



Noise Impact Assessment

Site Address: Brunel Road Recycling Centre, Brunel Industrial Estate, TQ12 4PJ

Client Name: Oaktree Environmental

Project Reference No: NP-012295



Authorisation and Version Control

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1. Introduction

NOVA Acoustics Ltd has been commissioned to prepare a noise impact assessment as part of an Environmental Agency ('EA') application for a bespoke permit ('the application'), at Brunel Road Recycling Centre, Brunel Road Industrial Estate, Newton Abbot, TQ12 4PJ ('the site'). This report has been compiled to accompany the permit application to be submitted to the EA.

A noise survey has been undertaken to establish the prevailing background and ambient sound levels at the closest Noise Sensitive Receptors ('NSRs'). This report details the existing background and ambient sound climate, and the noise emissions associated with the proposed development.

Measures required to mitigate noise impacts have been recommended where necessary and assessed in accordance with the relevant performance standards, legislation, policy and guidance. The noise assessment is necessarily technical in nature; therefore, a glossary of terms is included in Appendix A to assist the reader.

1.1 Standards, Legislation, Policy & Guidance

The following performance standards, legislation, policy and guidance have been considered to ensure good acoustic design in the assessment:

- The Environment Agency Guidance 'Noise and Vibration Management: Environmental Permits (Jan 2022)'.
- Environmental Agency 'Method Implementation Document ('MID') for BS4142 (2023).
- National Planning Policy Framework (2024).
- Noise Policy Statement for England (2010).
- BS4142:2014+A1:2019 – 'Methods for rating and assessing commercial and industrial sound'.

Further information on the legislation can be found in Appendix B.

1.2 Background

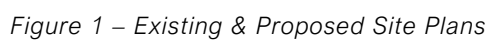
The site is currently operating under a waste exemption license (registration number: WEX399000) with a series of exemptions which include an S1, S2 and T4 exemption.

The site operates 06:00 – 17:00 hours, Monday to Friday, and 06:00 – 16:30 hours on Saturdays, however it is understood that any particularly noisy operations do not take place until 07:00 hours (e.g., picking lines).

The applicant is seeking a bespoke EA permit for the equivalent operations, however, alterations to the site furniture are required. The steel portal frame building currently housing the picking line, baler and bottle basher will be demolished. A part concrete, part steel building will be erected to also house the bale loading area in the southwestern corner of the site and bays no. 8 & 9 just north of the picking line.

There will be no intensification of operations or waste acceptance as part of the bespoke permit application.

The figure overleaf shows the existing and proposed site plans.



2. Environmental Noise Survey

2.1 Measurement Methodology

An environmental noise survey was carried out by Oaktree Environmental in February of 2025. Both long-term unattended and on-site spot measurements were conducted as part of the survey.

The following table and figure outline the measurement dates and particulars and the locations of the nearest noise sensitive receptors (NSR). All sound level meters were fitted with a proprietary environmental kit complete with a suitable windshield. A localised weather station could not be situated on-site, therefore, met office weather data of the area, specifically the closest weather station, has been consulted. Details of the equipment used and the meteorological conditions are available in Appendix C.

Location	Survey Dates	Measurement Particulars
MP1	13-17/02/2025	Microphone mounted on a tripod at 1.5m above the ground along the eastern boundary of Sandringham Park, representative of NSR1. The microphone was at least 3.5m from any other large reflective surface.
MP2		Microphone mounted on a tripod at 1.5m above the ground on council owned land off Torquay Rd, representative of the most exposed façades of NSR2. The microphone was at least 3.5m from any other large reflective surface.

Table 1 – Measurement Methodology

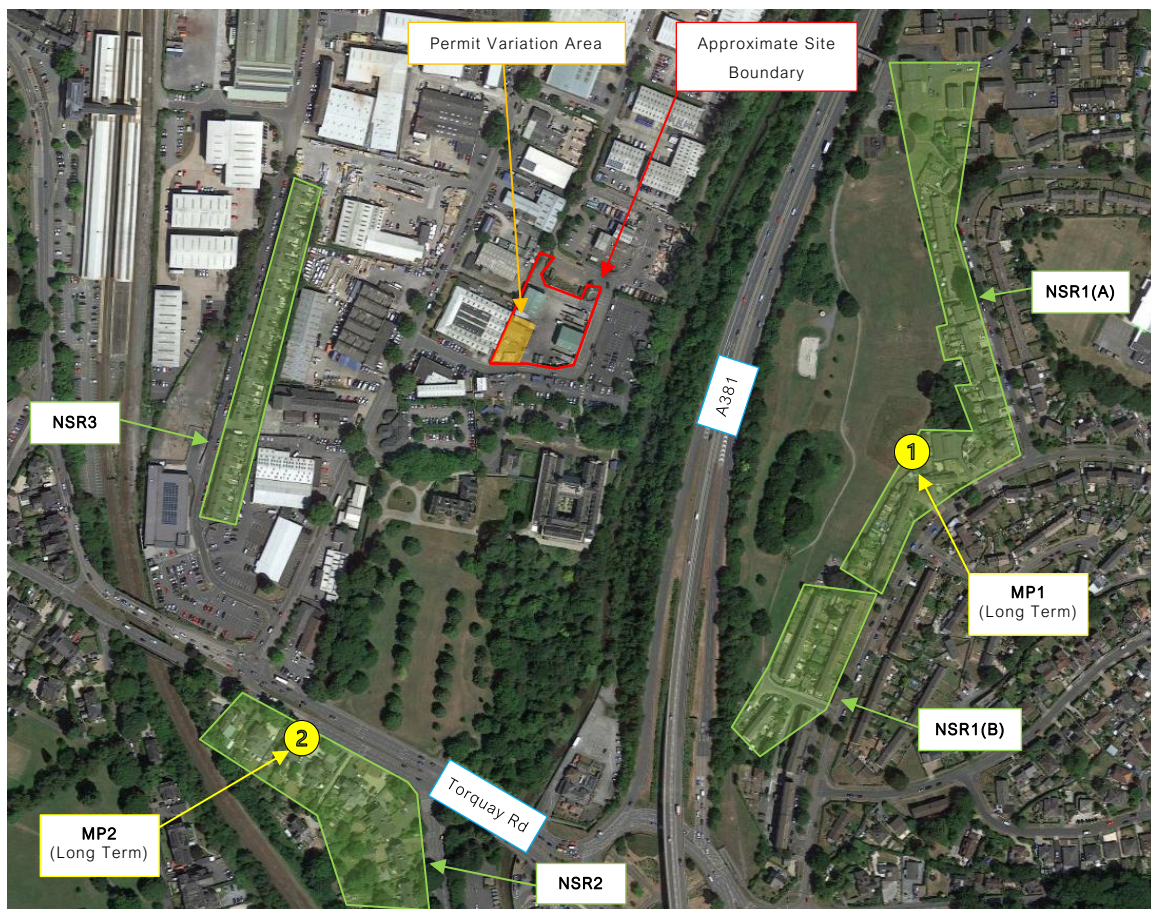


Figure 2 – Measurement Locations and Site Surroundings

2.2 Area Description and Context

The area surrounding the site is predominantly commercial and industrial in nature. The closest residential NSRs are:

- NSR1(A) – Terraced and semi-detached two-story dwellings. The closest property is approximately 250m east of the site.
- NSR1(B) – A row of two-storey terraced dwellings. The closest property is approximately 250m south-east of the site.
- NSR2 – A row of two-story semi-detached dwellings along Torquay Rd. the closest property is approximately 320m south of the site.
- NRS3 – A row of terraced properties approximately 160m to the west of the site.

The A831 separates the site from the closest NSRs(1) to the east. The A381 is elevated on an embankment, however, the topography for NSRs(1) is raised such that they have line of sight to the site (dense foliage does intervene during the summer months).

Bupa Dental Care and several council-owned buildings and associated infrastructure separate the site from the receptors labelled NSR2. Although the intervening ground is flat, it is soft and contains large trees that block the line of the sight during the summer months in particular.

The receptors labelled NSR3 are heavily screened from the site by the intervening buildings that make up Brunel Industrial Estate.

2.3 Subjective Impression of Noise Environment

Entire site shutdowns were agreed for each day surveyed:

- 07:00 – 08:00 hours
- 11:00 – 12:00 hours
- 15:00 – 16:00 hours

During a site shutdown between 15:00 – 16:00 hours, the acoustic climate at MP1 was dominated by constant road traffic noise emissions from the A381. Second in nature and only during infrequent lulls in road traffic were noise emissions from people shouting and playing in Sandringham Park.

Over the same period the acoustic climate at MP2 was akin to MP1, however, people were present within the grounds of 'visit south devon' and were just perceptible during lulls in road traffic. Occasional impulsive noise emissions, reversing alarms and car horns emanating from the north were also perceptible.

2.4 Operational Procedures & Permit Proposals

The site is a recycling centre and is active throughout most of the day. Skip wagons enter the site to deposit waste in the respective bays and a Manitou with a front bucket manoeuvres the waste as necessary. A forklift is also in the same fashion with certain waste, e.g., baled recyclables.

As part of bays 4 & 5, a cardboard baler line is situated under a steel portal frame lean-to structure; this is not subject to change under the bespoke permit.

A mixed plastic and cans baler line is situated on the western perimeter of the site. Currently, the picking line, bottle basher and baler are housed under a steel portal frame lean-to structure. The bespoke permit application proposes to house the picking line, baler and bottle basher under a new part concrete structure.

The new structure will also house bays 8 & 9 and the feed hopper, and areas 11 to 13 for baled recyclable storage. As part of the baling operation, a forklift will be required to traverse within the new lean-to structure to stack the bales and load them onto HGVs during collection.

