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NOISE IMPACT ASSESSMENT

NEW COMMERCIAL USE, MITCHELL'S ROAD, WOMBWELL BARNSLEY, S73 8DZ

REPORT REFERENCE NO. J004029-5808-SI-04

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02	31/05/2023	SI	Measurement time clarifications and corrections	
03	08/06/2023	RC	Update building envelope to insulated Euroclad construction	

	Name	Position
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This document has been prepared for the client only and solely for the purposes expressly defined herein. We owe no duty of care to any third parties in respect of its content. Therefore, unless expressly agreed by us in signed writing, we hereby exclude all liability to third parties, including liability for negligence, save only for liabilities that cannot be so excluded by operation of applicable law.

This report has been prepared based upon a scope of works and associated resources agreed between the client and Philip Dunbavin Acoustics Ltd (PDA). This report has been prepared with all reasonable skill, care and diligence and has been based upon the interpretation of data collected. This has been accepted in good faith as being accurate and valid at the time of the collection. This report has been based solely on the specific design assumptions and criteria stated herein.

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APPENDIX A – DEFINITION OF ACOUSTIC TERMS

1.0 SUMMARY

At the request of Cadam Construction Ltd, Philip Dunbavin Acoustics has conducted an environmental noise survey and assessment of the noise egress of the proposed new industrial units on land located at Mitchell's Road, Barnsley, S73 8DZ.

An environmental noise survey has been carried out in the vicinity of the nearest noise sensitive properties in order to obtain the Background Level at these locations in accordance with the method of BS 4142:2014+A1:2019.

Noise egress has been calculated based on a sound level within the unit at the Lower Action Value of the Control of Noise at Work Regulations [80 dB(A)] and based upon one deliver / collection per hour with loading / unloading on the service yard during the daytime.

During the night-time the noise egress has been limited to sound breaking out from within the building only, and it is recommended that deliveries and loading / unloading on the service yard are limited to daytime hours only (07:00 – 23:00). In order to control noise break-out from the building we recommend that the lightweight cladding is a built-up mineral wool sandwich construction such as Euroclad Elite 2.2 Kn walls and Euroclad Elite 51.30 Kn roof or similar.

During the daytime the Rating Level due to the proposed operation of the development exceeds the background sound level by 2dB which is below the equivalent LOAEL value when assessed in accordance with BS 4142:2014+A1:2019 and also meets the WHO Guidelines for Community Noise criterion for outdoor living spaces. As such when context is also taken into account the impact of sound from the proposed development during the daytime is predicted to be low.

During the night-time the Rating Level due to the proposed development is predicted to be 9dB below the background sound level. When context is also taken into account the impact of sound from the proposed development during the night-time remains low.

We are not currently aware of any external building services plant associated with the proposed development. In order to prevent noise disturbance from building services plant we would recommend that the Rating Sound Level due to any future building services plant is limited to 50dB(A) during the daytime and 35dB(A) at night-time when assessed at the nearest noise sensitive residences.

2.0 BRIEF FOR CONSULTANCY

PDA Ltd. was engaged to carry out the following:

A. Noise Survey

We will travel to the site and carry out an ambient noise survey to assess the level of existing environmental noise in the vicinity of the proposed development and nearby houses. The measurement and assessment will include for noise from the adjacent road network, and other local noise sources.

We would propose to undertake measurements over representative periods of the daytime and night-time.

We will carry out all noise surveys in accordance with the provisions of BS7445 "Description and Measurement of Environmental Noise". The measurements made will include both dBA and octave band noise levels including L_{eq}, L_{max}, and L_{90} parameters. During the survey duration, we will require unrestricted access to the site.

B. Survey Processing and Report

We will model the sound propagation from the proposed commercial units to the nearest noise sensitive residences using typical internal and external noise levels and sources for commercial units of this size. The results of the model will be compared with the pre-existing background sound levels measured in Part A).

The results of the absolute and relative sound levels will be assessed in line with the requirements of the National Planning Policy Framework (NPPF) and also in accordance with BS 4142:2014+A1:2019 "Methods for Rating and Assessing Industrial and Commercial Sound".

We will produce a report detailing all survey procedures, measurements and results suitable for submission to the Local Authority in support of your planning application. Where required we will propose appropriate mitigation to the building envelope and / or the boundary of the proposed commercial units.

3.0 SITE DESCRIPTION

The proposed development site is located at land to the south-west of Mitchells Road, Wombwell, Barnsley S73 8DZ.

The immediate local area consists of industrial sites to the north, with a main A-road (A633/Barnsley Road) to the south-west, and residential areas to the south-west and south-east. A bus stop is located directly adjacent to the proposed development (onto Barnsley Road). The first of the nearest residential receivers is a set of terraced houses, ranging between two and three storeys, located to the south-east around 15m away from the boundary of the proposed development. The second of the nearest residential receivers is a set of bungalows (single storey), located over the road to the south-west around 40m from the boundary.

The proposed site boundary showing the location of the site and surrounding local area including the closest residential receivers is shown in Figure 1 below.

