

SPRATT+HAMER



## Noise Impact Report

### Project Details

|                |                                                                                                                                  |
|----------------|----------------------------------------------------------------------------------------------------------------------------------|
| Client         | Witherslack Group Limited                                                                                                        |
| Client Address | Lupton Tower<br>Lupton<br>Carnforth<br>LA6 2PR                                                                                   |
| Site Address   | Proposed Educational Development<br>The Old Rectory<br>Rectory Lane<br>Market Bosworth<br>Nuneaton<br>Leicestershire<br>CV13 0LS |
| Survey Date    | 15/03/2023                                                                                                                       |
| Reference      | 20736                                                                                                                            |

### Quality Assurance

|               |                              |
|---------------|------------------------------|
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| Issue date    | 30/06/2023                   |

### Revision History

| Version | Date       | Editor       | Notes                                                                                                                                                 |
|---------|------------|--------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|
| V1      | 24/03/2023 | Matt Hine    | First issue                                                                                                                                           |
| V2      | 12/05/2023 | Matt Hine    | Revised site layout including relocated MUGA and additional play area, updated car park usage data & BB93 assessment                                  |
| V3      | 30/06/2023 | Martin Hamer | Report updates to include operational hours, staff & children numbers and other minor changes as requested by Witherslack Group.                      |
| V4      | 25/08/2023 | Martin Hamer | Changes made due to an email and a subsequent meeting with Giles Rawdon (EHO) at Hinkley & Bosworth Council. The assessment now considers ball impact |



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|    |            |              |                                                                                                                                                                                                                       |
|----|------------|--------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|    |            |              | within the MUGA in accordance with BS4142:2014+A1:2019. Also, we understand that 'The Stables' has planning consent for residential properties; therefore, 'The Stables' will also be included within the assessment. |
| V5 | 08/09/2023 | Martin Hamer | Some general updates following meetings with the client.                                                                                                                                                              |



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## Contents

|       |                                                                                 |    |
|-------|---------------------------------------------------------------------------------|----|
| 1     | Summary.....                                                                    | 1  |
| 2     | Introduction.....                                                               | 2  |
| 2.1   | An Environmental Noise Assessment.....                                          | 2  |
| 3     | Assumptions, Limitations & Uncertainty.....                                     | 3  |
| 4     | Planning Policies, Guidance and Criteria.....                                   | 4  |
| 4.1   | National Planning Policy.....                                                   | 4  |
| 4.2   | Local Authority Commentary.....                                                 | 5  |
| 4.3   | BS4142:2014+A1:2019.....                                                        | 6  |
| 4.4   | World Health Organisation.....                                                  | 6  |
| 4.5   | BS8233:2014 Guidance on Sound Insulation and Noise Reduction for Buildings..... | 7  |
| 4.6   | Building Bulletin 93 Acoustic design of schools: Performance Criteria 2015..... | 7  |
| 4.7   | Criteria Summary.....                                                           | 8  |
| 5     | Site Description.....                                                           | 9  |
| 5.1   | Subjective Observations.....                                                    | 9  |
| 5.2   | Weather.....                                                                    | 9  |
| 6     | Noise Measurement Procedure.....                                                | 10 |
| 6.1   | Personnel Present.....                                                          | 10 |
| 6.2   | Survey Equipment Used.....                                                      | 10 |
| 6.3   | Calibration.....                                                                | 10 |
| 6.4   | External Ambient Sound Measurements.....                                        | 10 |
| 6.4.1 | Monitoring Position 1.....                                                      | 10 |
| 6.4.2 | Monitoring Position 2.....                                                      | 10 |
| 6.4.3 | Monitoring Positions.....                                                       | 11 |
| 7     | Results and Analysis.....                                                       | 12 |
| 7.1   | External Ambient Noise Measurement Results Analysis.....                        | 12 |
| 8     | Noise Impact Assessment in accordance with World Health Organisation.....       | 13 |
| 8.1   | Noise Levels.....                                                               | 13 |
| 8.1.1 | Sound Pressure Level of Vehicle Movements Within Car Park.....                  | 13 |
| 8.1.2 | Sound Pressure Level of Proposed Multi-Use Games Area.....                      | 13 |
| 8.1.3 | Summary of Proposed Noise Sources.....                                          | 13 |
| 8.2   | Subjective Assessment.....                                                      | 13 |



8.3 Numerical Assessment.....14

8.3.1 Assessment of Proposed Vehicle Movements.....14

8.3.2 Assessment of Proposed MUGA.....14

9 Internal Ambient Noise Level Assessment in Accordance with BB93.....16

10 Recommendations .....17

10.1 Calculation Methodology.....17

11 Context.....18

12 Conclusion.....19

13 References .....20

13.1 Drawing References.....20

Appendix.....21

Monitoring Position 1.....22

Monitoring Position 2.....23

Measurement Results.....24

Glossary Of Acoustic Terminology .....25



# 1 Summary

- A noise assessment has been conducted for a proposed educational facility providing special needs schooling at The Old Rectory, Market Bosworth.
- The assessment is to be submitted as part of a planning application for the development site to Hinckley and Bosworth Borough Council.
- The assessment considers the impact on potentially noise sensitive neighbouring residential premises in accordance with BS4142:2014+A1:2019, with reference also to WHO Guidelines for Community Noise.
- Assessment of noise levels at the development due to car park vehicle movements and external MUGA activity at the proposed development are within BS4142:2014 and WHO guideline values indicating no adverse impact on the amenity of the local community.
- Projected internal noise levels within all rooms should pass with the exception of classroom 4 which is a marginal fail of 1.5db.
- Context in terms of design considerations, operational periods and other factors are considered.