NOVA Acoustics has been informed of the following:

- The site will continue to operate during the permitted hours of 06:00 – 17:00, Monday to Friday and 06:00 – 16:30 on Saturdays.
- Skip wagon deliveries do not typically exceed 30-minutes per a 'worst-case' 1-hour period during the daytime.
- No more than 4no. waste collections via HGVs occur per month for each waste type. The exceptions to this are:
 - o Aluminium – 1no. 7t collection per month (some months no collections),
 - o Steel – 1no. 19t collection per month (some months no collections),
 - o Bagged textiles – 3t collected daily via an LGV.

2.5 Environmental Noise Survey Results

Sound Level Results Summary & Baseline Noise Levels

The 'lowest typical' daytime background sound levels and average residual sound levels measured during the full site shutdowns is presented in the table below.

Due to the little variation in background sound levels between 06:00 to 07:00 hours (the 'night-time' period) and 07:00 to 17:00 hours (the daytime period), the BS4142 assessment has been conducted over one entire assessment period between 06:00 to 17:00 hours.

Full time histories, statistical analysis and weather conditions can be seen in Appendix C.

Description	L _{Aeq,15min} (dB)	L _{A90,15min} (dB)
MP1 Weekday & Saturday (06:00 – 17:00 hours)	52 (48 – 57)	49 (47 – 52)
MP2 Weekday & Saturday (06:00 – 17:00 hours)	55 (51 – 61)	52 (49 – 56)

Table 2 – Sound Level Results Summary

3. Noise Impact Assessment

In the following section of the report, the impact from the proposed bespoke permit is assessed. As there are no proposals to change the operational procedures, the following situations have been assessed:

- Existing waste exemption license with existing site furniture,
- Proposed bespoke permit with new part concrete steel portal frame lean-to structure.

3.1 Relevant Standards Guidance & Policies

BS4142:2014+A1:2019

When assessing industrial or commercial noise, acoustic design criteria are commonly set based on the guidance presented within BS4142:2014:A1:2019.

The following summarises the primary steps in the BS4142:2014:A1:2019 assessment methodology:

- A representative background sound level ($L_{A90,Tr}$) is determined based on the noise survey results;
- The cumulative specific sound level ($L_{Aeq,Tr}$) from the proposed development is predicted outside the windows of the NSRs and residential gardens;
- The rating sound level ($L_{Ar,Tr}$) is determined by applying 'acoustic feature corrections' which correct for the acoustic characteristics of the sound which may be perceptible and potentially cause annoyance at each NSR;
- The predicted rating sound level is compared with the background sound level and the level of impact is initially estimated in accordance with BS4142:
 - o Typically, the greater this difference, the greater the magnitude of the impact.
 - o A difference of around +10dB or more is likely to be an indication of a significant adverse impact, depending on the context.
 - o A difference of around +5dB is likely to be an indication of an adverse impact, depending on the context.
 - o The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source 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 negligible impact, depending on the context.
- Further context can then be provided where necessary;
- If necessary, mitigation measures are recommended to reduce the predicted noise impact.

3.2 Adopted Criteria

It is required that any site noise emissions causing significant noise impact (classed as 'significant adverse impact, dependent on context' in accordance with BS4142) are mitigated to an acceptable level given the context of the site.

Noise emissions causing an 'adverse impact' must be minimised to as low as practicable also considering context; this does not necessarily mean that such adverse effects cannot occur, providing the implementation of appropriate measures (may also be Best Available Techniques ('BAT')) can be "rigorously" demonstrated.

Site noise emissions causing 'no impact' to 'low impact' may not require any action over the basic appropriate measures or BAT.

Considering the above, the BS4142 rating sound level at the most affected NSRs shall be controlled to avoid 'significant adverse impact', further measures and BAT shall be considered to minimise any 'adverse impact' with the aim to reduce to 'low impact' where practicable, dependent on the context of the site.

3.3 Specific Sound Levels & Noise Modelling Data

HGV Movements

Please note that the sound power levels presented in the following table are the input values only; the speed and the number of events has been applied within the noise modelling software. Full calculations can be found in Appendix D.

The highest $L_{eq,1sec}$ measurement from an HGV pass-by at 5m measured by NOVA Acoustics (report ref: NP-009798) has been used to calculate the sound power levels seen below.

Description	1/1 Octave Frequency Band (Hz, L _w dB)								L _{WA} (dB)
	63	125	250	500	1k	2k	4k	8k	
HGV Pass-by	106	93	89	93	95	93	90	82	99

Notes:

A total of 1no. HGV movement through the site per 1-hour daytime period has been assumed (moving point source at 4.4m/s)

Table 3 – Sound Power Levels of HGV Pass-by

Heavy Plant Equipment & Operations

A summary of the source sound power levels is presented overleaf. Where spectrum data is not available from the applicant or the manufacturer, this has been determined from noise levels previously measured by NOVA Acoustics.

Whilst the site is open from 06:00 hours, it is understood that 'noisy' activities do not begin until 07:00 hours. As such, all equipment and operational on-times per the reference daytime 1-hour period of BS4142 have been prescribed by Oaktree Environmental (based on site visit). Full sound power calculations can be found in Appendix D.

Description	1/1 Octave Frequency Band (Hz, L _w dB)								L _{WA} (dB) & On-time (min/1-hour)
	63	125	250	500	1k	2k	4k	8k	
Minatou Moving Glass Pile ^[1]	115	111	104	105	103	105	109	111	115 (10-minutes)
Minatou Loading Cardboard Baler ^[1]	103	108	105	100	100	97	97	88	106 (60-minutes)
Cardboard Baler ^[1]	85	86	85	81	81	80	78	75	87 (60-minutes)
CKTR63-60-22kW (Bottle Basher) ^[1]	92	95	96	98	100	100	98	94	105 (60-minutes)
Plastic & Cans Sorting/Picking Line ^[1]	102	100	102	108	112	112	109	105	117 (15-minutes)
Skip Wagon Unloading Plastics & Cans ^[1]	95	99	95	96	94	92	91	87	100 (10-minutes)
FL Loading HGV ^[2]	90	95	94	93	91	91	86	79	97 (20-minutes)

Notes:

[1] – Spectrum measured by Oaktree Environmental whilst on-site.

[2] – Spectrum measured by NOVA Acoustics (report ref: NP-009798).

*Table 4 – Sound Power Levels of Equipment & Operations***Existing On-Site Furniture**

Various 3.5m tall concrete bay walls are present on site. These have been modelled within the SoundPlan software and an absorption spectrum for concrete in the SoundPlan library has been utilised.

The cardboard baling line and existing plastics and cans sorting/picking line buildings have been modelled according to on-site observations:

- The cardboard baling building is 7.5m in height and constructed from concrete panels up to a height of 3.5m. The remainder of the façades and roof are constructed from 1mm thick profiled steel. The building is fully open along the western elevation facing into the site.
- The existing plastic and cans sorting/picking line building is constructed entirely from 1mm thick profiled steel and is entirely open along the eastern elevation facing into the site.

The sound insulation performance of profile steel and concrete blocks have been modelled within Insul 9.0 modelling software and are presented below.

Description	1/1 Octave Frequency Band (Hz, SRI dB)								R _w (dB)
	63	125	250	500	1k	2k	4k	8k	
1mm Profile Steel	11	14	18	23	28	33	38	38	27
100mm Concrete Block	37	40	38	40	48	55	61	61	46

Table 5 – Assumed Transmission Loss of Building Elements

Proposed New Plastics & Cans Building (Bespoke Permit)

The new structure will house elements that were previously in open air.

The building will be 7.5m in height and constructed from concrete panels up to a height of 3.5m. The remainder of the façades and roof are constructed from 1mm thick profiled steel. The building is to fully open along the eastern elevation facing into the site.

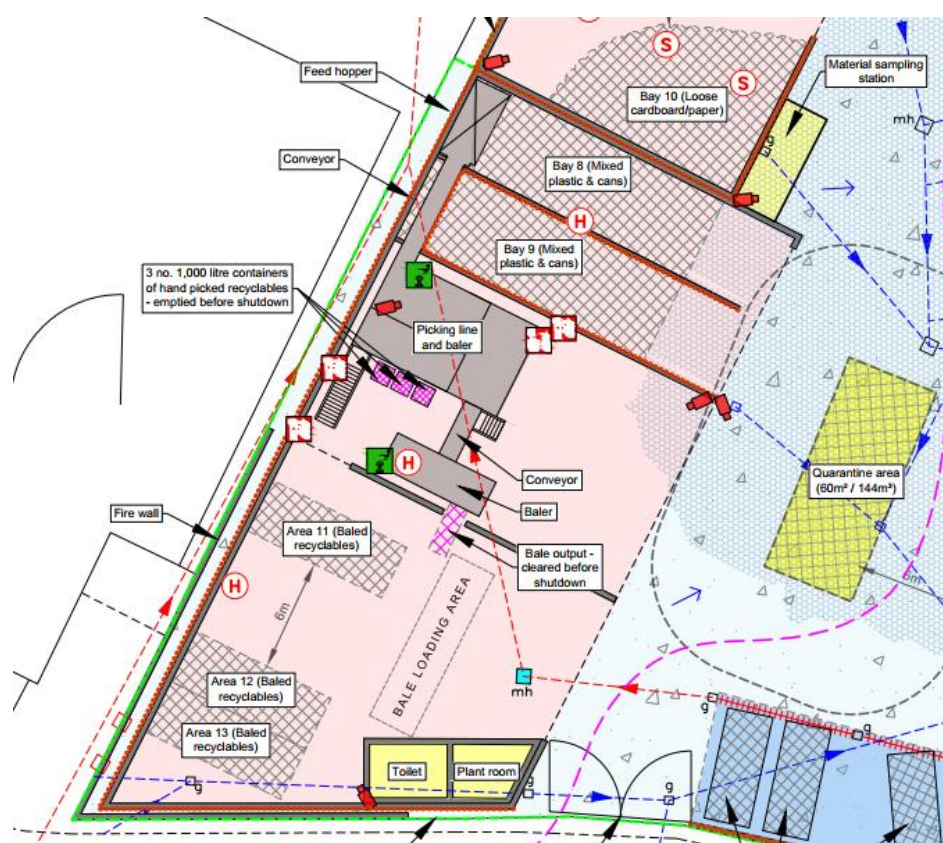


Figure 3 – Proposed Plastic & Cans Building

Noise Modelling

The following assumptions have been made within the SoundPlan 9.0 noise modelling software:

- To accurately model the land surrounding the Site, the topographical data has been taken from the EA's 'National LIDAR Programme' on the DEFRA Data Services Platform.
- For the purpose of the assessment, the ground between the source and receivers is considered to be a mixture of acoustically 'hard' and 'soft' surfaces that have been modelled according to the ground type.