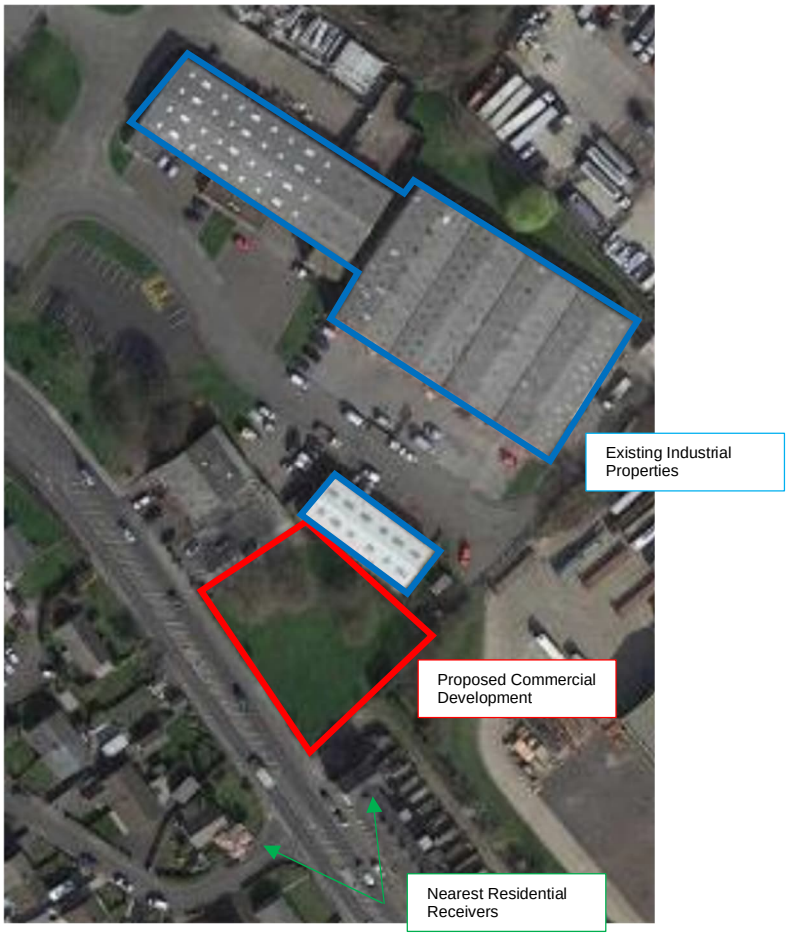


Figure 1 – Site location

4.0 ASSESSMENT CRITERIA

4.1 National Planning Policy Framework (NPPF)

National Planning Policy is guided by the National Planning Policy Framework (NPPF) updated in July 2021. With regard to Noise the Framework states the following:

Planning policies and decisions should contribute to and enhance the natural and local environment by:

- *preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability.*

  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:

- *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:*

- *identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason.*

The terms '*significant adverse impact*' and '*adverse impact*' are defined in the explanatory notes of the 'Noise Policy Statement for England (NPSE) which states:

There are two established concepts from toxicology that are currently being applied to noise impacts, for example, by the World Health Organisation. They are:

NOEL – No Observed Effect Level

This is the level below which no effect can be detected. In simple terms, below this level, there is no detectable effect on health and quality of life due to the noise.

LOAEL – Lowest Observed Adverse Effect Level

This is the level above which adverse effects on health and quality of life can be detected.

Extending these concepts for the purpose of this NPSE leads to the concept of a significant observed adverse effect level.

SOAEL – Significant Observed Adverse Effect Level

This is the level above which significant adverse effects on health and quality of life occur.

The notes also offer an explanation of the term 'other adverse impacts' as follows:

… refers to the situation where the impact lies somewhere between LOAEL and SOAEL. It requires that all reasonable steps should be taken to mitigate and minimise adverse effects on health and quality of life while also taking into account the guiding principles of sustainable development (paragraph 1.8). This does not mean that such adverse effects cannot occur.

It should be noted that no specific noise limits for LOAEL and SOAEL have yet been specifically defined; however, guidance from other acoustic standards may be employed to determine suitable levels within the overall principal of the National Planning Policy Framework.

4.2 Professional Planning Guidance on Noise

In March 2014 (updated July 2019) the UK Government published further guidance on the assessment of noise for planning purposes in the form of the on-line publication, Planning Practice Guidance on noise (http://www.gov.uk/guidance/noise--2). This document offers further guidance on the typical levels which constitute the NOEL, LOAEL and SOAEL. The relevant section is reproduced in the table below:

Table 1. Planning Practice noise level guidance

Perception	Examples of Outcomes	Increasing Effect Level	Action
No Observed Effect Level			
Not present	No Effect	No Observed Effect	No specific measures required
No Observed Adverse Effect Level			
Present and not intrusive	Noise can be heard, but does not cause any change in behaviour, attitude, or other physiological response. Can slightly affect the acoustic character of the area but not such that there is a perceived change in the quality of life.	No Observed Adverse Effect	No specific measures required
Lowest Observed Adverse Effect Level			
Present and intrusive	Noise can be heard and causes small changes in behaviour, attitude or other physiological response, e.g. turning up volume of television; speaking more loudly; where there is no alternative ventilation, having to close windows for some of the time because of the noise. Potential for some reported sleep disturbance. Affects the acoustic character of the area such that there is a small actual or perceived change in the quality of life.	Observed Adverse Effect	Mitigate and reduce to a minimum
Significant Observed Adverse Effect Level			
Present and disruptive	The noise causes a material change in behaviour, attitude or other physiological response, e.g. avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening, and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area.	Significant Observed Adverse Effect	Avoid
Present and very disruptive	Extensive and regular changes in behaviour, attitude or other physiological response and/or an inability to mitigate effect of noise leading to psychological stress, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory	Unacceptable Adverse Effect	Prevent

It is notable from the above planning guidance that development should not normally be permitted above Significant Observed Adverse Effect Levels, and should aim to minimise Other Adverse Effect Levels (below SOAEL but above LOAEL). However, it is clear that noise is permitted to approach and/or exceed the Lowest Observed Adverse Effect Level, providing that noise is mitigated and reduced to a minimum.

