Noise Impact Assessment

Site Address: Unit 5, Kestrel Way, Birdwell, Barnsley, S70 5SZ

Client Name: Carnell Management Services Ltd.

Project Reference No: NP-015024

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Delivering sustainable development by promoting good health and well-being through effective management of noise.

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1. Introduction

NOVA Acoustics Ltd has been commissioned to prepare a noise impact assessment for a new industrial unit ('the proposed development') at Unit 5, Kestrel Way, Birdwell, Barnsley, S70 5SZ ('the site').

The applicant has received conditional approval for planning application ref: 2023/0815 ('the Application') from Barnsley Metropolitan Borough Council, the Local Planning Authority ('LPA'). This report has been prepared as evidence to discharge Condition 15 imposed by the LPA.

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

Measures required to mitigate noise impact from the proposed development have been recommended where necessary and assessed in accordance with the relevant performance standards, legislation, policy and guidance.

This 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 LPA's conditional approval; specifically, 'Condition 15'.
- National Planning Policy Framework (NPPF, 2026)
- Noise Policy Statement for England (NPSE, 2010)
- British Standard BS4142:2014+A1:2019 – 'Methods for rating and assessing industrial and commercial sound'

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

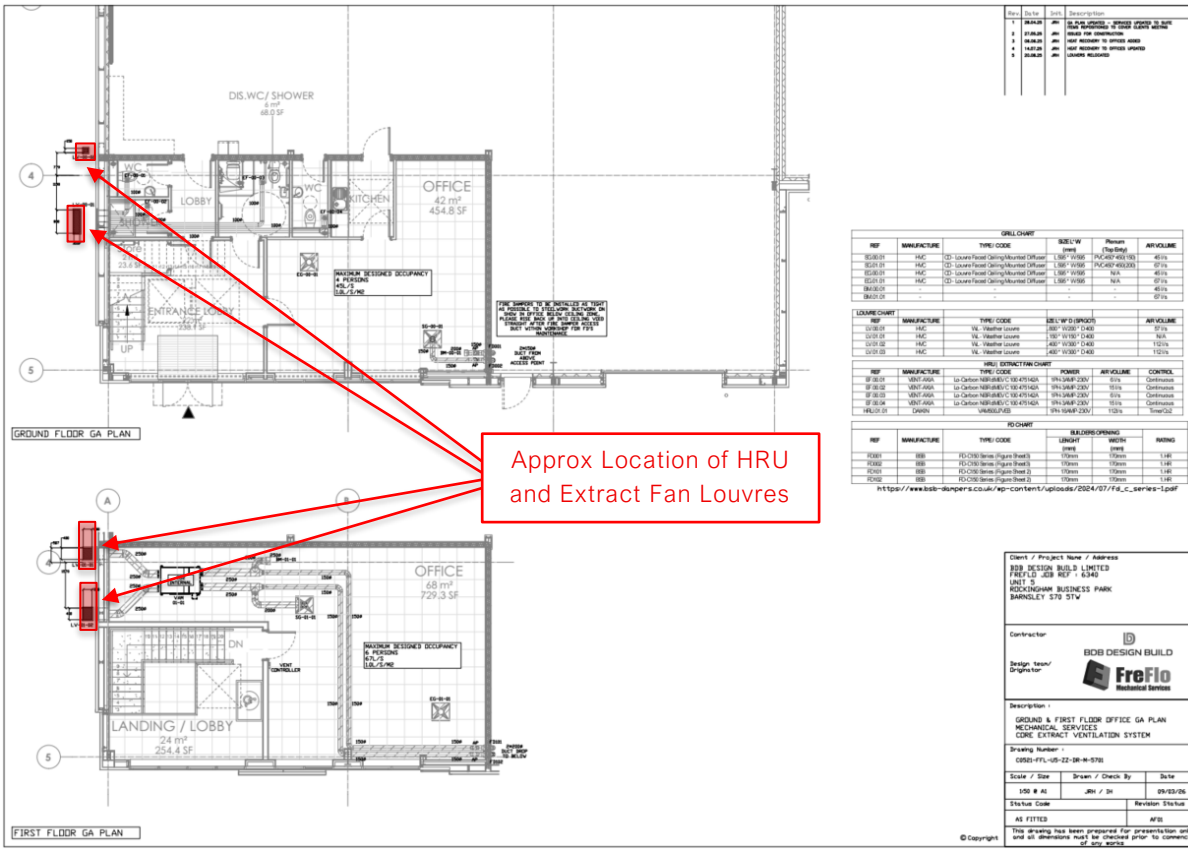
1.2 Proposal Brief

The unit forms part of a wider industrial estate containing 7no. new industrial units across 6no. buildings. This report covers Unit 1L (referred to throughout as 'Unit 5') only. Unit 5 is to be occupied by businesses 'WCT Smart Utility Services Limited' and 'Pure Atom Energy Limited', both offering metering and energy solutions. The unit shall be used for as an office with storage space. Minimal noise is expected to be generated internally, with the majority of the noise emissions associated with deliveries and forklift use.

The unit comes equipped with a Daikin Vam-J8 VAM500J7VEB heat reclaim ventilation unit ('HRU') system and 4no. Vent Axia toilet extract fans as part of fit out. No external fixed plant is provided.

Typical operating hours will be 07:00 to 17:00 Monday to Friday, with no weekend working. All deliveries will take place during typical operating hours and are assumed to consist of a combination of HGVs and LGVs.

Shown in the figure below is the layout of the proposed development.



Drawing Ref No. C0521-FFL-U5-ZZ-DR-M-5701 from 'FreFlo Mechanical Services'

Figure 1 – Proposed Development Layout

1.3 Local Planning Authority & Background

The following planning condition imposed on application ref 2023/0815 by the LPA requires discharging:

"15. Before use of any Unit within the proposed development commences, a Noise Impact Assessment shall be undertaken to determine the noise impact from the Unit.

The assessment will seek to demonstrate that, at the nearest noise sensitive receptor, the noise levels arising from operational activities will not exceed the background sound levels set out in the 'Noise Impact Assessment; Site Address: Proposed Development, Birdwell, Barnsley, S70 5SZ' produced by Nova Acoustics dated 9th May 2023, ref: NP-009288. If the assessment indicates a potential exceedance of these background levels, mitigation measures shall be identified to reduce the impact.

The assessment must be carried out by a suitably qualified acoustic consultant/engineer and follow the principles contained in BS 4142:2014 Methods for rating and assessing industrial and commercial sound.

The results of this assessment shall be submitted to and approved in writing by the Local Planning Authority. The approved details shall be fully implemented before the Unit is first occupied or the use commences and shall be thereafter maintained.

Reason: To reduce or remove adverse impacts on health and the quality of life, especially for people living and/or working nearby, in accordance with Local Plan Policy POLL1."

Further conditions on noise are imposed in conditions 16 and 17, however, as these require compliance across the entire development, they cannot yet be discharged. Nevertheless, they are reproduced below.

"16. Between the hours of 07:00 and 23:00 the sound levels from the development site. Measured at the boundary of the nearest noise sensitive receptor, shall not exceed 52dB LAeq, 15min. ***Reason: To reduce or remove adverse impacts on health and the quality of life, especially for people living and/or working nearby, in accordance with Local Plan Policy POLL1"***

And

"17. Between the hours of 23:00 and 07:00 the sound levels from the development site, measured at the boundary of the nearest noise sensitive receptor, shall not exceed 39dB LAeq, 15min. ***Reason: To reduce or remove adverse impacts on health and the quality of life, especially for people living and/or working nearby, in accordance with Local Plan Policy POLL1"***

NOVA Acoustics Ltd produced report NP-009288 (dated 9th May 2023) to accompany the planning application for the overarching development. A baseline noise survey was undertaken to support this report, with 52dB L_{A90} and 39dB L_{A90} being the lowest typical background sound levels during the daytime and night-time periods respectively.

