

JD Sports HQ, Bury

Planning Noise Assessment

JD Sports Fashion PLC

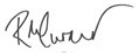
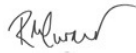
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1.0

Introduction

1.0 Introduction

It is proposed to construct a new flagship office / amenity building at the JD Sports Campus, Bury, a new creche building and outdoor sports pitch, as well as the provision of external parking. The main hub building will accommodate a number of different room types including offices, meeting facilities, display / presentation spaces, atrium, gym and a café along with the necessary mechanical plant services to serve these spaces.

The site is located at the existing JD Sports Campus at Hollins Brook Way, Bury, BL9 8RR and is currently an empty lot as the previous buildings have been demolished.

The purpose of this report is to:

- Document measured noise levels undertaken by Cundall at the site;
- Assess the predicted noise impact from the existing noise climate on the new buildings;
- Assess the predicted noise from the new outdoor play areas associated with the creche building and from the new MUGA sports pitch on existing noise sensitive receptors;
- Determine noise emission limits for new items of building services plant associated with the development.

2.0

Assessment criteria

2.0 Assessment comments and considerations

2.1 General

The section provides a summary of the relevant standards and guidance applicable to the development as stipulated in 'British Council for Offices: Guide to Specification 2019' (BCO 2019), Building Bulletin 93 *Acoustic design of schools: performance standards*, Sports England's 'Artificial Grass Pitch (AGP) Acoustics – Planning Implications (2015)', guidance taken from the Association of Australasian Acoustical Consultants' 'Guideline for Child Care Centre Acoustic Assessment Version 3.0' (AAAC), Bury Council's planning policies, the National Planning Policy Framework (NPPF) and the Noise Policy Statement for England (NPSE).

2.2 Planning policy and guidance

Bury Council is the Local Planning Authority (LPA) for this site, and have some guidance which is applicable to this development. Policy EN7/2 – Noise Pollution of the Adopted Bury Unitary Development Plan sets out the Council's policy on environmental noise pollution and states the following:

"In seeking to limit noise pollution the Council will not permit:

- *development which could lead to an unacceptable noise nuisance to nearby occupiers and/or amenity users;*
- *development close to a permanent source of noise.*

Justification

Noise is an environmental problem which can cause damage to people's health as well as the amenity of an area. This policy seeks to control the location of development in relation to noise pollution in order to reduce the impact of this form of pollution. Proposals for noisy developments likely to generate an unacceptable noise nuisance will not be permitted. Similarly, proposals for development close to permanent noise sources, such as motorways will not be permitted where it would lead to unacceptable noise nuisance for the occupiers or users of the proposed development. In certain cases, there may be opportunities to prescribe forms of screening, mounding and landscaping to reduce the impact of noise, which will benefit the quality of life for people living and working close to areas where there is noise generation or a noise pollution problem. For proposals involving recreational pursuits which generate noise or nuisance, see Recreation and Tourism Policy RT3/5. Guidance on noise pollution is provided in PPG24 "Planning and Noise".

Planning Policy Guidance 24: Planning and Noise (PPG24) is no longer used at a national level, since it was revoked when the National Planning Policy Framework (NPPF) was originally published.

2.3 National Planning Policy Framework (NPPF)

The National Planning Policy Framework (NPPF), published in March 2012 and updated most recently in July 2021, is currently the relevant document for defining the national policy toward noise sensitive development. It refers to the Noise Policy Statement for England (NPSE), which is discussed in the subsequent section.

The current policy on sustainable development influences the emphasis of any noise assessment. The development of a quiet, rural site is by most measures less sustainable than the development of a site located near existing infrastructure and facilities. The rating of development sites based on prevailing noise levels should reflect this.

Specifically, on the subject of noise, paragraph 185 of NPPF states:

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

- a. mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life;*

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

Paragraph 185 references the Noise Policy Statement for England and no other particular standards.

On the general issue of amenity, paragraph 130 states that planning policies and decisions should ensure that developments:

"create places that [...] promote health and well-being, with a high standard of amenity for existing and future users..."

Further to this, paragraph 174 states that 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"

A notable inclusion in the July 2018 edition of NPPF is the 'agent of change' principle, now in paragraph 187. In terms of noise, this principle requires that those proposing a new noise sensitive development incorporate sufficient mitigation such that the operation of existing premises in the area is not unreasonably restricted in order to control noise impact upon the new development:

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

2.4 Noise Policy Statement for England (NPSE)

This NPSE does not set quantitative guidelines for the suitability of noise sensitive development in an area depending on the prevailing levels of noise. Absent, therefore, is reference to specific noise thresholds (e.g. the Noise Exposure Categories as defined in the withdrawn PPG 24) which determine whether noise sensitive development is suitable and, if so, whether particular mitigation factors need to be considered.

Instead, the NPSE sets out three aims:

The first aim of the Noise Policy Statement for England

"Avoid significant adverse impacts on health and quality of life from environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development."

The second aim of the Noise Policy Statement for England

"Mitigate and minimise adverse impacts on health and quality of life from environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development."

The third aim of the Noise Policy Statement for England

"Where possible, contribute to the improvement of health and quality of life through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development."

Paragraph 2.24 states that all reasonable steps should be taken to mitigate and minimise adverse effects on health and quality of life. It also states that this does not mean that such adverse effects cannot occur.

In essence, therefore, each development site must be judged on its ability to deliver on each of the stated aims. Quantifying the prevailing noise levels is therefore an essential first step in assessing a given site.

The NPSE refers to SOAEL, the Significant Observed Adverse Effect Level. This is defined as the level above which significant adverse impacts on health and quality of life occur. Given the overall thrust of the NPSE, the SOAEL is therefore an important assessment standard although the document also comments that:

“It is not possible to have a single objective noise based measure that defines SOAEL that is applicable to all sources of noise in all situations. Consequently, the SOAEL is likely to be different for different noise sources, for different receptors and at different times.”