4.3 BS 4142:2014 +A1:2019 "Methods for rating and assessing industrial and commercial sound"

The effect of industrial noise on the nearest noise sensitive residences will be assessed in accordance with BS4142:2014+A1:2019 – 'Methods for rating and assessing industrial and commercial sound'. This will include sound break-out from the proposed commercial unit, activities in the service yard and building services plant.

The standard describes a method of determining the level of sound of a commercial nature, together with procedures for assessing the impact of such a sound outside nearby noise sensitive areas.

The standard may be thought of as a procedure for comparing the sound from commercial sources with background sound levels in the absence of the comercial sound and determining the likely impact of the sound on noise sensitive residences.

In accordance with BS 4142 the background sound level is the typical A-weighted sound pressure level at the assessment position that is exceeded for 90% of a given time interval (L_{A90}). The specific sound level is the equivalent continuous (L_{Aeq}) sound pressure level at the assessment position produced by the commercial source over a given time interval.

Certain acoustic features can increase the impact over that expected from a simple comparison between the specific sound level and the background level. Where such features are present, these are taken into account by adding corrections to the specific sound level.

This correction is applied based on whether the following features occur, or are expected to be present. The correction values can either be determined subjectively, or by various objective measurement procedures.

- The sound contains a distinguishable, discrete, continuous tone (whine, hiss, screech, hum, etc.). 0 – 6 dB penalty
- The sound contains distinct impulses (bangs, clicks, clatters, or thumps). 0 – 9 dB penalty.
- The sound is irregular enough to attract attention. 0 – 3 dB penalty.
- Where the specific sound features characteristics that are neither tonal nor impulsive, nor intermittent, though otherwise are readily distinctive against the residual acoustic environment, a penalty of 3 dB can be applied.

From the addition of the above penalties where appropriate the rating level is established, this being the value that is compared with the background noise. Note that corrections for impulsivity and tonality may be added arithmetically where both are present and likely to affect perception within the same reference period. However, if any single feature is dominant to the exclusion of the others then it might be appropriate to apply a reduced or even zero correction for the minor charcteristics.

According to BS 4142 an initial estimate of the impact is given based on the rating level value as follows:

- a rating level 10 dB(A) or more above the background is an indication of significant adverse impact, depending on the context.
- a rating level 5 dB(A) above the background is an indication of an adverse impact, depending on the context.
- where the rating level does not exceed the background level, this is an indication of the specific sound source having a low impact, depending on the context.

BS4142 indicates that the noise source should be evaluated over the appropriate time interval which is as follows:

- 1h during the day (07:00 – 23:00)
- 15 min during the night (23:00 – 07:00)

The above initial assessment may then be modified depending on the context, to take into account;

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

    1. Façade insulation treatment
    2. Ventilation and / or cooling that will reduce the need to have windows open so as to provide rapid or purge ventilation; and
    3. Acoustic screening

4.4 World Health Organisation Guidelines for Community Noise

BS4142:2014 also requires the absolute level of the sound to be taken into account in accounting for the context of the commercial sound. It is therefore appropriate to consider the absolute sound levels in accordance with appropriate criteria for disturbance / annoyance in residential areas. These are contained within the World Health Organisation (WHO) Guidelines for Community Noise.

World Health Organisation guidelines for community noise give noise levels for critical health effects of indoor and outdoor living spaces as follows;

Table 2 – WHO guidelines for community noise criteria

Environment	Critical health effect	Criterion
Dwelling, indoors	Speech intelligibility and moderate annoyance, daytime and evening	35 dB $L_{Aeq,\ 16\ hours}$
Outdoor living areas	Few moderately annoyed below this level, daytime and evening	50 dB $L_{Aeq,\ 16\ hours}$
	Few seriously annoyed below this level, daytime and evening	55 dB $L_{Aeq,\ 16\ hours}$
Inside bedrooms	Sleep disturbance (night-time)	30 dB $L_{Aeq,\ 8\ hours}$ 45 dB L_{Amax}
Outside bedrooms	Sleep disturbance (night-time)	45 dB $L_{Aeq,\ 8\ hours}$ 60 dB L_{Amax}

5.0 SURVEY DETAILS

An ambient environmental noise survey was carried at the nearest noise sensitive residences to the site. The survey was carried out using an unattended sound level meter in a weatherproof enclosure. The meter was located on the development site, close to the boundary of the nearest noise sensitive residence to the east of the site. Measurements were taken from the late evening, through the night-time period, then again in mid-morning.

See Figure 1 below for measurement location.

5.1 Survey times

The ambient night-time noise measurements were made between 23:00 – 04:06, 26th - 27th September 2022. Ambient day-time noise measurements were made between 21:36 – 22:59, 26th September 2022, and 09:33 – 10:53, 4th October 2022. All measurements were made by Mr Sam Iles of PDA Ltd.

5.2 Measurement Equipment

Throughout the survey measurements were undertaken with a Rion – NL52 sound level meter (S/N: 810315). The meter is a precision grade Class 1 sound level meter (as per BS EN 61672-1: 2002). The meter was set to A-Weighted and fast response. The meter was calibrated directly before any measurement took place and immediately afterwards and no significant drift was observed.



Figure 2 – survey measurement location

5.3 Weather

Weather data for the duration of the survey was taken from the nearby Weather Underground IBARNS46 weather station. Weather conditions were conducive to carrying out environmental sound measurements.