- Octave band noise data was used to facilitate noise modelling in accordance with ISO 9613-2. ISO 9613-2 assumes a 'downwind' model to the NSRs.
- The sound map grid height has been set to 1.5m, however, the noise levels used in the assessment has been taken from the most exposed point of each façade or the centre of gardens, depending on which was greater.
- The site and all other buildings and any intervening objects have been modelled according to measurements taken on-site, with Google Maps and those provided by the LIDAR data.
- In total the following has been assessed:
 - o Scenario 1 – existing waste exemption license.
 - o Scenario 2 – proposed bespoke permit with the new building in place.
- The sound levels and on-times presented in Tables 3 & 4 have been inputted into the noise model.
- All fixed operations have been modelled as point source emitters. However, where there is slight movement where this operation could take place, area noise sources have been set ($L_w/\text{unit area}$).
- Where more than one dominating noise generating element was present in a noise source, the median point source height was chosen. Where only a single noise generating element was present, or a single element was dominant, the point source height was that of the only or dominant element.
- All HGV movements have been modelled as slow-moving point source emitters (line source $L_{w/m}$) and on-times have been calculated based on vehicle speed (4.4 m/s) the number of events per 1-hour reference time period (1no. passing through site).
- In all instances, the noise emissions breaking out of the buildings is calculated within SoundPlan (in accordance with BS12354) accounting for the following:
 - o Building dimensions and heights in accordance with the provided drawings.
 - o Absorption spectrums and scattering coefficients have been obtained from the SoundPlan library.
 - o The internal ambient noise levels as calculated using SoundPlans 'Hallout' feature.
 - Internal ambient noise levels range from 88 to 89dBA within the cardboard baling building,
 - Between 95 to 96dBA within the existing plastics and cans building.
 - Between 89 to 92dBA in the new plastic and cans building.
 - o The building fabric sound reduction shown in Table 5,
 - o A Cd diffusivity term correction of -3dB for noise breakout from solid reflective elements (façades & roofing), and 0dB for breakout from absorptive elements (openings).

Specific Sound Level Summary & BS4142 Rating Sound Levels

The sound maps showing the specific sound level emissions from the site can be seen in the following figures.

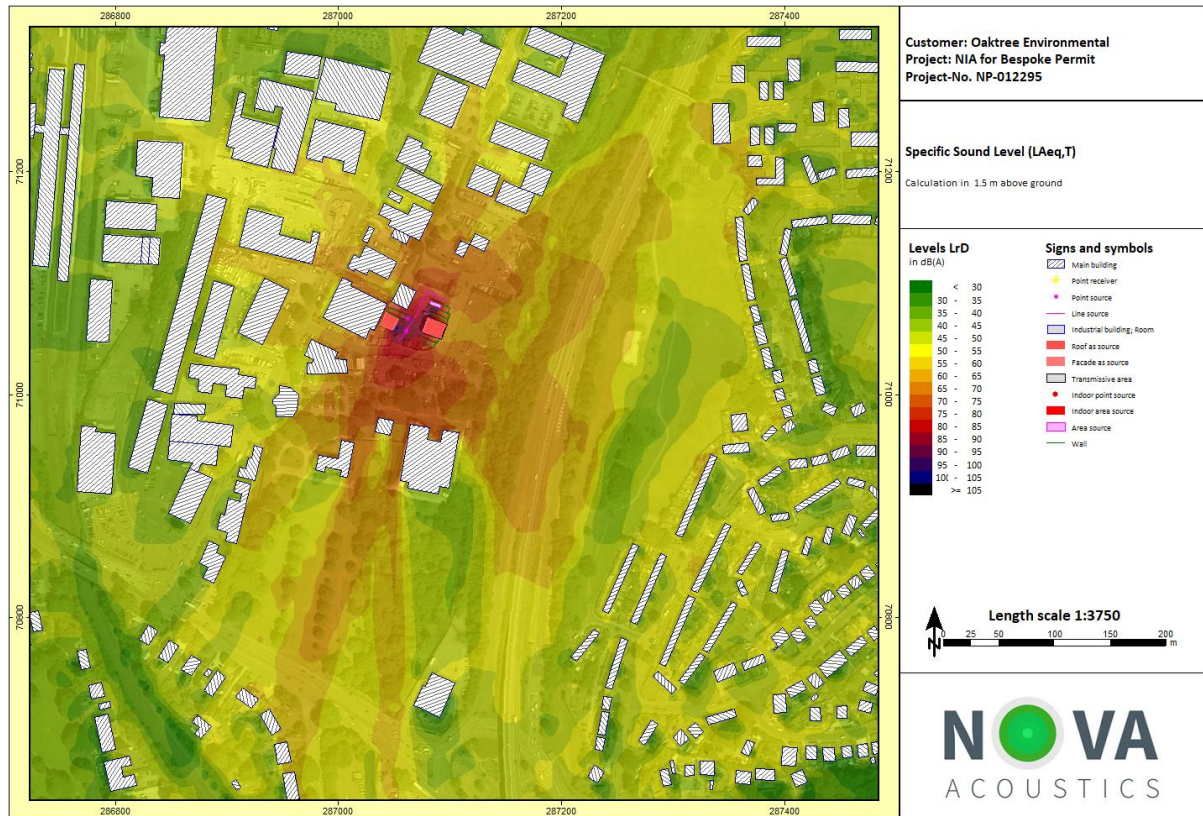


Figure 4 – Specific Sound Level Map – Existing Waste Exemption License

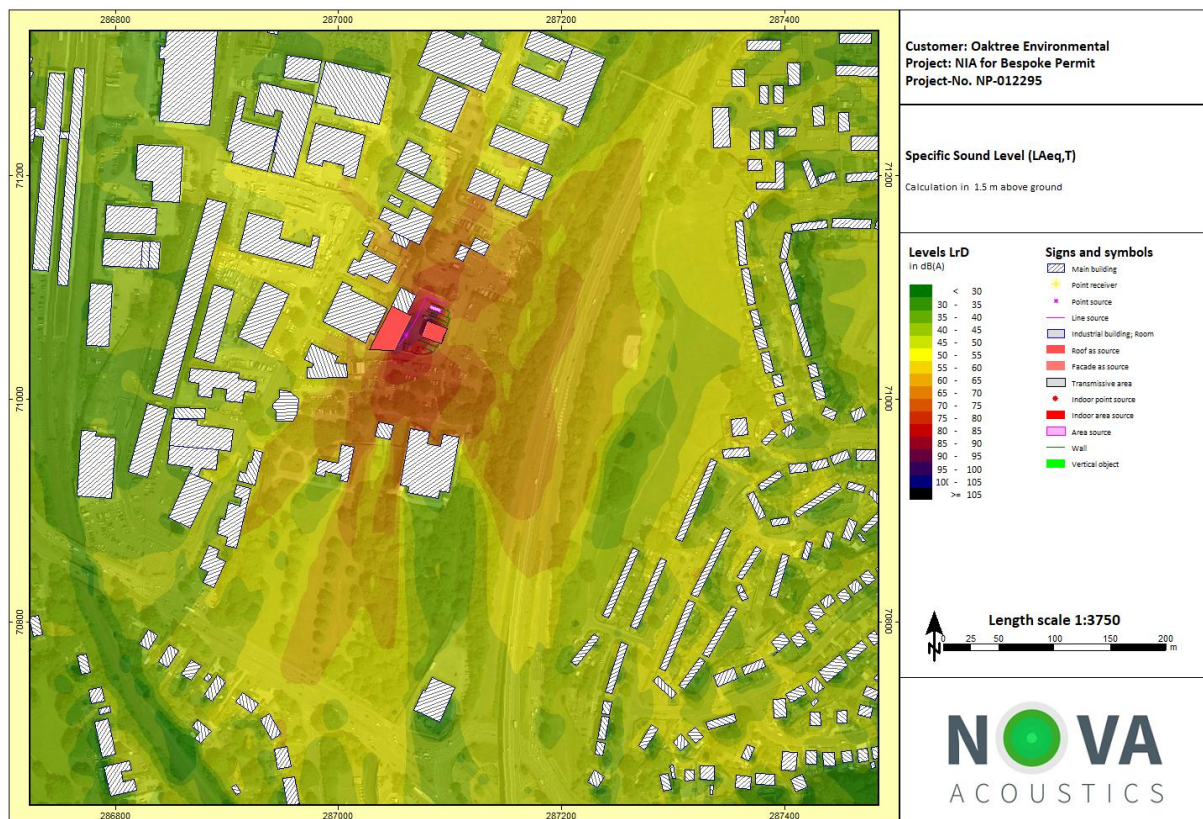


Figure 5 – Specific Sound Level Map – Proposed Bespoke Permit

3.4 BS4142 Noise Impact Assessments

The criteria that will be applied to the BS4142 assessment outcomes will be based on the table below. Please note that these are indicative at this stage and require a review of the 'contextual' nature of the site when compared to the background sound level. This is subsequently discussed after the BS4142 assessment.