Attention is drawn to the fact that the SOAEL is the level above which significant adverse effects can be observed. Importantly, it should be noted that the overall objective is to avoid or minimise significant adverse impacts; some degree of impact is acceptable, and it is not necessary to seek to achieve no impact at all.

2.5 BS 4142:2014+A1:2019 – Methods for rating and assessing industrial and commercial sounds

BS 4142 is the relevant British Standard for rating and assessing industrial and commercial noise, which includes the noise from mechanical services plant items. With regard to setting plant noise limits, BS 4142 provides guidance based on the comparison of rating noise levels and the pre-existing background sound levels:

“a) Typically, the greater this difference [between industrial site noise rating level and baseline background level], the greater the magnitude of the impact.

b) A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context.

c) A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context.

d) 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.

NOTE 2 Adverse impacts include, but are not limited to, annoyance and sleep disturbance. Not all adverse impacts will lead to complaints and not every complaint is proof of an adverse impact.”

The standard suggests that should the rating noise level not exceed the pre-existing background noise level, it is indicative of the noise source having a low impact, depending on the context. It also states that:

“For a given difference between the rating level and the background sound level, the magnitude of the overall impact might be greater for an acoustic environment where the residual sound level is high than for an acoustic environment where the residual sound level is low.

Where background sound levels and rating levels are low, absolute levels might be as, or more, relevant than the margin by which the rating level exceeds the background. This is especially true at night.”

While BS 4142:2014 does not suggest values for what might be considered “low” background levels, BS 4142:1997 stated that background levels below 30 dB and rating levels below 35 dB would be considered “very low”. Therefore, it would be appropriate to limit plant noise limits equal to the highest of the existing background or 30 dB.

2.6 British Council for Offices: Guide to Specification 2019

The BCO guidance, published in 2019 covers a number of important areas of consideration for the design of offices, including external noise intrusion to office spaces, sound insulation through floors, building services noise limits, acoustic privacy, façade flanking and rain noise. The acoustic requirements and comments / considerations for each of these items are summarised in Table 1 below:

Item	Acoustic requirements	Comments / considerations
External noise instruction to office spaces	<u>Guideline NR limits:</u> Open Plan Offices NR 40 $L_{eq,T}$ Specular offices NR 38 $L_{eq,T}$ Cellular offices/meeting rooms NR 35 $L_{eq,T}$ (to be achieved between 09:00 and 17:00) <u>Guideline LA01 limits (regular individual events)</u> Open Plan Offices 50 dB $L_{A01,1hour}$ Cellular Offices/meeting rooms 55 dB $L_{A01,1hour}$ NOTE: In the case of naturally ventilated buildings, a +5 dB relaxation may be considered acceptable in maximum ventilation mode, provided occupants have the choice to open or close windows or ventilation openings.	Noise break-in will be dictated by surrounding road traffic – see noise impact assessment in next section.

Table 1 – Acoustic performance requirements

2.7 Building bulletin 93: Acoustic design of schools: Performance standards

BB93 lays out design criteria for various types of school rooms covering indoor ambient noise limits, for both steady-state and regular discrete noise events. The “teaching” rooms have more onerous criteria than offices and other ancillary spaces, and have the following requirements:

Type of room	Upper limit for the indoor ambient noise level	
	$L_{Aeq,30mins}$ dB	$L_{A1,30mins}$ dB
Nursery school rooms <i>Primary school:</i> classroom, class base, general teaching area, small group room	35	60

Table 2 - BB93 indoor ambient noise level criteria

2.8 Association of Australasian Acoustical Consultants' Guideline for Child Care Centre Assessment Version 3.0

The AAAC documentation is not strictly applicable in the UK but provides useful guidance in the absence of specifically British documents. It provides details on typical noise levels for children in various age groups, as well as methods to adjust the noise levels to account for different numbers of children. The noise levels are provided as a sound power level for a group of 10 children, with the following equation for adjusting the noise levels:

$$\text{Effective Sound power level for 'n' children} = \text{Effective Sound power level for 10 children} + 10 \times \log\left(\frac{n}{10}\right)$$

Guidance is then provided on setting noise limits depending on the length of time in a given 24 hour period that the children will be playing outdoors. Where existing background noise levels exceed 40 dB $L_{A90,T}$ noise levels:

- A: Playground usage below combined 4 hours daily, $L_{eq,15 \text{ minutes}}$ should not exceed the background noise level by more than 10 dB at the assessment position
- B: Playground usage above combined 4 hours daily, $L_{eq,15 \text{ minutes}}$ should not exceed the background noise level by more than 5 dB at the assessment position

2.9 Sports England's *Artificial Grass Pitch (AGP) Acoustics – Planning Implication 2015*

This Sports England document provides noise levels for typical usage of outdoor Multi-Use Games Area (MUGA) pitches as a single figure value, of 58 dB at 10 m from the “halfway line” of the pitch. It also suggests external noise limits based on the World Health Organisation's *Guidelines for Community Noise* as follows – 50 dB $L_{Aeq,1\text{ hour}}$ upper noise limit, external to residential properties and within living areas.

3.0

Environmental noise survey

3.0 Environmental noise survey

3.1 Equipment and methodology

In order to assess prevailing levels of environmental noise affecting the proposed development, primarily due to the adjacent Pilsworth Road at the north of the site, a mixed attended and unattended noise survey has been undertaken. The noise survey was undertaken between approximately 07:00 on 17th March and approximately 08:00 on 18th March 2022.

