proposed development have been calculated at nearby noise-sensitive locations based on the following methodology and assumptions.

Recycling Shed Specification

- 12.5 The Shed encloses the recycling process, any penetrations in the building are reduced to a minimum.

Walls

- Steel frame
- 100mm concrete block
- 100mm KS1000 composite cladding

Roof

- 100mm KS100 composite cladding

Prediction Methodology

- 12.6 The prediction method used in this study is based upon that outlined within Annex F of British Standard BS 5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites Part 1: Noise. This guidance details methods to estimate noise from 'open sites' which can include quarries, waste disposal sites and long-term construction projects.
- 12.7 The most important elements of this standard used to estimate site noise within this assessment include the sound level of plant/activities, distance attenuation, activity on-time, screening effects, ground absorption and angle of view corrections.
- 12.8 In terms of screening, BS 5228 indicates that a barrier attenuation of 10 dB(A) can be used when the noise screen completely hides the source from the receiver and an attenuation of 5 dB(A)

when the screen partially hides the source from the receiver. The standard also recognises that high topographical features, including hills, and buildings can provide greater attenuation.

12.9 Hard ground has been assumed for all noise prediction calculations. 'hard' ground is taken to refer to surfaces which are reflective to sound, e.g. paved areas and rolled asphalt, as opposed to 'soft' ground surfaces which reflect sound such as cultivated land or plantations

12.10 All noise level predictions have been calculated with the combinations of plant working at the closest point to the assessment location. The predictions are therefore worst-case scenarios which may be of relatively short duration, however, they indicate the potential highest LAeq,1h noise level to which a particular property or group of properties may be exposed during the working of the site. This worst-case situation may occur intermittently over the lifetime of the site, but the longer-term noise levels perceived outside of the site boundary would normally be significantly less.

Plant Complement

12.11 Information regarding the working of the site has been based on discussions with the site operator.

12.12 A list of plant sound power levels from which the noise predictions have been made are presented in Table 1 along with several assumptions regarding activity 'on-times' and vehicle movements.

12.13 The sound power levels used within this assessment are based on measurements of other similar sites and plant.

Table 1 Plant Details

Description of Plant/Activity	Sound Power Level dB(A)	Assumptions	Data Source
Forklift	85	80	Measured at similar site
Forklift	85	80	Measured at similar site
Shed noise breakout (trommel/conveyor)	92	80	Measured at similar site
Generator	92	100	Measured at similar site
Generator	92	100	Measured at similar site
Generator	92	100	Measured at similar site
Generator	92	100	Measured at similar site
Generator	92	100	Measured at similar site
HGV	102	1 movement per hour	Measured at similar site

BS4142:2014 Assessment

13. Specific Sound Levels

13.1 The specific sound level is denoted LAs and is the A-weighted, equivalent noise level at the NSR locations over the reference time period.

13.2 The NSRs are located directly opposite the site. See Figure 1 for the location of sensitive receptors.

13.3 The Specific Sound Level of the Predicted worst-case site noise level at the nearest NSR locations is summarised below:

Table 2: Specific Sound Levels

NSR	Specific Sound Level, dB L _{As}
1	38

14. Rating Level

14.1 The specific sound level may be corrected for certain characteristics that make a sound more noticeable at the NSR locations. Corrections for tonality, impulsivity and intermittency may be applied.

14.2 The associated rating penalties and resultant sound rating levels, dB L_{Ar}, are tabulated below:

Table 3: Rating Penalties, dB, and Sound Rating Levels

NSR	dB L _{As}	Tonality	Impulsivity	Intermittency	dB L _{Ar}
1	38	0	0	0	38

At the NSR it is assumed that as the recycling processes will be enclosed, and generators are located at some distance away that no acoustic characteristics will be audible at the NSR.

15. Rating Level Vs Background

15.1 The rating level is to be compared to the background sound level to determine the resultant noise impact in accordance with BS4142:

A Sound Rating Level at or below the background noise level is indicative of *Low Impact*;

A Sound Rating Level that exceeds the background noise level by around + 5dB is likely an indication of *Adverse Impact*, depending on the context;

A Sound Rating Level that exceeds the background noise level by around + 10dB is likely an indication of *Significant Adverse Impact*, depending on the context.