26/27th September 2022
Temperature: 7-9°C
Wind Speed: 1-2 m/s
Wind Direction: Northwest
Precipitation: 0mm

4th October 2022
Temperature: 16°C
Wind Speed: 2-4 m/s
Wind Direction: Southwest
Precipitation: 0mm

5.4 Subjective Description of Noise Sources

Subjectively the noise climate at the survey location mainly consisted of road traffic on the A633 plus noise from distant traffic.

5.5 Measured survey Results

The noise survey results are summarised below.

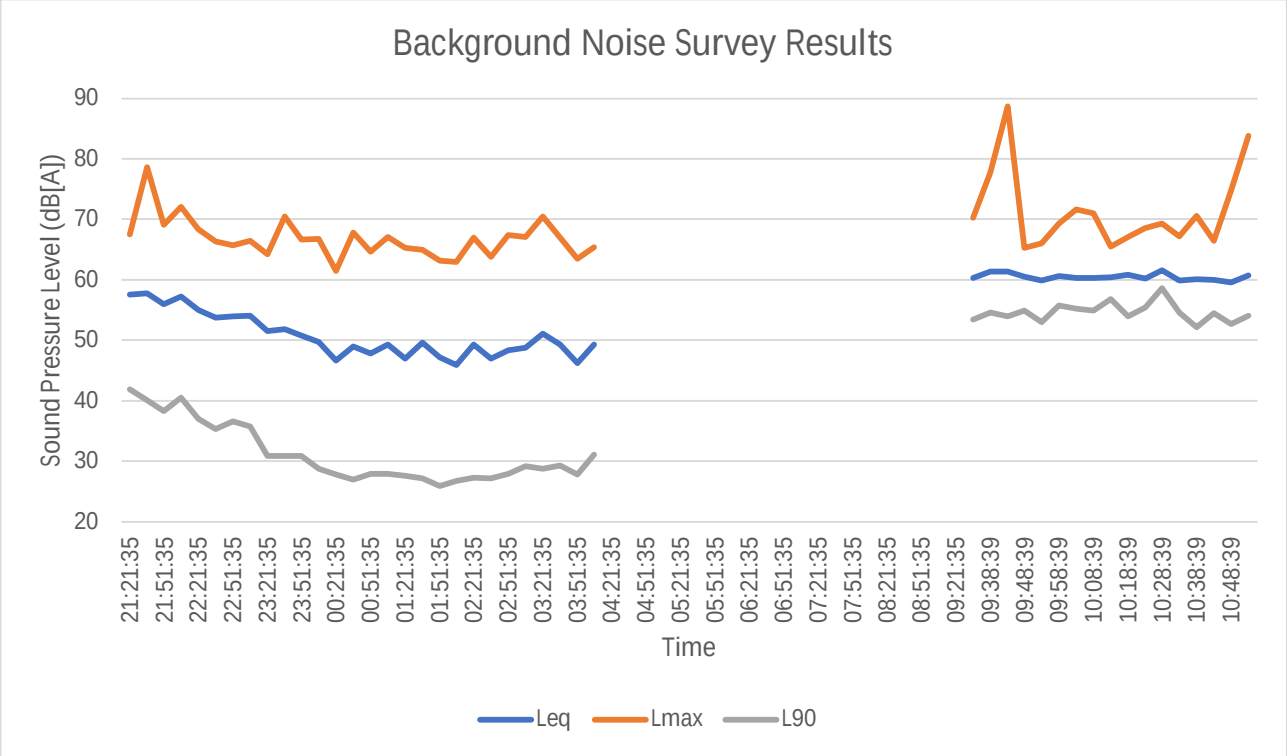


Figure 3. Survey time history at the measurement position

Typical L_{A90} background and residual sound levels at the nearest noise sensitive locations are indicated below:

Table 3 – Background and Residual Sound Levels at nearest noise sensitive residences

Measured parameter	Daytime (07:00 – 23:00)	Night-time (23:00 – 07:00)
Typical L_{A90} Background Level [dB]	53	29
Residual Sound Level $L_{Aeq,T}$ [dB]	59	50

6.0 SOUND PROPAGATION FROM PROPOSED DEVELOPMENT

Noise sources associated with the proposed development are likely to be:

- Noise break-out through the building envelope
- Noise from activities and deliveries on the service yard
- Noise from building services plant.

In order to assess the impact of the proposed development we have modelled noise break-out from the building and likely activities on the service yard to the nearest noise sensitive residences. The details of any building services plant are not known at this stage and we will propose noise limits for building services such that their noise impact on nearby noise sensitive properties is low.

Noise break-out through the building envelope of the development has been modelled by taking the conservative assumption that the ambient noise level within the unit will be at 80dB (A) (the maximum permitted level above which hearing protection must be offered in accordance with the Control of Noise at Work Regulations 2005). We have also assumed that the facades and roofs will be composite lightweight Architectural Wall Panels (i.e. Kingspan type cladding on steel frame) without any additional linings. Using an octave band spectrum of typical industrial noise within each of the units, and manufacturers sound insulation data for unlined Kingspan KS1000 AWP(60) insulated wall panels for the building envelopes (Rw 25 dB), we have calculated the noise break-out from the building to the nearest noise sensitive residences modelling the walls and roof of the building as area sources using SoundPlan sound propagation software and the methods of ISO 9613 part 2 "Acoustics – Attenuation of sound during propagation outdoors – General method of calculation".

For the service yard we have used noise levels measured of a delivery on a service yard for a delivery consisting of a heavy goods vehicle manoeuvring onto the service yard and operation of a service lift and delivery cages being wheeled across the yard. We would regard this as a conservative approach and would expect a similar or lower sound level for deliveries using an electric fork-lift instead of delivery cages / trollies, however, we have not included for use of a diesel or LPG fork-lift. The sound levels due to a single delivery have been averaged over a 1-hour during the daytime (assuming a maximum of 1 delivery per day) and 15 minutes at night-time to obtain the daytime and night-time Specific Sound Level in accordance with BS 4142:2014 + A1:2019.