Two positions were selected, one at the approximate location of the façade of the new hub building and the other was selected to be representative of the environmental noise levels at the nearest noise sensitive receptor. These positions are highlighted in Figure 1 below:

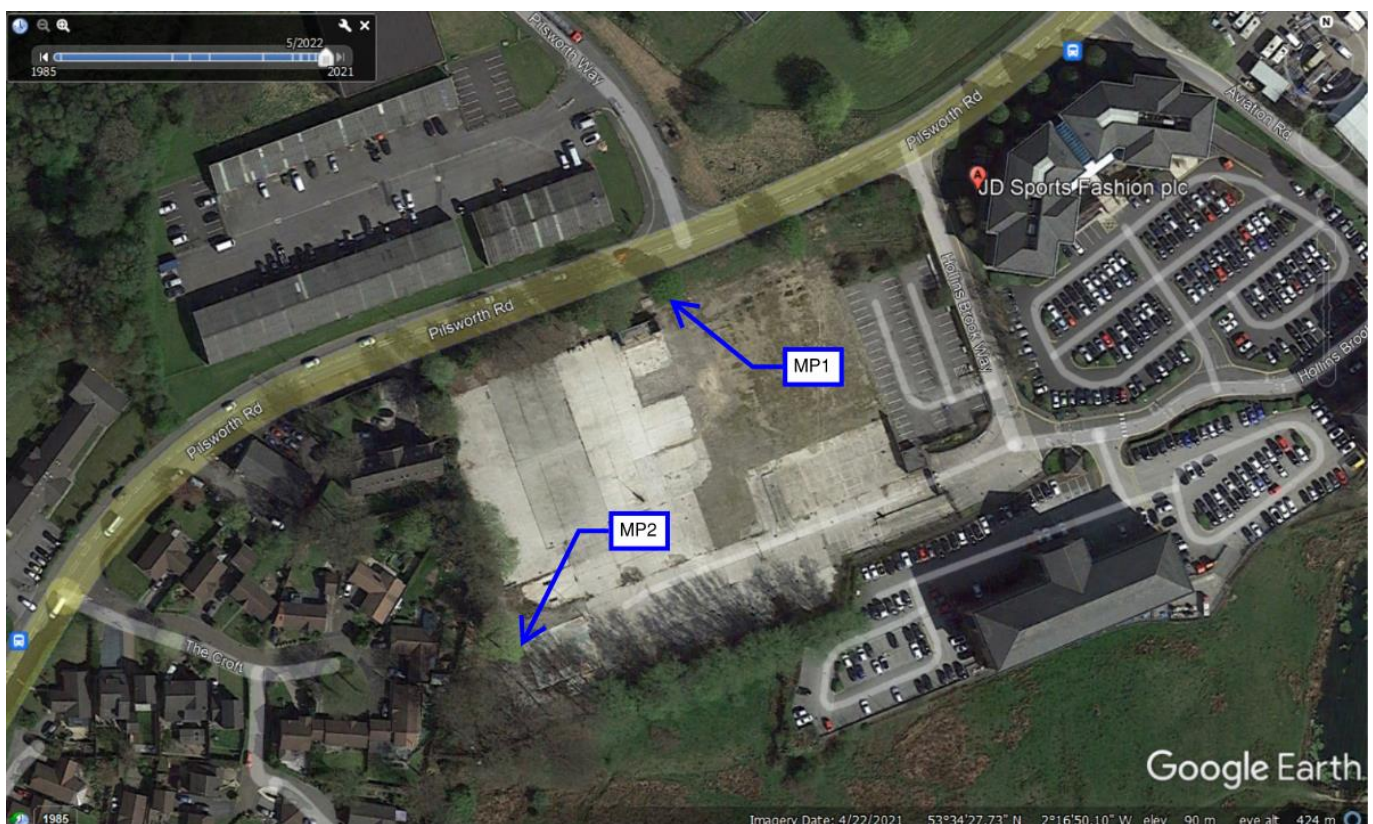


Figure 1 - Measurement positions

For attended measurements the sound level meter was mounted directly on a tripod approximately 1.3 m above local ground level and in a free-field position, MP1. For the unattended portion of the survey, the microphone was extended with a cable and fitted within a weatherproof enclosure, also approximately 1.3m above local ground level and in a free-field position.

Measurements were undertaken using a NTi XL2 precision sound level meter (serial number: A2A-16315-E0), in accordance with BS 7445-1:2003. The meter was field calibrated before and after the attended and unattended surveys to ensure a consistent and acceptable level of accuracy was maintained throughout. No significant drift was observed. Calibration certificated for all items of noise survey equipment are available on request.

All noise measurements were undertaken by competently trained Cundall acoustics staff. Subjective impressions were that the noise climate was dominated by road traffic noise on Pilsworth Road to the north of the site.

Weather conditions throughout the survey were overcast, dry and cool with dry roads and wind speeds throughout were below 5 m/s.

3.2 Results summary

A summary of the survey results is presented in:

Start time (Duration, T)	$L_{Aeq,T}$ (dB)	$L_{A01,T}$ (dB)	$L_{A90,T}$ (dB)
07:00 (T = 2 hours)	63	67	58

Table 3 - Attended environmental noise survey results summary at MP1

Start time (Duration, T)	$L_{Aeq,T}$ (dB)	$L_{A01,T}$ (dB)	$L_{A90,T}$ (dB)
Combined daytime (T = 14.75 hours)	53	62	46
Daytime (T = 15 minutes)	43 - 51	50 – 66	36 – 60
Night-time (T = 8 hours)	53	62	43
Night-time (T = 15 minutes)	44 – 61	51 – 66	38 – 60

Table 4 - Unattended environmental noise survey results summary at MP2

As can be seen from the results in tables 2 and 3 above, the noise levels at MP1 are higher than at MP2 – due to closer proximity to the main noise source at the site. Position MP1 is representative of the worst-case façade of the new hub building, which will face onto the road and these noise levels are therefore used for determining the façade performance required for the new hub building. Additionally, measurements at this position were undertaken between approximately 07:00 and 09:00 on a typical weekday morning, which is the loudest part of the day-time period due to ‘rush hour’ traffic.