15.2 The noise impact during the daytime is tabulated below:

Table 4: Noise Impact

NSR	Rating Level, dB L _{Ar}	Difference, dB	Impact
1	38	-14	Low

15.3 The noise impact during the night-time is tabulated below:

Table 5: Noise Impact

NSR	Rating Level, dB L _{Ar}	Difference, dB	Impact
1	38	-1	Low

15.4 A **Low Impact** has been identified from the processes at the site in operation at the NSR.

16. Mitigation

16.1 With regards to general site activities, the following noise control measures should also be considered to demonstrate that best practicable means are being implemented and to minimise the potential noise impact on sensitive receptor locations:

- (a) Adhere strictly to the stated operating hours of the site;
- (b) All plant and equipment should comply with EU noise emission limits;
- (c) Ensure machinery is regularly well maintained;
- (d) The use of audible alarms at the site (such as on fixed plant) should be reviewed, and where practicable, these devices should be replaced with silent or low-noise alternatives;
- (e) Avoid unnecessary horn usage and revving of engines;
- (f) Switch off equipment when not required;
- (g) When hiring or procuring, select plant and equipment which is inherently quiet where appropriate. For example, compressors should be sound reduced models with sealed acoustic linings, pneumatic tools should be fitted with manufacturer specified silencers or mufflers;
- (h) Where reasonably practicable, select quiet working methods should there be a suitable alternative with a lower noise impact;
- (i) Keep internal haul routes well maintained;
- (j) Minimise drop heights of materials where possible;
- (k) Throughout operations all doors and windows of the shed should remain fully closed.
- (L) Operatives should be trained to employ appropriate techniques to keep site noise to a minimum and should be effectively supervised to ensure that best working practice in respect of noise reduction is followed.

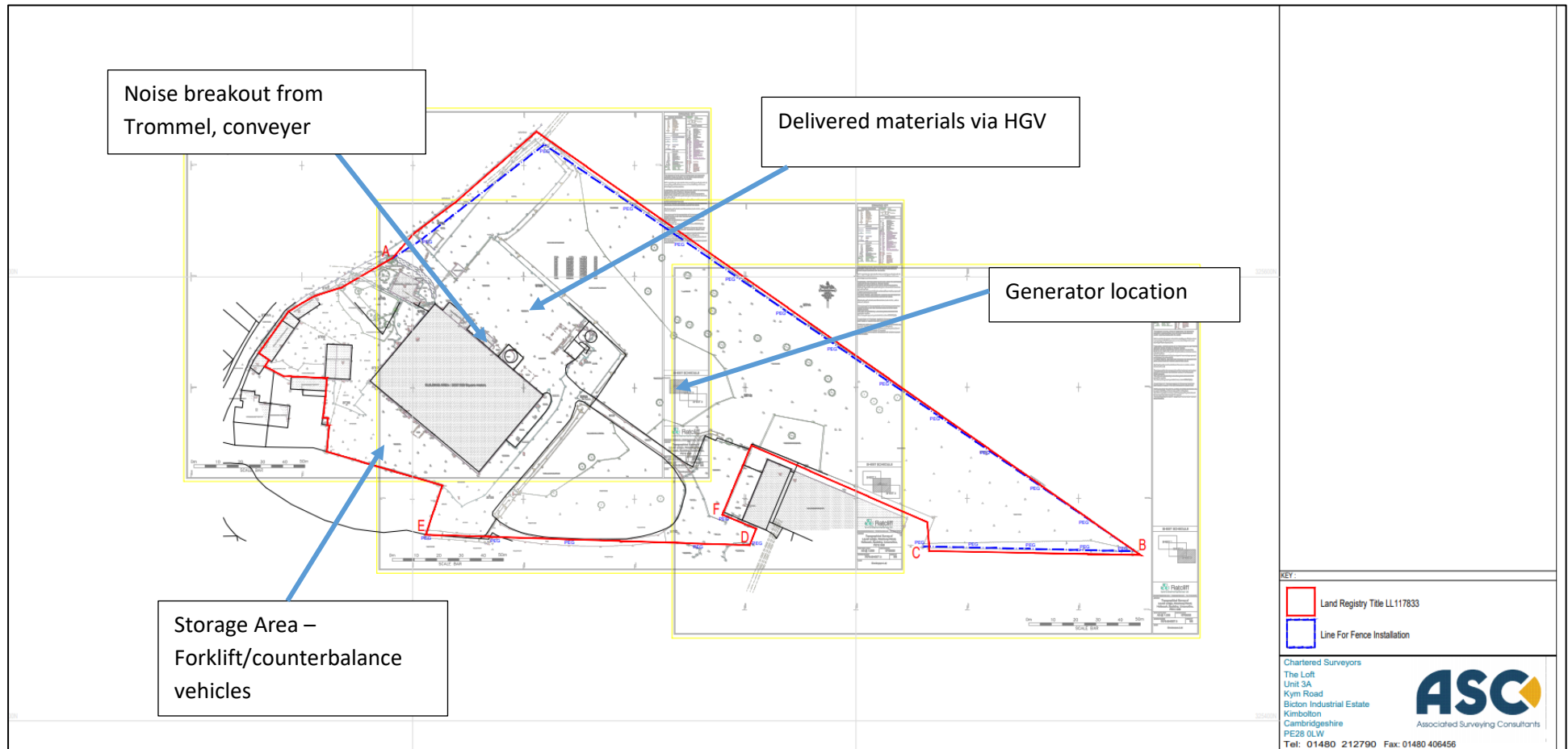
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17.1 A proposed industrial site with associated building (herein referred to as the site) is currently applying for permission to assess the likely noise impact from noise generated from the proposed recycling baled PET bottles plant operations at the nearest sensitive receptors which will comply with external noise guidance. The client has been requested by the Local Council to complete a noise assessment at Laurel Lodge, Washway Road, Holbeach, PE12 8JB