## 2 Introduction

Witherslack Group Limited has instructed Spratt and Hamer Limited to undertake an environmental noise survey in order to assess the impact of a proposed educational development on nearby existing residential receptors together with internal noise levels within the development itself.

The proposal is change of use of 'The Old Rectory' from a single dwelling house (Class C3) to a Specialist Education Needs (SEN) School (Class F1); alongside the erection of two single storey external classrooms; a Multi-Use Gaming Area (MUGA); a revised parking layout; replacement boundary fencing; and external landscaping with associated works to trees.

This report is prepared solely for Witherslack Group Ltd. Spratt and Hamer Limited accepts no responsibility for its use by any third party.

This document has been prepared using the various documents listed within the appendices of this report, together with drawings, technical information and additional verbal representations made by third parties. We have not audited nor independently verified the content or accuracy of any of the documents and information provided to us in the preparation of this report.

If additional information comes to light subsequent to the production of this report, we reserve the right to revise our opinions and the conclusions reached within this report.

### 2.1 An Environmental Noise Assessment

Spratt and Hamer Limited has undertaken an environmental noise assessment at the above site with noise levels measured externally during the daytime operational hours of the proposed development. Monitoring equipment was set up in the early morning and measurements taken until the early afternoon to capture critical periods during the daytime including the morning peak hour.

This report will state the measured noise levels and will refer to guidance relevant to the nature of this survey whilst considering Local Planning Authority guidance.



### 3 Assumptions, Limitations & Uncertainty

- a. All suggested specifications require a good level of workmanship and for materials to be installed as the manufacture intends. Any poor workmanship may lead to weaknesses in the sound attenuation provided by the building elements.
- b. It is assumed that the sound pressure levels measured on site during the environmental noise survey are typical of the site.
- c. It is assumed that drawings and information supplied by Witherslack Group Ltd. are up to date and correct.



## 4 Planning Policies, Guidance and Criteria

The planning policies and criteria listed below are taken from associated relevant guidance documents, all of which should be considered for the internal and external noise and vibration levels.

### 4.1 National Planning Policy

The National Planning Policy Framework (NPPF) July 2021 set out the Government's planning policies for England and how they are expected to be applied. It provides a framework within which the Local Authorities are to prepare local plans and use their planning powers to minimise the adverse impact of noise. It should contain the following in relation to noise impacts.

174. 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.'

185. 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'.*

The NPPF noise exposure hierarchy table is reproduced overleaf in Table 1.



| 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 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                          |

Table 1: Noise exposure hierarchy based on likely average response.

## 4.2 Local Authority Commentary

Sullivan Archer (Planning Officer) of Hinkley & Bosworth responded to a previous version of this report via email on 25/07/2023. A meeting was also held subsequent to the email with Giles Rawdon (EHO) discussing the concerns.

The meeting and subsequent email correspondence concluded that Giles' preference would be to assess ball impacting on the fence of the proposed MUGA, in accordance with BS4142:2014.

It was also suggested to apply the "15dB rule" for open windows in order to provide an idea of potential internal impact at the nearest receptor, with consideration to BS8233 and WHO Community Noise guidance. In particular the ball impact will be treated as a  $L_{AFmax}$  event, and; therefore, more appropriate to target a level of 45dB internally within dwellings, with partially open windows. It is also intended to use a time period of the MUGA in use. This will be treated as an hour and assessed in accordance with BS4142.



The consultant was also informed that a nearby building, 'The Stables', has planning consent for residential use.

### 4.3 BS4142:2014+A1:2019

BS 4142:2014+A1:2019 Method for rating and assessing industrial and commercial sound is routinely used by local authorities in assessing noise associated with industrial and/or commercial activity.

In brief, BS 4142 provides a means of assessment whereby noise from industrial and commercial sources (the "specific sound level",  $L_{Aeq,t}$ ) is compared with background noise ("background sound level",  $L_{AF90}$ ).

The specific sound level may be corrected by a numerical penalty if it includes acoustic features that are considered to be distinctive. The corrected specific sound level is termed a "rating level" ( $L_{Aeq,t}$ ) and is designed to reflect people's subjective reaction to noise characteristics that may be considered annoying.

The rating level is then compared to the background sound level to assess its impact. BS 4142 describes an indication of the impact according to the numerical difference between the rating level and the background sound level. This is shown below in Table 2.

| Rating Level – Background Sound Level | Indication of Impact       |
|---------------------------------------|----------------------------|
| + 10dB                                | Significant Adverse Impact |
| + 5dB                                 | Adverse Impact             |
| ≤ 0dB                                 | Low Impact                 |

Table 2: BS 4142 Rating Level Impact

### 4.4 World Health Organisation

The World Health Organisation (WHO) Guidelines for Community Noise includes guideline criteria for noise in outdoor living areas, which may be considered relevant to considering the amenity of neighbouring external areas such as gardens and patios at this development site. The relevant section taken from Table 1 of the WHO guidelines is reproduced below in Table 3:

| Specific Requirement | Critical Health Effect (s)                                         | $L_{Aeq}$ (dB) | Time base (hours)* | $L_{AFmax}$ (dB) |
|----------------------|--------------------------------------------------------------------|----------------|--------------------|------------------|
| Outdoor living area  | Serious annoyance, daytime and evening                             | 55             | 16                 | -                |
|                      | Moderate annoyance, daytime evening                                | 50             | 16                 | -                |
| Dwelling, indoors    | Speech intelligibility and moderate annoyance, daytime and evening | 35             | 16                 | -                |
| Inside bedrooms      | Sleep disturbance, night time                                      | 30             | 8                  | 45               |
| Outside bedrooms     | Sleep disturbance, window open (outdoor values)                    | 45             | 8                  | 60               |

Table 3: WHO Guideline values for community noise in specific environments



## 4.5 BS8233:2014 Guidance on Sound Insulation and Noise Reduction for Buildings

The British Standard BS 8233:2014, Guidance on Sound Insulation and noise reduction for buildings, provides appropriate internal levels of noise within dwellings, flats and rooms in residential use when unoccupied.