In order for condition 16 and 17 to be achieved, the cumulative breakout and plant noise emissions from each individual unit should not exceed 44dB during the daytime and 31dB during the night-time.

2. Environmental Noise Survey

2.1 Measurement Methodology

The background noise levels for the assessment are taken from a previous baseline noise survey performed in 2023 (contained in NOVA report ref. NP-009288) to avoid any influence from construction works in the area.

All Class 1 sound level meters and microphones were fitted with a proprietary environmental kit complete with a suitable windshield (130mm diameter). All measurements were taken using a fast time-weighting, logging every 0.1s and with integration periods in 15-minutes samples.

The environmental survey meteorological conditions can be found in Appendix D. During the survey equipment setup and collection, the following meteorological conditions were recorded:

- Setup:
  - Temperature: 8°C
  - Average wind speed: ≤1.4 m/s
  - Prevailing wind direction: SSE
  - Scattered showers throughout the day and damp roads.
- Collection:
  - Temperature: 16°C
  - Average wind speed: ≤0.6 m/s
  - Prevailing wind direction: SSE
  - No precipitation and dry roads

Location	Survey Dates	Measurement Particulars
LT1	14 – 17/04/2023	Equipment mounted on a lamppost along Wood View (southern NSRs). The microphone was positioned approximately 3.5m above local ground and in free-field conditions.
LT2		Equipment mounted on a lamppost along Locksley Gardens (northern NSRs). The microphone was positioned approximately 3.5m above local ground and in free-field conditions.

Table 1 – Measurement Methodology

Outlined in the following figure are the site surroundings and measurement locations.



Imagery ©2023 Infoterra Ltd & Bluesky, Maxar Technologies, The GeoInformation Group, Map data ©2023

Figure 2 – Measurement Locations and Site Surroundings

2.2 Area Description, Context & Subjective Impression

The proposed development site is located on land adjacent to A6195, Barnsley. The area surrounding the site is mixed in nature, with commercial/industrial buildings adjacent to the north and south-west and residential dwellings just beyond these.

The most affected noise sensitive receptors are the bedroom windows located on the first floor of residential buildings on Wood View (NSR1) and Locksley Gardens (NSR2).

The acoustic environment is deemed to be moderate in level, and the noise profile is dominated by road traffic noise emissions from the A6195 to the east.

2.3 Environmental Noise Survey Results

Background Sound Level Analysis

Statistical analysis of the measured $L_{A90,15min}$ during the daytime and night-time periods was undertaken in NOVA report ref NP-009288. From this, the lowest typical background sound levels during the respective periods were determined to be 52dB L_{A90} and 43dB L_{A90} at NSR1. Similarly, the lowest typical background sound level at NSR2 was 52dB L_{A90} and 39dB L_{A90} during the same daytime and night-time periods.

The background sound level histograms are available in Appendix D.

3. BS4142 Noise Impact Assessment

3.1 Relevant Standards Guidance & Polices

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:
    - 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.
- Further context can then be provided where necessary.
- If necessary, mitigation measures are recommended to reduce the predicted noise impact.
- An assessment of the night-time specific sound levels against the adopted absolute criteria has also been conducted. This is assessment is heavily dependent on the wider context of the assessment and the site.

NPPF (2026)

Government planning policy in relation to noise is set out within the *National Planning Policy Framework: Plan-making and national decision-making policies* (NPPF), published in August 2026. This supersedes the previous NPPF published in December 2024 and amended in February 2025.

Chapter 17, *Pollution, public protection and security*, contains the principal policies relating to noise. Plan-making Policy P1, *Planning for clean and safe places*, states that development plans should allocate land where:

Development proposals will not cause unacceptable levels of pollution, either alone or in combination with other pollution sources, taking into account communities which may be particularly vulnerable to its

effects, such as children and older people, as well as habitats and species which may be vulnerable to pollution.

Policy P1 also requires development plans to:

Consider any wider opportunities to reduce air, water, soil, noise or other forms of pollution, and contribute to compliance with national and local environmental targets and objectives, through the spatial strategy and policies for specific parts of the plan area.

For the determination of individual development proposals, national decision-making Policy P3, *Living conditions and pollution*, states:

Development proposals should be appropriate for their location, taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, whether these effects are on or off-site; and whether this is as a result of the development itself or the product of preexisting conditions in its vicinity. In assessing the potential effects of pollution, consideration should be given to the potential sensitivity of the site, and its intended occupiers and users, as well as that of the environment and population in the surrounding area.

Within this context, development proposals should:

Provide healthy living conditions for occupiers and users in terms of adequate access to light and avoiding exposure to levels of air, noise, artificial light or other sources of pollution which could have an unacceptable adverse effect on health and the quality of life. Where necessary suitable mitigation measures should be incorporated to secure acceptable living conditions.

In relation specifically to noise, Policy P3 requires development proposals to:

Mitigate and reduce to a minimum potential adverse impacts resulting from noise, not result in levels of noise exposure which would have a significant observed adverse effect, and maintain the character of tranquil areas.

Annex B of the NPPF defines the Significant Observed Adverse Effect Level as the level of noise exposure above which significant adverse effects on health and quality of life occur. The NPPF does not prescribe numerical noise limits. The significance and acceptability of noise effects must therefore be assessed in the context of the individual development, its surroundings and the relevant technical standards and guidance.

NPSE (2010)

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”.

The policy identifies the following three aims:

1. Avoid significant adverse impacts on health and quality of life (SOAEL).
2. Mitigate and minimise adverse impacts on health and quality of life (LOAEL).
3. Where possible, contribute to the improvement of health and quality of life.

It is acknowledged within the NPSE 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 the 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, particularly where they are economic or social benefits.

3.2 Adopted Criteria

To comply with Planning Condition 15, the operational noise level from the unit cannot exceed the typical background sound level at the receptor for the relevant assessment period. This equates to rating level limit of **52dB** during the daytime and **39dB / 43dB** during the night-time, dependant on the receptor location.

3.3 Proposed Plant Source Noise Levels

Presented in the following table are the 1/1 octave frequency band sound power levels of the proposed plant that have been used in the specific sound level calculations. Note that these levels are based on the plant operating at maximum capacity and is thus conservative.

Octave frequency band data was not readily available from the manufacturer for the toilet extract fans ('TEF'), with the manufacturer only providing an overall sound pressure level at 3m. This has been converted to a sound power level and a reference spectrum provided using that for a centrifugal radial fan from CIBSE table 4.1.

It is understood that a forklift will be used to assist with loading and unloading deliveries. As the exact forklift to be used is unknown, a reference spectrum from one previously measured by NOVA Acoustics has been used. HGV delivery noise is assessed separately in section 3.4.

The manufacturers data sheets can be found in Appendix E.