17.2 **Low Impact** noise has been identified based on the processes at the site in operation at the NSRs, therefore further mitigation is not required.

Appendices

APPENDIX A – Assumed Plant Locations



APPENDIX B - Measurement Details

Measurement	Start Date	Start Time	End Date	End Time
M1	10/04/21	10:30	13/04/21	13:15

APPENDIX C - Equipment Details

Equipment	Make	Model	Class	Serial Number
Sound Meter	Pulsar	N45	1	1365
Calibrator	Pulsar	PM1	1	011121C

APPENDIX D - Calibration Details

Measurement	Calibrator Ref Level (dB)	Level Before (dB)	Deviation Before (dB)	Level After (dB)	Deviation After (dB)
M1	94.0	94.0	0	94.0	0


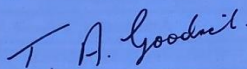
APPENDIX E - Meteorology Details

Date	Temp C	Wind Speed m/s*	Wind Direction	Humidity %	Precipitation mm	Cloud Cover (Oktas)
10-13/04/21	12	2.9	ssw	84	0.0	5/8

*Windspeeds measured on site using a Skywatch Xplorer 2 Anemo-Thermometer.

APPENDIX F – Calibration Certificates

CERTIFICATE OF CALIBRATION	
ISSUED BY	Pulsar Instruments Plc
DATE OF ISSUE	22 June 2020
CERTIFICATE NUMBER	142658

 <p>Pulsar Instruments Plc The Evron Centre John Street Filey North Yorkshire YO14 9DW United Kingdom</p>	Page 1 of 2 Approved signatory T.Goodrich Electronically signed: 
---	--

Sound Level Meter : IEC 61672-3:2006

Instrument information

Manufacturer:	Pulsar Instruments Plc	Notes:
Model:	Model 45	
Serial number:	PN1432	
Class:	1	
Firmware version:	2.5.0.296	

Test summary

Date of calibration: 22 June 2020

The calibration was performed respecting the requirements of ISO/IEC 17025:2017.
Periodic tests were performed in accordance with procedures from IEC 61672-3:2006.

The sound level meter submitted for testing has successfully completed the class 1 periodic tests of IEC 61672-3:2006, for the environmental conditions under which the tests were performed. However, no general statement or conclusion can be made about conformance of the sound level meter to the full requirements of IEC 61672-1:2002 because evidence was not publicly available, from an independent testing organisation responsible for pattern approvals, to demonstrate that the model of sound level meter fully conformed to the requirements in IEC 61672-1:2002 and because the periodic tests of IEC 61672-3:2006 cover only a limited subset of the specifications in IEC 61672-1:2002..

Notes

This certificate provides traceability of measurement to the SI system of units and/or to units of measurement realised at the National Physical Laboratory or other recognised national metrology institutes. This certificate may not be reproduced other than in full, except with the prior written approval of the issuing laboratory. The results within this certificate relate only to the items calibrated. The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor $k=2$, providing a coverage probability of approximately 95%.