Annex G1 of BS8233 states:

“If partially open windows were relied upon for background ventilation, the insulation would be reduced to approximately 15 dB.”

## 4.6 Building Bulletin 93 Acoustic design of schools: Performance Criteria 2015

Building Bulletin 93 is intended to provide advice to all those involved in the specification, design and construction of school buildings.

Table 1 of the document (Shown below as Table 4 of this report) specifies upper limits for indoor ambient noise levels in terms of  $L_{Aeq,30mins}$  during normal teaching hours.

| Room Type                                                                                            | Room Classifications for the purpose of airborne sound insulation... |                                  | Upper Limit for the indoor ambient noise level $L_{Aeq,30minutes}$ dB |               |
|------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------|----------------------------------|-----------------------------------------------------------------------|---------------|
|                                                                                                      | Activity noise (Source Room)                                         | Noise Tolerance (Receiving Room) | New Build                                                             | Refurbishment |
| Nursery school rooms                                                                                 |                                                                      |                                  |                                                                       |               |
| Primary school: classroom, class base, general teaching area, small group room                       | Average                                                              | Medium                           | 35                                                                    | 40            |
| Secondary school: classroom, general teaching area, seminar room, tutorial room, language laboratory |                                                                      |                                  |                                                                       |               |
| Teaching space intended specifically for students with special hearing and communication needs       | Average                                                              | Low                              | 30                                                                    | 35            |
| SEN calming room                                                                                     | High                                                                 | Low                              | 35                                                                    | 35            |
| Administration and ancillary spaces:                                                                 |                                                                      |                                  |                                                                       |               |
| Kitchen                                                                                              | High                                                                 | High                             | 50                                                                    | 55            |
| Office, medical room, staff room                                                                     | Low                                                                  | Medium                           | 40                                                                    | 45            |
| Corridor, stairwell, coats and locker area                                                           | Average                                                              | High                             | 45                                                                    | 55            |
| Changing area                                                                                        | High                                                                 | High                             | 50                                                                    | 55            |
| Toilet                                                                                               | Average                                                              | High                             | 50                                                                    | 55            |
| Dining Room                                                                                          | High                                                                 | High                             | 45                                                                    | 50            |

Table 4: BB93 Upper Limits for internal ambient noise levels



## 4.7 Criteria Summary

It should be noted that the scope of BS4142 states that the standard is not intended to be applied to the assessment of sound from recreational activities and people; however, as stated above BS4142 will be applied to assess car movements and the MUGA.

World Health Organisation, BS8233:2014 and BB93 guideline criteria and advice are considered appropriate in assessing noise from and at the proposed development at the Old Rectory.



## 5 Site Description

The proposed development at The Old Rectory is an existing 1849 built Grade II listed residential dwelling set within extensive grounds located in Market Bosworth, south of Rectory Lane and approximately 1.6km east of the A447.

The development proposes to make use of a large dwelling-house and ancillary buildings to form a school for children with special needs, with the inclusion of additional classroom and therapy buildings.

A Multi-Use Games Area (MUGA) and playground are proposed within external grounds at locations designed to be largely shielded and at distance from neighbouring residential properties. It is understood that a Zaun Noise Reducing Sports Fence around the perimeter of the MUGA.

It is also proposed to use the area at the front of the development as a car park and drop off area.

Operational Hours are proposed to be 08:00 and 17:00, Monday to Friday (38 weeks – primary school). Children teaching time will be between 08.30 and 15.00.

We are informed that the MUGA will be used by the children during break times and limited periods throughout the day.

Staff Numbers are proposed to be approximately 40 full time equivalent staff (30 full time, 20 part time).

Children – Approx. 40 (5–11 years old).

The school will follow a typical schedule, open solely during weekdays and following typical term and holiday dates including closure during summer months.

### 5.1 Subjective Observations

During site attendance, subjectively the main source of noise was road traffic on Rectory Road and with occasional air traffic and distant farmwork noise audible throughout the day.

### 5.2 Weather

| Description               | Daytime Average      |
|---------------------------|----------------------|
| Temperature               | 3°C                  |
| Wind Speed                | 2.5m/s               |
| Wind Direction            | S                    |
| Precipitation             | Dry                  |
| Any damp road/ wet ground | None                 |
| Any fog/snow/ice          | Morning ground frost |

Table 5: Weather Conditions (www.windy.com)



## 6 Noise Measurement Procedure

### 6.1 Personnel Present

Jack Holmes BSc (Hons) MIOA

### 6.2 Survey Equipment Used

| Manufacturer | Model     | Serial No. | Description                                          |
|--------------|-----------|------------|------------------------------------------------------|
| Rion         | NL52      | 01032413   | Integrating Sound Level Meter and Real Time Analyser |
| Rion         | NL52      | 00976149   | Integrating Sound Level Meter and Real Time Analyser |
| Pulsar       | Model 105 | 86702      | Acoustic Calibrator                                  |

Table 6: Survey Equipment Used

### 6.3 Calibration

The sound level meters were calibrated with the field calibrator to a level of 94.0 dB @ 1 kHz prior to and on completion of the survey. No significant drift in calibration was observed. The meters used during the survey are precision grade class 1.