Description	Exceedance Levels & Initial Assessment Outcome			
Exceedance of Background (L_{A90})	<0	0 - 4	5 - 9	10+
BS 4142 Initial Assessment Outcome	Low Impact to 'Negligible Impact	Low Impact / Low Likelihood of Adverse Impact	Adverse Impact	Significant Adverse Impact

Table 6 – BS4142 Initial Noise Impact Criteria

The BS4142 noise impact assessments are conducted at the most affected NSRs in the table below.

Description	NSR			
	1(A)	1(B)	2	3
Existing Waste Exemption License				
Specific Sound Level (dB $L_{Aeq,1hr}$)	56	54	58	52
BS4142 Acoustic Feature Corrections	+5 ^[1]	+5 ^[1]	+2 ^[2]	+2 ^[2]
Rating Sound Level (dB $L_{Ar,Tr}$)	61	59	60	55
Background Sound Level (dB $L_{A90,15min}$)	49	49	52	49
Exceedance of L_{A90}	+12	+10	+8	+6
Proposed Bespoke Permit				
Specific Sound Level (dB $L_{Aeq,1hr}$)	56	54	54	46
BS4142 Acoustic Feature Corrections	+5 ^[1]	+5 ^[1]	+2 ^[2]	+2 ^[2]
Rating Sound Level (dB $L_{Ar,Tr}$)	61	59	56	48
Background Sound Level (dB $L_{A90,15min}$)	49	49	52	49
Exceedance of L_{A90}	+12	+10	+4	-1

Notes:

[1] A +2dB penalty for a 'just perceptible' low frequency hum, and a +3dB penalty for 'just perceptible' impulsivity has been applied.

[2] A +2dB penalty for a 'just perceptible' low frequency hum has been applied. Sufficient impulsive events are already audible in the residual climate at NSR2 and, hence, an additional +3dB penalty has not been applied.

Table 7 – BS4142 Noise Impact Assessments

As can be seen in the BS4142 assessment, the rating sound levels for the existing waste exemption license are +10 to +12dB above the background sound level at NSR1. This initially indicates the potential for a 'significant adverse impact' in accordance with BS4142.

The BS4142 assessment also shows rating sound levels for the existing waste exemption license that are 6dB to 8dB above the background sound level at NSRs 2 & 3. This initially indicates the potential for a 'adverse impact' in accordance with BS4142.

The site has been operation for a number of years and NOVA Acoustics is not aware of any noise related complaints made against the site. As such, it is possible that the noise impact is lower than what has initially been quantified.

In accordance with the NPSE and NPPF, the existing noise impacts are thought to lie above a 'Lowest Observed Adverse Effect Level' ('LOAEL') at NSRs 2 & 3, and above 'Significant Observed Adverse Effect Level' ('SOAEL') at NSR1.

The BS4142 assessment for the proposed bespoke permit indicates no change in the noise impact NSR1, and a 4dB and 7dB rating sound level reduction at NSRs 2 & 3, respectively. The BS4142 assessments at NSRs 2 & 3 indicate a low likelihood of 'adverse impact' as a 'worst-case' scenario.

The bespoke permit operations form part of good acoustic design and BAT, given more 'noisy' operations are to be housed within a more substantial structure. However, the adopted criterion is to ensure that 'significant adverse impact' in accordance with BS4142 is avoided. As such, further mitigation and noise control measures are deemed necessary.

3.5 Recommendations and Mitigation Measures

The noise emissions from the plastic & cans picking line and bottle basher breaking out of the new building are predicted to be dominant.

The noise impact could be reduced further by closing off the opening along the eastern elevation of the new plastics and cans building. However, mobile plant is required to frequently traverse in and out, and a 'fast-acting' roller shutter door would not provide the necessary attenuation due its inherently poor sound insulation and it being opened so frequently. Furthermore, the building cannot be re-oriented due to site constraints.

Therefore, it is proposed that the internal sound pressure level within the new building is reduced by controlling the build-up of reverberant sound energy. To do so, the upper steel sections of the wall and the roofing should be lined with 50mm mineral wool slab insulation (min. density 40kg/m³) and held in place by a perforated steel liner sheet (30% free area). It may be necessary to install a glass tissue lining to protect the mineral wool from dust and significant moisture. The Kingspan 'Acoustics Performance Guide' has been consulted for test data.

Please note that these measures will need to be maintained throughout the lifetime of the development. It may also be feasible to utilise a more resilient absorptive material provided it is a Class A absorber (approx. NRC 0.85).

The proposed internal lining is predicted to reduce the cumulative internal sound pressure level by approximately 6dB at all breakout elements.

The figure below shows the specific sound map considering the proposed mitigation measures.

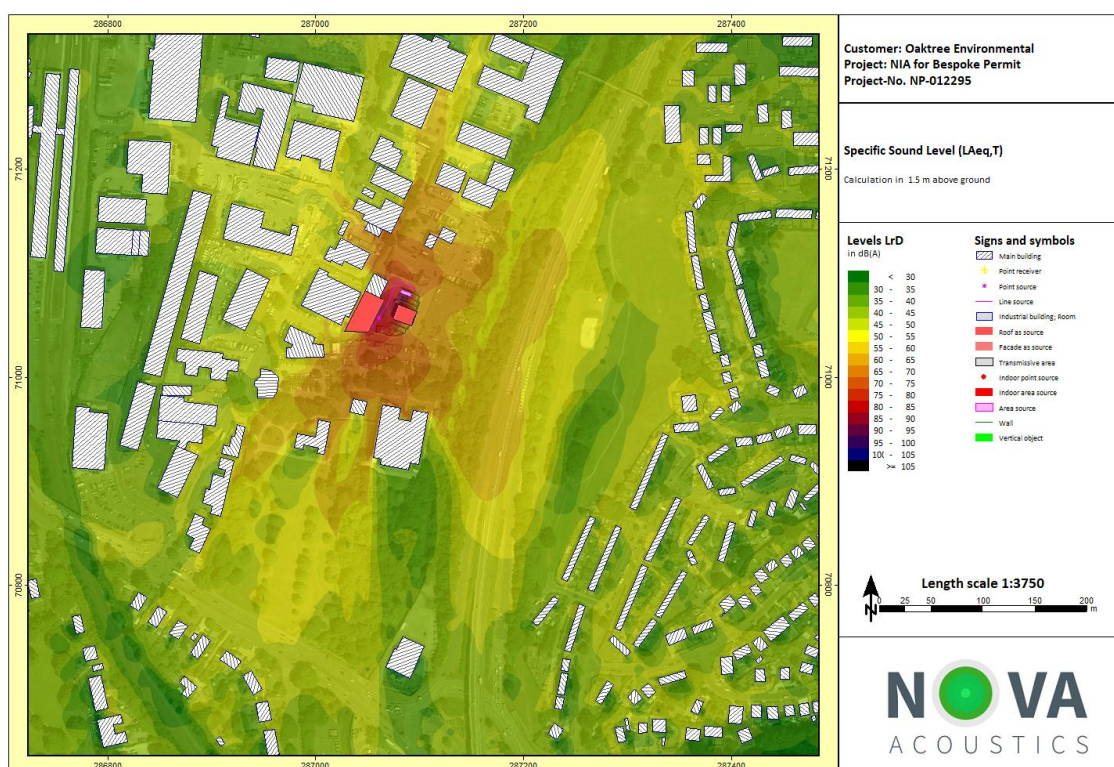


Figure 6 – Specific Sound Level Map – Proposed Bespoke Permit with Mitigation

The BS4142 noise impact assessments are conducted at the most affected NSRs in the table below.

Description	NSR			
	1(A)	1(B)	2	3
Proposed Bespoke Permit - Mitigation				
Specific Sound Level (dB L _{Aeq,1hr})	51	49	49	45
BS4142 Acoustic Feature Corrections	+3 ^[1]	+3 ^[1]	+2 ^[2]	+2 ^[2]
Rating Sound Level (dB L _{A,r,Tr})	54	52	51	47
Background Sound Level (dB L _{A90,15min})	49	49	52	49
Exceedance of L _{A90}	+5	+3	-1	-2
Notes: [1] A +3dB penalty for 'just perceptible' impulsivity has been applied. [2] A +2dB penalty for a 'just perceptible' low frequency hum has been applied.				

Table 8 – Mitigated BS4142 Noise Impact Assessments

As can be seen above, the BS4142 noise impacts have been reduced to +5dB above the background sound level at the most affected NSR1(A), which is an indication of 'adverse impact, dependant on context'. A low likelihood of 'adverse impact' is predicted at NSR1(B), and 'low impact' at NSRs 2 & 3.

Given the context of the area which is already heavily industrialised and such acoustic features are already present, it is likely that the noise impact is lower than what has been initially quantified. The noise impacts in line with the NPSE and NPPF are considered between a NOAEL and LOAEL.

4. Limitations and Uncertainty

Any measurement of existing ambient and background sound levels will be subject to a degree of inherent uncertainty. Environmental sound levels vary between days, weeks and throughout the year due to the variations in source level and conditions, meteorological effects on sound propagation and other factors.