Description	1/1 Octave Frequency Band (Hz, L_w dB)								Overall (dBA)
	63	125	250	500	1k	2k	4k	8k	
1 no. Daikin VAM500J7VEB HRU	70	63	60	57	51	48	44	39	58
1 no. Vent Axia Lo-Carbon NRBdMEV C 100 475142A [1]	44	38	41	38	36	31	29	29	41
4 no. Vent Axia Lo-Carbon NRBdMEV C 100 475142A	71	65	68	65	63	58	56	56	68
1no. Toyota TONERO 25 forklift	96	87	78	80	78	77	73	73	84

Note [1] *Sound pressure level at 3m.*

Table 2 – Sound Power Levels of Plant Equipment

The following assumptions have been used within the calculations:

- The forklift is to be operating primarily outside in the concrete compound to the east of Unit 5.
- A 50% on-time correction has been applied to the forklift only. No other on-time corrections have been applied.
- No ductwork losses or end reflection corrections have been applied to the internal plant. This is a conservative approach.
- The louvre for ground floor internal plant is approximately 2m above local ground. The louvre for first-floor internal plant is approximately 4.5m above local ground.
- All plant is operating at maximum capacity and simultaneously.
- A receiver height of 4m, representative of a first-floor bedroom window, has been used.
- Screening from intervening buildings has been included, with heights estimated from google maps street view and globe view.
- All doors and windows to the unit are closed during when in use.

3.4 Deliveries

It is understood that no more than five deliveries will take place per week. For the purpose of this assessment, all main deliveries are assumed to be HGVs. To enable a conservative assessment, it has been assumed that one HGV will visit the site per day, resulting in a worst-case scenario of 2no. one-way movements over an hour period and no other HGV movements that day. No HGVs will visit the site during the night.

NOVA Acoustics have previously measured a HGV starting up and pulling away (report ref NP-009814), providing an SEL of 92dB at 3m.

Considering the approximate distance from the site entrance to the loading bay (approximately 80m) and using a reference speed limit of 10mph, the equivalent percentage on time for a two-way movement is <0.01%. The table below provides a time corrected sound power level for a single HGV delivery, based on the vehicle arriving and leaving within the same hour.

Description	1/1 Octave Frequency Band (Hz, L_W dB)								Overall (dBA)
	63	125	250	500	1k	2k	4k	8k	
1 no. HGV movement (time corrected)	78	76	76	76	76	78	77	68	82

Table 3 – Time Corrected HGV Sound Power Level

3.5 Breakout Noise from Internal Sources

Due to the business not yet being operational, it is not possible to measure internal noise levels of the manufacturing processes in site. Instead, a typical internal sound level of 80dB has been used, accounting for the type of business and works that will operate from the premises. This is deemed to be a robust assessment.

The following assumptions have been included within the subsequent calculations:

- The unit is understood to be a steel-framed structure comprising of Kingspan composite cladding panels (or equivalent) on each façade, with an acoustic performance of approximately 25dB R_W.
- The sound power of the façade has been calculated using the formula: $L_{W,rad} = L_{P,rev} + 10*LOG(S) – C_d + SRI$, where; S is the surface area of the element (16m x 7.2m for the southern facade), C_d is the correction for the difference between reverberant internal conditions and non-reverberant external conditions (-3), and SRI is the sound reduction index associated with the façade elements.
- Full and partial screening from any intervening structures between the source and the receiver has been included.
- Only the closest façades have been considered due to the contribution from other building elements being significantly lower. The roof is also excluded due to the proposed development being significantly taller than the receptor height. Q4 propagation from the façades has been used.

3.6 BS4142 Noise Impact Assessment

The criteria that are applied to the BS4142 assessment outcomes is based on the table below. Please note that these are indicative 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. As a result, all discussions presented below are pre-contextual.

Description	Exceedance Levels & Initial Assessment Outcome			
Exceedance of Background (L_{A90})	<0	0 – 4	5 – 9	10+
BS4142 Initial Assessment Outcome	'Low Impact' to 'Negligible Impact'	'Low Impact' / Low Likelihood of 'Adverse Impact'	'Adverse Impact'	'Significant Adverse Impact'

Table 4 – BS4142 Initial Noise Impact Criteria

Presented in the tables overleaf are the BS4142 assessments for the worst-case receptor (NSR1), considering all proposed fixed mechanical plant, future forklift use, and noise breakout from internal sources. Although the core operating hours are daytime only, for flexibility and transparency, the night-time period has also been included.

Description	1/1 Octave Frequency Band (Hz, dB)								Overall (dBA)
	63	125	250	500	1k	2k	4k	8k	
Specific Sound Level from Ground Floor TEF	*9*	*3*	*5*	*2*	*0*	*0*	*0*	*0*	*4*
Specific Sound Level from 1no. HRU	*9*	*2*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Specific Sound Level from 1no. Forklift	*34*	*24*	*15*	*16*	*13*	*9*	*3*	*0*	*18*
Specific Sound Level from Building Breakout	*20*	*21*	*18*	*13*	*15*	*5*	*0*	*0*	*18*
Specific Sound Level from HGV delivery	*18*	*16*	*15*	*14*	*15*	*12*	*0*	*0*	*18*
Cumulative Specific Sound Level at NSR1 ($L_{eq,1hr}$)	34	26	21	19	19	14	5	0	23
BS4142 Subjective Acoustic Feature Correction	No acoustic feature corrections have been applied due to the cumulative specific sound level being significantly lower than the prevailing background sound level and in keeping with the type of noise already present in the area.								0
Rating Sound Level ($L_{Ar,Tr}$)	Specific sound level + rating penalties								23
Daytime Assessment (07:00 – 23:00 hours)									
Background Sound Level	LT1 Daytime $L_{A90,15min}$ – Section 2.2								52
Exceedance	**$L_{Ar,Tr} – L_{A90,15min}$**								**-29**
Night-time Assessment (23:00 – 07:00 hours)									
Background Sound Level	LT1 Night-time $L_{A90,15min}$ – Section 2.2								43
Exceedance	**$L_{Ar,Tr} – L_{A90,15min}$**								**-20**
Initial BS4142 Assessment Outcome	**'Low impact, dependant on context'.**								
NPPF & NPSE Outcome	**'No Observed Effect Level ('NOEL').**								

Table 5 – BS4142 Noise Impact Assessment – NSR1

3.7 Discussion

As the above table demonstrates, no adverse impact is expected at the worst-case receptor (NSR1) due to the operational use of Unit 5. As NSR2 benefits from shielding provided by the structure itself and intervening buildings; the level of impact at this NSR is lessened. This assessment has been conducted on a worst-case basis and is conservative in nature. When also considering the context of the area and that other commercial and industrial premises are operating in close proximity to the site, the overall risk of complaints is viewed to be very low.

Nevertheless, the business should still operate with good acoustic practices in mind and try to keep operational noise to a minimum. Machinery and plant should be turned off when not in use, deliveries should be limited to daytime hours where possible, and the use of mobile plant and horns should be avoided during the night-time period.

4. Conclusion and Action Plan

The proposed development has been assessed against the requirements of BS4142, national policies and planning condition 15.

A comprehensive BS4142 assessment of noise from external fixed plant, future mobile plant, and breakout noise from internal sources concluded that the cumulative rating level from operational use of Unit 5 will be significantly below the prevailing daytime and night-time background sound level. As such, low impact in line with BS4142 and NOEL in accordance with NPPF is expected and the risk of complaints is very low.

No further mitigation is required for compliance with planning Condition 15; however, it is recommended that the site still operates with best acoustic practices in mind. Depending on the operational noise emissions from the other units within the wider development, this unit is also expected to comply with Conditions 16 and 17.

The findings of this report will require written approval from the Local Authority prior to the unit becoming operational.