We are not aware of any external building services plant associated with the proposed development, hence a limit will be determined such that the impact of any proposed plant will be low.

The proposed layout of the new industrial development, along with the initial calculations for noise break-out of the building envelope (for both day and night measurements) are indicated in Figure 5 below.

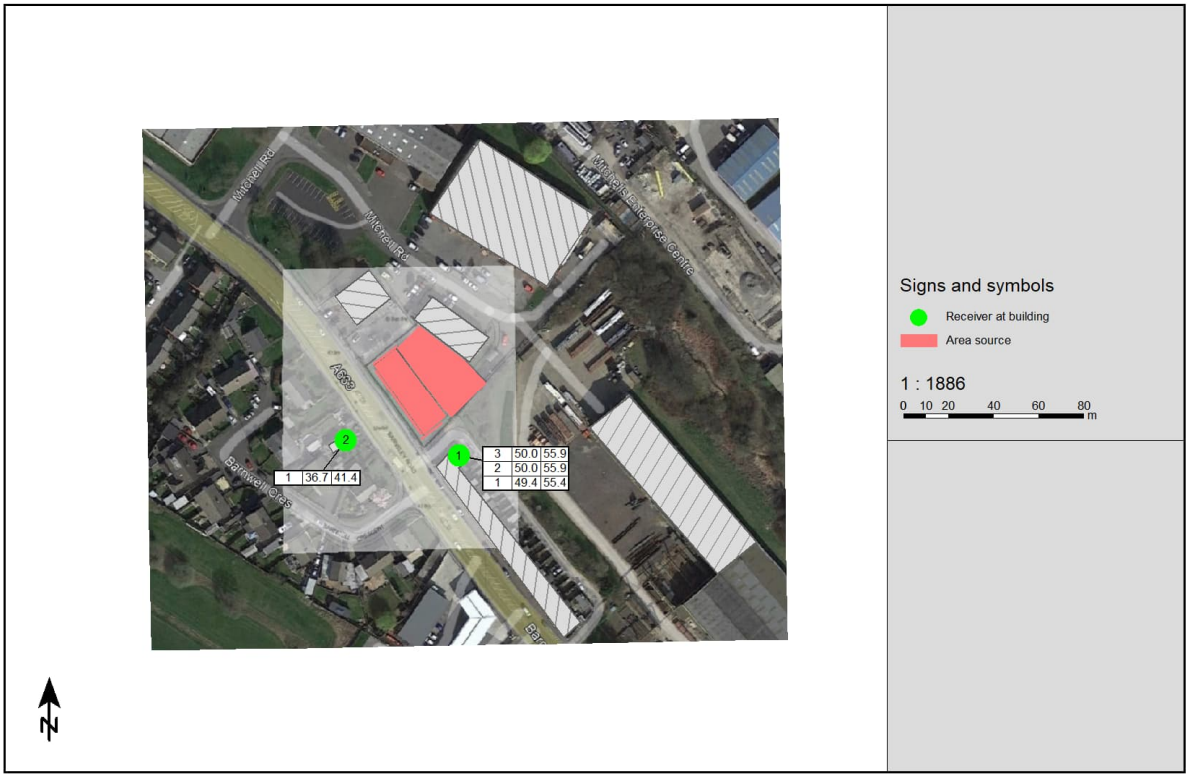


Figure 5. Noise break-out to nearest noise sensitive residences (80dB(A) within all units) plus 1 delivery and loading / unloading per hour on service yard

7.0 ASSESSMENT

7.1 Background sound levels

BS 4142 states that background sound levels should be determined by statistical analysis of a series of background measurements taken over the period typical of the operation of the source. Typical background levels have been determined for the daytime and night-time period.