Histograms of the day- and night-time $L_{A90,15min}$ levels recorded at MP2 are displayed in Figure 2 and Figure 3 below, with the representative levels specified in Table 5 below these.

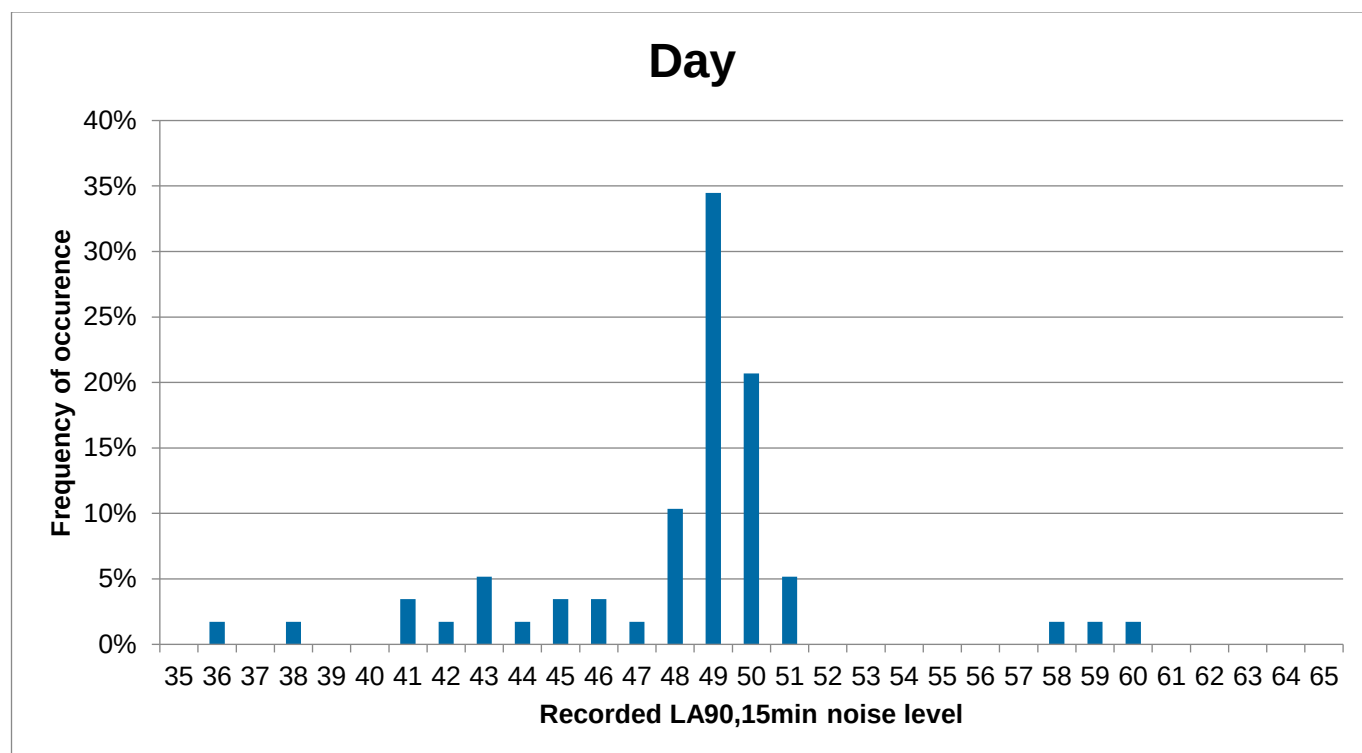


Figure 2 – Daytime $L_{A90,15min}$ histogram

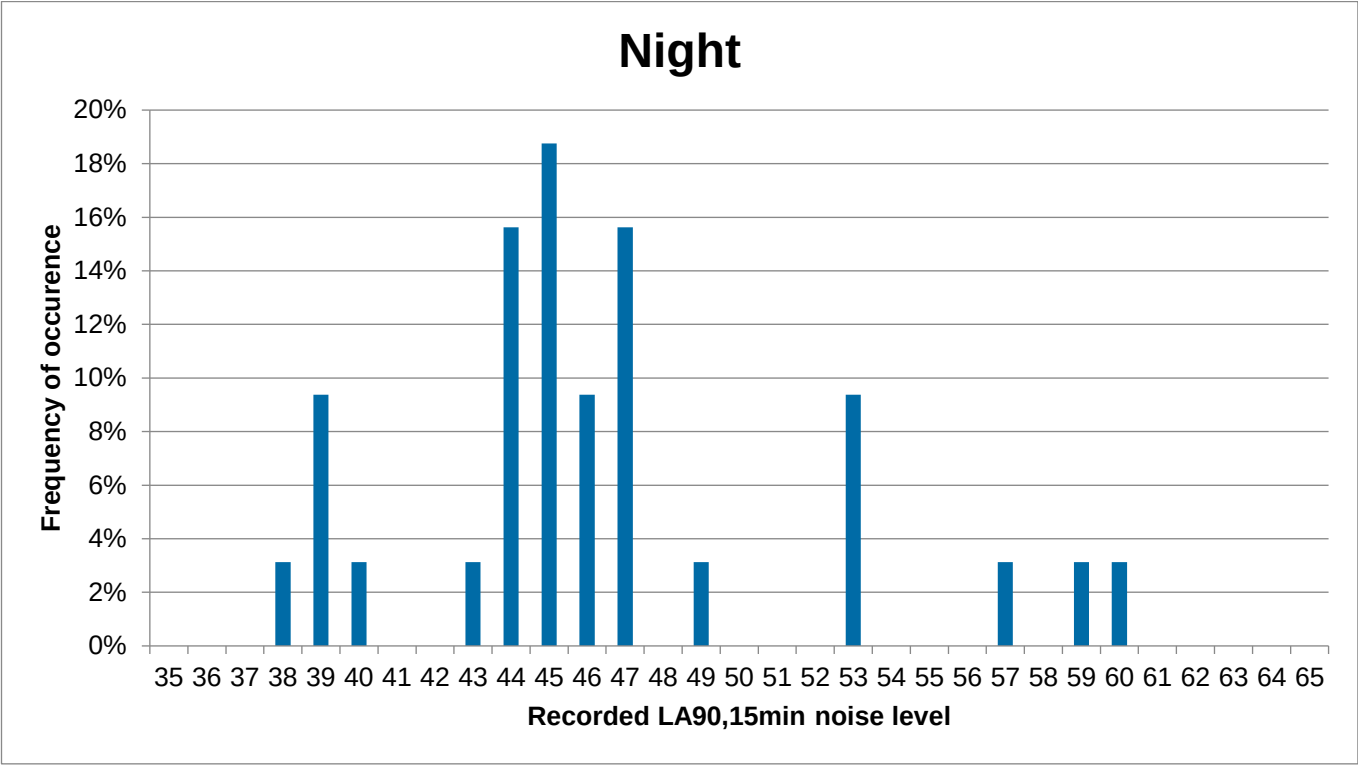


Figure 3 – Night-time $L_{A90,15min}$ histogram

Time period	Representative $L_{A90,15min}$
Daytime (07:00 – 23:00)	49
Night-time (23:00 – 07:00)	45

Table 5 - Representative $L_{A90,15min}$ noise levels

4.0

Noise break-in assessment

4.0 Noise break-in assessment

4.1 Glazing system requirements

For most buildings utilising a traditional façade construction, the weakest element of the external elevation from an acoustic perspective is the glazing. The specification of glazing is therefore considered to be the primary factor in determining the internal ambient noise level within noise sensitive areas due to noise ingress from outside.

Based on meeting the requirements of BCO in the Hub building and BB93 in the creche, the minimum sound reduction requirements identified for façades across the development use the calculation procedure for determining the glazing attenuation as follows:

$$R_w + C_{tr} = \text{External Façade Level dBA} - \text{Internal Design Target dBA}$$

Table 6 presents the highest façade noise level incident on the development, along with a comparison against the proposed internal noise level criteria.

Space type	Worst case external façade noise level	BCO internal noise criterion	BB93 internal noise criterion	Required sound insulation, dB $R_w + C_{tr}$
Offices / meeting rooms	$L_{Aeq,T}$ 63 dB	$L_{Aeq,T}$ 41 dB (NR 35)	N/A	22
	$L_{A01,1hr}$ 68 dB	$L_{A01,1hr}$ 50 dBA	N/A	18
Classrooms	$L_{Aeq,30min}$ 54 dB	N/A	$L_{Aeq,30min}$ 35 dB	19
	$L_{A01,1hr}$ 65 dB	N/A	$L_{A01,1hr}$ 60 dB	5

Table 6 – Summary of glazing conditions

Based on the above, Table 7 presents as an example glazing configuration capable of achieving the minimum required façade sound reduction index value:

Minimum required glazing sound reduction index, dB $R_w + C_{tr}$	Example glazing specification
≥ 25	4 mm pane 6 to 20 mm airgap 4 mm pane - Rated at $R_w + C_{tr}$ 25 dB*
* Based on values given in 'BS EN 12354-3: 2000 Building acoustics: Estimation of acoustic performance in buildings from the performance of elements. Airborne sound insulation against outdoor sound'	

Table 7 – Minimum glazing sound insulation performance requirements

The example glazing configuration quoted above in Table 7 is standard thermal double glazing.

4.2 Natural ventilation assessment