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 $p0$ is the reference sound pressure (20 µPa)
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 $p0$ is the reference sound pressure (20 µPa)
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 (2026)

Government planning policy in relation to noise is set out within the *National Planning Policy Framework: Plan-making and national decision-making policies* (NPPF), published in August 2026. This supersedes the previous NPPF published in December 2024 and amended in February 2025.

Chapter 17, *Pollution, public protection and security*, contains the principal policies relating to noise. Plan-making Policy P1, *Planning for clean and safe places*, states that development plans should allocate land where:

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Policy P1 also requires development plans to:

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For the determination of individual development proposals, national decision-making Policy P3, *Living conditions and pollution*, states:

Development proposals should be appropriate for their location, taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, whether these effects are on or off-site; and whether this is as a result of the development itself or the product of preexisting conditions in its vicinity. In assessing the potential effects of pollution, consideration should be given to the potential sensitivity of the site, and its intended occupiers and users, as well as that of the environment and population in the surrounding area.

Within this context, development proposals should:

Provide healthy living conditions for occupiers and users in terms of adequate access to light and avoiding exposure to levels of air, noise, artificial light or other sources of pollution which could have an unacceptable adverse effect on health and the quality of life. Where necessary suitable mitigation measures should be incorporated to secure acceptable living conditions.

In relation specifically to noise, Policy P3 requires development proposals to:

Mitigate and reduce to a minimum potential adverse impacts resulting from noise, not result in levels of noise exposure which would have a significant observed adverse effect, and maintain the character of tranquil areas.

Annex B of the NPPF defines the Significant Observed Adverse Effect Level as the level of noise exposure above which significant adverse effects on health and quality of life occur. The NPPF does not prescribe

numerical noise limits. The significance and acceptability of noise effects must therefore be assessed in the context of the individual development, its surroundings and the relevant technical standards and guidance.

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

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:

1) Avoid significant adverse impacts on health and quality of life.
2) Mitigate and minimise adverse impacts on health and quality of life.
3) 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 refers to the situation where impact 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 recognising the constraints of the site.

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

Overview

BS4142 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 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 $L_{Ar,Tr}$ '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 describes how the rating sound level should be derived from the specific sound level, by deriving a rating penalty.

BS4142 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, 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 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 +2dB is applicable for a tone which is "just perceptible", +4dB where a tone is "clearly perceptible", and +6dB where a tone is "highly perceptible".

b) Impulsivity

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

c) Other Sound Characteristics

BS4142 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 +3dB can be applied."

d) Intermittency

BS4142 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 +3dB 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 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 low impact, depending on the context.”

Interpreting the guidance given in BS4142, 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 +10dB above the background sound level is likely to be an indication of a ‘Significant Observed Adverse Effect Level’;
- A rating sound level that is +5dB 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 low impact and would therefore classify as ‘No Observed Adverse Effect Level’;
- At levels significantly below the measured background sound level (i.e. greater than 10dB), this is an indication of a ‘No 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.