Therefore, any environmental noise survey can only provide a snapshot of the noise levels. However, all efforts have been made to ensure that the measurements were conducted in a way to provide a robust sample of representative and typical conditions, e.g., avoiding or omitting adverse weather conditions. Nonetheless, a small degree of uncertainty will always remain in the noise levels from surveys.

All measurements were taken with a 130mm diameter windshield fitted. The average wind speeds shown in Appendix C fall below the manufacturer's limits of effectiveness.

The impact assessment has been prepared in accordance with source data measured during a site visit. The measurement distances were measured accurately using a laser meter, and the worst-case highest sound levels measured where directivity was at its greatest have been used.

To reduce uncertainty when measuring noise sources that are erratic or variable, longer measurements were taken that included several full cycles rather than a single 'snapshot'.

The measurements were undertaken at distances where noise emissions from operations were thought to be dominant and also where they were propagating in point source manner.

The calculations using SoundPlan 9.0 conform to ISO 9613 that has an uncertainty reported as ± 3.0 dB. ISO 9613 assumes a downwind model output that will tend overestimate actual noise propagation from source to receptor locations; the calculated levels are therefore based on worst-case scenarios.

5. Conclusion and Action Plan

A BS4142 assessment has been undertaken for the existing waste exemption license and proposed bespoke permit application.

The BS4142 assessment for the existing waste exemption license initially indicates 'significant adverse impact' in accordance with BS4142 at the most affected NSR(1). The same BS4142 assessment also indicated 'adverse impact' at NSRs 2 & 3.

In accordance with the NPSE and NPPF, the existing noise impacts are thought to lie above a 'Lowest Observed Adverse Effect Level' ('LOAEL') at NSRs 2 & 3, and above a 'Significant Observed Adverse Effect Level' ('SOAEL') at NSR1.

The BS4142 assessment for the proposed bespoke permit indicates no change in the noise impact NSR1, but a notable rating sound level reduction at NSRs 2 & 3. The BS4142 assessments at NSRs 2 & 3 indicate a low likelihood of 'adverse impact' as a 'worst-case' scenario. However, to achieve the adopted criterion and avoid 'significant adverse impact' at NSR1 in accordance with BS4142, further mitigation and noise control measures have been advised.

Provided the mitigation measures are duly implemented and retained throughout the lifetime of the site, 'adverse impact, dependant on context' is predicted at the most affected NSR. At all other receptors, 'low impact' to a low likelihood of 'adverse impact' is predicted in accordance with BS4142.

Given the context of the area which is already heavily industrialised and such acoustic features are already present, it is likely that the noise impact is lower than what has been quantified in the BS4142 assessment. The mitigated noise impacts in line with the NPSE and NPPF are considered between a NOAEL and LOAEL as a 'worst-case' scenario.

It is thought that through correct implementation of BAT and community liaison, the noise impact will typically be lower than what has been predicted within the assessments.

The following 'Action Plan' is outlined to ensure the design considerations and specifications from this report are duly implemented:

1. The upper steel sections of the wall and the roofing should be lined with 50mm mineral wool slab insulation (min. density 40kg/m³) and held in place by a perforated steel liner sheet (30% free area). It may be necessary to install a glass tissue lining to protect the mineral wool from dust and significant moisture. These measures will need to be maintained throughout the lifetime of the development. It may also be feasible to utilise a more resilient absorptive material provided it is a Class A absorber (approx. NRC 0.85).
2. The Noise Management Plan ('NMP') outlined in Section 6 should be implemented and continuously reviewed.

The findings of this report will require written approval from the Environment Agency prior to the approval of the application.

6. Noise Management Plan ('NMP')

This noise management plan outlines the methods by which the site operator will systematically assess and minimise the potential impacts of noise generated by the site. The noise management plan is a working document with the specific aim to ensure that:

- Noise impact is considered as part of routine inspections.
- Noise is primarily controlled at source by good operational practices and 'Best Available Techniques' ('BAT'), including physical and management control measures.
- All appropriate measures are taken to prevent or, where that is not reasonably practical, to reduce noise emissions from the site.

The noise management plan addresses the impact of noise, and the control measures employed to mitigate the risk. These are supported through monitoring procedures to identify elevated levels and review complaints should they arise. The complaints management procedure is also addressed, which includes the management responsibilities.

6.1 Hours of Operation

- The site will continue to operate during the permitted hours of 06:00 – 17:00 Monday to Friday, and 06:30 – 16:30 on Saturdays exclusively.

6.2 Equipment Maintenance

All failed/broken plant and equipment will be replaced with equivalents that produce equal or lower levels of noise. This will be verified with manufacturers technical datasheets or on-site noise measurements.

All plant and machinery will be regularly and properly maintained in accordance with the preventative maintenance schedule of which the appropriate staff will be trained in.

6.3 Operator Monitoring Plan

Monitoring of noise emissions from the site will be undertaken both subjectively and objectively.

Continuous Subjective Noise Monitoring

- All operational staff will, as part of their induction, be made aware of their roles and responsibility. It is the responsibility of all staff to be aware of noise on site and to report any potential noise issues to the sites Operations Manager at the earliest opportunity.
- All staff will have refresher training on noise issues, prevention and management at six-monthly intervals.
- If members of staff report any instances of elevated noise, this should be investigated immediately. In the event that increased noise levels are verified; the source of the noise should be taken out of commission and must be fixed/corrected prior to the equipment being put back into commission.
- A visual inspection of all equipment should be made before use to ensure that there are no obvious faults or malfunctions that could lead to elevated noise levels. It will be ensured that all noise mitigation measures (silencers, etc.) are installed as per manufacturer's guidance.

Objective Noise Monitoring

- A class 2 sound level meter should be purchased to measure sound levels on site. This will take place during typical operations when the site is in use and associated plant vehicles are operating as normal.

Monthly Measurements

Noise levels will be measured at monthly intervals at the site perimeter in the location shown below.

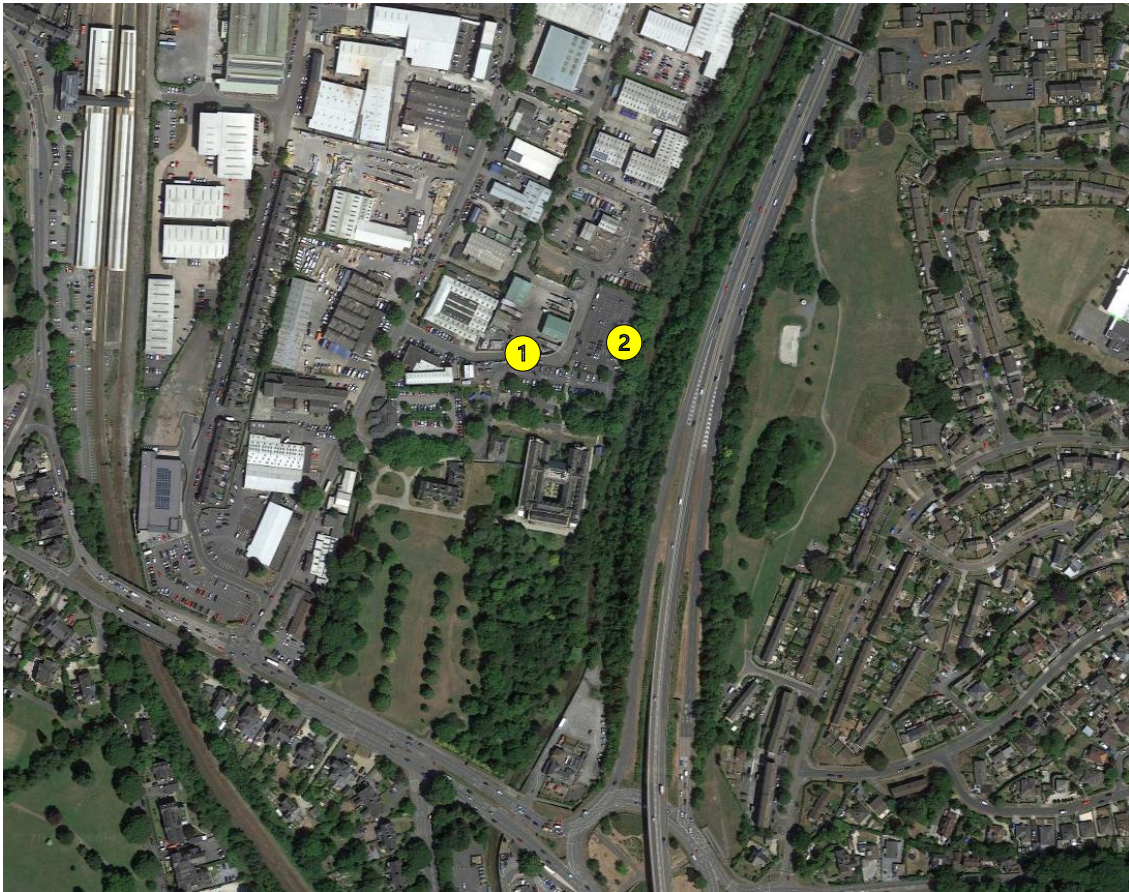


Figure 7 – Proposed Monitoring Locations

- $L_{Aeq,1hour}$ (A-weighted noise levels averaged over a 1-hour assessment period) and L_{AFmax} noise levels will be recorded. Measurements taken on site will be compared with previous measurements. If $L_{Aeq,1hour}$ noise levels increase by more than 3dB from the previous month then the cause of the increase shall be investigated.
- When the source of the elevated noise levels is discovered, remedial work shall be undertaken to reduce noise emissions to 'normal' levels. If complex remedial work is required, the offending equipment will be taken out of commission until repair work is completed. This will be logged in an IMS (Issue Management System).