Based on the BCO design guidance presented in Table 1 and the findings of the noise survey presented in Table 3, the following table presents a preliminary assessment of external noise break-in for open plan and cellular offices with an open window natural ventilation strategy in place. Whilst it is understood that the development is to be fully mechanically ventilated, this assessment has been carried out to demonstrate the potential impact of opening windows as part of the mixed-mode solution.

This assessment defines the estimated upper noise levels at the external façade which are expected to result in compliance with the BCO criteria, and then compares these estimated external limits against the $L_{Aeq,T}$ values measured at the most exposed façade location:

	Open plan offices
BCO 2019 upper limit for external noise intrusion	$\approx L_{Aeq,T} 45 \text{ dB}^*$ (NR 40)
Relaxation to BCO 2019 design criteria for naturally ventilated spaces	+ 5 dB
Assumed attenuation provided by a partially open window	+ 10 dB**
Resultant estimated maximum allowable noise level at external façade to see compliance with BCO 2019 internal noise level criteria	45 +5+10 = 60 dB
Worst case measured $L_{Aeq,T}$ value during attended noise survey	63 dB
Assessment outcome (comparison of estimated upper façade limit against measured survey values)	Survey result exceeds estimated external noise limit – compliance is not expected
* Converting values from Noise Rating (NR) levels to L_{Aeq} levels is equivalent roughly to an increase in 5 dB ** Attenuation of noise through a partially open window is generally quoted as being between 10 – 15 dB. Using the lower value of 10 dB as the figure for attenuation through an open window represents a robust 'reasonable worst-case' methodology.	

Table 8 - Maximum facade noise levels for naturally ventilated solution

As can be seen from Table 3, the initial assessment has identified that the BCO 2019 internal noise criteria would not be achievable in open plan office areas when windows are opened on the façades facing the road. However the exceedance, while noticeable, is not overly significant for open plan offices so may be deemed acceptable as part of a whole-building sustainable design solution.

For meeting rooms and private offices where the guideline criteria is more onerous, the exceedance would be considered significant so the mechanical ventilation solution should be designed in such a way that opening windows are not required but can be used at the occupants' discretion.

The creche building will use hybrid ventilation with openable windows where additional ventilation is desirable or necessary. The noise levels external to the creche building are sufficiently low throughout the day-time period that when allowing the 5 dB relaxation for natural ventilation allowed within BB93, internal noise levels are anticipated to comply with guideline noise limits when windows are open.