Appendix C – Drawings and Plans



Figure 3 – Wider site plan

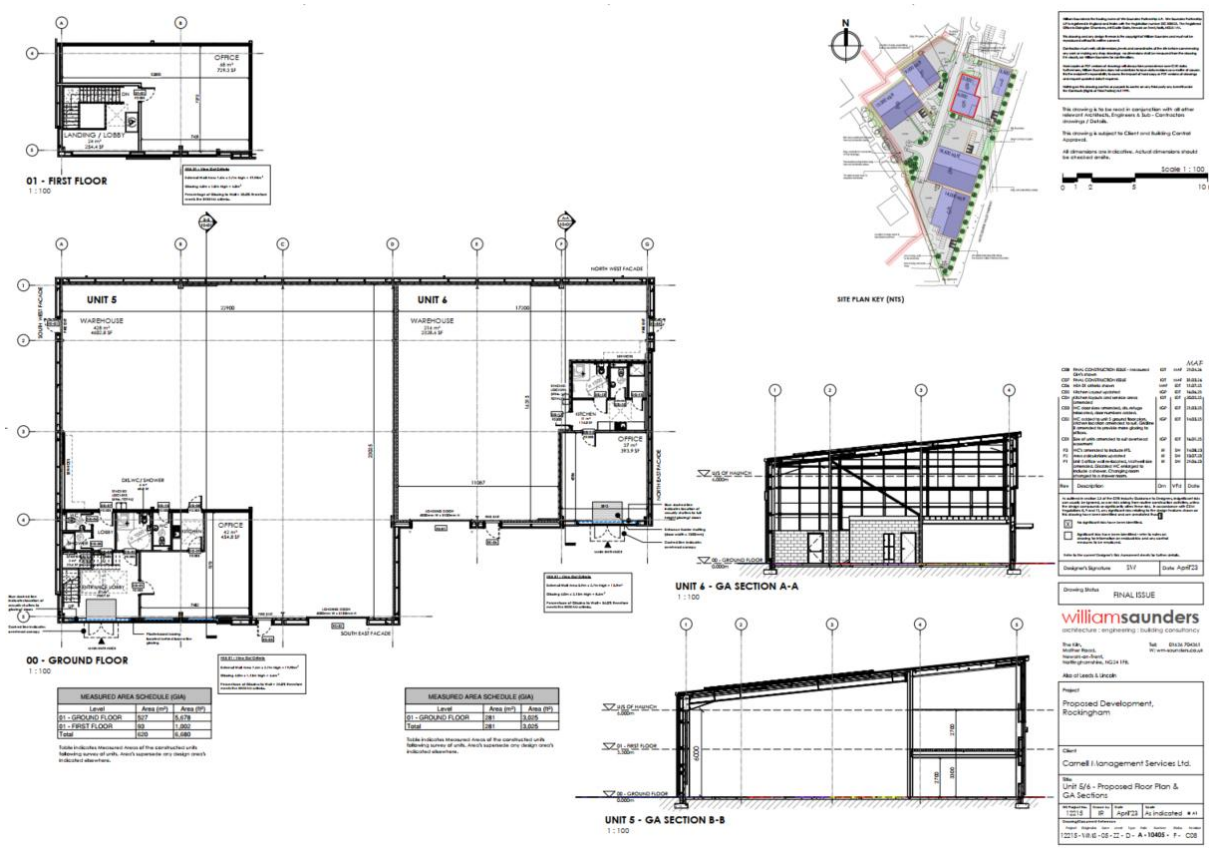


Figure 4 – GA and Elevations

Appendix D – Environmental Survey

D.1 – Time History Noise Data

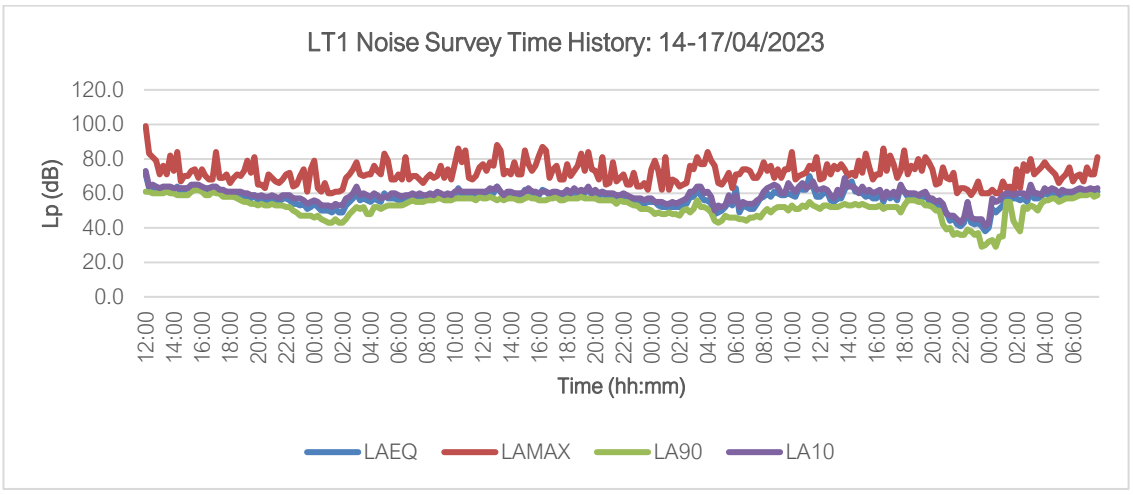


Figure 5 – LT1 Noise Survey Time History

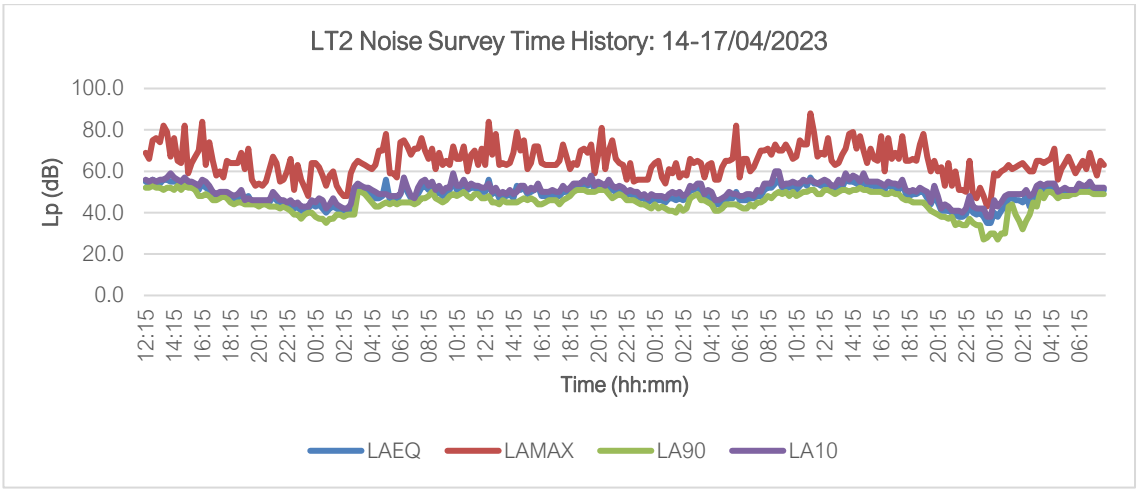


Figure 6 – LT2 Noise Survey Time History

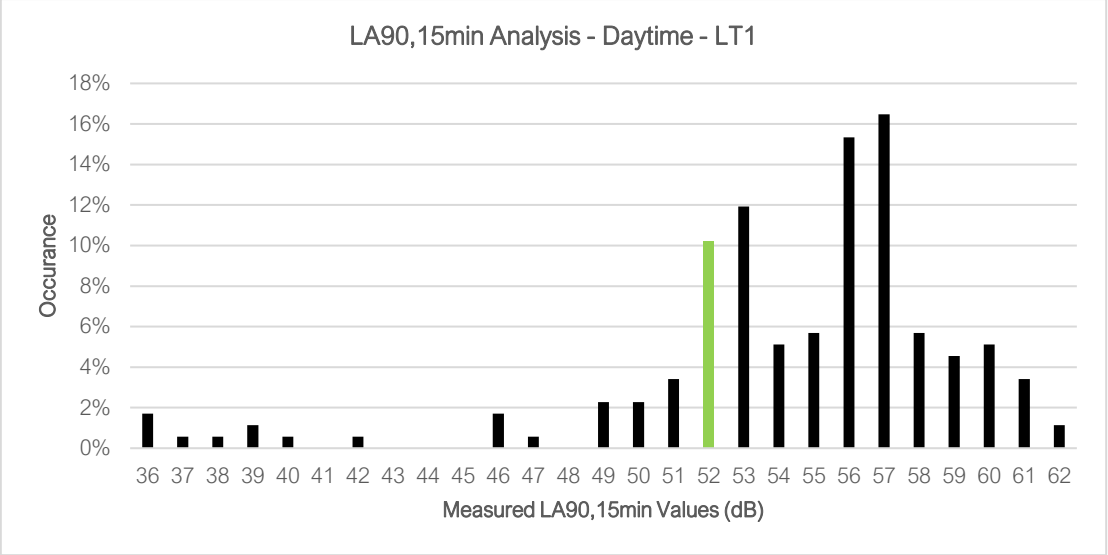


Figure 7 – LT1 Daytime Background Sound Level Analysis

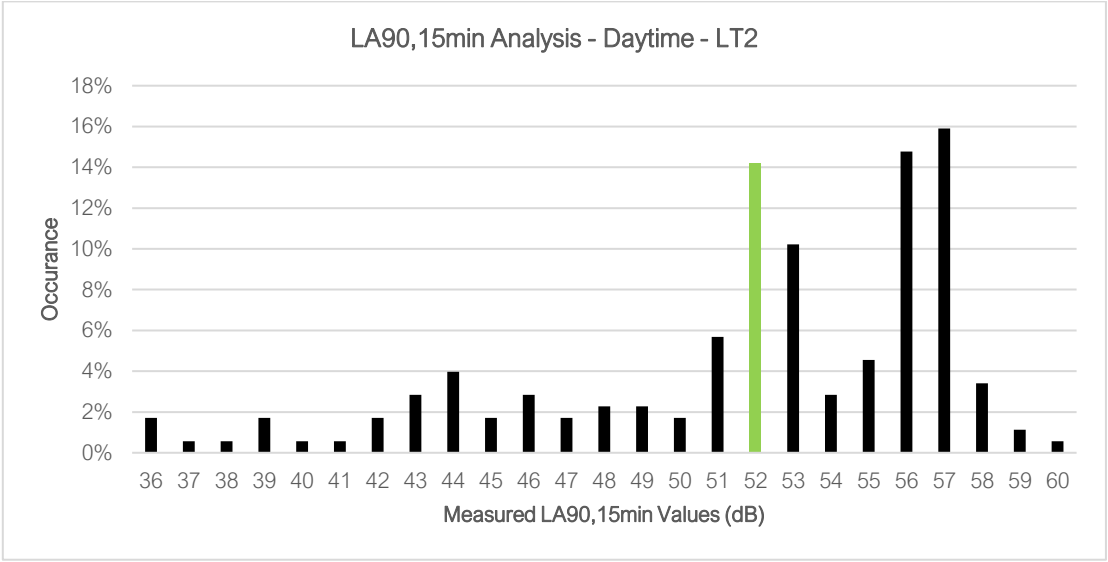


Figure 8 – LT2 Daytime Background Sound Level Analysis

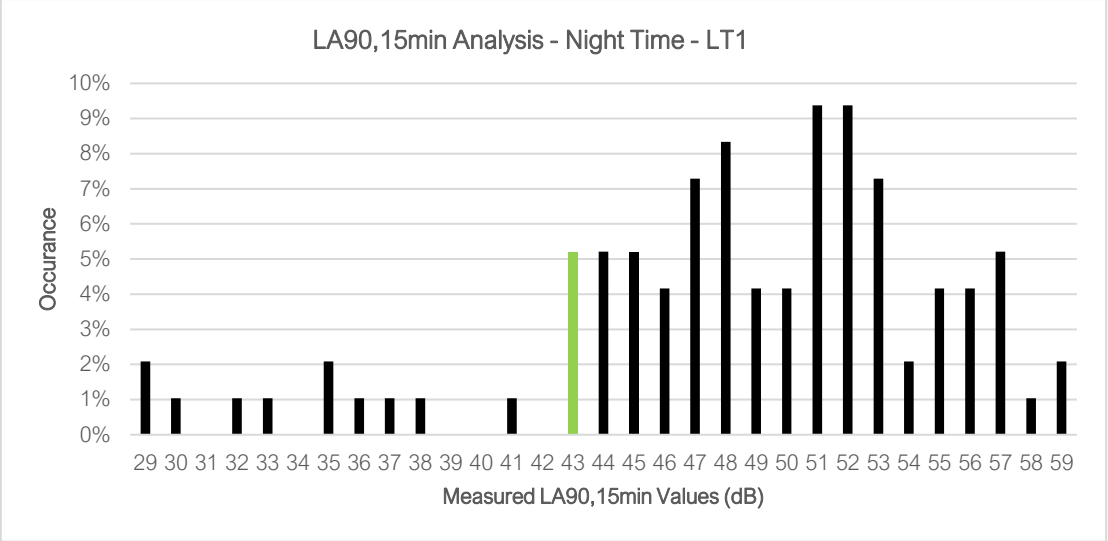


Figure 9 – LT1 Night-time Background Sound Level Analysis

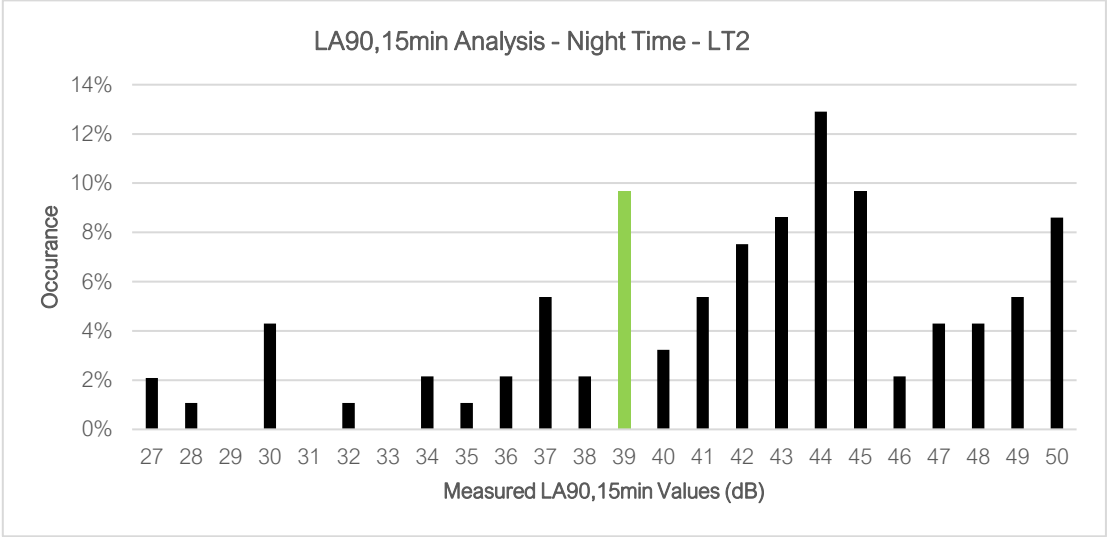


Figure 10 – LT2 Night-time Background Sound Level Analysis

D.2 – Surveying Equipment

Piece of Equipment	Serial No.	Calibration Deviation
Svantek SV307 Class 1 Sound Level Meter	70884	≤0.3
CESVA CB006 Class 1 Calibrator	901911	
Svantek SV307 Class 1 Sound Level Meter	101030	≤0.3
CESVA CB006 Class 1 Calibrator	901911	
Svantek 971A Class 1 Sound Level Meter	77796	≤0.5
CESVA CB006 Class 1 Calibrator	901911	

Table 6 – Surveying Equipment