6.4 Noise Control Measures Summary

- The absorptive internal lining proposed in Section 3.5 of this report shall be implemented in full and retained throughout the lifetime of the site.
- Reversing alarms will be self-adjusting white noise models.

- Engines will be switched off when not in use. Vehicles will not be left idling.
- Vehicle horns to be used as a Health and Safety measure only.
- Deliveries will be spread evenly throughout the day where practicable.
- All drop heights (including that from heavy mobile plant) will be reduced to as low as possible.
- All mobile plant will be fit with the appropriate exhaust silencers and radiator intake attenuators.

6.5 Management Control Measures

- Users of on-site plant and equipment complete a daily defect log at the beginning of the working day if they observe that their vehicle is not working to its optimum. An on-site mechanic actions the defect log on the same working day and machines are not used until this action has been completed.
- Tool-box talks are provided by site management on a regular basis to site operatives. These talks include all aspects of the management plans for this site.
- Plant maintenance schedules using the manufacturer's recommendations where vehicles are serviced after 500 hours of operation.
- Pre-use checks are completed prior to using plant and equipment daily.
- Defects are reported and actions are taken to rectify the problem or remove the offending item from service until such time as the issue is resolved.
- All plant and equipment are visually inspected by the operator at the end of the working day.
- Throughout the day operators are vigilant in checking vulnerable areas like exhausts and engine bays.
- Specialist contractors are used to perform maintenance outside the scope and expertise of the site management and operatives.
- All documentation relating to plant and equipment maintenance is retained in the site office for inspection.

6.6 Noise Complaint Investigation

It is understood that an Issue Management System ('IMS') is not currently implemented.

Therefore, this should be completed by a site manager and should include a site diary, plus forms and records of complaints. Further to this, a complaints procedure should be implemented; this procedure would need to allow for all complaints, feedback and requests made by third parties regarding the site's operational activities, as well as the health and safety performance or quality of service/product.

A phone number for the head office should be available online (it is understood that this available) in order to allow for any member of the public to lodge a complaint without entering the operational site. The operations manager will be specifically assigned to deal with complaints.

All complaints received from third parties including statutory authorities, statutory consultees, members of the general public and representatives of the company will be forwarded to the operations manager to action as below within 2 hours (where feasible). The complaint will be logged in the incident database within 72 hours.

The operations manager will ensure that:

- The complaint is investigated to identify the cause, if necessary, this may involve direct communication with the complainant.
- The noise source will be measured using a class 2 sound level meter and compared with monthly objective monitoring records.
- In the event of elevated noise being detected, the presence of 'abnormal' onsite activity is assessed and if necessary, action is taken immediately to prevent a reoccurrence of the same problem. These actions must be documented.
- The complainant will be contacted and given information on the investigations conducted and actions taken as appropriate.
- All complaints are reported to regional directors and discussed at site meetings.
- Details of other complaints are sent to the other company personnel as appropriate.

If the investigation indicates that the complaint has not been justified this will be clearly recorded on the incident report. All complaints will be logged.

6.7 Reporting Measures

In the event of elevated levels of noise being identified, the event will be reported into the IMS by a member of operational staff. Upon notification of an environmental incident, the site manager will complete an incident reporting form. The completed form is then distributed throughout the company for review at operational, management and health and safety meetings.

All performance failures will be categorised for input into the IMS as follows:

- Minor event: quick fix possible, locally resolved.
- Medium event: brief disruption to service, management intervention required.
- Major event: significant disruption to service.

Each non-conformance category must have a given deadline for rectification. The deadline for each category is:

- Minor Event: within 24 hours
- Medium Event: within 6 hours
- Major Event: within 1 hour

The IMS/EHS will record any actions taken to rectify the issue, ensure that any necessary actions or review are recorded onto the IMS/EHS and ensure that the person reporting the incident is notified. The site manager will investigate the performance failure within a reasonable time frame (ideally 2 hours). Once the issue has been resolved, the corrective action will be entered onto the system and the issue will be closed.

Appendix A – Acoustic Terminology

A-weighted sound pressure level, L_{pA}	Quantity of A-weighted sound pressure given by the following formula in decibels (dBA). $L_{pA} = 10 \log_{10} (pA/p_0)^2$. Where: pA is the A-weighted sound pressure in pascals (Pa) and p_0 is the reference sound pressure (20 μ Pa)
Background Sound	Underlying level of sound over a period, T , which might in part be an indication of relative quietness at a given location
Equivalent continuous A-weighted sound pressure level, $L_{Aeq,T}$	Value of the A-weighted sound pressure level in decibels (dB) of a continuous, steady sound that, within a specified time interval, T , has the same mean-squared sound pressure as the sound under consideration that varies with time
Facade level	Sound pressure level 1 m in front of the facade
Free-field level	Sound pressure level away from reflecting surfaces
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
Noise Criteria	Numerical indices used to define design goals in a given space
Noise Rating (NR)	Graphical method for rating a noise by comparing the noise spectrum with a family of noise rating curves
Octave Band	Band of frequencies in which the upper limit of the band is twice the frequency of the lower limit
Percentile Level, $L_{AN,T}$	A-weighted sound pressure level obtained using time-weighting “F”, which is exceeded for $N\%$ of a specified time interval
Rating Level, $L_{Ar,Tr}$	Equivalent continuous A-weighted sound pressure level of the noise, plus any adjustment for the characteristic features of the noise
Reverberation time, T	Time that would be required for the sound pressure level to decrease by 60 dB after the sound source has stopped
Sound Pressure, p	root-mean-square value of the variation in air pressure, measured in pascals (Pa) above and below atmospheric pressure, caused by the sound
Sound Pressure Level, L_p	Quantity of sound pressure, in decibels (dB), given by the formula: $L_p = 10 \log_{10} (p/p_0)^2$. Where: p is the root-mean-square sound pressure in pascals (Pa) and p_0 is the reference sound pressure (20 μ Pa)
Weighted sound reduction index, R_w	Single-number quantity which characterizes the airborne sound insulating properties of a material or building element over a range of frequencies

Appendix B – Standards, Legislation, Policy, and Guidance

This report is to be primarily based on the following standards, legislation, policy and guidance.

B.1 – National Planning Policy Framework (2024)

Government policy on noise is set out in the National Planning Policy Framework (NPPF), published in 2023. This replaced all earlier guidance on noise and places an emphasis on sustainability. In section 15, Conserving and enhancing the natural and local environment, paragraph 187e, it states:

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. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans;

Paragraph 198 states:

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 impact 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.*

B.2 – Noise Policy Statement for England (2010)

Paragraph 198 of the NPPF also refers to advice on adverse effects of noise given in the Noise Policy Statement for England (NPSE). This document sets out a policy vision to:

Promote good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development.

To achieve this vision the Statement identifies the following three aims:

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;
- Where possible, contribute to the improvement of health and quality of life.

In achieving these aims the document introduces significance criteria as follows:

SOAEL – Significant Observed Adverse Effect Level

This is the level above which significant adverse effects on health and quality of life occur. It is stated that “significant adverse effects on health and quality of life should be avoided while also considering the guiding principles of sustainable development”.

LOAEL – Lowest Observed Adverse Effect Level

This is the level above which adverse effects on health and quality of life can be detected. It is stated that the second aim above lies somewhere between LOAEL and SOAEL and requires that: “all reasonable steps should be taken to mitigate and minimise adverse effects on health and quality of life while also considering the guiding principles of sustainable development. This does not mean that such adverse effects cannot occur.”

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. This can be related to the third aim above, which seeks: “where possible, positively to improve health and quality of life through the pro-active management of noise while also considering the guiding principles of sustainable development, recognising that there will be opportunities for such measures to be taken and that they will deliver potential benefits to society. The protection of quiet places and quiet times as well as the enhancement of the acoustic environment will assist with delivering this aim.”

This is further expanded using the updated “Noise Exposure Hierarchy Table” which includes an additional level of impact referred to as the ‘No Observed Adverse Effect Level’ (‘NOAEL’). It is stated that at this level: “*noise can be heard, but does not cause any change in behaviour, attitude or other physiological response*”. In addition, noise at this level “*can slightly affect the acoustic character of the area but not such that there is a change in the quality of life*”.

The NPSE recognises that it is not possible to have a single objective noise-based measure that is mandatory and applicable to all sources of noise in all situations and provides no guidance as to how these criteria should be interpreted. It is clear, however, that there is no requirement to achieve noise levels where there are no observable adverse impacts but that reasonable and practicable steps to reduce adverse noise impacts should be taken in the context of sustainable development and ensure a balance between noise sensitive and the need for noise generating developments.

Any scheme of noise mitigation outlined in this report will, therefore, aim to abide by the above principles of the NPPF and NPSE whilst recognizing the constraints of the site.

B.3 – BS4142:2014+A1:2019 – ‘Methods for rating and assessing industrial and commercial sound’

Overview

BS4142:2014 sets out a method to assess the likely effect of sound from factories, industrial premises or fixed installations and sources of an industrial nature in commercial premises, on people who might be inside or outside a dwelling or premises used for residential purposes in the vicinity.

The procedure contained in BS4142:2014 for assessing the effect of sound on residential receptors is to compare the measured or predicted sound level from the source in question, the $L_{Aeq,T}$ 'specific sound level', immediately outside the dwelling with the $L_{A90,T}$ background sound level.

Where the sound contains a tonality, impulsivity, intermittency and other sound characteristics, then a correction depending on the grade of the aforementioned characteristics of the sound is added to the specific sound level to obtain the $L_{A,r}$ 'rating sound level'. A correction to include the consideration of a level of uncertainty in sound measurements, data and calculations can also be applied when necessary.

Rating Penalty

Section 9 of BS4142:2014 describes how the rating sound level should be derived from the specific sound level, by deriving a rating penalty.