Calibration certificates are available on request.

### 6.4 External Ambient Sound Measurements

The measurement locations chosen during the survey were deemed suitable for the determination of noise levels at nearby residential receptors.

The sound level meters were set to measure primarily  $L_{Aeq}$  values in 5-minute periods.

#### 6.4.1 Monitoring Position 1

A microphone was placed 1.5m above the ground floor surface at the front of the site facing Rectory Road, level with neighbouring residential properties.

#### 6.4.2 Monitoring Position 2

A microphone was placed 1.5m above the ground floor surface at the rear façade level with neighbouring residential properties.



6.4.3 Monitoring Positions



## 7 Results and Analysis

### 7.1 External Ambient Noise Measurement Results Analysis

Table 7 below presents summary highest recorded 30-minute average  $L_{Aeq}$  results Monitoring Positions 1 and 2:

| Time Period                   | Monitoring Position 1<br>$L_{Aeq, 30 \text{ min}}$ (dB) | Monitoring Position 2<br>$L_{Aeq, 30 \text{ min}}$ (dB) |
|-------------------------------|---------------------------------------------------------|---------------------------------------------------------|
| 08:00 – 09:00                 | 53.4                                                    | 49.5                                                    |
| 09:00 – 10:00                 | 51.5                                                    | 48.0                                                    |
| 10:00 – 11:00                 | 48.4                                                    | 46.2                                                    |
| 11:00 – 12:00                 | 48.2                                                    | 42.2                                                    |
| 12:00 – 13:00                 | 48.1                                                    | 43.2                                                    |
| 13:00 – 14:00                 | 47.3                                                    | 43.7                                                    |
| 14:00 – 15:00                 | 48.7                                                    | 44.9                                                    |
| 15:00 – 16:00                 | 48.9                                                    | 43.5                                                    |
| 16:00 – 17:00                 | 49.4                                                    | 43.6                                                    |
| Complete Day: 08:00 – 17:00   | 48.8                                                    | 49.5                                                    |
| Teaching Hours: 08:30 – 15:00 | 51.5                                                    | 48.0                                                    |

Table 7: Summary 1 hour Noise Survey Results

Table 7 demonstrates highest  $L_{Aeq, 30 \text{ min}}$  levels are c.2-4dB lower at Monitoring Position 2 compared with Monitoring Position 1, primarily due to further distance from Rectory Road traffic noise and natural acoustic shielding afforded by The Old Rectory building.

The following table demonstrates the  $L_{A90, 1 \text{ hour}}$  background measurements at both positions. Any rounding is to be done on the basis that a value of 0.5 is rounded up.

| Time Period   | Monitoring Position 1<br>$L_{A90, 1 \text{ hour}}$ (dB) | Monitoring Position 2<br>$L_{A90, 1 \text{ hour}}$ (dB) |
|---------------|---------------------------------------------------------|---------------------------------------------------------|
| 08:00 – 09:00 | 45                                                      | 45                                                      |
| 09:00 – 10:00 | 42                                                      | 41                                                      |
| 10:00 – 11:00 | 39                                                      | 39                                                      |
| 11:00 – 12:00 | 39                                                      | 39                                                      |
| 12:00 – 13:00 | 40                                                      | 40                                                      |
| 13:00 – 14:00 | 40                                                      | 39                                                      |
| 14:00 – 15:00 | 40                                                      | 40                                                      |
| 15:00 – 16:00 | 41                                                      | 41                                                      |
| 16:00 – 17:00 | 42                                                      | 42                                                      |

Table 8: Summary of Background Levels



## 8 Noise Impact Assessment in accordance with World Health Organisation

As a part of the development, it is proposed to use land at the front of the development as a car park and drop off/ pick up area. It is also proposed to make use of a section of land at the rear of the development as a Multi-Use Games Area (MUGA).

Both vehicle movements within the proposed car park, and the proposed MUGA are assessed in order to determine the noise impact at the nearest receptors.

### 8.1 Noise Levels

#### 8.1.1 Sound Pressure Level of Vehicle Movements Within Car Park

Spratt and Hamer Ltd. has measurement data of car park vehicle movements at an unrelated site. This historical data is used in the assessment of car park noise at the Old Rectory development site.

The average car pass was 9 seconds to drive 32m, which equates to a speed of approximately 8mph.

The highest car pass measured in free field was 63.5 dB for the total time of 9 seconds. This equates to  $L_{Aeq,9seconds}$  63.5dB.

When calculated as an on-time value of  $L_{Aeq,3600seconds}$  37.5dB.

#### 8.1.2 Sound Pressure Level of Proposed Multi-Use Games Area

As the development is currently in planning stage, it was not possible to measure the MUGA on site; therefore, measurements were taken at another Witherslack site that had a Zaun Noise Reducing Sports Fence around the perimeter of the MUGA. The measurements included kicking a football at the side of the fence.

It should be noted; however, that the MUGA is likely to be used by children between 5 – 11 years, and therefore, it's unlikely that such a child could kick a ball at the fence with as much impact as an adult.

Generally, the impacts on balls hitting the fence, varied between 73dB – 87dB out of 58 ball impacts.