All equipment used during the survey was field calibrated at the start and end of the measurement period with negligible deviation noted. 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.

D.3 – Meteorological Conditions

As the environmental noise survey was carried out over a long un-manned period no localised records of weather conditions were taken. 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.

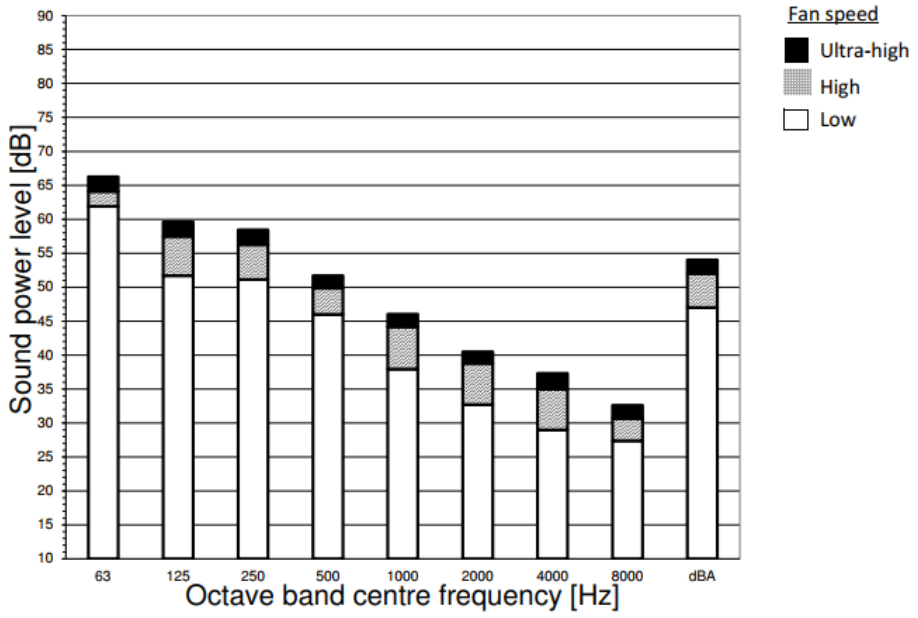
Weather Conditions – DB-Barnsley (Approx. 5.7km SW of Site)				
Time Period	Air Temp (^{0}C)	Rainfall (mm/h)	Prevailing Wind Direction	Wind Speed (m/s)
14/04/23 – 00:00 – 23:59	1.1 – 8.8	0.0 – 4.8	SSE	0.0 – 1.4
15/04/23 – 00:00 – 23:59	4.3 – 13.9	0.0	SW	0.0 – 1.0
16/04/23 – 00:00 – 23:59	5.8 – 15.1	0.0	SE	0.0 – 1.8
17/04/23 – 00:00 – 23:59	6.0 – 16.5	0.0	SSE	0.0 – 0.6

Table 7 – Weather Conditions

Appendix E – Manufacturers' Data Sheets

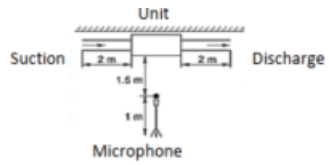
1no. HRU

VAM500J8



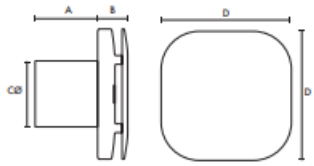
Notes
- dBA = A-weighted sound power level (A scale according to IEC).
- Reference acoustic intensity 0dB = ·10^ -12 W·
- Measured according to ISO 3744