BS4142:2014 states:

"Certain acoustic features can increase the significance of impact over that expected from a basic comparison between the specific sound level and the background sound level. Where such features are present at the assessment location, add a character correction to the specific sound level to obtain the rating level. This can be approached in three ways:

- a) subjective method;*
- b) objective method for tonality;*
- c) reference method."*

Due to the nature of the development the subjective method has been adopted to derive the rating sound level from the specific sound level. This is discussed in Section 9.2 of BS4142:2014, which states:

"Where appropriate, establish a rating penalty for sound based on a subjective assessment of its characteristics. This would also be appropriate where a new source cannot be measured because it is only proposed at that time, but the characteristics of similar sources can subjectively be assessed. Correct the specific sound level if a tone, impulse or other characteristics occurs, or is expected to be present, for new or modified sound sources."

BS4142:2014 defines four characteristics that should be considered when deriving a rating penalty, namely; tonality; impulsivity; intermittency; and other sound characteristics, which are defined as:

a) Tonality

A rating penalty of +2 dB is applicable for a tone which is *"just perceptible"*, +4 dB where a tone is *"clearly perceptible"*, and +6 dB where a tone is *"highly perceptible"*.

b) Impulsivity

A rating penalty of +3 dB is applicable for impulsivity which is *"just perceptible"*, +6 dB where it is *"clearly perceptible"*, and +9 dB where it is *"highly perceptible"*.

c) Other Sound Characteristics

BS4142:2014 states that where *"the specific sound features characteristics that are neither tonal nor impulsive, though otherwise are readily distance against the residual acoustic environment, a penalty of +3 dB can be applied."*

d) *Intermittency*

BS4142:2014 states that when the *“specific sound has identifiable on/off conditions, the specific sound level ought to be representative of the time period of length equal to the reference time interval which contains the greatest total amount of on time ... if the intermittency is readily distinctive against the residual acoustic environment, a penalty of +3 dB can be applied.”*

Background Sound Level

The background sound level is the underlying level of sound over a period, T, and is indicative of the relative quietness at a given location. It does not reflect the occurrence of transient and/or higher sound level events and is generally governed by continuous or semi-continuous sounds.

To ensure the background sound level values used within the assessment are reliable and suitably represent both the particular circumstance and periods of interest, efforts have been made to quantify a ‘typical’ background sound level for a given period. The purpose has not been to simply select the lowest measured value. Diurnal patterns have also been considered as they can have a major influence on background sound levels, for example, the middle of the night can be distinctly different (and potentially of lesser importance) compared to the start or end of the night-time period for sleep purposes.

Since the intention is to determine a background sound level in the absence of the specific sound that is under consideration, it is necessary to understand that the background sound level can in some circumstances legitimately include industrial and/or commercial sounds that are present as separate to the specific sound.

Assessment of Impact

BS4142:2014 states: *“The significance of sound of an industrial and/or commercial nature depends upon both the margin by which the rating level of the specific sound source exceeds the background sound level and the context in which the sound occurs”*. An estimation of the impact of the specific sound can be obtained by the difference of the rating sound level and the background sound level and considering the following:

- *“Typically, the greater this difference, the greater the magnitude of the impact.”*
- *“A difference of around +10dB or more is likely to be an indication of a significant adverse impact, depending on the context.”*
- *“A difference of around +5dB is likely to be an indication of an adverse impact, depending on the context.”*
- *“The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source 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 negligible impact, depending on the context.”*

Interpreting the guidance given in BS4142:2014, with consideration of the guidance given in the NPSE and NPPG Noise, an estimation of the impact of the rating sound is summarised in the following text:

- A rating sound level that is +10 dB above the background sound level is likely to be an indication of a Significant Observed Adverse Effect Level;

- A rating sound level that is +5 dB above the background sound level is likely to be an indication of a Lowest Observed Adverse Effect Level;
- The lower the rating sound level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact. Where the rating sound level does not exceed the background sound level, this is an indication of the specific sound source having a negligible impact and would therefore be classified as No Observed Adverse Effect Level.

During the daytime, the assessment is carried out over a reference time period of 1-hour. The periods associated with day or night, for the purposes of the Standard, are 07.00 to 23.00 and 23.00 to 07.00, respectively.

B.4 – Environmental Permitting Regulations 2022

Most recently updated in January 2022, the 'Noise and Vibration Management: Environmental Permits' provides advice on how the Environment Agency ('EA') assesses noise from industrial processes, what the law says must be done to manage noise and vibration, how to carry out a noise impact assessment and what should be included in a noise management plan ('NMP'). It replaces Horizontal Guidance for Noise (H3) Parts 1 and 2, and the Scottish Environmental Protection Agency (SEPA) Guidance on the control of noise at Pollution Prevention and Control (PPC) installations.

The guidance lists the reasons why regulation of noise is important, defines when an assessment is needed, and states required competency standards before presenting the approved methodology for undertaking a noise impact assessment, broken into the following four steps:

Step 1: desktop risk assessment:

- Identification of plant or operations that could be audible at any known or proposed NSR, including non-routine noise sources (e.g. emergency pressure relief / venting systems).
- Description and ranking of noise sources in terms of off-site impact, noting what they sound like and when they operate.
- Identification of current and proposed NSRs by name, type, location and distance from source.
- Description of the land between the site and the NSRs and whether any man-made features could increase or decrease the audibility of the sound at the NSRs.

Step 2: off-site monitoring survey, involving baseline measurements at NSRs to the standards defined in BS4142:

- When considering overall site impact, background sound levels at NSRs must not be influenced by site noise.
- In addition to assessment of the 'typical' impact required by BS4142, worst-case impact scenarios should also be considered, e.g. atypical sound sources, low background sound levels, or downwind propagation from the noise source.
- When applying for a variation, the existing noise sources on the site (before changes) must not be included in the baseline background and residual sound levels. The existing and proposed sources should be considered as separate components and combined to give a new total for the specific sound level at the receptor(s).

Step 3: source assessment, involving quantification of the noisiest items of plant or operations identified in Step 1 and estimating / predicting their impact at the receptor using BS4142. Due consideration of uncertainty should be incorporated into the assessment:

- Where modelling or calculation is used, they must comply with the requirements of 'ISO 9613 Acoustics – attenuation of sound during propagation outdoors' and the following must be provided alongside the assessment:
 - o Statement of modelling/calculation assumptions.
 - o Copy of all modelling/calculation files (models to be submitted in original software format and, where possible, QSI data exchange format).
 - o Copy of numerical noise data (excluding terrain data) in a clearly labelled and concise spreadsheet.

Step 4: BAT or appropriate measures justification, involving presentation of Best Available Techniques or appropriate measures and justification for their use in the context of the specific application:

- Demonstration that emissions have been prevented or minimised as far as reasonably practicable with respect to:
 - o The dominant noise sources (where necessary considered as sub-components within a system).
 - o All existing noise attenuation measures (physical, managerial and maintenance).
 - o Consideration of all reduction techniques for dominant noise sources and provide a reasoned determination of what is achievable.
 - o As appropriate, prediction of the impact of upgrade works and commitment to a firm timescale.
 - o Development of a noise management plan where there will be a noise impact beyond the site boundary.

Further guidance is provided in the 'Method Implementation Document ('MID') for BS4142 (2023)'.

Appendix C – Environmental Survey

C.1 – Time History Noise Data

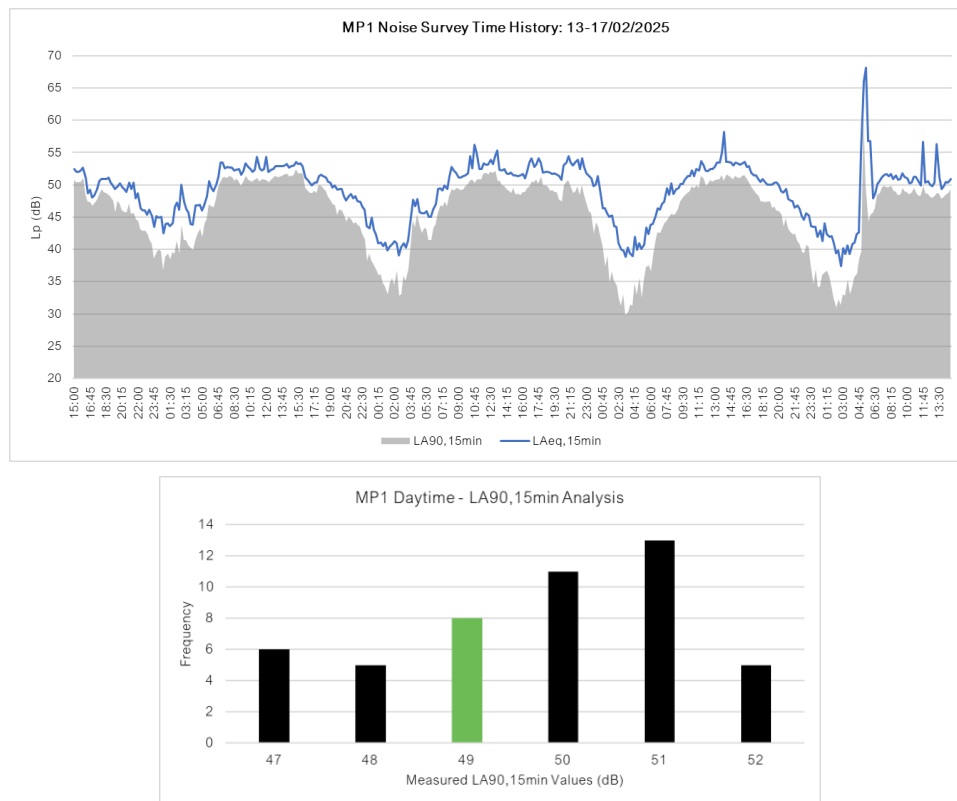


Figure 8 – MP1 Noise Survey Time History (Full Period) & Site Shutdown $L_{A90,15min}$ Histogram