#### 8.1.3 Summary of Proposed Noise Sources

The noise source data are calibrated into sound power levels (SWL) for use in CadnaA noise models of the proposed development site to assess the noise impact at the nearest noise sensitive receptors.

### 8.2 Subjective Assessment

BS4142 describes impulse as 'bangs, clicks, clatters or thumps', all of which are typically short duration events. Regarding car movements, there could be an element of impulsive sound from doors slamming etc.

BS4142 states that correction of up to +9 dB can be applied for sound that is highly impulsive, considering both the rapidity of the change in sound level and the overall change in sound level. Subjectively, this can be converted to a penalty of 3 dB for impulsivity which is just perceptible at the noise receptor, 6 dB where it is clearly perceptible, and 9 dB where it is highly perceptible.



## 8.3 Numerical Assessment

### 8.3.1 Assessment of Proposed Vehicle Movements

Table 9 below demonstrates the impact of sound from 32 cars of staff entering between 09:00 – 10:00 in the morning or leaving between 16:00 – 17:00.

| Description                                                                     | Sound Pressure Level (dB) |
|---------------------------------------------------------------------------------|---------------------------|
| Car Park Noise Level $L_{Aeq, T}$ (on time) at nearest noise sensitive location | 36                        |
| Acoustic Correction Penalty for Impulsivity                                     | 6                         |
| Noise Rating Level at Nearest Receptor                                          | 42                        |
| Background Level at Position 1                                                  | 42                        |
| Difference:                                                                     | 0                         |

Table 9: Car Park Noise Impact Assessment

Table 9 indicates the noise impact of vehicle movements in the proposed car park at the development to be low impact in accordance with BS4142:2014.

### 8.3.2 Assessment of Proposed MUGA

It is the opinion of the consultant that it would be onerous to use the highest ball impact for the assessment of the MUGA, given the comments in section 8.1.2. As a conservative assessment, a ball impact of 84dB will be used to assess the impact on neighbouring dwellings.

Table 10 demonstrates the impact of a ball strike at neighbouring dwellings with consideration to the 15dB open window rule as stated in BS8233, and the guidance within WHO.

|                               | The Stables | Sutton Lane | Cedar Drive |
|-------------------------------|-------------|-------------|-------------|
| 84dB distance attenuated (dB) | 59          | 58          | 56          |
| -15dB                         | 44          | 43          | 41          |

Table 10: Assessment of Proposed MUGA

Table 10 indicates the noise impact of the proposed MUGA to be within the World Health Organisation guideline noise criterion at the nearest noise sensitive receptor, when considering the 15dB rule for partially open windows, therefore achieving  $L_{AFmax}$  levels below 45dB as stated in WHO guidance.

The following assessment is based on the criteria of BS4142:2014. The data is taken from the whole 8-minute session of kicking the ball against the fence, but not the ball hitting the basketball hoop. The measurement over the whole 8-minute period is  $L_{Aeq}$  65dB. This value will be assumed to be consistent over a 1-hour period.

|                                 | The Stables | Sutton Lane | Cedar Drive |
|---------------------------------|-------------|-------------|-------------|
| 65dB distance attenuated (dB)   | 40          | 36          | 37          |
| Worst case $L_{A90, 1-hour}$    | 39          | 39          | 39          |
| Correction for Impulsivity      | 6           | 6           | 6           |
| Excess of level over background | +7          | +3          | +4          |

Table 11: MUGA Noise Rating Level Impact



The assessment indicates low impact at both Sutton Lane and Cedar Drive; however, there is an indication of adverse impact at the Stables.

It should be noted that this is a numerical assessment and context should; however, be considered. In particular, sound pressure levels of the MUGA may be lower when used by 11-year-old children, and times of use.



## 9 Internal Ambient Noise Level Assessment in Accordance with BB93

Internal ambient noise levels at the proposed development have been calculated using the Building Research Establishment (BRE) Building Element Evaluation tool based on external noise levels measured during site attendance. Calculations assume each room achieves the upper limit for the target reverberation time detailed in BB93. Table 12 below compares estimated internal ambient noise levels with BB93 criteria based on a natural ventilation strategy with scenarios where windows are closed and when open:

| Room                            | Measured External<br>$L_{Aeq, 30minute}$ (dB) | BB93 Criteria<br>$L_{Aeq, 30minute}$ (dB) | Estimated Internal Natural Ventilation<br>$L_{Aeq, 30minute}$ (dB) | Natural Ventilation Within BB93 Criteria (Yes/No) ? | Estimated Internal Open Window<br>$L_{Aeq, 30minute}$ (dB) | Open Window Within BB93 Criteria (Yes/No) ? |
|---------------------------------|-----------------------------------------------|-------------------------------------------|--------------------------------------------------------------------|-----------------------------------------------------|------------------------------------------------------------|---------------------------------------------|
| Existing Building               |                                               |                                           |                                                                    |                                                     |                                                            |                                             |
| GF Classroom 1                  | 48.0                                          | 35.0                                      | 21.6                                                               | Yes                                                 | 33.0                                                       | Yes                                         |
| GF Classroom 2                  | 48.0                                          | 35.0                                      | 19.6                                                               | Yes                                                 | 33.0                                                       | Yes                                         |
| GF Staff Room                   | 48.0                                          | 45.0                                      | 21.2                                                               | Yes                                                 | 33.0                                                       | Yes                                         |
| GF Office                       | 48.0                                          | 45.0                                      | 22.8                                                               | Yes                                                 | 33.0                                                       | Yes                                         |
| GF Toilet                       | 48.0                                          | 50.0                                      | 21.1                                                               | Yes                                                 | 33.0                                                       | Yes                                         |
| GF Kitchen                      | 51.5                                          | 55.0                                      | 39.7                                                               | Yes                                                 | 36.5                                                       | Yes                                         |
| GF Dining Hall                  | 51.5                                          | 55.0                                      | 22.3                                                               | Yes                                                 | 36.5                                                       | Yes                                         |
| GF Office                       | 51.5                                          | 45.0                                      | 27.6                                                               | Yes                                                 | 36.5                                                       | Yes                                         |
| GF Meeting Room                 | 51.5                                          | 45.0                                      | 25.0                                                               | Yes                                                 | 36.5                                                       | Yes                                         |
| 1F Classroom 3                  | 48.0                                          | 35.0                                      | 25.9                                                               | Yes                                                 | 33.0                                                       | Yes                                         |
| 1F Classroom 5                  | 48.0                                          | 35.0                                      | 24.6                                                               | Yes                                                 | 33.0                                                       | Yes                                         |
| 1F Pastoral Office              | 48.0                                          | 45.0                                      | 25.5                                                               | Yes                                                 | 33.0                                                       | Yes                                         |
| 1F Therapy Room                 | 48.0                                          | 35.0                                      | 22.1                                                               | Yes                                                 | 33.0                                                       | Yes                                         |
| 1F Office/Immersive Room        | 51.5                                          | 40.0                                      | 28.8                                                               | Yes                                                 | 36.5                                                       | Yes                                         |
| 1F Classroom 6                  | 51.5                                          | 35.0                                      | 28.4                                                               | Yes                                                 | 36.5                                                       | No                                          |
| 1F Office                       | 51.5                                          | 45.0                                      | 31.1                                                               | Yes                                                 | 36.5                                                       | Yes                                         |
| 1F Classroom 4                  | 51.5                                          | 35.0                                      | 28.4                                                               | Yes                                                 | 36.5                                                       | No                                          |
| New Therapy/Office Building     |                                               |                                           |                                                                    |                                                     |                                                            |                                             |
| GF Office                       | 51.5                                          | 45.0                                      | 31.7                                                               | Yes                                                 | 36.5                                                       | Yes                                         |
| GF Therapy Room                 | 48.0                                          | 35.0                                      | 26.6                                                               | Yes                                                 | 33.0                                                       | Yes                                         |
| New Classrooms/Therapy Building |                                               |                                           |                                                                    |                                                     |                                                            |                                             |
| GF Classroom                    | 48.0                                          | 35.0                                      | 25.9                                                               | Yes                                                 | 33.0                                                       | Yes                                         |
| GF Therapy Room                 | 48.0                                          | 35.0                                      | 26.7                                                               | Yes                                                 | 33.0                                                       | Yes                                         |

Table 12: Estimated Internal Ambient Noise Levels

It may be seen from Table 10 above that estimated internal noise levels are comfortably within BB93 criteria for all naturally ventilated rooms with closed windows and all except two rooms with windows partially open.



## 10 Recommendations

Predicted noise levels attributable to the development are comfortably below World Health Organisation (WHO) Guidance values for both serious and moderate annoyance within outdoor living areas during the day/evening period as reproduced in Table 3, Section 4.3; therefore, no further recommendations are required.

The noise break-in assessment has demonstrated that all rooms of the development are expected to meet the BB93 requirements for internal ambient noise levels with the exception of two classrooms during periods when windows are required to be opened.

Due to the building's Grade II listed status, it is currently unclear as to the scope of alterations permissible to the building fabric, of which the glazing and ventilation strategy are important considerations from an acoustic perspective, representing the dominant paths for external noise to enter rooms.

It is recommended that further discussion may be required as to whether the current glazing and/or ventilation strategy needs further assessment.

It should also be noted that if mechanical ventilation is considered to be installed, upper limits set out in BB93 must be adhered to by cumulative noise resulting from external ambient break-in and mechanical plant operation.

### 10.1 Calculation Methodology

The BRE Building Envelope Insulation calculator has been used for the noise break in calculations for the BB93 assessment which is based on the rigorous calculation method of BS 8233:2014 and BS EN 12354-3.

The calculations are based on the existing glazing observed during site attendance, assumed to be 4mm single glazed windows, predominantly in timber sash windows.

All room dimensions used in calculations are based on drawings provided by the architect.

Calculations are based on the solid brick external wall observed during site attendance.

The calculations assume each room meets target reverberation times outlined in BB93.

Rooms used as classrooms have been assessed using the  $L_{Aeq,30minutes}$  35dB criterion applicable to teaching spaces intended specifically for students with hearing and communication needs in refurbishments (Section 4.4, Table 3)

Predictions have been calculated assuming all windows are naturally ventilated with either closed windows including one standard non-acoustic performance trickle vent (or equivalent system) per room or partially open windows with a typical sound reduction of 15dBA  $R_w$  in accordance with BS 8233, Table 10.



## 11 Context

In assessing noise impact from the development, consideration may also be given to the limited periods of time that external noise generating activities within play areas are likely to occur. Physical Education classes in the MUGA at break times will take place over short durations solely between 09:00 and 15:30 on weekdays and during terms times only.

The data used for the BS4142 assessment of the MUGA was based on 2 adults kicking a football around and into the fence. These levels are likely to be lower when used by 11-year-old children.

Internal noise predictions to rooms within the proposed development are assessed to be within BB93 criteria with the exception of two classrooms during periods when windows are required to be opened.