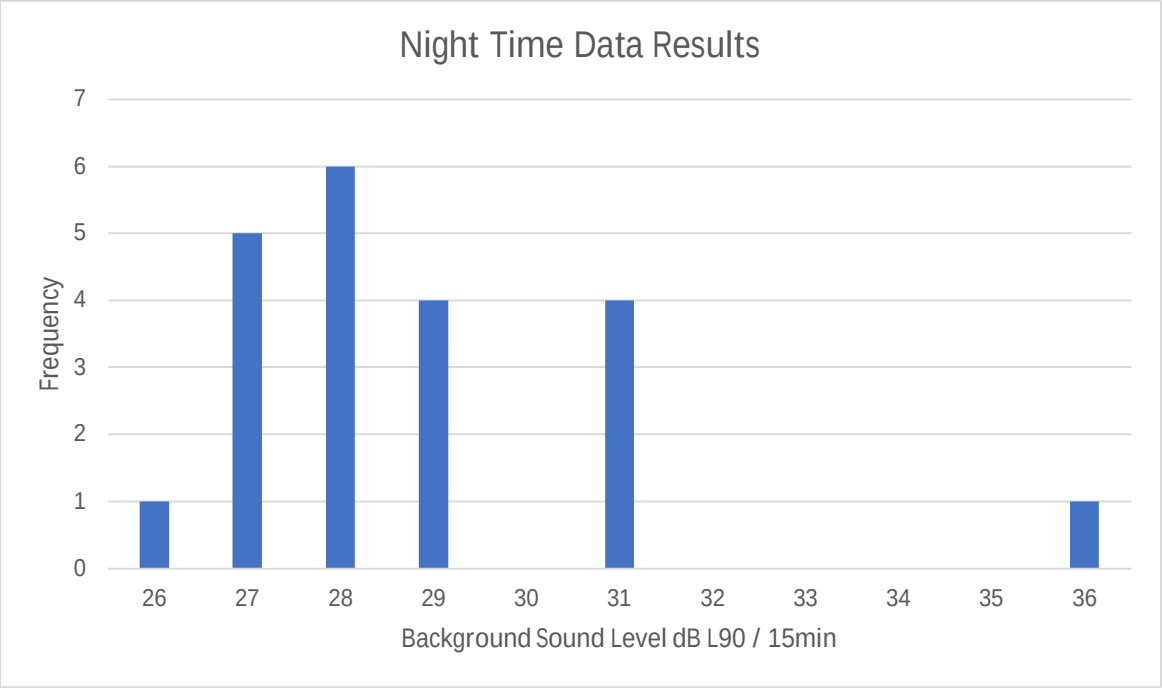


Figure 6. Background sound histogram (night-time)

Modal background sound was found to be 28 dB(A).

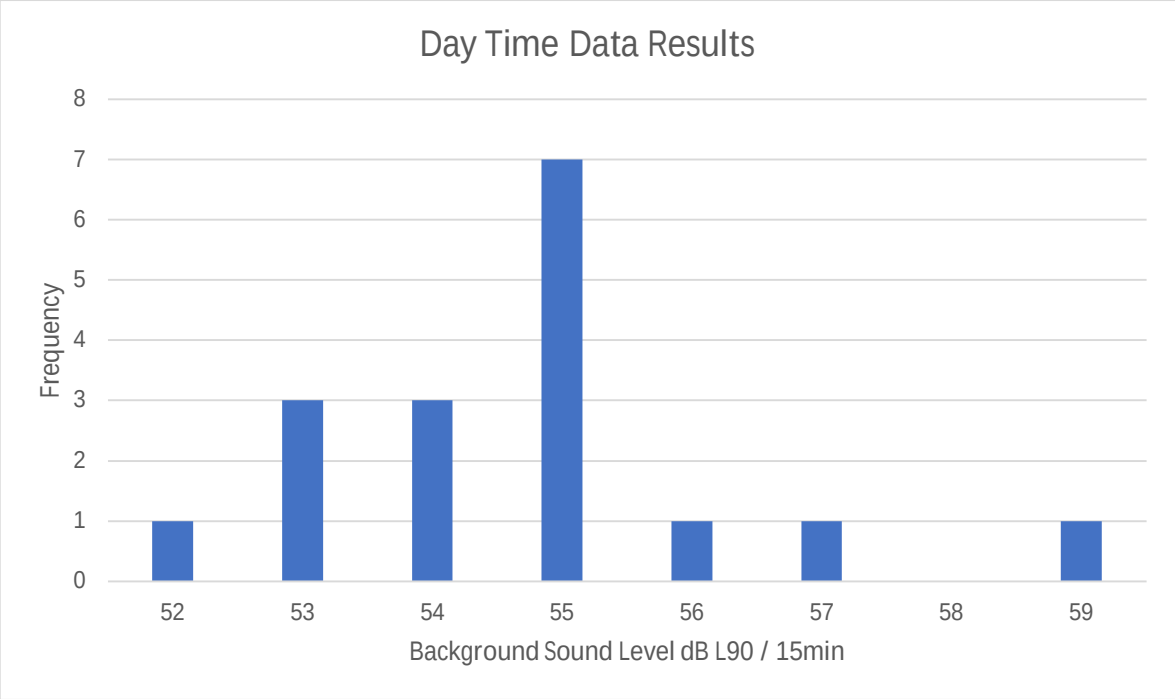


Figure 7. Background sound histogram (daytime)

Modal background sound was found to be 55dB L_{A90} during the daytime.

7.2 Initial BS 4142:2014 + A1:2019 Assessment

An initial assessment has been made of the use of the unit, and service yard during the daytime and night-time periods.

7.2.1 Daytime

Comparing the worst case calculated sound level at the nearest noise sensitive façade when assessed over an hour during the daytime including an assumed delivery with the background sound level gives the following preliminary assessment in accordance with BS 4142:2014 for daytime use of the unit and service yard (excluding consideration of context).

Specific sound level (worst case)	50 dB(A)
Character correction / penalty	5 dB (some impulsive sounds unloading and wheeling trolleys)
Rating Level	55 dB(A)
Background Level (L_{A90})	53 dB(A)
Rating Level relative to Background Level	+2 dB

In accordance with BS4142:2014 + A1:2019, a difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context, whilst where the rating level does not exceed the background level, this is an indication of the specific sound source having a low impact, depending on the context. As such the noise from the development is below the level of onset of an adverse impact, depending on context.

Consideration of the Planning Practice noise level guidance (see Section 0) it can be seen that this is onset of adverse impact (+5dB) is equivalent to the 'Lowest Observed Adverse Effect Level' or LOAEL which suggests that noise from the development is below the LOAEL and no additional mitigation measures are required for daytime use (depending on context).

7.2.2 Night-time

Comparing the worst case calculated sound level (at the nearest noise sensitive façade when assessed over 15 minutes including an assumed delivery) with the background sound level gives the following preliminary assessment in accordance with BS 4142:2014 for night-time use of the unit and service yard (excluding consideration of context).

Specific sound level (worst case 15mins)	56 dB(A)
Character correction / penalty	5 dB (some impulsive sounds unloading and wheeling trolleys)
Rating Level	61 dB(A)
Background Level (L_{A90})	29 dB(A)
Rating Level relative to Background Level	+32 dB

In accordance with BS4142:2014 + A1:2019, a difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context. As such the noise from the development is likely to be a significant impact without further mitigation, depending on context.