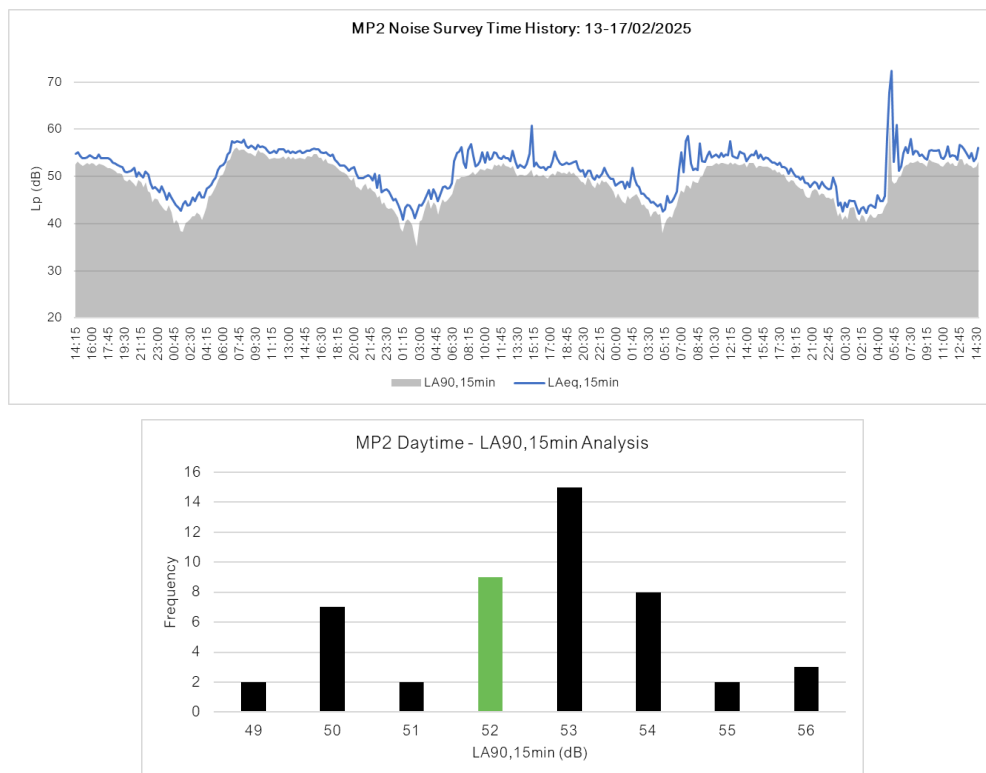


Figure 9 – MP2 Noise Survey Time History (Full Period) & Site Shutdown $L_{A90,15min}$ Histogram

C.2 – Surveying Equipment

Piece of Equipment	Serial No.	Calibration Deviation
NOR 150 Class 1 Sound Level Meter	15030504	On-site measurements
Norsonic 1225 Class 1 Calibrator	305208	
Svantek 971A Class 1 Sound Level Meter	143581	113.8 (pre) / 114.0 (post)
Svantek SV33B Class 1 Calibrator	125695	
Svantek 971 Class 1 Sound Level Meter	44018	114.0 (pre) / 114.1 (post)
Svantek SV33B Class 1 Calibrator	125695	

Table 9 – Surveying Equipment

All equipment used during the survey was field calibrated at the start and end of the measurement period with negligible deviation. All sound level meters are calibrated every 24 months, and all calibrators are calibrated every 12 months by a third-party calibration laboratory. All microphones were fitted with a protective windshield for the entire measurements period. Calibration certificates can be provided upon request.

C.3 – Meteorological Conditions

A localised weather station was not used by Oaktree Environmental, therefore, met office weather data of the area, specifically the closest weather station, has been consulted; however, all measurements have been compared with met office weather data of the area, specifically the closest weather station, and the data from the weather station is outlined in the table below.

When reviewing the time history of the noise measurements, any scenarios that were considered potentially to be affected by the local weather conditions have been omitted. The analysis of the noise data includes statistical and percentile analysis and review of minimum and maximum values, which aids in the preclusion of any periods of undesirable weather conditions. The weather conditions were deemed suitable for the measurement of environmental noise in accordance with BS7445 Description and Measurement of Environmental Noise. The table below presents the average temperature, wind speed and rainfall range for each 24-hour period during the entire measurement.

Weather Conditions – Kingskerswell Weather Station (Approx. 3.3km SSE of Site)				
Time Period	Air Temp (°C)	Rainfall (mm/h)	Prevailing Wind Direction	Wind Speed (m/s)
13/02/25: 00:00 – 23:59	4.7 – 7.2	0.0	SW	0.05 – 1.2
14/02/25: 00:00 – 23:59	5.2 – 6.9	0.0 – 2.0 ^[1]	SW	0.1 – 2.5
15/02/25: 00:00 – 23:59	2.1 – 9.0	0.0 – 1.5 ^[1]	SW	0.0 – 0.7
16/02/25: 00:00 – 23:59	2.2 – 7.7	0.0	SSW	0.0 – 1.1
17/02/25: 00:00 – 23:59	5.3 – 8.4	0.0 – 0.3	WSW	0.2 – 1.15

<https://www.metoffice.gov.uk/observations/details/20250305txbhq7z3uhe69kyhytrtechqe>

Notes:
 [1] Brief rain showers localised to weather station. Based on time histories, the rain fall did not influence the acoustic climate at the survey location.

Table 10 – Survey Weather Conditions

Appendix D – Full Sound Power Calculations

Description		Item	Source Term	Parameter	dBA	1/1 Octave Frequency Band (Hz, dB)								Lp Dist (m)	Q Factor
Model / Unit		Glass Manoeuvring with Manitou Front Bucket	Octave-Band Lp	Lp at 11.5m, Q factor (Q=4)	88	63	125	250	500	1k	2k	4k	8k	11.5	4
No. of		1	Area source 2.5m high												
Data Type		Empirical Data		Total Lw	115	115	111	104	105	103	105	109	111		
Source Mitigation No															
Description															

Description		Item	Source Term	Parameter	dBA	1/1 Octave Frequency Band (Hz, dB)								Lp Dist (m)	Q Factor
Model / Unit		Cardboard Baler Filling with Manitou Front Bucket	Octave-Band Lp	Lp at 10.5m, Q factor (Q=4)	80	63	125	250	500	1k	2k	4k	8k	10.5	4
No. of		1	Area source 2.5m high												
Data Type		Empirical Data		Total Lw	108	103	108	105	100	100	97	97	88		

Description		Item	Source Term	Parameter	dBA	1/1 Octave Frequency Band (Hz, dB)								Lp Dist (m)	Q Factor
Model / Unit		Cardboard Baler In Isolation	Octave-Band Lp	Lp at 1.6m, Q factor (Q=4)	78	63	125	250	500	1k	2k	4k	8k	1.6	4
No. of		1	Point source 2.5m high												
Data Type		Empirical Data		Total Lw	87	85	86	85	81	81	80	78	75		

Description		Item	Source Term	Parameter	dBA	1/1 Octave Frequency Band (Hz, dB)								Lp Dist (m)	Q Factor
Model / Unit		CKTR63-60-22kW (Bottle Basher) In Isolation	Octave-Band Lp	Lp at 7.7m, Q factor (Q=4)	83	63	125	250	500	1k	2k	4k	8k	7.7	4
No. of		1	Point source 1m high												
Data Type		Empirical Data		Total Lw	105	92	95	96	98	100	100	98	94		
Source Mitigation No															
Description															

Description		Item	Source Term	Parameter	dBA	1/1 Octave Frequency Band (Hz, dB)								Lp Dist (m)	Q Factor
Model / Unit		Plastics & Cans Sort/Picking Line In Isolation	Octave-Band Lp	Lp at 9.5m, Q factor (Q=2)	89	63	125	250	500	1k	2k	4k	8k	9.5	2
No. of		1	Area source 3m high												
Data Type		Empirical Data		Total Lw	117	102	100	102	108	112	112	109	105		
Source Mitigation No															
Description															

Description		Item	Source Term	Parameter	dBA	1/1 Octave Frequency Band (Hz, dB)								Lp Dist (m)	Q Factor
Model / Unit		Skip Wagon Unloading Plastics	Octave-Band Lp	Lp at 4m, Q factor (Q=2)	80	63	125	250	500	1k	2k	4k	8k	4	2
No. of		1	Point source 1.5m high												
Data Type		Empirical Data		Total Lw	100	95	99	95	96	94	92	91	87		

Description		Item	Source Term	Parameter	dBA	1/1 Octave Frequency Band (Hz, dB)								Lp Dist (m)	Q Factor
Model / Unit		FL Loading HGV	Octave-Band Lw	Lw	97	63	125	250	500	1k	2k	4k	8k		
No. of		1	Ref: NP-009798 / Point source 1.5m high												
Data Type		Empirical Data		Total Lw	97	90	95	94	93	91	91	86	79		

Description		Item	Source Term	Parameter	dBA	1/1 Octave Frequency Band (Hz, dB)								Lp Dist (m)	Q Factor
Model / Unit		HGV Pass-by	Octave-Band Lw	Lw	99	63	125	250	500	1k	2k	4k	8k		
No. of		1	Ref: NP-009798 / slow moving point source 1.5m high												
Data Type		Empirical Data		Total Lw	99	106	93	89	93	95	93	90	82		



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