5.0

MUGA noise impact assessment

5.0 MUGA noise impact assessment

As part of the proposed development, a MUGA pitch will be constructed towards the centre of the site. The following section assessed the noise impact from the pitch on existing nearby residential properties.

5.1 Assessment criteria

Limiting noise levels from the proposed MUGA at nearby residential properties has been set based on guidance contained within the Sport England documentation with reference made to BS 8233:2014¹ guidance. It is therefore considered that the following criteria are acceptable:

- Limiting continuous noise levels of 35 dB $L_{Aeq,T}$ within residential bedrooms; and
- Limiting continuous noise levels of 55 dB $L_{Aeq,T}$ in external amenity spaces (i.e. gardens).

It is generally accepted that a partially open window will provide a broadband attenuation of 10 – 15 dB, 15 dB is being used in this assessment as this is stated in the Sport England document. As such, when considering noise limiting criteria for internal spaces of residential properties, the following limiting levels will apply at the façade of the receptors:

Limiting continuous noise levels of 50 dB $L_{Aeq,T}$ at residential facades.

5.2 Source noise levels

The Sport England document states the following:

"A typical free-field noise level from an AGP (at 10 m from the sidelines halfway marking) = 58 dB $L_{Aeq}(1 \text{ hour})$ "

This was based on noise levels measured during nine sports sessions on three separate pitches and included football, hockey and rugby being played by men, women and children. However, there is no guidance provided regarding the acoustic spectrum of the noise source. As such, the following library data of sports pitch measurements has been used. This is based upon a MUGA soccer game without spectators and is given as a Sound Power per m² area of playing surface.

Octave Band Sound Power Unit Area (L_w/m^2)						
125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz
62	57	55	57	55	55	43

Table 9 – Soccer game sound power per unit area data

5.3 Noise impact assessment

In order to determine noise propagation from the proposed MUGA pitch, a model has been produced using SoundPLAN 8.2 acoustic modelling software. This model is capable of accurately determining sound propagation, by taking into account variations in topography, barrier attenuation provided by existing landscaping and buildings, and distance attenuation.

A model has been created of the proposed site, and the sound power data has been calibrated to a level of 58 dB at 10 m perpendicular from the halfway line. The Sport England documentation quotes this as being the average level measured at the loudest position when averaged for a number of sports and pitch uses, and this therefore equates to a worst-case scenario.

Without any specific acoustic mitigation for the MUGA, noise levels at nearby residences should not exceed a level of 48 dB $L_{Aeq,T}$, as shown in the noise map below:

¹ BS 8233:2014 'Guidance on sound insulation and noise reduction for buildings'