7.2.3 Mitigation for night-time use

The simplest mitigation for night-time use of the proposed commercial unit would be to restrict the loading / unloading of goods in the service yard to daytime only.

The model of Section 6.0 has been repeated without the noise sources assoicated with deliveries and unloading in the service yard. In addition to the loading we have also modelled a higher sound insulation cladding for the building consisting of:

- Lightweight wall cladding – Euroclad Elite system 2.2Kn
- Lightweight roof cladding – Euroclad Elite system 51.30 Kn

The results of the noise propagation to the nearby noise sensitive properties are shown in 8 below:

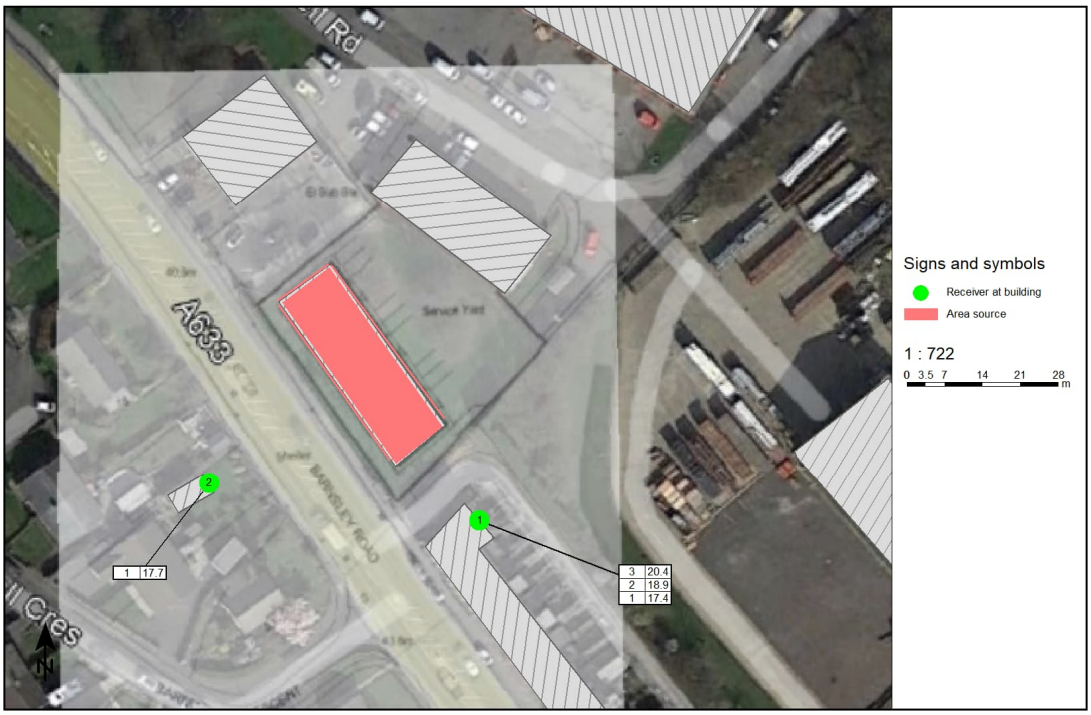


Figure 8 - Noise break-out to nearest noise sensitive residences (80dB(A) within all units), no deliveries / loading / unloading

In this case, noise break-out from the building envelope is likely to be relatively constant and is unlikely to feature sounds with a particular character. As such the night-time preliminary assessment of impact in accordance with BS 4142:2014+A1:2019 has been repeated (excluding delivery and loading / unloading activities on the service yard, and excluding consideration of context).

Specific sound level (worst case 15mins)	20 dB(A)
Character correction / penalty	0 dB
Rating Level	20 dB(A)
Background Level (L_{A90})	29 dB(A)
Rating Level relative to Background Level	-9 dB

In accordance with BS4142:2014 + A1:2019, where the rating level does not exceed the background level, this is an indication of the specific sound source having a low impact, depending on the context. As such the noise from the development is below the level of onset of an adverse impact, depending on context.

7.2.4 Consideration of context

In accordance with BS 4142:2014 + A1:2019, as well as considering the Rating Sound Level with the Background Sound Level to obtain a preliminary indication of impact, it is also necessary to consider the context of the assessment and if necessary to adjust the assessment of impact to take into account the context.

- Absolute sound levels – the absolute sound level due to the proposed unit is predicted to be 50dB(A) during the daytime and 20dB(A) during the night-time.

  We would note that the daytime noise level does not exceed the noise level for residential outdoor living areas indicated in the WHO Guidelines for Community Noise is 50 dB $L_{Aeq,16h}$ to avoid the majority of people from moderate annoyance. This further reinforces the preliminary assessment that the sound is likely to be at the LOAEL level and the impact of the development will therefore be low.

  During the night-time the level of 20dB(A) is well below the WHO Guidelines for Community Noise criterion of 45 dB $L_{Aeq,8h}$ outside bedrooms. Considering the sound break-in through a partially opened window, allowing a 15dB attenuation from the outdoor level to the level inside the habitable rooms (in accordance with BS 8233:2014) the estimated indoor level due to the development would be 5 dB which is unlikely to be audible due to masking from other sounds inside the dwellings.

- Residual sound – the residual sound level (i.e. the current $L_{Aeq,T}$ sound level in the absence of the proposed development) is 61 dB(A) during the daytime, and 50 dB(A) during the night-time. This is considerably higher than the predicted sound level from the development of 50dB(A) during the daytime and 20 dB(A) at night and indicates that the noise sensitive properties are already exposed to noise events with much higher levels than those likely to be generated by the proposed development.