3D113497A



7no. TEF

Dimensions (mm)



Model	A	B	CØ	D
100	81	43	99	190
125	100	46	115	213

Sound

100mm

Flow l/s	Min	6	8	13	Max
Pa	-	5	7	17	-
dB(A)	13	14	17	24	41

Appendix F – 1/1 Octave Band Sound Power Levels and Calculations

Description	Item	Source Term	Parameter	dBA	1/1 Octave Frequency Band (Hz, dB) 63	125	250	500	1k	2k	4k	8k
Model / Unit	HRU - VAM500J8	Octave-Band Lw	Lw	54	67	60	58	52	47	41	37	33
No. of	1	Ultra High										
Data Type	Manufacturers Data		Total Lw	54	67	60	58	52	47	41	37	33
Source Mitigation	No											
Description												
Time Corrected Lw of Fixed Plant	On-Time (min)	Time Period	Correction (dB)									
	60	Day	0	54	67	60	58	52	47	41	37	33
Propagation Loss to NSR1 (Point Source)	Distance (m)	Q Factor	Loss (dB)					Shielding (dB)				Yes
	182	2	-53		-5	-5	-5	-5	-5	-6	-7	-8
Specific Sound Level at NSR1				-4	9	2	0	-6	-11	-18	-23	-28
Propagation Loss to NSR2 (Point Source)	Distance (m)	Q Factor	Loss (dB)					Shielding (dB)				Yes
	114	2	-49		-14	-17	-20	-20	-20	-20	-20	-20
Specific Sound Level at NSR2				-14	4	-6	-11	-17	-22	-28	-32	-36

Barrier Details	NSR1		NSR2	
Distance Source to Barrier "a" (m)	98		1	
Distance Barrier to Receive "b" (m)	89		173	
Source Height	h_S (m)	4.5	h_S (m)	4.5
Barrier Height	h_B (m)	5	h_B (m)	9.5
Receiver Height	h_R (m)	4	h_R (m)	4
	A (m)	98.0	A (m)	5.1
	B (m)	89.0	B (m)	173.1
	d (m)	187.0	d (m)	174.0
	Case	Zone	Case	Zone
	B	shadowed	B	shadowed
	A	illuminated	A	illuminated

Description	Item	Source Term	Parameter	dBA	1/1 Octave Frequency Band (Hz, dB) 63	125	250	500	1k	2k	4k	8k	Lp Dist (m)	Q Factor
Model / Unit	(Ground Floor) Vent Axia Lo-Carbon NRBdMEV C	Global Lp dBA	Lp at 3m, Q factor (Q=2)	41									3	2
No. of	4	CIBSE, Tbl 4.1, Centrifugal radial fan	Typical Spectrum	-13	-10	-16	-13	-16	-18	-23	-25	-25		
			Corrected Spectrum	41	44	38	41	38	36	31	29	29		
Data Type	Manufacturers Data		Total Lw	65	68	62	65	62	60	55	53	53		
Source Mitigation	Yes													
Description	e.g. Caice Enclosure			65	68	62	65	62	60	55	53	53		
Time Corrected Lw of Fixed Plant	On-Time (min)	Time Period	Correction (dB)											
	60	Day	0	65	68	62	65	62	60	55	53	53		
Propagation Loss to NSR1 (Point Source)	Distance (m)	Q Factor	Loss (dB)		Shielding (dB)							Yes		
	187	2	-53		-5	-5	-6	-6	-8	-10	-12	-15		
Specific Sound Level at NSR1				4	9	3	5	2	-2	-9	-13	-16		
Propagation Loss to NSR2 (Point Source)	Distance (m)	Q Factor	Loss (dB)		Shielding (dB)							Yes		
	173	2	-53		-16	-19	-20	-20	-20	-20	-20	-20		
Specific Sound Level at NSR2				-8	-1	-10	-8	-11	-13	-18	-20	-20		

Barrier Details	NSR1		NSR2	
Distance Source to Barrier "a" (m)	98		1	
Distance Barrier to Receive "b" (m)	89		173	
Source Height	h_S (m)	2	h_S (m)	2
Barrier Height	h_B (m)	5	h_B (m)	9.5
Receiver Height	h_R (m)	4	h_R (m)	4
	A (m)	98.0	A (m)	7.6
	B (m)	89.0	B (m)	173.1
	d (m)	187.0	d (m)	174.0
	Case	Zone	Case	Zone
	B	shadowed	B	shadowed
	A	illuminated	A	illuminated

Description	Item	Source Term	Parameter	dBA	1/1 Octave Frequency Band (Hz, dB) 63	125	250	500	1k	2k	4k	8k
Model / Unit	Toyota TONERO 25 Forklift	Octave-Band Lw	Lw	84	96	86	78	80	78	77	73	73
No. of	1	No forklift provided. Used forklift from NP-009560-2										
Data Type	Manufacturers Data		Total Lw	84	96	86	78	80	78	77	73	73
Source Mitigation Description	No											
Time Corrected Lw of Fixed Plant	On-Time (min)	Time Period	Correction (dB)									
	30	Day	-3	81	93	83	75	77	75	74	70	70
Propagation Loss to NSR1 (Point Source)	Distance (m)	Q Factor	Loss (dB)					Shielding (dB)				Yes
	206	2	-54		-5	-5	-6	-7	-8	-11	-13	-16
Specific Sound Level at NSR1				18	34	24	15	16	13	9	3	0
Propagation Loss to NSR2 (Point Source)	Distance (m)	Q Factor	Loss (dB)					Shielding (dB)				Yes
	174	2	-53		-10	-13	-16	-19	-20	-20	-20	-20
Specific Sound Level at NSR2				10	30	17	6	5	2	1	-3	-3

Barrier Details	NSR1		NSR2	
Distance Source to Barrier "a" (m)	116		25	
Distance Barrier to Receive "b" (m)	90		149	
Source Height	h_S (m)	1	h_S (m)	1
Barrier Height	h_B (m)	5	h_B (m)	9.5
Receiver Height	h_R (m)	4	h_R (m)	4
	A (m)	116.1	A (m)	26.4
	B (m)	90.0	B (m)	149.1
	d (m)	206.0	d (m)	174.0
	Case	Zone	Case	Zone
	B	shadowed	B	shadowed
	A	illuminated	A	illuminated

Description	Item	Source Term	Parameter	dBA	1/1 Octave Frequency Band (Hz, dB) 63	125	250	500	1k	2k	4k	8k
Model / Unit	HGV Lw from SEL Calculator	Octave-Band Lw	Lw	82	78	76	76	76	78	77	68	59
No. of	1	TIME CORRECTION ALREADY APPLIED (36 seconds per hour for transitting)										
Data Type	Manufacturers Data		Total Lw	82	78	76	76	76	78	77	68	59
Source Mitigation	Yes											
Description	e.g. Caice Enclosure			82	78	76	76	76	78	77	68	59
Time Corrected Lw of Fixed Plant	On-Time (min)	Time Period	Correction (dB)									
	60	Day	0	82	78	76	76	76	78	77	68	59
Propagation Loss to NSR1 (Point Source)	Distance (m)	Q Factor	Loss (dB)		Shielding (dB)							Yes
	214	2	-55		-5	-5	-6	-7	-8	-10	-13	-16
Specific Sound Level at NSR1				18	18	16	15	14	15	12	0	-12
Propagation Loss to NSR2 (Point Source)	Distance (m)	Q Factor	Loss (dB)		Shielding (dB)							Yes
	140	2	-51		-10	-13	-16	-19	-20	-20	-20	-20
Specific Sound Level at NSR2				11	17	12	9	6	7	6	-3	-12