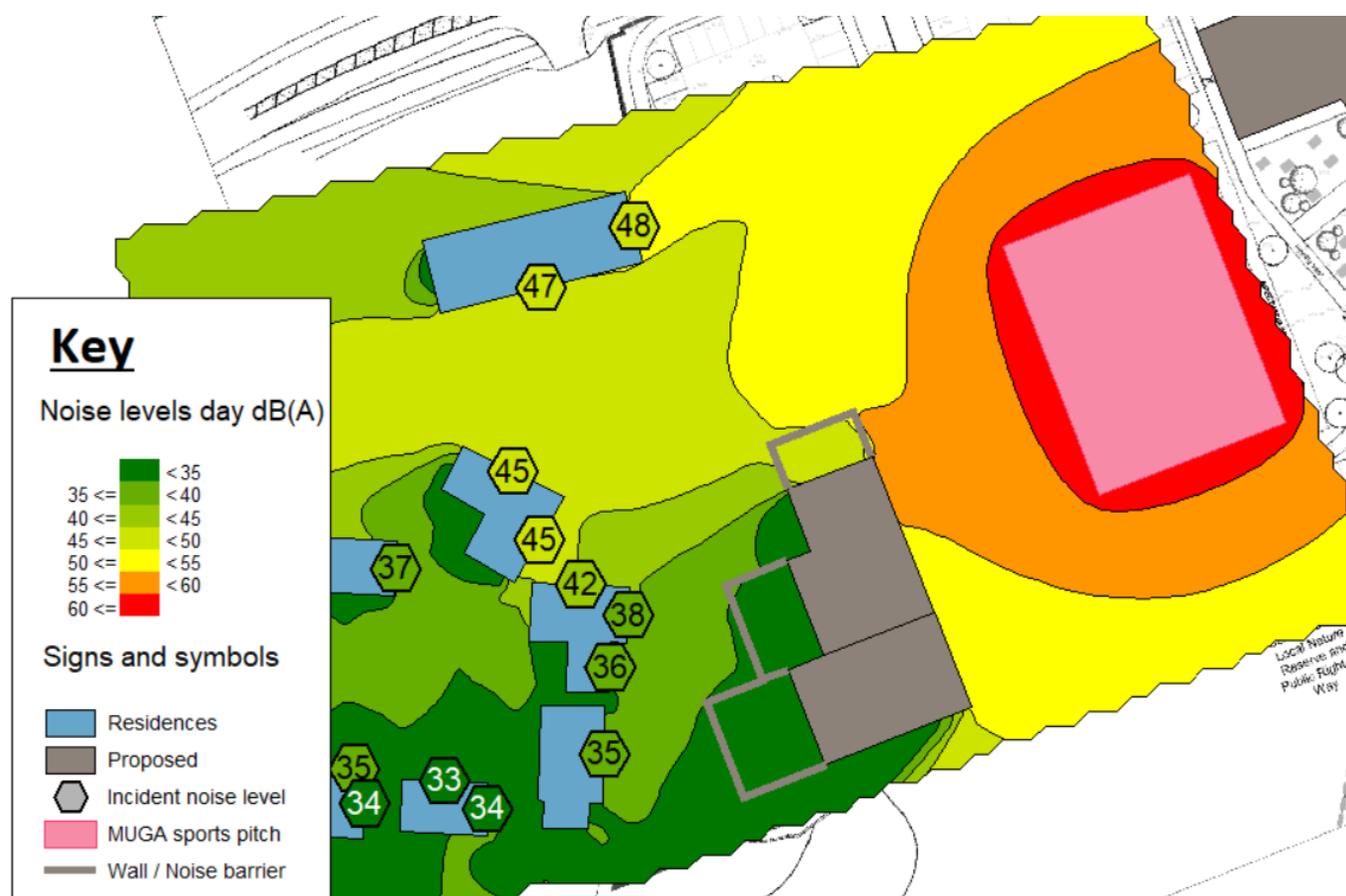


Figure 4 - MUGA / Sports pitch noise map

5.4 Assessment summary

Based on the modelling results presented in Section 5.3, Table 10 below presents a summary of predicted levels with reference to the relevant BS 8233 criteria.

Acoustic metric	Sport England criteria	BS 8233 criteria	Calculated level	Assessment outcome
Equivalent continuous sound level	≤ 50 dB $L_{Aeq,T}$ in external amenity spaces	≤ 55 dB $L_{Aeq,T}$ in external amenity spaces	≤ 48 dB $L_{Aeq,T}$	Compliant with BS 8233 and Sport England criteria

Table 10 – Summary of MUGA noise impact assessment

It can be seen from the results in Table 10 above that without the need for any specific acoustic mitigation, noise impacts associated with the MUGA are expected to be comply with both BS 8233 best-practice design criteria and the Sports England criteria.

6.0

Creche noise

6.0 Creche noise

The following noise guidance is being used for the assessment of noise from the proposed creche building.

Item	Relevant Standard	Acoustic requirements	Comments / considerations
Children's playground noise	AAAC Guideline for Child Care Centre Acoustics Assessment	Where existing background noise levels exceed 40 dB $L_{A90,T}$ noise levels: Playground usage below combined 4 hours daily, $L_{eq,15 \text{ minutes}}$ should not exceed the background noise level by more than 10 dB at the assessment position Playground usage above combined 4 hours daily, $L_{eq,15 \text{ minutes}}$ should not exceed the background noise level by more than 5 dB at the assessment position	This guidance is taken from Australasian documentation as there is no specific guidance within the UK. These guidelines are therefore not a requirement, but are being applied here.

Table 11 - Acoustic performance requirements

Combining this guidance with the recorded noise levels from the environmental noise survey discussed in Section 3.0 of this report result in the following noise limits in Table 12:

Existing background noise level, dB $L_{A90,15min}$	Outdoor period	Resultant noise limit
49	Below 4 hours	59
	Above 4 hours	54

Table 12 - Creche noise limits

The following assumptions have been made for the purposes of assessment:

- Maximum capacity of children: 54 toddlers, 28 toddlers / babies (under 2 y/o), 25 pre-schoolers
- All children outdoors at once

The following octave band noise levels are provided in the AAAC documentation for children, and have been used in the assessment:

Age of children	Sound power levels (dB) at Octave band centre frequencies (Hz)								Single figure dB(A)
	63	125	250	500	1000	2000	4000	8000	
0 to 2 years	54	60	66	72	74	71	67	64	78
2 to 3 years	61	67	73	79	81	78	74	70	85
3 to 5 years	64	70	75	81	83	80	76	72	87

Table 13 - Effective sound power levels ($L_{Aeq, 15 \text{ min}}$) for groups of 10 children playing

It is noted in the AAAC documentation, if applicable, an adjustment to these sound power levels of -6 dB could be applied to each age group for children involved in passive play. However, these corrections have not been applied to ensure that a worst-case assessment is undertaken. Corrections have also been made for the number of children using the following equation from the AAAC documentation:

$$\text{Effective Sound power level for 'n' children} = \text{Effective Sound power level for 10 children} + 10 \times \log\left(\frac{n}{10}\right)$$

Additionally, the noise levels from boys and girls at this age are very similar, and are therefore not differentiated in this guideline.

In order to determine noise propagation from the proposed outdoor play areas associated with the creche building, a model has been produced using SoundPLAN 8.2 acoustic modelling software. This model is capable of accurately determining sound propagation, by taking into account variations in topography, barrier attenuation provided by existing landscaping and buildings, and distance attenuation.

The corrected noise levels for the number of children have been used as area noise sources in the model at a height of 0.5m above the local ground level, and the play-area has been assumed to be acoustically soft-ground. The height of the fencing around the play areas forms part of the mitigation for this site and is informed by this assessment. For these barriers to be effective in practice, there should be no cracks or gaps in any part of the fence, and they must be continuous to the ground. For example, a timber fence with overlapping boards achieving a minimum surface density of 10 kg / m², or using a brick / blockwork solid barrier.

In addition, there is a 1.8 m solid barrier proposed at the site boundary to the west of the creche building. Using these details to assess the noise from children in a worst-case assessment, we find that the noise barriers / fences around the play areas will need to be **2.5 m** and **1.8 m** in the following locations in below:

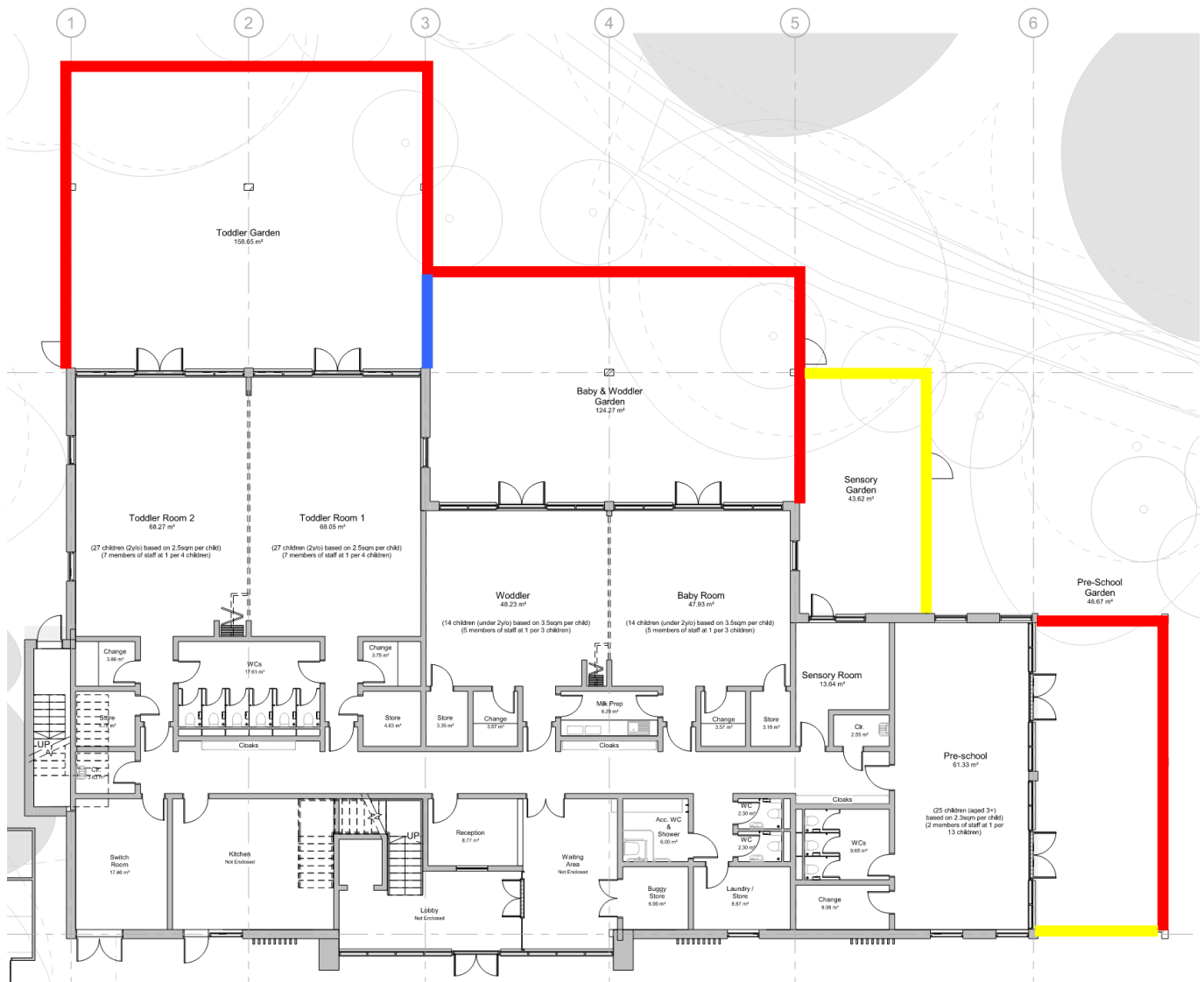


Figure 5 - Assessed barrier heights

Barriers marked in **YELLOW** are not marked up with acoustic requirements: the noise impact from the “Sensory Garden” will be minimal compared with the other play areas, and the barrier adjacent to the Pre-School play area faces towards the car park, MUGA pitch and office building and is less sensitive than the residences.

The results of the undertaken assessment with these acoustic mitigation measures implemented are as follows in Table 14 and Figure 6:

Outdoor period	Noise limit	Assessed noise level	Assessment outcome
Below 4 hours	59	51	Compliant with AAAC criteria without time limits
Above 4 hours	54		

Table 14 - Creche noise levels



Figure 6 - Outdoor play areas noise map

As can be seen from Table 14 above, the assessed noise level from the worst-case assessment undertaken with the proposed mitigation measures will meet the noise limits at the nearest noise sensitive receptors without any requirement for outdoor-play time limits for the creche building, or the installation of noise barriers on the site boundary.

7.0

Plant noise limits

7.0 Plant noise limits

Based on the guidance contained within BS 4142, detailed in Section 2.0 it would be appropriate to set the mechanical services plant noise limits equal to the existing background noise levels ($L_{A90,T}$). The background noise levels at the site are detailed in Section 3.0 of this report.

The noise limits are therefore as shown in Table 15:

Time period	Existing background noise level, dB ($L_{A90,T}$)	Resultant plant noise limit, dB ($L_{A,T}$)
Daytime (07:00 – 23:00)	49	49
Night-time (23:00 – 07:00)	45	45

Table 15 - Mechanical services noise limits

The noise limits should not be exceeded by the combined mechanical services plant noise including any character corrections described within BS 4142 – intermittency, impulsivity, tonality and other acoustic character corrections.

The noise from mechanical services associated with the development, including both the hub building, the creche and any other part of the development must be assessed at a later date when mechanical services plant selections have been made. This will determine the specific acoustic performance required from acoustic mitigation associated with these items. It is understood that the rooftop plant on the creche will be surrounded by a parapet, which will assist with the attenuation of plant noise to the nearby receptors.

8.0

Conclusions

8.0 Conclusions

It is proposed to construct a new flagship office / amenity building at the JD Sports Campus, Bury, a new creche building and outdoor sports pitch, as well as the provision of external parking. The main office building will accommodate a number of different room types including offices, meeting facilities, display / presentation spaces, atrium, gym and a café along with the necessary mechanical plant services to serve these spaces.

This report has laid out details of the undertaken environmental noise survey, as well as assessments of noise break-in to the new buildings, noise from the MUGA sports pitch and the outdoor play areas associated with the creche building, and has set plant noise limits for the site.

Mitigation measures have been proposed around the outdoor play areas only to ensure appropriate levels of amenity will be maintained at the existing residences to the west of the site. No specific acoustic treatment is required on the site boundary.

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