Considering the above context it is apparent that the impact of the proposed development will be low both during the daytime and during the night-time.

During the daytime the Rating Level does not exceed the Background Level by more than 2dB and would also remain below the appropriate criteria of WHO Guidelines and BS 8233:2014 in habitable rooms with open windows when noise from the development was considered in isolation. It is also noted that the sound from the development is predicted to be more than 10dB below the Residual Sound Level already present at the nearby noise sensitive residences from road traffic.

During the night-time the Rating Sound does not exceed the Background Level. In absolute terms the sound is well below the criteria of WHO Guidelines and BS 8233:2014 in habitable rooms and is unlikely to cause disturbance. Furthermore the Specific Sound Level is well below the Residual Sound Level and hence will not significantly increase the Ambient Sound Level at the nearest noise sensitive residences.

7.3 Building Services / external plant emissions

The requirement for building services plant for the proposed development is not known. For the avoidance of doubt we would recommend that the Rating Sound Level of any building services plant does not exceed the Background Sound Level, or 35 dB(A) at the nearest noise sensitive residences (whichever is greater). Thus the sound level due to mechanical services noise should be limited to 50 dB(A) during the daytime and 35 dB(A) during the night time when assessed at the nearest noise sensitive residences.

8.0 CONCLUSION

At the request of Cadam Construction Ltd, Philip Dunbavin Acoustics has conducted an environmental noise survey and assessment of the noise egress of the proposed new industrial units on land located at Mitchell's Road, Barnsley, S73 8DZ.

An environmental noise survey has been carried out in the vicinity of the nearest noise sensitive properties in order to obtain the Background Level at these locations in accordance with the method of BS 4142:2014+A1:2019.

Noise egress has been calculated based on a sound level within the unit at the Lower Action Value of the Control of Noise at Work Regulations [80 dB(A)] and based upon one deliver / collection per hour with loading / unloading on the service yard during the daytime.

During the night-time the noise egress has been limited to sound breaking out from within the building only, and it is recommended that deliveries and loading / unloading on the service yard are limited to daytime hours only (07:00 – 23:00). In order to control noise break-out from the building we recommend that the lightweight cladding is a built-up mineral wool sandwich construction such as Euroclad Elite 2.2 Kn walls and Euroclad Elite 51.30 Kn roof or similar.

During the daytime the Rating Level due to the proposed operation of the development exceeds the background sound level by 2dB which is below the equivalent LOAEL value when assessed in accordance with BS 4142:2014+A1:2019 and also meets the WHO Guidelines for Community Noise criterion for outdoor living spaces. As such when context is also taken into account the impact of sound from the proposed development during the daytime is predicted to be low.

During the night-time the Rating Level due to the proposed development is predicted to be 9dB below the background sound level. When context is also taken into account the impact of sound from the proposed development during the night-time remains low.

We are not currently aware of any external building services plant associated with the proposed development. In order to prevent noise disturbance from building services plant we would recommend that the Rating Sound Level due to any future building services plant is limited to 50dB(A) during the daytime and 35dB(A) at night-time when assessed at the nearest noise sensitive residences.

APPENDIX A – DEFINITION OF ACOUSTIC TERMS

The decibel

This is the basic unit of noise, denoted dB.

A Weighting

This is a weighting process which simulates the human ear's different sensitivity at different frequencies. A weighting can be shown two typical ways, 50 dB(A) L_{eq} or 50 dB $L_{Aeq.}$ Both mean the same thing. (See below for a definition of L_{eq}). The dB(A) level can be regarded as the overall level perceived by human beings.

L_{eq} and $L_{eq(s)}$

This is the equivalent continuous noise level which contains the same acoustic energy as the actual time-varying sound. In other words it is a kind of average noise level. It is denoted dB L_{eq} or, for A-weighted figures dB(A) L_{eq} or dB L_{Aeq}. It can also be expressed in terms of frequency analysis (see later). $L_{eq(s)}$ is the sample L_{eq} level.

L_n

This is the level exceeded for n% of the time. It is denoted dB L_n or, for A-weighted figures dB(A) L_n or dB $L_{An.}$ It can be expressed in terms of frequency analysis (see later). L_{90} is the level exceeded for 90% of the time and is a measure of the lowest level typically reached. L_{10} is the level exceeded for 10% of the time and is the highest level typically reached. L_{50} is the level exceeded for 50% of the time and, mathematically, it is the median.

L_{max}

This is the maximum level reached during a measurement period. The "time constant", or the ability of the equipment to respond to impulses is usually expressed along with it, e.g. "Fast", "Slow", etc. It is denoted dB L_{max} or, for A-weighted figures dB(A) $L_{max,}$ dB $L_{Amax,}$ etc. It can also be expressed in terms of frequency analysis.

Frequency Analysis

Whereas dB(A) gives a very useful overall figure, it has its limitations in that it cannot be used to model or predict the effect of noise control and mitigation as this nearly always has radically different performance at different frequencies.

Frequency analysis expresses an overall noise level at each frequency or band of frequencies in the audible range. Octave band analysis divides the audible range into 10 bands from 31.5 Hz to 16 kHz and the noise level in each band can be expressed in any form e.g. L_{eq}, L_{90}, L_{max} etc. One third octave band analysis uses 30 bands.

Narrow band analysis takes the process to resolutions of less than 1 Hz. This is useful for identifying the existence of tones (whines, hums, etc.) and in pin-pointing the sources.