It is noted that the BB93 criteria is only exceeded in the highest recorded  $L_{Aeq, 30minutes}$  period from Monitoring Position 1 which occurred during 09:00 and 10:00. The external level at this time is 51.5 dBA, compared with levels of between 47.3 – 48.9  $L_{Aeq, 30minutes}$  at all other times during teaching hours which projects internal levels to be within BB93 criteria.

Classroom calculations have been assessed on a worst case scenario basis by using the more onerous  $L_{Aeq, 30minutes}$  35dB criterion applicable to teaching spaces intended specifically for students with hearing and communication needs in refurbishments as opposed to the less demanding  $L_{Aeq, 30minutes}$  40dB criterion applicable to nursery/primary/secondary classrooms in refurbishments (Section 4.4, Table 3).

Potentially also of note is that the more typical relaxation of BB93 internal noise criteria that permits an additional +5dBA for natural ventilation has not been applied in the assessment at this development of classrooms intended specifically for students with special hearing and communication needs in accordance with footnote 5 of BB93 Table 2.



## 12 Conclusion

A noise assessment has been conducted for a proposed educational facility providing special needs schooling at The Old Rectory, Market Bosworth.

The assessment is to be submitted as part of a planning application for the development site to Hinckley and Bosworth Borough Council.

The assessment considers the impact on potentially noise sensitive neighbouring residential premises in accordance with BS4142:2014+A1:2019, with reference also to WHO Guidelines for Community Noise and BS8233:2014.

Assessment of noise levels at the development due to car park vehicle movements at the proposed development are within BS4142:2014 guidance indicating no adverse impact on the amenity of the local community.

The assessment indicates the noise impact of the proposed MUGA to be within the World Health Organisation guideline noise criterion at the nearest noise sensitive receptor, when considering the 15dB rule for partially open windows, therefore achieving  $L_{A_{Fmax}}$  levels below 45dB as stated in WHO guidance.

The assessment indicates low impact at both Sutton Lane and Cedar Drive; however, there is an indication of adverse impact at the Stables; however, it should be noted that this is a numerical assessment and context should; however, be considered. In particular, sound pressure levels of the MUGA may be lower when used by 11-year-old children, and times of use.

It is opinion of the consultant that assessments demonstrate a low impact of sound from the proposed school on neighbouring dwellings.



## 13 References

National Planning Policy Framework (NPPF)

World Health Organisation Guidelines for Community Noise

BS 8233:2014, Guidance on Sound Insulation and noise reduction for buildings

BS 4142:2014+A1:2019 Method for rating and assessing industrial and commercial sound

Building Bulletin 93 Acoustic Design Of Schools: Performance Standards February 2015 (BB93)

BS 7445-1:2003 Description and measurement of environmental noise – Part 1: Guide to quantities and procedures

CadnaA noise mapping software by DataKustik

[www.openstreetmap.org](http://www.openstreetmap.org)

[www.windy.com](http://www.windy.com)