	Item / Description		Meas Dist (m)	Measur Q	dB(A)	Octave Band Centre Frequency (Hz, dB) 63	125	250	500	1k	2k	4k	8k
Process No. 1	HGV Start up and pull away	From noise database, ref NP-009814	3	On 1 Reflecting Plane (Q2)	92	88	86	86	86	88	87	78	69
	Time Corrected Lw of Process No. 1		Time Period: Day	On Time: 0.010	82 (A)	78	76	76	76	78	77	68	59

Barrier Details	NSR1		NSR2	
Distance Source to Barrier "a" (m)	127		37	
Distance Barrier to Receive "b" (m)	90		133	
Source Height	h_S (m)	1	h_S (m)	1
Barrier Height	h_B (m)	5	h_B (m)	11
Receiver Height	h_R (m)	4	h_R (m)	4
	A (m)	127.1	A (m)	38.3
	B (m)	90.0	B (m)	133.2
	d (m)	217.0	d (m)	170.0
	Case	Zone	Case	Zone
	B	shadowed	B	shadowed
	A	illuminated	A	illuminated

Breakout Calculations – NSR1

Description	63	125	250	500	1000	2000	4000	8000	dBA
Internal Sound Pressure Level (dB)	78	77	76	75	74	73	71	71	80
Diffusivity Term C_d (dB)	Industrial building, few dominating directional sources; in front of reflecting surface							-3	

SRI Type	Single Element / Composite	(Composite at the bottom of the sheet)

Description	63	125	250	500	1000	2000	4000	8000	R_w (dB)
SRI of Element (dB)	20	18	20	24	20	29	39	39	25
Construction description									

Width of radiating element (m)	16.0
Height of radiating element (m)	7.2
Area of element (m^2)	115.20

	63	125	250	500	1000	2000	4000	8000	dBA
L_w of element (dB)	76	77	74	69	72	62	50	50	74

Description	Item	Source Term	Parameter	dBA	1/1 Octave Frequency Band (Hz, dB) 63	125	250	500	1k	2k	4k	8k
Model / Unit	Breakout (closest façade)	Octave-Band Lw	Lw	74	76	77	74	69	72	62	50	50
No. of	1	Taken from breakout sheet in folder. Internal Lp from original report (NP-09288)										
Data Type	Manufacturers Data		Total Lw	74	76	77	74	69	72	62	50	50
Source Mitigation	No											
Description	Diffusivity Term Cd already taken off in breakout calc											
Time Corrected Lw of Fixed Plant	On-Time (min) 60	Time Period Day	Correction (dB) 0	74	76	77	74	69	72	62	50	50
Propagation Loss to NSR1 (Point Source)	Distance (m) 187	Q Factor 4	Loss (dB) -50		Shielding (dB) -5	-5	-5	-5	-6	-6	-8	Yes -10
Specific Sound Level at NSR1				**18**	**20**	**21**	**18**	**13**	**15**	**5**	**-9**	**-11**

Barrier Details	NSR1	
Distance Source to Barrier "a" (m)	98	
Distance Barrier to Receive "b" (m)	89	
Source Height	h_S (m)	4
Barrier Height	h_B (m)	5
Receiver Height	h_R (m)	4
	A (m)	98.0
	B (m)	89.0
	d (m)	187.0
	Case	Zone
	B	shadowed
	A	illuminated

Breakout Calculations – NSR2

Description	63	125	250	500	1000	2000	4000	8000	dBA
Internal Sound Pressure Level (dB)	78	77	76	75	74	73	71	71	80
Diffusivity Term C_d (dB)	Industrial building, few dominating directional sources; in front of reflecting surface							-3	

SRI Type	Single Element / Composite	(Composite at the bottom of the sheet)

Description	63	125	250	500	1000	2000	4000	8000	R_w (dB)
SRI of Element (dB)	20	18	20	24	20	29	39	39	25
Construction description									

Width of radiating element (m)	22.9
Height of radiating element (m)	7.2
Area of element (m^2)	164.88

	63	125	250	500	1000	2000	4000	8000	dBA
L_w of element (dB)	77	78	75	70	73	63	51	51	75

Description	Item	Source Term	Parameter	dBA	1/1 Octave Frequency Band (Hz, dB) 63	125	250	500	1k	2k	4k	8k
Model / Unit	Breakout (closest façade)	Octave-Band Lw	Lw	75	77	78	75	70	73	63	51	51
No. of	1	Taken from breakout sheet in folder. Internal Lp from original report (NP-09288)										
Data Type	Manufacturers Data		Total Lw	75	77	78	75	70	73	63	51	51
Source Mitigation	No											
Description	Diffusivity Term Cd already taken off in breakout calc											
Time Corrected Lw of Fixed Plant	On-Time (min) 60	Time Period Day	Correction (dB) 0	75	77	78	75	70	73	63	51	51
Propagation Loss to NSR2 (Point Source)	Distance (m) 150	Q Factor 4	Loss (dB) -48		Shielding (dB) -8	-10	-12	-15	-18	-20	-20	Yes -20
Specific Sound Level at NSR2				11	21	20	15	7	7	-5	-17	-17

Barrier Details	NSR2	
Distance Source to Barrier "a" (m)	70	
Distance Barrier to Receive "b" (m)	80	
Source Height	h_S (m)	4
Barrier Height	h_B (m)	11
Receiver Height	h_R (m)	4
	A (m)	70.3
	B (m)	80.3
	d (m)	150.0

NSR1 – Cumulative Level and Contributions

Specific Sound Levels at NSR1

Description	dB(A)	63	125	250	500	1k	2k	4k	8k
HRU - VAM500J8	-4	9	2	0	-6	-11	-18	-23	-28
(Ground Floor) Vent Axia Lo-Carbon NRBdMEV C 100 475142A	4	9	3	5	2	-2	-9	-13	-16
Toyota TONERO 25 Forklift	18	34	24	15	16	13	9	3	0
HGV Lw from SEL Calculator	18	18	16	15	14	15	12	0	-12
Breakout (closest façade)	18	20	21	18	13	15	5	-9	-11
Cumulative Specific Sound Level	**23**	**34**	**26**	**21**	**19**	**19**	**14**	**5**	**0**

NSR2 – Cumulative Level and Contributions

Specific Sound Levels at NSR2

Description	dB(A)	63	125	250	500	1k	2k	4k	8k
HRU - VAM500J8	-14	4	-6	-11	-17	-22	-28	-32	-36
(Ground Floor) Vent Axia Lo-Carbon NRBdMEV C 100 475142A	-8	-1	-10	-8	-11	-13	-18	-20	-20
Toyota TONERO 25 Forklift	10	30	17	6	5	2	1	-3	-3
HGV Lw from SEL Calculator	11	17	12	9	6	7	6	-3	-12
Breakout (closest façade)	11	21	20	15	7	7	-5	-17	-17
Cumulative Specific Sound Level	**16**	**31**	**22**	**16**	**11**	**10**	**7**	**0**	**-2**


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