CERTIFICATE OF CALIBRATION

Certificate Number:

142658

Page 2 of 2

Environmental conditions

The following conditions were recorded at the time of the test:

Pressure: 101.53 kPa Temperature: 23.2 °C Humidity: 43 %

Test equipment

Equipment	Manufacturer	Model	Serial number
Signal Generator	TTi	TGA1241	474596
Attenuator	Cirrus Research	ZE:952	64370
Environmental Monitor	Comet	T7510	16966334

Additional instrument information

Instruction manual:

Reference level range: Single range

Pattern approval: No

Source of pattern approval: -

Preamplifier

Model: PA40

Serial number: 1365

Microphone

Model: PM1

Serial number: 011121C

Test results summary

Test	Result
Internal settings adjustment	Complies
Toneburst response	Complies
Electrical noise-floor	Complies
Linearity	Complies
Frequency weightings	Complies
Frequency and time weightings at 1 kHz	Complies
C-weighted peak	Complies
Overload indication	Complies

CERTIFICATE OF CALIBRATION

ISSUED BY **Pulsar Instruments Plc**
 DATE OF ISSUE **22/06/20** CERTIFICATE NUMBER **142657**



Pulsar Instruments Plc
The Evron Centre
John Street
Filey
North Yorkshire
YO14 9DW
United Kingdom

Page 1 of 2

Test engineer:
 D.Swalwell
 Electronically signed:

Microphone

Microphone capsule

Manufacturer: Pulsar Instruments

Model: PM1

Serial Number: 011121C

Calibration procedure

Date of calibration: 22 June 2020

Open circuit: 49.6 mV/Pa

Sensitivity at 1 kHz: -26.1 dB rel 1 V/Pa

The microphone capsule detailed above has been calibrated to the published data as described in the operating manual of the associated sound level meter (where applicable).

The frequency response was measured using an electrostatic actuator in accordance with BS EN 61094-6:2005 with the free-field response derived via standard correction data traceable to a National Measurement Institute.

The absolute sensitivity at 1 kHz was measured using an acoustic calibrator conforming to IEC 60942:2003 Class 1.

Environmental conditions

Pressure: 101.40 kPa

Temperature: 22.0 °C

Humidity: 49.0 %

APPENDIX G – Terminology and Definitions

Noise

Sound only becomes noise (often defined as ‘unwanted sound’ or sound that is considered undesirable or disruptive) when it causes or contributes to some harmful or otherwise unwanted effect, like annoyance or sleep disturbance.

Acoustic Environment

Sound from all sound sources as modified by the environment.

Equivalent continuous A-weighted sound pressure level $L_{Aeq,T}$

Value of the A-weighted sound pressure level of a continuous, steady sound that, within a specified time interval T, has the same mean square sound pressure as a sound under consideration whose level varies with time.

A-weighting

The human ear is most sensitive to frequencies in the range 1 kHz to 5 kHz. On each side of this range the sensitivity falls off. A-weighting is used in sound level meters to replicate this sensitivity and respond in the same way as the human ear.

Octave Band

Band of frequencies in which the upper limit of the band is twice the frequency of the lower limit.

Maximum Sound Pressure Level $L_{Amax,T}$

Highest value of the A-weighted sound pressure level with a specified time weighting that occurs during a given event or measuring period.

The $L_{A10,T}$ Sound Level

The A-weighted sound pressure that is exceeded for 10% of a given time interval, T. It is often used to evaluate road traffic noise.

The $L_{A90,T}$ Sound Level

The A-weighted sound pressure that is exceeded for 90% of a given time interval, T, measured using time weighting F. It is often referred to as the background noise level and which might in part be an indication of relative quietness at a given location

Free-field Level

The sound pressure level away from reflecting surfaces.

NOTE Measurements made 1.2 m to 1.5 m above the ground and at least 3.5 m away from other reflecting surfaces are usually regarded as free-field. To minimize the effect of reflections the measuring position has to be at least 3.5 m to the side of the reflecting surface (i.e. not 3.5 m from the reflecting surface in the direction of the source).

Façade Level

The sound pressure level 1 m in front of the façade.

NOTE Facade level measurements of LpA are typically 1 dB to 2 dB higher than corresponding free-field measurements because of the reflection from the facade.

Indoor Ambient Noise

Noise in a given situation at a given time, usually composed of noise from many sources, inside and outside the building, but excluding noise from activities of the occupants.



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