### 13.1 Drawing References

23.009(2-) 006.B

23.009(2-) 008.B

23.009(2-) 009

23.009(9-) 001.C



Appendix



## Monitoring Position 1

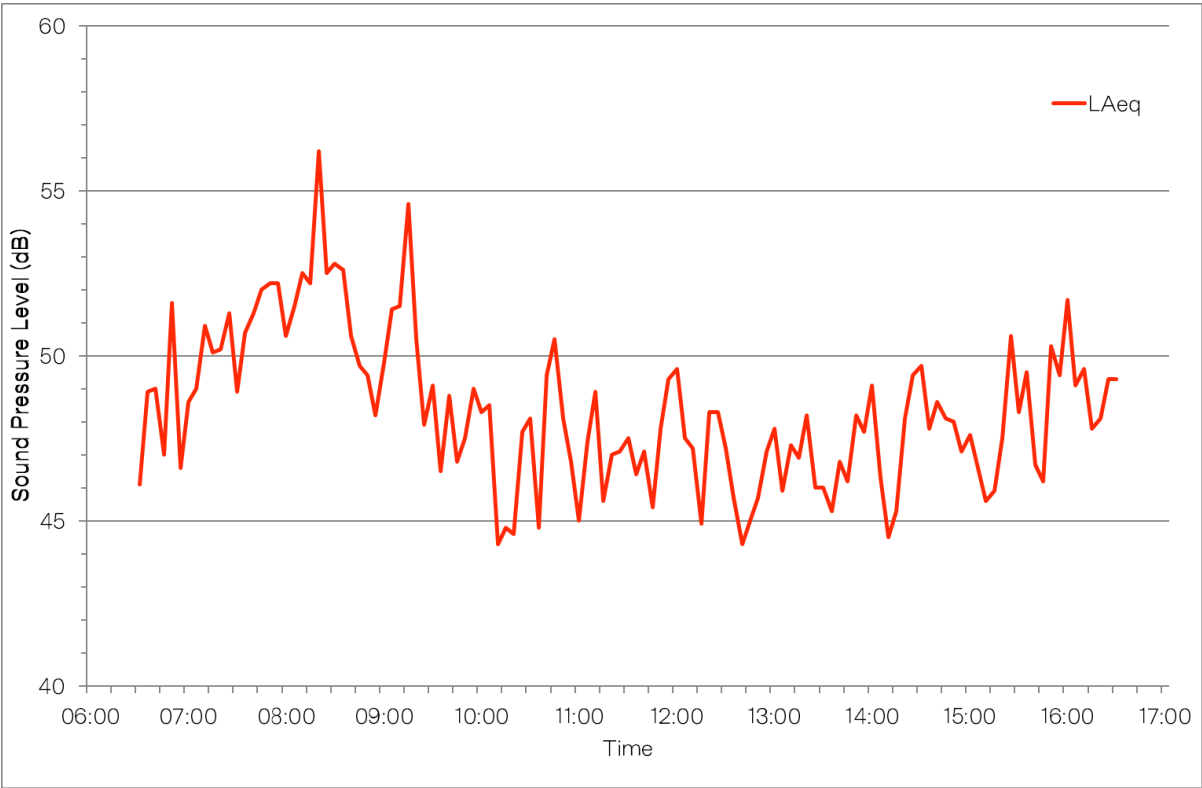


## Monitoring Position 2

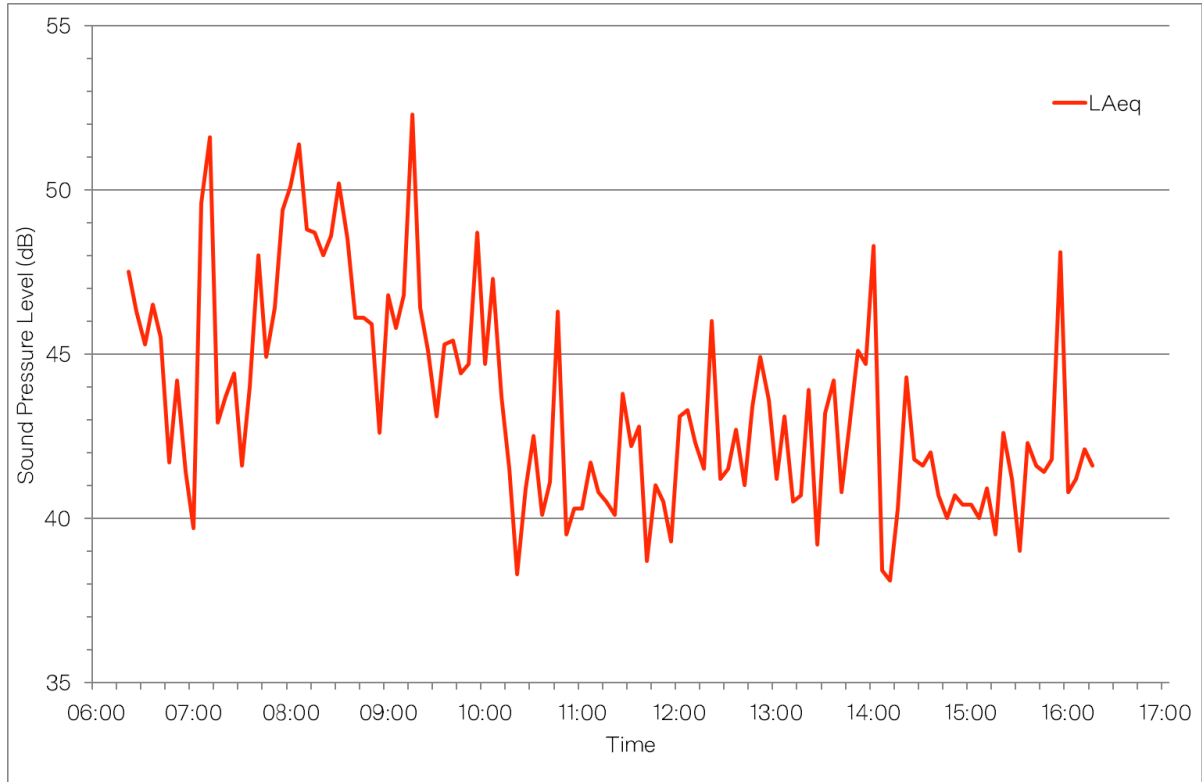


# Measurement Results

Monitoring Position 1



Monitoring Position 2



## Glossary Of Acoustic Terminology

### A-weighting

Noise levels are corrected to represent human response to sound.

### $L_{Aeq}$

This is a continuous equivalent of time varying noise, or effectively the average measured (A weighted) noise level over a defined period of time.

### $L_{Aeq,16hour}$

A 16 hour long measurement of the  $L_{Aeq}$  over the period between 07:00 and 23:00, also known as a daytime measurement.

### $L_{Aeq,8hour}$

An 8 hour long measurement of the  $L_{Aeq}$  over the period between 23:00 and 07:00, also known as a night time measurement.

### $L_{AFmax}$

The highest, or maximum A-weighted sound pressure level measured over a specified time period. The 'F' defines a time weighting in Fast.

### $L_{A90}$

The A-weighted noise level or average level which is exceeded for 90 percent of the measured time period. Also known as a background level.

### $L_{A10}$

The A-weighted noise level or average level which is exceeded for 10 percent of the measured time period.

### 1:1 & 1:3 octave spectrum analysis

A single measurement that is separated into frequency bands to allow for a more detailed analysis of the noise source in question.

### $R_w$

The weighted sound reduction index of a partition or facade. A single number value based on the performance of a partition between two rooms across the frequency range 100Hz to 3150Hz. The level is adjusted for the effects of reverberation and background noise.



$D_{n,e,w}$

The weighted level difference of a partition or façade which takes into account a small element such as a grill or vent.

SEL (sound exposure level)

A measure of A-weighted sound energy used to describe a particular event, such as a train pass. It is the sound energy, which, if occurring over one second would contain the same energy as the event.

Free field sound pressure

Is where the radiation or spread of sound is completely unaffected by the presence of any reflecting surfaces or boundaries.

Low Frequency Noise

A term generally used for sound below a frequency of 100 to 150Hz.





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